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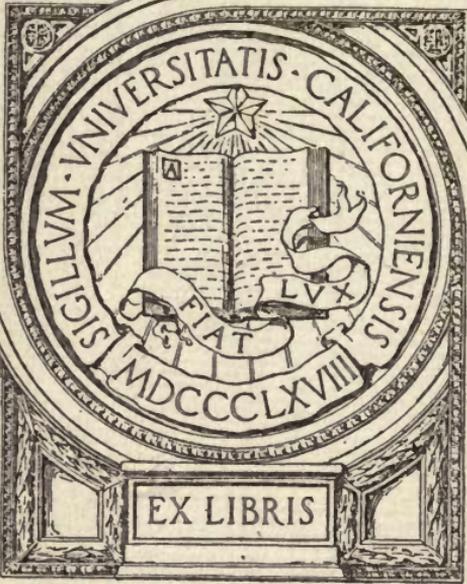
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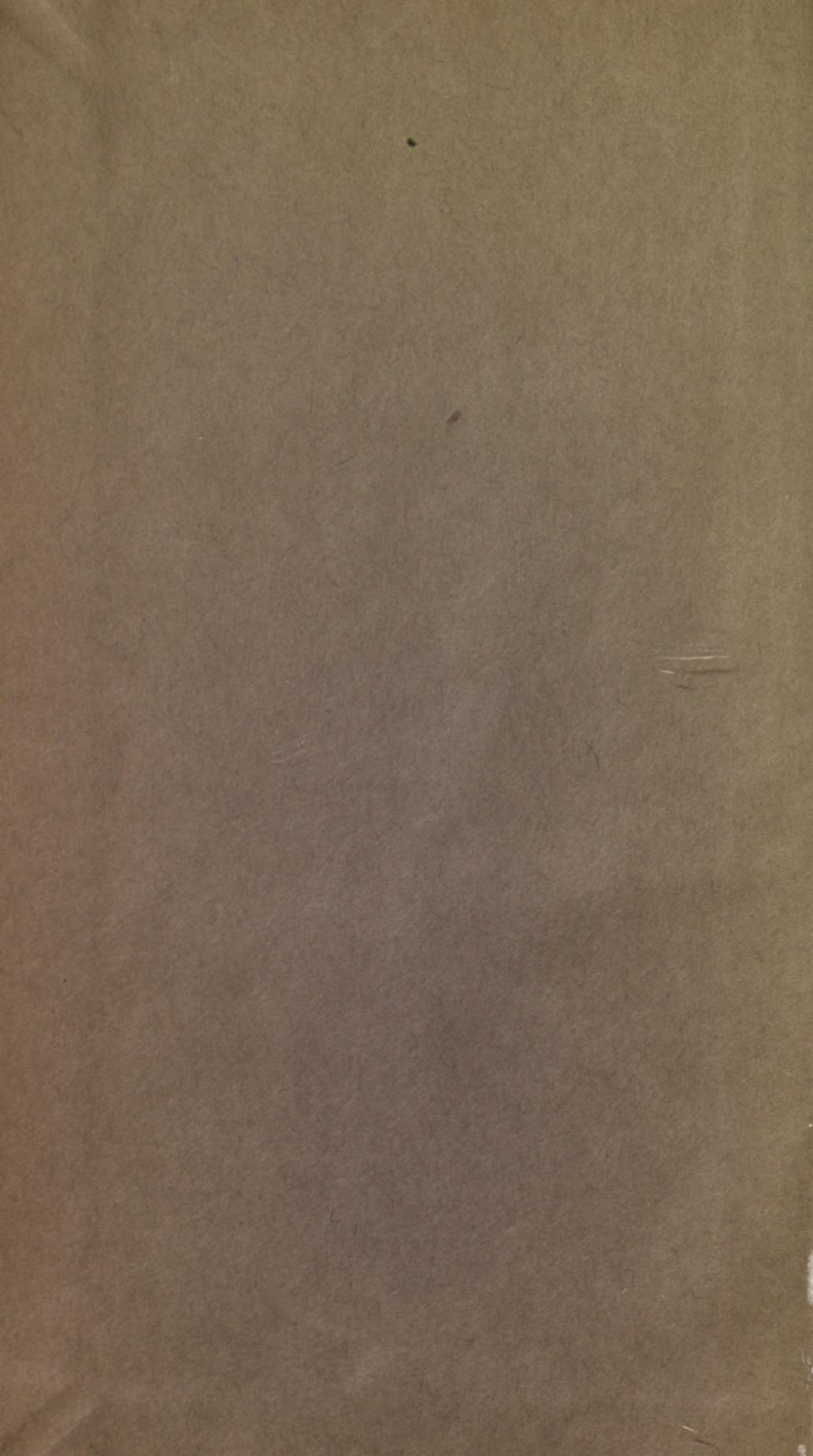
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ZOOLOGY,

AND OTHER BRANCHES OF

NATURAL HISTORY,

AS ARE CONNECTED WITH

THE STUDY OF GEOLOGY.

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BY WILLIAM HUMBLE, M.D. *Green*

LONDON:

PUBLISHED BY HENRY WASHBOURNE,  
SALISBURY SQUARE, FLEET STREET.

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*In Memoriam*

*Arthur Eaton*

AND OTHER BRANCHES OF

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NATURAL HISTORY

AS ASSOCIATED WITH

THE STUDY OF GEOLOGY

BY WILLIAM HUMBOLDT, M.D.

LONDON:

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PRINTED BY STEWART AND MURRAY,  
OLD BAILEY.

STATIONERS' HALL COURT, FLEET STREET.

1844

TO  
HIS GRACE THE DUKE OF  
RICHMOND, LENNOX, AND AUBIGNY, K.G.  
LORD LIEUTENANT OF THE COUNTY OF SUSSEX,  
ETC. ETC. ETC.

*THIS VOLUME*

Is respectfully Inscribed,

AS AN EARNEST OF THE HIGHEST ADMIRATION,

AND MOST PROFOUND RESPECT,

BY HIS GRACE'S

OBEDIENT AND OBLIGED SERVANT,

WILLIAM HUMBLE.

*Steyne, Worthing,  
February 27, 1840.*

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## P R E F A C E .

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IN submitting the following pages to public approbation, or public censure, I avail myself of the accustomed privilege to offer a few prefatory observations ; explanatory, on the one hand, of the motives which led to their preparation ; and deprecatory, on the other, of severity of criticism.

The labours of the lexicographer greatly differ from those of authors generally. Dr. Johnson has observed, " every other author may aspire to praise ; the lexicographer can only hope to escape reproach, and even this negative recompence has been yet granted to very few. It is the fate of those, who toil at the lower employments of life, to be rather driven by the fear of evil, than attracted by the prospect of good ; to be exposed to censure, without hope of praise ; to be disgraced by miscarriage, or punished for neglect, where success would have been without applause, and diligence without reward. Among these unhappy mortals is the writer of dictionaries ; whom mankind have considered, not as the pupil, but the slave of science, the pioneer of literature, doomed only to remove rubbish and clear obstructions from the paths through which learning and genius press forward to conquest and glory, without bestowing a smile on the humble drudge that facilitates their escape."

When I commenced collecting materials for the present work, I was induced to undertake the labour from a conviction that something of the kind was greatly needed. At entering on the study of geology, scarcely had I read through a single page, ere I found my difficulties much enhanced by the non-existence of a dictionary containing such technological terms as are peculiar to this branch of science, and, for a time, I was frequently obliged to pass over words, without any distinct comprehension of their force or application. Assuredly, some writers on geology have appended a glossary to their productions ; but, I need scarcely say, these are, for the most part, necessarily meagre and ineffectual. The very necessity, also, for their insertion, I may, perhaps, claim as one of the strongest arguments in justification of my present attempt.

It can hardly, however, be adduced as a charge of inattention to the wants of the student, against the writers on geology, that no dictionary relating to its nomenclature has already appeared. Geology may still be regarded as in its infancy ; it is, as it were, almost a creation of the present century ; it may, not inaptly, be termed a new science ; for, although

Pythagoras, and Aristotle, and Strabo, were, to a certain extent, geologists; although Ovid puts into the mouth of the Samian philosopher—

“ Vidi factas ex æquore terras :

Et procul a pelago conchæ jacuere marinæ ;

Et vetus inventa est in montibus anchora summis ;

Quodque fuit campus, vallem decursus aquarum

Fecit ; et eluvie mons est deductus in æquor :

Eque paludosa siccis humus aret arenis ;

Quæque sitim tulerant, stagnata paludibus hument.”

although, from time to time, theories of the earth have been published, and hypotheses the most crude, and fanciful, and illusory have been propounded; although men have been found so blind as to argue in favour of a plastic force; although, almost even in our own days, Vulcanist would have submerged Neptunist in his own aqueous deposits, and Neptunist would have torrefied Vulcanist in the igneous causes which he advocated; although, for upwards of two thousand years, geology may be said to have had its students and its advocates; yet till within the last half century it has never deserved the name of a science. Mixed up and confounded with cosmogony, it continued in a state of flux and reflux, at one time making advances, at another retrograding, till Hutton, in 1795, declared that “geology was in no ways concerned with questions as to the origin of things.” Nor was it till, throwing aside all preconceived notions, geologists determined to found, and gradually advance, step by step, their theories on sound induction, that geology, in the magnitude and sublimity of the objects of which it treats, second only to astronomy, assumed its proper position in the order of scientific pursuits.

With the great increase of knowledge in geology, there necessarily sprang up a new nomenclature, and although this particular branch of technological lexicography may, and does, admit of much modification, it appears to me that it has at this time become sufficiently established to warrant, and call for, the issuing of a dictionary of geological terms.

Nomenclature being in itself an important part of science, I trust I may be excused for offering in this place a few observations on the subject. It is perhaps a very natural weakness that men should desire to distinguish things by names of their own appointing; but, inasmuch as a redundancy of names is prejudicial to the interests of science; perplexing, and often disgusting, to the student; and, in fact, raises an unnecessary obstruction in the path of knowledge; it becomes a subject of grave consideration whether the imposition of a new name, in lieu of one already become conventional, though that which has become conventional may, probably, not be the best or most appropriate that could have been chosen, be not a hazardous and injudicious course. It has been remarked by one of the

most scientific men and greatest philosophers of the present day, Sir John Herschel, "it appears doubtful, whether it is desirable, for the essential purposes of science, that extreme refinement in systematic nomenclature should be insisted on. In all subjects where comprehensive heads of classification do not prominently offer themselves, all nomenclature must be a balance of difficulties, and a good, short, *unmeaning* name, which has once obtained a footing in usage, is preferable almost to any other."

These remarks are the more readily offered, in consequence of a fear, which I trust is groundless, arising out of, and caused by, the occasional observations of some of our most able geologists. Thus, I find one author objecting to the term *tertiary*, as applied to the supra-cretaceous deposits, stating it to be exceedingly objectionable: I turn over the pages of another great luminary, and I find that "the name of tertiary has been given with much propriety; that the name of super-cretaceous is peculiarly inappropriate, and that if a new name were necessary, post-cretaceous should have been chosen." Every neophyte in geology now knows that the tertiary deposits have been divided into eocene, miocene, and pliocene, the last being subdivided into older and newer pliocene: this also is objected to, and it is said, "if it be considered convenient to divide the supra-cretaceous rocks of Europe into three or more sub-groups, names which imply their actual geological position in the series, such as 'superior,' 'medial,' and 'inferior,' 'upper,' 'medial,' and 'lower,' or others of the like kind, would seem preferable to those derived only from a per-centage of certain organic contents." To multiply instances of this kind, would, however, be useless, and the sole motive for adducing the above, springs from a desire of restraining, as far as may be, a too natural fondness for innovating on established nomenclature.

It is most desirable that geologists should endeavour to avoid a very great evil which has gradually obtained in, and now sadly clogs, the pursuit of mineralogy. The redundancy of terms there introduced is most painfully bewildering, as the following instance will illustrate:—"The nomenclature of most minerals is at present so incumbered with synonyma, that it has become exceedingly perplexing to the student. The mineral which is called *epidote* by Häuy, is named *pristazit* by Werner, *thallite* by Leme-therie, *akanticon* by Dandrada, *delphinite* by Saussure, *glassy actinolite* by Kirwan, *arendalit* by Karsten, *glassiger strahlstein* by Emmerling; *la rayonnante vitreuse* by Brochant, *prismatoidischer augit-spath* by Mohs, &c. &c."\*

To enter, here, on any defence of geology, against the groundless objections of weak, but amiable opponents, would be to travel out of the record.

\* Professor Cleaveland.

Happily, the mists of delusion, and the prejudices consequent on long-cherished and preconceived notions, are rapidly clearing away before the lucid, and delightful, and unanswerable statements and views of the galaxy of learned, and scientific, and pious geologists of the present day. I trust I may be permitted to quote from one of these a most happily conceived and beautifully expressed passage :—“How then can they, by whom the magnificent truths of elapsed time and successive generations have been put in clear and strong evidence—how can they be expected to yield to false notions of philosophy, and narrow views of religion, the secure conviction that, in the formation of the crust of the earth, Almighty wisdom was glorified, the permitted laws of nature were in beneficent operation, and thousands of beautiful and active things enjoyed their appointed life, long before man was formed of the dust of the ancient earth, and endowed with a divine power of comprehending the wonders of its construction? It is something worse than philosophical prejudice, to close the eyes of reason on the evidence which the earth offers to the eyes of sense; it is a dangerous theological error, to put in unequal conflict a few ill-understood words of the Pentateuch, and the thousands of facts which the finger of God has plainly written on the book of nature; folly, past all excuse, to suppose that the moral evidence of an eternity of the future should be weakened by admitting the physical evidence for an immensity of the past.”\*

It remains for me to add a few words only, as deprecatory of severe criticism. No one can be more aware than myself of the numerous errors and deficiencies everywhere pervading this small volume: for these I urge nothing, even in extenuation. For myself, it is sufficient that I have derived from its preparation much information, great gratification. I entertain no morbid sensitiveness respecting the fate that awaits it. With our prince of lexicographers I may say, “I dismiss it with frigid tranquillity, having little to fear or hope from censure or from praise.”

The necessity created, by preparing such a book for the press, for carefully looking into and examining the opinions of various authors on the same subject, has made me acquainted with many works which, otherwise, I never might have perused; and I have, from this circumstance only, reaped a rich reward of the purest pleasure; and, though critics may in unmeasured terms condemn, it is more than probable that

“*Seu me tranquilla senectus  
Expectat, seu mors atris circumvolat alis;  
Dives, inops, Romæ, seu fors ita, jusserit, exsul;  
Quisquis erit vitæ, scribam, color.*”

\* Professor Phillips.

# A D I C T I O N A R Y.

## A

### A

**A.** The first letter of the alphabet in all the known languages except the Ethiopic and the Runic; in the former it is the thirteenth, and in the latter the tenth.

Among the ancients, A was used as a numeral, and signified 500; with a line over the top,  $\bar{A}$ , 5000.

In words of Greek derivation, A is used privatively, or in a negative sense, as acephalous, without a head; acaulous, having no stem; apetalous, having no petals; acotyledonous, having no cotyledons, &c.

**ABAI'SIR.** A name for spodium, burnt ivory, or ivory black.

**ABARTICULA'TION.** (from *ab* and *articulatio*, Lat.) That kind of articulation which admits of manifest motion; it is also called diarthrosis, from the Greek word *διάρθρωσις*, and dearticulation.

**ABBRE'VIATED.** (*abbreviatus*, Lat.)

1. In botany, an epithet for the perianth. An abbreviated perianth is shorter than the tube of the corolla, as in *Pulmonaria maritima*.

2. Shorter than a correspondent part.

**AB'DITIVE.** (from *abdo*, Lat.) That has the power of hiding or concealing.

**ABDO'MEN.** (*abdomen*, Lat. *abdomen*, Fr. *addomine*, It.) The large cavity commonly known as the belly, containing the organs more immediately concerned in the process of digestion, as the stomach, liver, spleen, pancreas, bowels, &c.

**ABDO'MINAL.** (from *abdomen*.)

1. Pertaining to the abdomen or belly.

2. Fishes belonging to the order abdominalis, or the fourth order of Linnæus.

**ABDOMINA'LES.** The fourth order of fishes in the arrangement of Linnæus; they have ventral fins behind the thoracic, or fins placed on the belly, and the branchia ossiculated; they chiefly inhabit fresh

### A B R

water. The salmon, trout, smelt, &c., are examples.

**ABDO'MINOUS.** Relating to the abdomen or belly.

**ABDU'CENT.** (from *abduco*, Lat.) The name given to those muscles which serve to open or draw back parts of the body; their opposites, or antagonists, are called adducent.

**ABDU'CTOR.** (*abducteur*, Fr. *abduktore*, It.) The same as abducent.

**ABERRA'TION.** (*aberratio*, Lat.)

1. A certain deviation in the rays of light, from the true or geometrical focus of reflection or refraction, in curved specula or lenses.

2. A deviation from the ordinary course of nature.

**ABNO'RMAL.** } (*abnormis*, Lat.) Irregular;

**ABNO'RMIOUS.** } unwonted; unnatural.

**ABNO'RMITY.** Departure from natural formation; irregularity.

**ABRA'DE.** (*abrado*, Lat.) To wear away from the other parts; to destroy by friction; to rub off.

**ABRA'SION.** (from *abrasio*, Lat.)

1. The act of wearing or rubbing off.

2. The matter abraded by the friction of bodies.

**ABRA'NCHIA.** (from  $\alpha$ , priv. and  $\beta\rho\acute{\alpha}\gamma\chi\iota\alpha$ , Gr.) Animals destitute of gills, and having no apparent external organs of respiration.

**ABRANCHIA'TA.** The third order of articulata, having no apparent external organs of respiration, but seeming to respire, some, by the entire surface of the skin, others, by internal cavities. The abbranchiata are divided into two families; the first, Abbranchiata setigera, comprising the Lumbrici and Naides of Linnæus; the second, Abbranchiata asetigera, comprising the Hirudo and Gordius of Linnæus.

**ABRU'PT.** (*abruptus*, Lat.) Broken; craggy; steep; precipitous. In botany, applied to leaves; when the extremity of the leaf is, as it were, cut off by a transverse line.

**ABRU'PTLY PIN'NATE.** Applied to pinnate leaves, terminated neither with a leaflet nor a tendril.

**ABRU'PTNESS.** Cragginess; steepness; roughness; precipitousness.

**A'BSONOUS.** (*absonus*, Lat.) Without sound; ill-sounding; untunable.

**ABSO'RBE'NT.** (from *absorbeo*, Lat.)

1. Any substance possessing the property of absorbing, or sucking up, fluids, or neutralizing acids; as the earths, alumina, magnesia, &c.

2. In anatomy, the absorbents are small pellucid tubes, which have been discovered in most parts of the body, and are supposed to exist in all. The absorbents begin by numberless open mouths, too minute to be visible to the naked eye; by the assistance, however, of glasses, the orifices of the lacteals have been seen in the human body, and those of the lymphatics in certain fishes.

**ABSO'RBE'NT SYSTEM.** This consists of the absorbent vessels and conglobate glands; the former are divided into lymphatics and lacteals, and the thoracic duct, or common trunk, in which they terminate.

**ABSTE'RGE'NT.** (from *abstergeo*, Lat. *abstergent*, Fr.) Having a cleansing property; which not only wash off adhering substances, but possess a power of loosening their cohesion.

**ABSTE'R'SIVE.** (*abstersif*, Fr. *astervivo*, It.) That has the property of cleansing.

**ABU'TTAL.** A head-land; a bounding of land.

**ACA'LEPHA.** (*ἀκαλήφη*, Gr.) A class of zoophytes found swimming in the waters of the ocean. The acalepha are divided into orders, namely, the *A. simplicia*, and *A. hydrostatica*. The latter, or hydrostatica, are recognized by one or more bladders commonly filled with air, by the aid of which they suspend themselves in their watery element. "In all parts of the ocean," says Professor Grant, "are numerous gelatinous animals, for the most part of a simple and transparent texture, such as the Medusa and Portuguese man-of-war, and numerous other genera. For the most part, those soft gelatinous animals (which are entirely aquatic, and all of them marine) possess a property by which they excite inflammation, when they touch the surface of the skin, like nettles. The word whence they derive their name is a Greek term expressive of nettles. The Acalepha scarcely possess a trace of a nervous system, and are all

aquatic. They float, for the most part, by the action of their own muscular power, or by air-sacs, or by cilia. They feed upon animals of extreme minuteness—for the most part, on the microscopic crustaceous animals, which abound in the ocean as in other waters." Cuvier places the Acalepha in the third class of the fourth great division of the animal kingdom, or Radiata. Linnæus placed them in the class Zoophyta, order Gelatinous zoophytes.

**ACALY'CI'NOUS.** A term applied to plants which want a calyx.

**ACANA'CEOUS.** (from *ἄκανος*, Gr.) Armed with spines or prickles.

**ACA'NTHA.** (*ἄκανθα*, Gr.)

1. In botany, the spine or prickle of a plant.

2. In zoology, a term for the prickly fins of fishes.

3. In anatomy, the spinous process of a vertebra.

**ACANTHA'CEOUS.** (*acanthace*, Fr.) Possessing spines or prickles.

**ACANTHOPTERY'GI'OUS.** (from *ἄκανθα* and *πτερυξ*, Gr.) A term applied to those fishes whose back fins are osseous and prickly. The acanthopterygii form the first, and by far the most numerous division of ordinary fishes.

**ACANTHOCE'PHALA.** (from *ἄκανθα* and *κεφαλή*, Gr.) An intestinal worm, belonging to the order Parenchymata, class Entozoa.

**ACAN'TICONE.** A sub-species of prismatical augite, occurring principally in primitive rocks, such as mica-slate, gneiss, &c. Known also as pistacite and epidote.

**A'CARUS.** (*ἄκαρι*, Gr. animal minutissimum.) The tick or mite. A genus of insects belonging to the order Aptera. The Acarus has eight legs, two eyes, and two jointed tentacula. The female is oviparous, and excessively prolific. Authors estimate the number of species variously; Linnæus enumerates 35, and Gmelin 82 species. Most of these are very small and almost microscopical. Some are parasitical, living in the skin of animals: some of the coleoptera are found covered with them.

**ACAU'LIS.** } (from *a*, priv. and *καυλός*,  
**ACAU'LOUS.** } Gr.) A term applied to plants, the flowers of which have no pedicle or stalk.

**ACCENDIB'LITY.** Capability of being kindled or ignited.

**ACCI'PITRES.** (Lat. from *accipiendo*.) Rapacious birds; the first order of birds in the Linnæan system of ornithology. The Accipitres are known by their hooked beak and talons; they feed upon other birds, as well as upon the weaker quadrupeds, and reptiles. They have been di-

- vided into two families, the diurnal and the nocturnal.
- ACCIPITRINE.** Belonging to the order Accipitres; rapacious.
- ACCLIMATED.** (*acclimaté*, Fr.) Accustomed to a climate not natural to it.
- ACCLIMATION.** Naturalization to foreign climate.
- ACCLIMATIZE.** (*acclimater*, Fr.) To accustom to foreign climate; to accustom to the temperature of a new climate. A term applied both to persons and things; to animals and plants.
- ACCRETION.** (*accretio*, Lat.) Increase, or growth, by the accession of new parts. Bacon says, plants do nourish; inanimate bodies do not; they have an *accretion*, but no alimentation.
- ACCRETIVE.** Increasing, or growing, by the accession of new parts.
- ACEPHALA.** (*a*, priv. and *κεφαλή*, the head, Gr.)
1. A class of animals not having any head, but merely a mouth, concealed between the folds of their mantle; the mouth is always edentated: the oyster furnishes an example. All the acephala are aquatic.
  2. In entomology, an order of insects.
- ACEPHALOUS.** (*acephale*, Fr. *ἀκεφάλος*, Gr.) Headless; this term was given by Cuvier to animals not having any head.
- ACERB.** (*acerbus*, Lat. *acerbe*, Fr. *acerbo*, It.) Acid with an addition of roughness: the taste of an unripe sloe is a familiar and good illustration.
- ACERBITY.** (*acerbitas*, Lat. *acerbité*, Fr.) Sourness combined with roughness of taste.
- ACEROSE.** } (*acerosus*, Lat.)
- ACEROUS.** } 1. Chaffy; branny.
2. In botany, leaves linear, needle-shaped, every where of an equal breadth, mostly acute, and rigid.
- ACESCENT.** (*ascensens*, Lat. *acescent*, Fr.) That has a tendency to become sour spontaneously, or by spontaneous decomposition.
- ACETABULUM.** (Lat.)
1. A cavity in a bone formed for receiving the head of another bone, and thus named from its cup-like shape; it is more particularly used for expressing the cavity in the os innominatum, which receives the head of the femur, or thigh-bone.
  2. In botany it is used for the cotyledon.
- ACETARY.** (from *acetum*, Lat.) An acid pulpy substance found in some fruits, especially the pear, surrounding the core; it is enclosed in a congeries of small calculous bodies towards the base of the fruit.
- ACETATE.** Any salt formed by the union of acetic acid with a salifiable base, as acetate of iron, acetate of potash, &c. The acetates are all soluble in water;
- many of them are deliquescent, and crystallizable with difficulty: they are decomposed by the sulphuric acid.
- ACETITE.** The old name for what is now called acetate.
- ACHATES.** (*ἀχάτης*, Gr.) The agate.
- ACEUS.** Terminations in *aceus* and *icius*, express a resemblance to a material; those in *eus* indicate the material itself; as membranaceous, resembling skin; membranaceous, skin itself.
- ACHA'NIA.** (from *ἀχανής*, Gr. ab *a*, priv. et *χαίνω*.) In botany, plants whose corolla does not open. Order Polyandria, class Monodelphia; natural order Columniferæ.
- ACHENIUM.** (from *ἀχάνη*, Gr.) A sort of fruit.
- ACHIRITE.** Emerald malachite.
- ACICULA.** (Lat.) A prickle or fine spine.
- ACICULAR.** In the shape of a needle: rocks of granite having sharp, needle-like, summits, are thus named.
- ACICULARLY.** Needle-like.
- ACID.** (*acidum*, Lat. *acide*, Fr.) The word *acid*, originally synonymous with *sour*, and applied only to bodies distinguished by that taste, has been gradually extended in its signification, and now comprehends all substances possessed of the following properties:—
1. When applied to the tongue, they excite that sensation which is called *sourness*.
  2. They change the blue colours of vegetables to a red.
  3. They unite with water in almost any proportion, with a condensation of volume, and evolution of heat.
  4. They combine with all the alkalies, producing effervescence during the combination, and with most of the metallic oxides and earths, and form with them those compounds which are called salts.
- The acids terminating in *ous* produce compounds to which the termination *ite* is given, as, e. g. the combination of sulphurous acid and potassa is a sulphite of potassa; the acids ending in *ic* form compounds to which the termination *ate* is applied; the combination of sulphuric acid and potassa is a sulphate of potassa.
- ACIDIFEROUS.** Containing acid.
- ACIDIFIABLE.** Any substance capable of being converted into an acid, by the union of an acidifying principle, without decomposition.
- ACIDULOUS.** (*acidulus*, Lat.) Slightly acid; sub-acid; sourish.
- ACINACIFORM.** (from *acinaces* and *forma*, Lat.) Cimeter shaped; a term applied to leaves, one edge of which is straight and thick, the other curved and thin.
- ACINI.** Granulations; compound berries. The plural of *acinus*.

**A'CIÑOSE.** Iron ore. A variety of iron ore found in masses, and commonly lenticular. Colour, generally, brownish red: lustre metallic: texture granular: hardness 5 to 9: brittle.

**A'CIÑUS.** (Lat.) Each separate part of a compound berry containing a seed: compound berries consist of many simple acini united together, as the raspberry, blackberry, &c.

**ACOTYLE'DON.** (from *a*, priv. and *κοτυληδών*, Gr.) A plant whose seeds have no cotyledons, or side-lobes.

**ACOTYLE'DONOUS.** Plants, whose embryos have no lobes, or seminal leaves; not having cotyledons, or seed lobes.

**ACROCERAU'NIAN.** (from *ἄκρος* and *κεραυνός*, Gr.) A term given to some mountains, supposed to be especially subject to the effects of lightning.

**A'CROGEN.** (from *ἄκρος* and *γεννώ*, Gr.) An acrogen is a cylindrical plant growing at its point only, and never augmenting in thickness after once formed.

**A'CROMION.** (*ἄκρος* and *ὤμος*, Gr.) The humeral extremity of the spinous process of the scapula; situated over the upper end of the humerus, and contributing to the protection of the shoulder joint.

**A'CROSPIRE.** (from *ἄκρος* and *σπείρα*, Gr.) The shoot or sprout of a seed, also called the plume, or plumule.

**ACT'INIA.** The sea-anemony, a genus of the order Vermes mollusca. The fleshy body of the actinia is frequently ornamented with bright colours, and exhibits numerous tentacula placed round the mouth in several ranges, like the petals of a double flower, from which it has obtained its name of sea-anemony.

**ACTINO'COMAX.** A genus of fossil shells, having the form of belemnites.

**ACTINOGRITE.** A fossil crinoidean, found in the carboniferous limestone near Bristol.

**ACTINOLITE.** (from *ἄκτιν* and *λίθος*, Gr.) A variety of hornblende. Its constituent parts are silica 46·26, magnesia 19·03, lime 13·96, alumina 14·48, protoxide of iron 3·43, protoxide of manganese 0·36, fluoric acid 1·60, water, &c. 1·04. This variety of hornblende rarely occurs in the secondary rocks, being principally confined to those of the primary class. It is of a green colour.

**ACTINOLITE-SCHIST.** A metamorphic rock, consisting principally of actinolite, with an admixture of mica, quartz, or felspar; its texture is slaty and foliated.

**ACTINOLITIC.** Containing actinolite; of the nature of actinolite.

**ACU'ITY.** (*acuité*, Fr.) Sharpness; acrimony.

**ACU'LEATE.** } (*aculeatus*, Lat.) Prickly;

**ACU'LEATED.** } having spines or prickles.

Applied to leaves armed with prickles.

Used to denote prickles, fixed in the bark, in distinction from thorns, which grow from the wood.

**ACU'LEUS.** A prickle or spine, arising from the bark only, and not growing from the wood.

**ACU'MINATED.** (*acuminatus*, Lat.) Ending in a point; sharp-pointed, the decrease being very gradual.

**A'DAMANT.** (*ἀδάμας*, Gr.) A name given to different stones of excessive hardness, as to the diamond.

**ADAMANTE'AN.** (*adamantæus*, Lat.) Hard as adamant; impenetrable.

**ADAMA'NTINE.** Of the nature of adamant; of excessive hardness.

**ADAMA'NTINE SPAR.** Imperfect corundum; a variety of rhombohedral corundum, nearly analogous to perfect corundum, containing from 3 to 5 per cent. of silica, and 1 to 2 of oxide of iron. It occurs massive and in crystals. The crystals brought from India are the most pure.

**ADA'MIC EARTH.** A name given to red clay.

**A'DAPIS.** One of the extinct pachydermata, found in the gypsum quarries of Montmartre. The form of this creature most nearly resembled that of a hedgehog, but it was three times the size of that animal: it seems to have formed a link connecting the pachydermata with the insectivorous carnivora.—*Buckland.*

**ADDU'CENT.** (from *adduco*, Lat.) A name given to those muscles which bring forward, close, or draw together, the parts of the body to which they are attached; their antagonists are termed abducent.

**ADDU'CTOR.** The same as adducent.

**ADE'NOID.** (from *ἀδην*, a gland, and *εἶδος*, form, Gr.) Glandiform; having the shape of a kernel, almond, or gland; glandulous.

**ADE'RENT.** (from *adhæreo*, Lat.) United with; sticking to.

**ADEH'SION.** (*adhesio*, Lat.) The union of two substances, either similar or dissimilar. Adhesion is generally used in the natural, and adherence in the metaphorical sense.

**ADEH'SIVE.** (*adhesivus*, Lat.) Having a tendency to adhere, or stick to.

**ADEH'SIVELY.** In an adhesive manner.

**ADEH'SIVENESS.** Tenacity; the quality of sticking to.

**ADIPOCERATION.** The process of being converted into adipocere.

**A'DIPOCERE.** } (*adeps*, fat, and *cera*, wax,  
**A'DIPOCIRE.** } Lat.) A substance resembling spermaceti, produced by the conversion of animal matter exposed to running water; in this way animal matter may be converted into a soft, unctuous, or waxy substance in the space of a

little more than a month; but adipocire has also been produced, though not so rapidly, by the heaping together large masses of putrefying animal matter, as was discovered on the removal of a very great number of bodies from the burial ground of the Church des Innocens at Paris, 1787. Adipocire possesses many of the properties of fat combined with a portion of ammonia. It was first discovered by Fourcroy.

**ADIPOCIRE MINERAL.** A fatty matter found in the argillaceous iron ore of Merthyr: it is fusible at about 160°, and is indorous when cold, but when heated it emits a slightly bituminous odour.

**A'DIPOSE.** } (*adiposus*, Lat.) Fat; fatty.

**A'DIPOUS.** } (*adiposus*, Lat.) Fat; fatty.

**A'DIT.** (*aditus*, Lat.) The shaft or entrance into a mine, usually made in the side of a hill, for the conveyance of ore, and the carrying off the water.

**ADJ'USTMENT.** A rendering fit or conformable.

**ADMI'XTION.** (*admisceo*, Lat.) The union of various bodies, or substances, by mingling them together. In admixtion each body retains its own character, and does not undergo any chemical change, as in composition.

**ADMI'XTURE.** The mass of mingled substances.

**ADNA'SCENT.** (*adnascens*, Lat.) Growing to some other thing.

**ADNA'TA.** (*adnatus*, Lat.)

1. Those parts of animal, or vegetable bodies which are natural, as the nails, hair, &c.

2. Accidental parts, as fungi, misletoe, &c.

3. The external coat of the eye.

**A'DNATE.** Growing to; adhering. In botany, it is used when a leaf adheres to the branch or stem by the surface or disk itself; applied to stipules when they are fixed to the petioles.

**ADPRE'SSED.** (*appressus*, Lat.) Appressed, or pressed close to; pressed together.

**ADSCIT'IOUS.** (Lat.) That is added to complete something else, though originally extrinsic.

**ADVENT'IOUS.** (*adventitious*, Lat.) Accidental; extrinsically added; that which does not properly belong to any body, or substance; casual.

**ADULA'RIA.** Moonstone; a transparent white-coloured variety of feldspar, with a silvery, or pearly opalescence.

**ADU'NCITY.** (*aduncitas*, Lat.) Crookedness; hookedness; flexure inwards.

**ADU'ST.** (*adustus*, Lat.) Burnt up; scorched.

**ADU'STIBLE.** That is capable of being burnt.

**ÆDELITE.** A stone found in Sweden, and

thus named by Mr. Kirwan. Its form is tuberoso and knotty. Texture striated; sometimes resembles quartz. Lustre from 0 to 1. Specific gravity 2.515 after it has absorbed water. Colour light grey. Before the blow-pipe it intumesces, and forms a frothy mass. Acids convert it into a jelly. A specimen, analysed by Bergman, contained 69 silica, 8 lime, 20 alumina, 3 water.—*Thomson*.

**Æ'LONDON.** A fossil saurian of the oolite and lias.

**Æ'ERATE.** To combine with carbonic acid.

**Æ'ERATED.** Combined with carbonic acid, or fixed air.

**Æ'ERATION.** The combining with fixed air, or carbonic acid.

**Æ'ERIAL ACID.** A name given by Bergman to carbonic acid or fixed air; aerial acid is of greater specific gravity than atmospheric air, and extinguishes flame.

**Æ'RIFORM.** Resembling air; having the nature and properties of air.

**Æ'ROLITE.** (from *ἀήρ* and *λίθος*, Gr.) A name given to meteoric stones, which, occasionally, fall to the earth. Nothing is positively known as to the origin of aërolites: by some authors they have been supposed to come from the moon, being projected by volcanic force beyond the sphere of the moon's attraction; by others they have been thought to be children of the air, created by the union of simpler forms of matter. They do not resemble any other substance found on the earth, and it has been indisputably proved that they are not of terrestrial formation. The fall of these bodies has been well ascertained, and has occurred at different times, and in various parts, through many ages. Some of these aërolites are immensely large, from 300 lbs. downwards. From an analysis of them, they are all found to agree in their component parts. They are covered with a thin crust of a deep black colour, their exterior is roughened with small projections, and they are destitute of gloss. Internally their texture is granulated, and of a greyish colour. When carefully examined, they appear composed of a number of small spherical bodies and metallic grains imbedded in a softer matter, composed, according to the Hon. Mr. Howard, who diligently and carefully studied them, of silica, magnesia, iron, and nickel. In addition to these substances, Vauquelin found chrome, and Stromeyer discovered cobalt, in aërolites: lime, alumine and manganese have also been detected in them. Meteoric iron has been imitated by fusing iron with nickel. When it is considered how many of these bodies have been seen, or heard, to fall

through the air, we must conclude that they are exceedingly numerous; more especially, when we reflect on the small proportion which must be observed, and the small comparative portion of the globe which is inhabited, or habitable, by man.

**AERO'METER.** (from *ἀήρ* and *μέτρον*, Gr. *acromètre*, Fr.) An instrument for ascertaining the weight, or density, of the atmosphere.

**AERO'METRY.** (*aérométrie*, Fr.) The science which treats of the properties of the air; it comprehends not only the doctrine of the air itself, considered as a body, but also its pressure, elasticity, rarefaction, and condensation.

**AERO'SCOPY.** (from *ἀήρ* and *σκοπέω*, Gr.) The observation of the air.

**ÆRUGINOUS.** (from *æruinosus*, Lat.) Partaking of the nature of the rust of copper.

**ÆRUGO.** Verdigrease, or verdigris; rust of copper, formed by the combination of an acid with copper. Impure subacetate of copper. Verdigris is inodorous, and when first applied to the tongue is nearly insipid, though strongly styptic; it leaves a metallic taste in the mouth. It is poisonous; sugar acts as a specific against its poisonous effects.

**ÆSTIVAL.** (*æstivalis*, Lat.) Pertaining to summer.

**ÆSTIVAL PLANTS.** Plants which flower during the summer.

**ÆSTIVA'TION.** (*æstivatio*, Lat.)

1. The effect produced by summer heat.
2. The mode in which the parts of a flower, taken separately, are arranged in the bud.

**ÆTITES.** (*αἰτός*, Gr. *aetite*, Fr.) Eagle-stone; a variety of oxide of iron mixed with clay. It is found in masses, generally under the form of a rounded knob, something resembling a kidney. It prevails in the coal formations of England, Wales, and Scotland, has a rough surface, and is of a brown colour. Specific gravity 4 to 7. Lustre of the exterior metallic. It frequently contains a sort of kernel, which rattles on being shaken. It was formerly in repute for several extraordinary magical as well as medical properties, such as preventing abortion, discovering thieves, &c. It derives its name from a popular notion that it was found in eagles' nests, where it was supposed to prevent the eggs from becoming rotten. See *Nodular Iron Ore*.

**ÆTITES LAPIS.** Eagle-stone. See *Ætites*.

**AFFI'NITY.** (*affinité*, Fr. *affinità*, It.) The tendency which bodies, dissimilar in their composition, have to unite and form new compounds. Different bodies are pos-

sessed of different attractive powers, and if several be brought together, those which have the strongest mutual affinities enter first into union. Affinity, like sensible attraction, varies with the mass and the distance of the attracting bodies. That the force of affinity increases as the distance diminishes, and the contrary, is obvious; for it becomes insensible when the distance is sensible, and exceedingly great when the distance is exceedingly diminished. Affinity agrees with sensible attraction in every point which it has been possible to determine.

**AGALMA'TOLITE.** (from *ἀγαλμα* and *λίθος*, Gr.) Figure-stone. A sub-species of talc-mica, of different colours, as white, red, brown, green, and grey. It occurs massive. It feels greasy, is translucent, and has a conchoidal fracture. The finest specimens are brought from China. It does not contain any magnesia, but in other respects it has the characters of talc.

**A'GARIC.** (*agaricus*, Lat.) The generic name for the mushroom, a genus of the order Fungi, class Cryptogamia. Gmelin enumerates nearly 400 species.

**A'GARIC MINERAL.** A variety of soft carbonate of lime. It is found in the cliffs of rocks, or the bottom of lakes, in pieces loosely cohering, and it is so light as nearly to swim upon water. It obtains its name from its resemblance to a fungus in colour and texture.

**A'GATE.** (*αχάτης*, Gr. *agate*, Fr. *agata*, It.) A siliceous, semi-pellucid gem, of which there are many varieties, not of great value. Agates are principally composed of quartz with various colouring matters. Agates may be artificially coloured by immersion in metallic solutions. Amongst the varieties of agate may be enumerated, calcedony, carnelian, onyx, sardonyx and heliotrope. As precious stones, agates are now less esteemed than formerly; the most valuable are the oriental. When cut and polished, agates present an appearance of waving lines, sometimes accurately parallel, sometimes varying in breadth, and sometimes containing a resemblance to vegetable forms, as mosses, ferns, &c. Small agates are frequently found in common gravel.

**A'GATY.** Of the nature of agate.

**AGGELA'TION.** Concretion by freezing.

**A'GGEROSE.** (from *agger*, Lat.) Full of heaps.

**AGGLU'TINANT.** (*agglutinant*, Fr.) That which has the power of uniting parts together.

**AGGLU'TINATE.** (*agglutino*, Lat.) To cause to adhere; to glue together.

**AGGLUTINA'TION.** (*agglutination*, Fr.)

Union ; cohesion ; the state of being glued, or fastened together by some viscid matter ; the adhesion of parts by the effusion of a coagulating medium.

**AGGLUTINATIVE.** That which has the property of causing agglutination.

**A'GGREGATE.** (*aggregat*, Fr.)

1. The complex, or collective result of the conjunction, or acervation, of many particulars : it differs from a compound body, inasmuch as the union in the last is more intimate than between the parts of an aggregate.

2. In botany, a term used to express flowers composed of many small florets, having a common undivided receptacle, the anthers separate and distant, the florets commonly standing on stalks, each having a single or double partial calyx. They are opposed to simple flowers, and are usually divided into seven kinds.

**A'GGREGATE.** (*aggrego*, Lat.) To collect together ; to accumulate.

**A'GGREGATED.** Collected ; accumulated ; heaped together.

**AGGREGATION.** (*aggrégation*, Fr. *aggrégazione*, It.) The collection into one mass of bodies having no natural connexion, but, by a species of union, made to constitute one body.

**A'GITATE.** (*agito*, Lat.) To put in motion ; to shake.

**AGITATION.** (*agitatio*, Lat.) The state of being moved, or shaken.

**AGNOSTUS.** (*ἀγνωστος*, Gr.) A fossil, genus of trilobites, mentioned by M. Brongniart.

**AGNOTHERIUM.** An extinct animal of the miocene period, order Mammalia, allied to the dog, but of very large size. One species only has been found, at Epplesheim, in Germany.

**AIGUE MARINE.** A variety of topaz, of a bluish or pale green colour.

**AIGUILLES.** (*aiguilles*, Fr.) The needle-like points, or tops, of granitic rocks.

**AIGUILLE DE DRU.** A pyramidal granitic mountain, according to Bakewell, the most remarkable at present known ; the upper part, or spire, rises above its base nearly to a point, in one solid shaft, more than 4000 feet ; the summit being 11,000 feet above the level of the sea.

**A'LA.** (*ala*, Lat.)

1. In botany, a term used for the hollow, which either the leaf, or the pedicle of the leaf, makes with the stalk ; the hollow turning, or sinus, placed between the stalk or branch of a plant and the leaf, and whence a new offspring generally rises. Sometimes it is used for those parts of leaves otherwise called lobes or wings. Those petals of papilionaceous flowers placed between those other petals, distinguished as the vexillum and carina,

and which constitute the top and bottom of the flower, are also called *alæ*.

2. In anatomy, the lobes of the liver, the cartilages of the nostrils, and the cartilaginous parts of the ears, are called *alæ*.

**ALA'TED.** (*alatus*, Lat.) That hath wings ; winged.

**A'LABASTER.** (*Alabaster*, Lat. *ἀλάβαστρον*, Gr.) Granular, or massive sulphate of lime. Alabaster is found in this country accompanying the salt deposits in Cheshire. It is also most abundant at Montmartre, in the neighbourhood of Paris. At Montaiont, in Italy, it is found in blocks of such magnitude, that statues of the size of life are occasionally cut from them. Being semi-transparent, it has sometimes been employed for windows instead of glass, and a church at Florence is still illuminated by alabaster windows. Instead of panes of glass, there are slabs of alabaster 15 feet high, each of which forms a single window, through which the light is conveyed. Alabaster may be turned by the lathe, and is thus formed into a great variety of ornamental articles.

**ALABA'STRITES.** (*alabastrites*, Lat. *ἀλαβαστρίτης*, Gr.) Alabaster stone ; a kind of marble, whereof the ancients made vessels for ointment ; by Horace called onyx.

**A'LALITE.** Called also Diopside, a variety of augite. It occurs massive, disseminated, and crystallized, with a vitreous external, and pearly internal lustre ; it is translucent, and either white or of a pale green colour. It was named by Bonvoisin, from his finding a variety of it near the village of Ala, in Piedmont.

**ALA'SMODON.** A species of shells of the genus *Unio*, having cardinal, but no lateral teeth.

**A'LTE.** } (*alatus*, Lat.) Winged. In  
**ALA'TED.** } conchology, applied to shells  
having an expanded lip, or when any portion of them is much expanded.

**A'LARY.** (from *ala*, Lat.) Of the nature of wings.

**A'LBITE.** Tetarto-prismatic felspar ; soda felspar. A name given to felspar, whose alkali is soda instead of potash. Colour generally white, sometimes grey, green, or red. Lustre upon faces of cleavage pearly, in other directions vitreous. Albite forms a constituent part of the greenstone rocks in the neighbourhood of Edinburgh. It is composed of silica, alumina, and soda, with a trace of lime.

**ALBI'TIC.** Of the nature of albite ; containing albite.

**ALBUG'NEA.** (from *albus*, Lat.)

1. The fibrous membrane in the eye, situate immediately under the tunica conjunctiva.

2. One of the tunics of the testis.

**ALBU'GINEOUS.** (*albugineus*, Lat.)

1. The aqueous humour of the eye.
2. Resembling the white of an egg.

**A'LBUM GRÆ'CUM.** The excrement of dogs, wolves, hyenas, &c., feeding or living on bones. It principally consists of the earth of bones or lime, in combination with phosphoric acid.

**ALBU'RNUM.** (*alburnum*, Lat.) Called also sap-wood; the interior white bark of trees; it is this which yearly becomes new wood; the last formed wood of the trunk of trees and woody plants. It appears probable, that the new layers of alburnum and liber, which are produced each year, on the outside of all that preceded, are formed by the descending fibres, or roots, of the leaf-buds.

**A'LICALI.** See *Alkali*, the more usual way of writing the word.

**ALCYO'NIA.** The plural of alcyonium.

**ALCYO'NIUM.** A genus of zoophytes, the characters of which are, that the animal grows in the form of a plant; the stem, or root, is fixed, fleshy, gelatinous, spongy, or coriaceous, with a cellular epidermis, penetrated with stellated pores, and shooting out tentaculated oviparous hydræ.—*Encyclop.*

From the experiments of Hachett, it appears that these animals are composed principally of carbonate of lime and a little gelatinous matter. The alcyonium belongs to the class Vermes, order Zoophyta. Cuvier places the alcyonium in the order Coralliferi, class Polypi.

**ALCYO'NITE.** Alcyonites are fossil alcyonia, or zoophytes nearly allied to sponges, the production or habitation of polypi.—*Bakewell.*

**A'LEMBIC.** (*alambic*, Fr. *lambicco*, It. *alembicum*, Lat.) A vessel used in the process of distillation, usually made of glass or copper. Of alembics there are two different forms, the beaked and the blind, the former having communication with a receiving vessel, the latter being without such. The use of the alembic has yielded to that of the retort.

**ALEPIDOTE.** (from *a*, priv. and *λεπις*, squama, a scale.) Any fish destitute of scales, as the eel, cod-fish, &c.

**A'LGA.** (Lat.) Sea-weed.

**A'LGÆ.** An order, or division, of the Cryptogamia class of plants. It is one of the seven families, or natural tribes, into which Linnæus distributed the vegetable kingdom. The whole of the sea-weeds are comprehended under this division. The plants belonging to this order are described as having their leaf, stem, and root all one. The depths at which, according to Lyell, some of the algæ live, is extremely great, being no less than one thousand feet, "and although in such

situations there must reign darkness more profound than night, at least to our organs, many of these vegetables are highly coloured."—*Principles of Geology.*

**ALGALMA'TOLITE.** Figure-stone. A mineral, the finest varieties of which we receive from China. A sub-species of talc-mica. See *Agalmatolite.*

**A'LGID.** (*algidus*, Lat.) Cold.

**ALGI'DITY.** } Chilness; cold.

**A'LGIDNESS.** }

**ALGI'FICK.** That which causes cold.

**A'LGOR.** (Lat.) Extreme cold.

**A'LGOSUS.** (*algosus*, Lat.) Having the nature, or characters, of sea-weed.

**ALI'FEROUS.** (from *ala* and *fero*, Lat.) Having wings; winged.

**ALI'GEROUS.** (*aliger*, Lat.) The same as aliferous.

**A'LIMENT.** (*alimentum*, Lat.) Nourishment; food; nutriment.

**ALIMENTAL.** That has the quality of aliment; that nourishes.

**ALIMENTALLY.** So as to serve for nourishment.

**ALIMENTARINESS.** The quality of affording nourishment.

**ALIMENTARY.**

1. That has the property of supplying nourishment.

2. That relates to nourishment.

**ALIMENTA'TION.**

1. The power of affording nutriment.

2. The state of being nourished by assimilation of matter received.—*Johnson.*

**A'LITURE.** (*alitura*, Lat.) Nutriment; nourishment; food; aliment.

**ALKALE'SCENCY.** A tendency to become alkaline.

**ALKALE'SCENT.** That has a tendency to the properties of an alkali.

**A'LKALI.** (from the Arabic word *kali*, with the usual prefix *al*; the name given by the Egyptians to the plant called by us glasswort.) Any substance which by uniting with an acid neutralizes, or impairs, its activity, and forms a salt. Alkalies possess the property of converting vegetable blues to green, and yellows to red. There are three kinds of alkalies: 1. The vegetable alkali, or potash; 2. The mineral alkali, or soda; 3. The animal, or volatile alkali.

**A'LKALINE.** Possessing the properties of alkali; as baryta, lime, magnesia, strontia, &c.

**ALKALI'NITY.** The property of changing vegetable blues into green.

**ALKALI'METER.** An instrument for ascertaining the proportion of alkali contained in any substance.

**A'LKALOID.** (from *alkali*, and *ειδος*, Gr. likeness.) Bodies possessing some of the properties of alkalies.

**A'LKANET.** The name of a plant, the root of

which yields a fine red, and is much used by dyers.

**A'LLAGITE.** A mineral; colour brown or green; massive; semi-opaque; fracture conchoidal: it is a carbo-silicate of manganese.

**A'LLANITE.** An orthitic melane-ore. The cerium oxyd<sup>e</sup> siliceux of Haüy. A mineral brought from Greenland, and thus named after Mr. Thomas Allan, of Edinburgh, who first distinguished it as a peculiar species. According to the analysis of Dr. Thomson, allanite was found to contain silica 35.4, oxide of cerium 33.9, oxide of iron 25.4, lime 9.2, alumina 4.1, moisture 4.0.

It is of a black colour, inclining to grey or brown. It is found massive, or in acicular crystals. External lustre imperfect, metallic; internal, shining. Fracture conchoidal. Opaque. Streak greenish or brownish-grey. It is a siliceous oxide of cerium.

**A'LLOCHROITE.** A mineral variety of the dodecahedral garnet. It is found massive, of a green, brown, grey, or yellowish colour; lustre glimmering. It consists of silica, lime, carbonate of lime, oxide of manganese, oxide of iron, alumina, and moisture. Before the blow-pipe it melts into an opaque black enamel.

**A'LLOPHANE.** A mineral of a blue, green, or brown colour, occurring massive, or in imitative shapes. It is rather hard and brittle. It gelatinizes in acids. According to the analysis of Stromeyer, it consists of alumina, silica, carbonate of copper, lime, iron, sulphuric acid, and water.

**ALLOY.** To alloy, called also allay, is to mix one metal with another, in order to give greater hardness, fusibility, &c. To diminish the pureness of a metal by mixing with it one of less value.

**ALLOY.**

1. A mixture of different metals: it must, however, be kept in mind that when mercury forms one of the metals, the mixture is called amalgam.

2. The metal of inferior value, which is used to deteriorate, or give new properties to, another metal.

**ALLUVIAL.** That is carried by water to another place, and lodged upon something else.

**ALLUVION.** } (*alluvio*, Lat. *alluvion*, Fr.  
**ALLUVIUM.** } (*alluvione*, It.) Earth, sand, gravel, stones, or other transported matter which has been washed away and deposited by water upon land not permanently submerged beneath the waters of lakes or seas.—*Lyell*.

Alluvium has been divided into modern and ancient. The modern, characterized by the remains of man and

contemporaneous animals and plants; the ancient, by an immense proportion of large mammalia and carnivora, both of extinct and recent genera and species.

**ALLUVIOUS.** See *Alluvial*.

**A'LMANDINE.** (*almandine*, Fr. *alabandina*, It.) A precious stone, having some of the characters of the garnet; a species of ruby.

**A'LPINE.** (*alpinus*, Lat.) This term is not confined merely to the Alps, and the things therewith connected, but is applied to any lofty or mountainous country, and to the productions of elevated situations.

**ALTERNATE.** (*alternus*, Lat.) Being by turns; one after another; reciprocal. In botany, applied to leaves when they stand singly on the stem or branches, alternately first on one side, then on the other; to branches when placed round the stem alternately, one above the other; to flowers placed in regular succession, one above another.

**ALTERNATE, n. s.** That which happens alternately; vicissitude.

**ALTERNATELY.** In reciprocal succession, so that each shall be succeeded by that which it succeeds.

**ALTERNATENESS.** The quality of being alternate, or of happening in reciprocal succession.

**ALTERNATION.** Reciprocal succession.

**ALTERNATIVELY.** (*alternativement*, Fr. *alternativamente*, It.) Reciprocally; in alternate manner.

**ALTERNITY.** Reciprocal succession; vicissitude; turn.

**A'LTERNATING.** Following, or succeeding, reciprocally; happening in reciprocal succession.

**ALTI'METER.** (from *altus*, Lat. and *μέτρον*, Gr.) An instrument by which the heights of bodies may be ascertained.

**ALTI'METRY.** (*altimétrie*, Fr. *altimetria*, It.) The art of measuring altitudes or heights, whether accessible or otherwise.

**A'LTITUDE.** (*altitudo*, Lat.) Height of place; space measured upwards.

**A'LTIVOLANT.** (*altivolans*, Lat.) High-flying.

**A'LUM.** (*alumen*, Lat. *alun*, Fr. *allume*, It.) A triple sulphate of alumina and potassa. Alum is both native and factitious. The common mode of obtaining alum is by roasting and lixiviating certain clays containing pyrites; to the leys a certain quantity of potassa is added, and the triple salt is obtained by crystallization. Alum has a sweetish astringent taste. It dissolves in five parts of water at a temperature of 60°, and the solution reddens blues.

**A'LUM-STONE.** The shale from which alum is extracted.

**ALU'MINA.** } Pure argillaceous earth, or alu-

**A'LUMINE.** } mina, is a substance which

in a mixed state is well known, but pure and unmixed, is one of the rarest substances in the mineral kingdom. This earth is soft, smooth, and unctuous to the touch. Combined with other earths, or rocks, it communicates to them some of these properties; such rocks are termed argillaceous. Alumina constitutes some of the hardest gems, such as the ruby and sapphire, the latter being crystallised alumine. According to the analysis of Klaproth the sapphire contains 95 per cent. of pure clay. Alumina was considered an elementary substance till Sir Humphry Davy's electro-chemical researches led to the opinion of its being a metallic oxide.

Next to silicium, aluminum would appear to be the most important base of the earths on the face of the globe. Its collective amount is by no means so great as that of silicium, but it is quite as widely spread. There is scarcely one among the mechanical rocks that does not contain alumina. It constitutes the base of the various clays, and must be regarded as a very abundant and important constituent part of rocks. It contains 46·8 per cent. of oxygen.—*De la Beche.*

**ALU'MINITE.** Sub-sulphate of alumine. A white mineral, dull, opaque, and having an earthy fracture. This mineral occurs massive, in veins, and in tabular and tuberosse masses; the former frequently attaining a length of several feet, and the latter a weight equal to three or four pounds. It appears to have been of stactical origin, and is supposed to result from the decomposition of iron pyrites, and the reaction of other substances. It is infusible at 166° of Wedgewood, but fuses rapidly when exposed to the stream of the hydro-oxygen blow-pipe. According to the analysis of Stromeyer, it consists of alumine 30, sulphuric acid 25, water 45.

**ALU'MINOUS.** Having the properties of alum; containing alum; resembling alum.

**ALU'MINUM.** The metallic base of alumina. The metal itself has not yet been obtained in a separate state, but the analyses to which alumina has been subjected have clearly shewn that it is a metallic oxide.

**ALVE'OLAR.** (*alveolus*, Lat.) Containing sockets, pits, hollows or cavities.

**ALVE'OLATE.** Pitted or honey-combed.

**ALVEOLI'NA.** A genus of microscopic foraminiferous shells.

**ALVE'OLUS.** (*alveolus*, Lat. *alvéole*, Fr. *alveolo*, It.) A socket for a tooth; a small

cavity or cell; the cell of the honey-comb.

**ALVE'OLUS.** } A fossil marine body, large at

**ALVE'OLITE.** } one end and tapering towards the other, composed of hemispheric cells.

**AMA'LGAM.** (from *ἄμα*, together, and *γαμέω*, to marry.) A compound of any metal with mercury. When two or more metals, neither being mercury, are mixed together, the compound is termed an alloy, but when mercury enters into the composition it is called an amalgam, and its derivation has been supposed to be from *μάλαγμα*, or *μαλίσσω*, to soften, which derivation appears to be more correct than that of Johnson, and lexicographers generally.

**AMA'LGAMATE.** (*amalgamer*, Fr. *amalgamare*, It.)

1. To mix mercury with any other metal.  
2. To mix any two substances capable of uniting into one body.

**AMALGAMA'TION.** (*amalgamation*, Fr. *amalgamatione*, It.)

1. The act of mixing mercury with other metals.  
2. The act of blending different bodies.

**AMA'THUS.** A species of ammonite.

**A'MAZON-STONE.** A variety of prismatic felspar, of a blue or green colour.

**A'MBER.** (*ambar*, Arab.) A fossil resin.

For a great length of time, various were the opinions as to the nature and composition of amber, but it is now well ascertained to be a fossilized vegetable resin. It is found in similar localities to coal and jet. It is brittle, easily cut with a knife, of various shades of yellow, sometimes nearly white, and semi-transparent; insects are frequently found enclosed in it, and Jussieu states that these are not European. Its constituent parts are carbon 70·68, hydrogen 11·62, oxygen 7·77. Amber is found in nodular masses, which are sometimes eighteen inches in circumference; that which is found on the eastern shores of England, and on the coasts of Prussia, and Sicily, is derived from beds of lignite in tertiary strata. Fragments of fossil gum were found near London in digging the tunnel through the London clay at Highgate. In the royal cabinet of Berlin there is a lump of amber, discovered in Lithuania, weighing eighteen pounds. Amber is one of the most electric substances known; when submitted to distillation, it yields an acid sublimate, which has received the name of succinic acid. Ten pounds of amber yield about three ounces of purified succinic acid.

**AMBE'RGRIS.** (from *amber* and *gris*, or grey.) A concretion from the intestines of the physeter macrocephalus, or spermacti whale. It was long doubted of

what ambergris consisted; and Todd, in his last edition of Johnson's Dictionary, retains without any comment, or observation, the absurd opinions of former days, stating that "some imagine it to be the excrement of a bird, which, being melted by the heat of the sun, and washed off the shore by the waves, is swallowed by whales, who return it back in the condition we find it." Neumann absolutely denies it to be an animal substance, as not yielding in the analysis any one animal principle. He concludes it to be a bitumen issuing out of the earth into the sea; at first of a viscous consistence, but hardening, by its mixture with some liquid naphtha, into the form in which we find it. It is stated by Sir E. Home that this substance is only found in the unhealthy animal, but whether the cause or the effect of disease is not well ascertained. When the pieces of ambergris are large, they are found to contain beaks of the sepia octopodia, or cuttlefish, the usual food of the spermaceti whale. Ambergris is a solid, opaque, ash-coloured, inflammable, substance, variegated like marble, remarkably light, its specific gravity ranging from 780 to 926; rugged, and, when heated, emitting a fragrant odour. It is sometimes found in masses of two hundred pounds weight and upwards. It breaks easily, but cannot be reduced to powder; melts like wax, and is soluble in ether and the volatile oils, and, assisted by heat, in alcohol, ammonia, and the fixed oils. It has been employed in medicine, but is now quite laid aside. In consequence of its fragrance it enters into the composition of many articles of perfumery.

**A'MBIENT.** (*ambiens*, Lat. *ambient*, Fr. *ambiente*, It.) Surrounding; encompassing; investing.

**A'MBIT.** (*ambitus*, Lat.) The compass or circuit of any thing; the line that encompasses any thing.

**A'MBITUS.** In conchology, the circumference or outline of the valves.

**AMBLYP'TERUS.** A genus of fishes whose duration was limited to the early periods of geological formations; and which are marked by characters that cease after the deposition of the magnesian limestone. This genus occurs only in strata of the carboniferous order, and presents four species at Saarbrück, in Lorraine; it is found also in Brazil. The character of the teeth in *Amblyterus* shews the habit of this genus to have been to feed on decayed sea-weed, and soft animal substances at the bottom of the water; they are all small and numerous, and set close together like a brush. The form of the body, being not calculated for rapid progression, accords with this habit. The vertebral

column continues into the upper lobe of the tail, which is much longer than the lower lobe, and is thus adapted to sustain the body in an inclined position, with the head and mouth nearest to the bottom. This remarkable elongation of the superior lobe of the tail is found in every bony fish of strata anterior to, and including, the magnesian limestone.—*Buckland*.

**AMBLYRHY'NCHUS CRISTATUS.** The only existing marine lizard now known.—*Lyell*.

**AME'NT.** } (*amentum*, Lat.) A catkin, one  
**AME'NTUM.** } kind of inflorescence. When the bractæ on the principal stalk are close, and overlap one another, or are imbricated with the flowers sessile in their axillæ, the spike is termed an *amentum*, or *catkin*, and the peduncle is always articulated with the main stem of the plant. Aments, or catkins, are generally pendent, while spikes are for the most part erect.

**A'METHYST.** (*ἀμέθυστος*, Gr. contrary to wine, or drunkenness, so called from a supposed virtue it possessed of preventing inebriation.) Quartz, coloured by a minute portion of iron and manganese. The finest specimens come from India, Spain, and Siberia, but the amethyst is commonly found in most countries. The amethyst is a transparent gem of a purple or violet-blue colour; it is sometimes found naturally colourless, and may at any time be made so by putting it into the fire. When deprived of its colour it greatly resembles the diamond. Some derive the name amethyst from its colour, which resembles wine mixed with water; whilst others, with more probability, think it obtained its name from its supposed virtue of preventing drunkenness; an opinion which, however imaginary, prevailed to that degree among the ancients, that it was usual for great drinkers to wear it about their necks.

**AMETHYSTINE.** Possessing the properties of an amethyst; of the colour of an amethyst.

**A'MIANTH.** } (*amiante*, Fr. *amianto*, It.)  
**AMIA'NTHUS.** } A variety of asbestos,

or flexible asbestos; an incombustible mineral composed of very delicate and minute fibres, which were, sometimes, according to Dioscorides, worked into a cloth capable of resisting the action of fire.

**AMIA'NTHIFORM.** Having the form or likeness of Amianthus.

**AMMONA'CEA.** According to the arrangement of De Blainville, a family of the order Polythalamacea. It embraces the genera *Discorbis*, *Scaphites*, *Ammonites*, and *Simplegas*. In the Lamarckian system the ammonacea is a family of the order Polythalamous cephalopoda, embracing

the genera Ammonites, Ammonoceras, Baculites, Turritiles.

**AMMONITE.** (from *Jupiter Ammon.*) An extinct and very numerous genus of the order of molluscous animals called Cephalopoda, allied to the modern genus Nautilus, which inhabited a chambered shell, curved like a coiled snake. Species of it are found in all geological periods of the secondary strata; but they have not been seen in the tertiary beds. They are named from their resemblance to the horns on the statues of Jupiter Ammon.—*Lyell.*

The ammonite differs greatly from the chambered nautilus, the whorls, or turns, being all distinct, and in the same plane, and the cells very small. The family of ammonites extends through the entire series of the fossiliferous formations, from the transition strata to the chalk inclusive. M. Brochant, in his translation of De la Beche's Manual of Geology, enumerates 270 species; these species differ according to the age of the strata in which they are found, and vary in size from a line to more than four feet in diameter. The geographical distribution of ammonites in the ancient world, seems to have partaken of that universality, we find so common in the animals and vegetables of a former condition of our globe, and which differs so remarkably from the varied distribution that prevails among existing forms of organic life. We find the same genera, and, in a few cases, the same species of ammonites, in strata, apparently of the same age, not only throughout Europe, but also in distant regions of Asia, and of North and South America. Dr. Gerard has found at the elevation of 16,000 feet in the Himalaya Mountains, species of ammonites, identical with those of the lias at Whitby and Lyme Regis. The ammonite, like the nautilus, is composed of three essential parts:—1st. An external shell, usually of a flat discoidal form, and having its surface strengthened and ornamented with ribs. 2nd. A series of internal air chambers, formed by transverse plates, intersecting the inner portion of the shell. 3rd. A siphuncle, or pipe, commencing at the bottom of the outer chamber, and thence passing through the entire series of air chambers to the innermost extremity of the shell. The most decided distinction between ammonites and nautili is founded on the situation of the siphon. In the ammonite this organ is always on the back of the shell, but never so in the nautilus.—*Buckland.*

The opinions of geologists and conchologists have greatly varied as to the situation and use of the shell of the am-

monite; Cuvier, Lamarck, Bakewell, and others, have supposed that the shell was an internal one, but the reasoning of Buckland on this subject, seems conclusively and indisputably to prove that the shell was external.

**AMMONITIFEROUS.** Containing the remains of ammonites.

**AMMONOCERAS.** } (from *ammon*, and  
**AMMONOCERATITES.** } *κέρας*, Gr.) The shells of this genus resemble ammonites in their internal structure, but that they are only curved instead of being spirally convolute.

**AMORPHOUS.** (from *a*, priv. and *μορφή*, form, Gr.) Bodies devoid of shape or form.

**AMPHELITE.** (from *ἄμπελος*, Gr. a vine.) A kind of aluminous slate, belonging to both the fossiliferous and metamorphic series of rocks.

**AMPHIBIA.** (from *ἀμφι* and *βίος*, Gr.) A class of animals possessing the property of living either in the water or on dry land. In the Linnæan system the amphibia form the third class of animals. The lungs of the amphibia differ greatly from those of animals of the classes aves and mammalia. Their body is covered with a shell, or with scales, or is quite naked. They have neither hair, mammæ, feathers, nor radiated fins: they are oviparous or viviparous, and are divided into reptiles and serpents; or reptilia pedata, and serpentes apodes, the former being furnished with teeth, and the latter being destitute of them. The class Amphibia, according to Gmelin, consists of two orders; the first, or Reptilia pedata, being divided into four genera, having generally four, seldom two feet, namely, Testudo, Draco, Rana, and Lacerta. 2nd, Serpentina, or serpentes apodes, having no feet. Some are ovo-viviparous, having the egg hatched in the oviduct. This order is divided into six genera, namely, Crotalus, or Rattle-snake, Boa, huge serpents of Asia and Africa, Coluber or viper, Anguis or blind worm, Amphibæna, and Cæcilia. Many of the amphibia possess the extraordinary property of reproducing parts, such as their legs, tails, &c., if destroyed.

**AMPHIBIOLITHI.** (from *ἀμφίβιος* and *λίθος*, Gr.) Fossil amphibia. The amphibiolithi form a very large and important class of fossils.

**AMPHIBIOUS.** (*ἀμφίβιος*, Gr. *amphibie*, Fr. *anfibo*, It.) That partakes of two natures, being able to live either in the air or in the water.

**AMPHIBIOUSNESS.** The quality of being able to live in two elements, air and water.

**AMPHIBOLE.** (*ἀμφίβολος*, Gr.) The name given by Haüy, and the French, to

hornblende: for particulars see *Hornblende*.

**AMPHIBOLITE.** Any rock whose basis is amphibole or hornblende.

**AMPHIGENE.** (from *αμφι* and *γένος*, Gr.) Trapezoidal zeolite, or leucite. This mineral, also called Vesuvian, occurs in imbedded grains or crystals, in the more ancient lavas, and is found mixed with garnet, hornblende, quartz, &c. in the ejected masses of old volcanoes.

**AMPHISBÆNA.** (from *ἀμφι* and *βαίνω*, Gr. to walk both ways.) The name given to a genus of serpents, natives of South America.

**AMPHITRITE.** A genus of Tubicola, of the division Articulata.

**AMPHORA.** A vessel used by the ancients, containing about seven gallons, and thus named from its having two handles.

**AMPLEXICAULENT.** (from *amplexus* and *caulis*, Lat.) Stem clasping; embracing the stem.

**AMPLEXUS.** A singularly formed fossil, resembling a coral or madrepora, found in the Dublin limestone: it is described as being nearly cylindrical, divided into chambers by numerous transverse septa, which embrace each other with reflected margins.—*Sowerby*.

**AMPULLARIA.** (from *ampulla*, Lat.) A ventricose, subglobose, univalve, with an umbilicated base; the opening oblong and entire, with no thickening on the left lip. The ampullaria is a river shell of warm climates. Its spire, which always slightly projects, distinguishes this genus from Planorbis; and there being no thickening on the left lip marks it from Natica.—*Parkinson*. Lamarck places the genus in the family Peristomata, order Trachellipoda. There are many species, as the Ampullaria patula, Ampullaria Sigaretina, &c.

**AMYGDALOID.** (*ἀμυγδαλή*, an almond, Gr. *amygdaloïde*, Fr.) A volcanic, or igneous, rock of any composition, containing nodules of minerals, scattered through its base, of a roundish shape; cellular volcanic rock, having its cells, or cavities, occupied with nodules of a dissimilar substance.

**AMYGDALOIDAL.** Containing rounded, or kernel-shaped, cavities, filled with mineral matter of a different character from the substance generally.

**AMYGDALYTE.** Almond-stone.

**ANAL.** Pertaining to the anus; the fin between the vent and the tail.

**ANALCIME.** A simple mineral, a variety of zeolite, with which it was formerly confounded; it is also called eubizite. It occurs regularly crystallised; in angular-granular concretions, and massive. Specific gravity above 2. When rubbed,

it acquires only a small degree of electricity, and with difficulty. It is composed of silica 55·07, alumina 20·22, soda 14·71, moisture 8·28. It is found, in secondary greenstone rocks, in various parts of Scotland, more especially near Edinburgh. This mineral, also called Cubizite, has been regarded by mineralogists as having the cube for its primitive form. Alalcime has certainly no cleavage planes, and it must be regarded at present as forming in this respect as great an anomaly in crystallography as it does in optics by its extraordinary optical phenomena. The most common form of analcime is the solid, called the icositetrahedron, which is bounded by twenty-four equal and similar trapezia; and we may regard it as derived from the cube, by cutting off each of its angles by three planes equally inclined to the three faces which contain the solid angle. The Abbé Haüy first observed in this mineral its property of yielding no electricity by friction, and derived the name of analcime from its want of this property.

**ANALOGOUS.** (from *ἀνά* and *λόγος*, Gr. *analogue*, Fr. *analogo*, It.) Having analogy; bearing some resemblance.

**ANALOGUE.** (*analogue*, Fr. *On le fait quelquefois substantif. Ce sont deux analogues.*) Any body which corresponds with, or bears great resemblance to, some other body. A recent shell of the same species with a fossil shell, is an Analogue of the latter.—*Lyell*.

**ANANCHYTES.** A helmet-shaped echinus, a fossil of the chalk formation.—*Bakewell*. It approaches near to the form of Spatangus globosus.

**ANASTOMO'SIS.** (*anastomose*, Fr. *anastomose*, It. from *ἀνά* and *στέμα*, Gr.) The running of vessels one into another, or communication by inoculation, as of the arteries into the veins.

**ANASTOMO'SING.** Communicating by anastomosis. Applied to vessels, threads or fibres, which by meeting or touching in separate points only, form a sort of network, or reticulation.

**ANATASE.** (*ἀνατάσις*, Gr. extension.) Pyramidal titanium; this mineral is nearly of the same nature as titanite. It is found in Dauphiny, Bavaria, Norway, Switzerland, Spain, and Brazil. It is a pure octahedral oxyde of titanium. Its colours are brown and blue; structure lamellar; lustre splendid and adamantine; it scratches glass. Specific gravity 3·80.

**ANATIFA.** A cuneiform multivalve, composed of several unequal valves, five or more, united together at the extremity of a cartilaginous tube, fixed at its base. The opening without an operculum.—

- Parkinson.* The genus comprises several species. It belongs to the class Cirrhopoda. The anatifæ are often found adhering to rocks, pieces of wood, the bottoms of ships, &c.
- ANATIFER.** (from *anas*, a duck, and *fero*, to bear, Lat.) A name given to the barnacle, or pentelasmis. The same as Anatifæ.
- ANCILLA.** } An oblong subcylindrical  
**ANCILLA'RIA.** } univale, with a short spire, not channelled: the aperture effused, and its base slightly notched.—*Parkinson.* The *eburna glabrata*, or ivory shell, belongs to the genus *Ancilla*.
- ANDALU'SITE.** A massive mineral of a red or grey colour; it occurs also crystallised. Lustre shining, glistening, and vitreous. Fracture uneven; is easily broken. Feebly translucent. Specific gravity 3.160. Constituent parts, alumina 52, silica 32, potash 8, oxide of iron 2. It was first found in Spain; it occurs in gneiss in England, Ireland, and Scotland.
- ANDRE'OLITE.** Thus named from its having been first found at Andreasberg, in the Hartz; called also Harmotome, and, sometimes, from the form of its crystals, cross-stone. Its crystals are two four-sided flattened prisms, terminated by four-sided pyramids, intersecting each other at right angles; the plane of intersection passing longitudinally through the prisms. Texture foliated. Colour milk-white. Constituent parts, silica 44, alumina 20, barytes 20, water 16. It effervesces with borax and microcosmic salt, and is reduced to a greenish opaque mass. With soda it melts into a frothy white enamel. When its powder is thrown on a hot coal, it emits a greenish yellow light.—*Thomson.*
- ANDRO'GYNAL.** } (from *ἀνήρ*, and *γύνη*,  
**ANDRO'GYNOUS.** } Gr.) Having two sexes; being both male and female; hermaphroditical. Plants bearing male and female flowers on the same root are thus called.
- ANEMO'METER.** (from *ἀνεμος* and *μέτρον*, Gr. *anémomètre*, Fr. *anemometro*, It.) An instrument for measuring the strength or velocity of the wind.
- ANGIOSPE'RMIA.** (from *ἀγγεῖον*, a receptacle, and *σπέρμα*, seed, Gr.) In the artificial system of Linnæus, an order of plants of the class Didynamia. It consists of plants having numerous seeds contained in a seed vessel. The class Didynamia is divided into two orders, Gymnospermia and Angiospermia. In the first order, or those having naked seeds, the plants are mostly wholesome and aromatic. In the second, where the seeds are enclosed in a seed-vessel, we find the *Digitalis*, and other poisonous plants.
- ANGIOSPE'RMIOUS.** (*angiosperme*, Fr.) Belonging to the order Angiospermia; having the seeds enclosed in a seed-vessel.
- ANGIO'STOMA.** } A family of univalve shells,  
**ANGYO'STOMA.** } in the order of Siphonobranchiata. It includes many genera, as the *Conus*, *Cypræa*, *Terebellum*, &c.
- A'NGLE.** (*angulus*, Lat. *angle*, Fr. *angolo*, It.) The point at which two lines meet.
- ANGU'LLIFORM.** (from *anguilla*, an eel, and *forma*, Lat.) A term given to fishes having the form of an eel.
- A'NGULAR.** Having angles or corners.
- ANGULA'RITY.** The quality of being angular.
- A'NGULARLY.** With angles or corners; in the direction of the angles.
- A'NGULARNESS.** The quality of being angular.
- A'NGULATED.** Formed with angles or corners.
- ANGULI'TES.** A species of fossil nautilus.
- ANGULO'SITY.** Angulated; cornered form.
- A'NGULOUS.** Angular; hooked.
- ANGU'STATE.** (*angustus*, Lat.) Beginning with a narrow base, which base then dilates and thickens.
- ANHY'DRITE.** Anhydrous gypsum. A variety of sulphate of lime, called anhydrous gypsum, or anhydrite, in consequence of its being quite free from water. It is harder than selenite, and sometimes contains chloride of sodium, when it is called muriacite. Its colours are white, blue, red, and grey. It occurs both massive and crystallised. Lustre alternates from splendent to glistening, and is pearly. Fracture splintery and conchoidal. Specific gravity 2.850. There are six varieties of this mineral.
- ANHY'DROUS.** (from *α*, priv. and *ὕδωρ*, water.) Without water in its composition.
- ANIMA'LCULAR.** Belonging to animalculæ, or animalcules.
- ANIMA'LCULE.** (*animalculum*, Lat. *animalcule*, Fr. *animaletto*, It.) An exceedingly small animal, scarcely discoverable by unaided vision, but which, by the help of the microscope, is found both in solids and fluids.
- A'NKERITE.** Paratomous limestone, a species of limestone thus named after Prof. Anker. It is found in the mines of Styria.
- A'NIMAL KINGDOM.** The animal kingdom comprehends beings the most diversified as to form, structure, and the media in which they live; for in it are found some organised to fly through the air, others to creep on the earth or burrow under its surface, and others to descend into, and inhabit the depths of the sea. Naturalists, taking the structure of animals for their basis, have arranged the whole animal kingdom under four great divisions,

namely, Vertebrata, Mollusca, Articulata, and Radiata.

In the first of these divisions is included man, and all those animals having the brain and principal trunk of the nervous system enclosed in a bony case, or envelope, formed by the skull and vertebræ. The division *Vertebrata*, or as it has been also termed *Spini-Cerebrata*, comprises Mammalia, Aves, Reptilia, Amphibia, Pisces. All these have red blood, a muscular heart, a mouth with two jaws, placed one above the other; organs of taste, smell, sight and hearing, placed in the cavities of the face; never more than four limbs, and the sexes always separated.

The second division, *Mollusca*, or *Cyclo-gangliata*, comprises Cephalopoda, Pteropoda, Gasteropoda, Conchifera, Tunnicata. These all possess no skeleton, and from that circumstance have been called soft animals, or Mollusca. The muscles are attached to the skin; they have no articulated members; they possess a heart and blood-vessels, and their circulation is double. Some are destitute of an external covering, and are called *Mollusca nuda*; others are enclosed in a shell, and these are termed Mollusca testacea. When the shell consists of one piece only, it is called univalvular; if of two pieces, bivalvular; and when it consists of a greater number, multivalvular.

The third division, *Articulata*, or *Diplo-Neura*, comprises Crustacea, Arachnida, Insecta, Myriapoda, Annelida, Cirrhopoda, Rotifera, Entozoa. In the *Articulata* may be observed the transition from circulation in closed vessels to nutrition by imbibition, and the corresponding transition from respiration in circumscribed organs to that effected by tracheæ, or air vessels, distributed throughout the body. In the crustacea, the nervous system is disposed in the form of two abdominal chords, and this form can be traced through the whole of the third division, from Crustacea to Entozoa.

The fourth division, *Radiata*, or *Cyclo-neura*, includes Echinoderma, Acalepha, Polypiphera, Poriphera, and Polygastrica. These animals, forming the lowest in the scale of creation, have been also called Zoophytes. Many of them bear a great resemblance to plants.

ANNE'LIDANS. } (from *annellus*, a small  
ANNE'LIDES. } ring, Lat.) Worms with red blood, whose bodies are composed of rings. Professor Buckland observes, "We have abundant evidence of the early and continued prevalence of that order of Annelidans, which formed shelly calcareous tubes, in the occurrence of fossil serpulæ, in nearly all formations, from the

transition periods to the present time." The shores of the sea, the moist sands of coasts, as well as the soils of all countries, are inhabited by myriads of worms, which are found to contain a red-coloured fluid, circulating in veins and arteries. These constitute the red bloody worms of naturalists, the "vers à sang rouge" of Cuvier. The term *annelida* is most frequently applied to them, from their being surrounded by rings, extending from the anterior to the posterior part of the body.—*Prof. Grant*.

A'NNOLIS. An American animal, resembling a lizard.

A'NNUAL. (from *annus*, Lat. *annuel*, Fr. *annuale*, It.)

1. That which comes yearly.

2. That which lasts only a year.

A'NNULAR. (from *annulus*, Lat. *annulaire*, Fr. *annulario*, It.) In the form of a ring.

ANNULA'RIA. A species of phalæna, of the geometra section.

A'NNULATE. (*annulatus*, Lat.) Formed or divided into distinct rings, or marked with differently-coloured annulations; surrounded by rings.

ANNULA'TION. Circular, or ring-like formations.

A'NNULOSE. Furnished with rings; composed of rings. The annulose animals form two great series; those without jointed feet, viz. vermes, annulosa, cirripeda; and those with jointed feet, namely, insecta, myriapoda, arachnida, crustacea.

ANOCY'STI. The incongruous assemblage of fossil substances, termed *echinites*, have been arranged by Leske into two classes: the first class is that of the *anocysti*, the vent of which is in the vertex. This class is arranged under two divisions, *Cidaris* and *Clypeus*.

ANODO'NTA. A form of bivalvular mollusc, with a transverse shell, having three muscular impressions: the hinge plain, having no appearance of a tooth.

ANO'MIA. A genus of molluscous multivalve. The anomie are inhabitants of every sea, and are found adhering to foreign bodies by means of an operculum, or valve.

ANO'MITE. A fossil shell of the genus *Anomia*.

ANOMORHOMBOI'DA. } (from *ἀνόμοιος*, ir-  
ANOMORHO'MBOID. } regular, and *ῥομβοειδής*, of a rhomboidal figure.) A genus of pellucid, crystalline spars, of no determinate, regular, external form, but always fracturing into regularly rhomboidal masses. Of this genus there are five known species, all possessing, in some degree, the double refraction of the island crystal.

**ANOPLOTHER'Æ.** } (from *ἄνοπλος*, un-  
**ANOPLOTHER'IUM.** } armed, and *θηρίον*,  
 a wild beast.) A fossil extinct quadruped,  
 belonging to the order Pachydermata, re-  
 sembling a pig. Five species of Anoplo-  
 therium have been found in the gypsum  
 of the neighbourhood of Paris. The  
 largest (*Anaplotherium commune*) being  
 of the size of a dwarf ass, with a thick  
 tail, equal in length to its body, and re-  
 sembling that of an otter; its probable  
 use was to assist the animal in swimming.  
 The posterior molar teeth in the genus  
*Anoplotherium* resemble those of the  
 rhinoceros; their feet are terminated by  
 two large toes, like the ruminating ani-  
 mals, whilst the composition of their  
 tarsus is like that of the camel. The  
 place of this genus stands, in one respect,  
 between the rhinoceros and the horse;  
 and in another, between the hippopota-  
 mus, the hog, and the camel.—*Buckland*.  
*Cuvier* has shown that the structure of  
 the hind-foot alone, is sufficient to prove  
 that the *Anoplotherium* was of a species  
 at present unknown.

**ANOR'MAL.** (*anormis*, Lat.) Irregular;  
 deformed.

**ANOR'THITE.** The mineral to which this  
 name is given is thus called from the ab-  
 sence of right angles in its fracture, which  
 circumstance serves to distinguish it. It  
 is a variety of felspar, and has been de-  
 scribed by *Rose*. Its specific gravity is  
 763. Its constituent parts are silica 44.49,  
 alumina 34.40, lime 15.68, magnesia 5.30,  
 oxide of iron, under 1.

**ANOR'THIC MELANE-ORE.** A species of  
 mellane-ore, called also *Allanite*, which  
 see.

**ANTA'CID.** (from *ἀντι* and *acid*.) Op-  
 posed to sourness; of an alkaline quality;  
 a remedy for acidity.

**ANTAGONIST.** (*antagonista*, Lat. *anta-*  
*goniste*, Fr. *antagonista*, It.) A term  
 applied to such muscles as oppose, or  
 counteract, others.

**ANTA'RTIC.** (from *ἀντι*, against, and  
*ἄρκτος*, the bear, or northern constella-  
 tion.)

1. The southern pole, so called, as oppo-  
 site to the northern.

2. One of the lesser circles, drawn on  
 the globe, at the distance of twenty-three  
 degrees and a half from the antarctic, or  
 south pole.

**ANTE'CIAN.** (from *ἀντικος*, Gr. living  
 opposite.) Those who live under the  
 same meridian east or west, but under  
 opposite parallels of latitude north and  
 south. The word is also written *Antoe-*  
*cian*.

**ANTEDILU'VIAL.** } (from *ante*, before, and  
**ANTEDILU'VIAN.** } *diluvium*, a deluge.)

1. Existing before the deluge.

2. Relating to things existing before the  
 deluge.

**ANTEDILU'VIAN.** One that lived before  
 the deluge.

**ANTEMU'NDANE.** (from *ante*, before, and  
*mundus*, the world.) That existed before  
 the creation of the world.

**ANTE'NNÆ.** (*antenna*, Lat. *antennes*, Fr.  
 This word appears by all lexicographers  
 to be given in the plural only.) Those  
 delicate moveable horns with which the  
 anterior part of the heads of insects are  
 furnished. These are peculiar to this  
 order of beings, and are easily distin-  
 guished from the tentaculæ of vermes, in  
 being crustaceous; and from the palpi of  
 insects, by their situation being nearer  
 the mouth. The antennæ rarely exceed  
 two in number, though in some insects  
 of the apterous kind they amount to four,  
 or even six. Of the uses of the antennæ  
 we are still ignorant.

The antennæ are jointed organs, placed  
 one on either side of the head between  
 the angle of the mouth and the eyes; the  
 variations in their structure are very  
 great. Those which consist of equal  
 joints are called equal; those whose  
 joints are dissimilar are called unequal.  
 The inequality of antennæ proceeds  
 chiefly from the differing form of their  
 second and last joint. Antennæ which  
 consist of but one joint are called exarti-  
 culate; those with two joints, biarticu-  
 late; with three, triarticulate; while  
 those whose joints are numerous are  
 called multiarticulate. The great ma-  
 jority of antennæ are completely naked;  
 others have a clothing consisting of  
 shorter or longer hair.

**ANTE'RIOR.** In conchology, the anterior of  
 bivalves is the side opposite to the  
 hinge; of a spiral univalve, that part of  
 the aperture most distant from its apex;  
 of a symmetrical conical univalve, that  
 part where the head of its inhabitant lies.

**ANTHER.** (*anthera*, Lat. *ἀνθηρά*, Gr.)  
 That part of the flower which contains  
 the fertilizing dust, pollen, or farina,  
 which, when mature, it scatters. The  
 anther forms the essential part of the  
 stamen. Anthers differ greatly as re-  
 gards their figure, number, and situation.  
 The most common form of the anther is  
 that of a grain of corn, only smaller; it  
 has a crease, or line, down it, as the  
 grain has, at which it opens when burst-  
 ing; this is generally turned inwards to-  
 wards the axis of the flower; but in  
 some plants, as the cucumber, iris, ranu-  
 culus, &c., it is turned outwards. The  
 anther is generally fixed immoveably to  
 the filament in various ways; but in  
 most of the grasses, and many other  
 plants, it is attached by its middle, and

the filament being very thin, it is moved by the slightest air. The plural of anther is anthera.

**ANTHOPHYLLITE.** (from *ἄνθος*, a flower, and *φύλλον*, a leaf, Gr.) A mineral occurring both crystallized and massive, of a yellowish grey, or brownish colour. Its constituent parts are, silica 56·0; alumina 3·0; magnesia 23·0; lime 2·0; oxide of iron 13·0; oxide of manganese 4·0.—*Gmelin.* Specific gravity 3·2. Alone, infusible before the blow-pipe; but with borax it yields a grass-green transparent bead. It is the prismatic schiller-spar of Mohs. It is found in Inverness-shire and in Norway.

**ANTHRACITE.** (from *ἀνθραξ*, Gr. *anthrax*, Lat.) A shining substance like black-lead; a species of mineral charcoal; a mineral approaching to the state of plumbago; it consists nearly of pure carbon, is hard to ignite, and has frequently a semi-metallic lustre. The coal in the extensive coal-formation in Pennsylvania is called anthracite, because it emits but little smoke in burning; but it is only a variety of common coal, containing but little bitumen, and is not the true anthracite of mineralogists. From the same circumstance, also, it has become a common thing to call the Welsh coal anthracite. Some anthracite contains 97 per cent. of carbon. Hardness from 2·0 to 2·5. Specific gravity from 1·3 to 1·6.

**ANTHRACITIC.** Partaking of the nature of anthracite.

**ANTHRA'COLITE.** The same as anthracite.

**ANTHRA'CONITE.** A variety of calcareous spar, of a black colour, with a compact fracture, of a glimmering lustre, and which, on rubbing, yields a sulphureo-bituminous odour.

**ANTHRACTHE'RIMUM.** (from *ἀνθράκτιος*, and *θηριον*, wild beast, Gr.) A name given to an extinct mammifer, thus named by Cuvier, supposed to belong to the Pachydermata, the bones of which, changed into a kind of coal, have been found in the lignite and coal of the tertiary strata. This genus was first discovered in the lignite of Cadibona, in Liguria: seven species are known, some approximating to the size and appearance of the hog; others approaching that of the hippopotamus.

**ANTHRÓPOLITE.** (from *ἄνθρωπος*, a man, and *λίθος*, a stone, Gr.) A petrification of the human body; a fossil human skeleton. Several skeletons of men, more or less mutilated, have been found in the West Indies; these still retain some of their animal matter, and all their phosphate of lime. One of them may be seen in the British Museum, and another in the Royal Cabinet at Paris.

**ANTHROPOMÓRFHOUS.** (*ἄνθρωπομορφος*, from *ἄνθρωπος*, a man, and *μορφή*, form, Gr.) Having a form resembling the human.

**ANTIA'CID.** Contrary to sourness; of an alkaline quality; remedial of acidity. More generally written antacid.

**Α'ΝΤΙΧΡΟΝΙΣΜ.** (from *ἀντι*, against, and *χρόνος*, time.) Deviation from the right order, or account, of time.

**ANTICLINAL.** If a range of hills, or a valley, be composed of strata, which on the two sides dip in opposite directions, the imaginary line that lies between them, towards which the strata on each side rise, is called the anticlinal axis. In a row of houses, with steep roofs facing the south, the slates represent inclined strata dipping north and south, and the ridge is an east and west anticlinal axis.—*Lyell.*

In most cases an anticlinal axis forms a ridge, and a synclinal axis a valley.

**ANTIMO'NIAL.** Made of antimony; having the properties of antimony.

**ANTIMO'NIATE.** } A salt formed by the com-  
**ANTI'MONITE.** } bination of antimonic acid with a salifiable base.

**Α'NTIMONY.** (*antimoine*, Fr. *antimonio*, It. The derivation of this word is not agreed on, some lexicographers stating it to be from *ἀντι* and *μόνος*, two Greek words, signifying that it is never found alone: Dr. Johnson, however, on the authority of Furetiere, refers it to a ludicrous story related of Basil Valentine, a German, who appears to have been the discoverer of the metal in 1620; it is stated that he was a monk, and practised as a physician, and having thrown some of it to the hogs, he observed that after it had purged them, they immediately fattened; imagining that the effect on bipeds would be similar, he administered a like dose to his fellow monks. The experiment, however, proved rather an unfortunate one, for, in consequence of the dose being too large, they all died of it, and the substance thenceforth obtained the name of Antimoine, i. e. Antimonk.) A metallic ore, consisting of sulphur combined with the metal which is properly called antimony. This metal is of a bluish-white colour, and considerable brilliancy, with a specific gravity of 6·712. It fuses at a temperature of 900, but requires a greatly increased heat to volatilize it. It is not malleable, being so brittle as to be easily reduced to powder by trituration, and its ductility is inconsiderable. The most abundant ore of antimony is that in which it is found combined with sulphur, and called sulphuret of antimony. Antimony combines with chlorine so rapidly as to produce a shower of fire, if it be poured,

finely powdered, into a glass jar, filled with that gas. It unites with many metals, some of the alloys being useful. That with lead is used for the plates on which music is engraved. With tin it forms a kind of pewter, and with lead and copper it forms printer's type metal. Native, or rhombohedral antimony, occurs in metalliferous veins in primitive rocks in Sweden, and in the mountains of Hannover, Dauphiny, Hungary, Brazil, and Mexico.

**ANTIPÁRALLEL.** Lines which make equal angles with other lines, but in a contrary order; running in a contrary direction.

**ANTI'PATHES.** The name given by Linnæus to black coral, a genus of *Ceratomyta*.

**ANTI'PODAL.** (from *antipodes*.) Relating to the countries inhabited by the antipodes; opposed.

**ANTI'PODE.** (*ἀντιπόδες*, Gr. *antipode*, Fr. *antipodi*, It.) Although this word is occasionally, and with propriety, used in the singular, yet it is more commonly used in the plural number; antipodes.

Those people who, from their situation on the globe, have their feet opposed directly to each other.

**AN'TIQUATED.** In conchology, longitudinally furrowed, but interrupted by transverse furrows, as if the shell had acquired new growth at each furrow.

**ANTISE'PTIC.** (from *ἀντι*, against, and *σήπω*, to putrefy, Gr.) Substances which prevent putrefaction.

**A'NTLER.** The horn of the stag, or elk.

**A'NTLERED.** Having antlers, as the antlered elk of Ireland; now extinct.

**A'NTŒCI.** } See *Anteciens*.

**A NTŒCIANS.** }

**A'NTRUM.** (*antrum*, Lat. *antre*, Fr. *antro*, It.)

1. A cavern; a cave; a den.

2. The maxillary sinus, situate above the molar teeth of the upper jaw.

**A'NUS.** (*anus*, Lat. *anus*, Fr. *ano*, It.)

1. The termination downwards of the intestinal canal.

2. In conchology, a depression on the posterior side near the hinge of bivalves.

**AÓRTA.** (*ἀορτή*, Gr. *aorte*, Fr. *aorta*, It.)

The principal artery of the body, which arises from the left ventricle of the heart.

**A'PATITE.** A genus of calcareous and brittle earths, composed of lime 55.75 and phosphoric acid 44.25. Apatites are white, green, blue, red, brown, and yellow; they occur both crystallized and massive. Fracture conchoidal and uneven; lustre resinous. Specific gravity 3.1. The crystals are six-sided prisms, low, and sometimes passing into the six-sided table. One set of varieties, in which the cleavage is very distinct, is

named foliated apatite; another, in which the fracture is conchoidal, is called conchoidal apatite; and such varieties as display an uneven fracture have obtained the name of phosphorite. The crystallized variety is found, extremely beautiful, in Devon and Cornwall.

**A'PENNINE.** Relating to the chain of mountains called the Apennines.

**A'PENNINES.** (*apenninus*, Lat.) A chain of mountains extending through Italy. What now constitutes the central calcareous chain of the Apennines must for a long time have been a narrow ridgy peninsula, branching off, at its northern extremity, from the Alps near Savona. This peninsula was afterwards raised from one to two thousand feet, by which movement the ancient shores, and, for a certain extent, the bed of the contiguous sea, were laid dry, both on the side of the Mediterranean, and the Adriatic. — *Lyell*.

**A'PERTURE.** (from *apertus*, open.) An opening; a chasm; a mouth, or entrance.

**APE'TALOUS.** (from *a*, priv. and *πέταλον*, a flower-leaf, or petal, Gr.) Without flower-leaves, or petals; not having petals.

**APE'TALOUSNESS.** The state of being without flower-leaves, or petals.

**A'PEX.** (Lat.) The tip or point of any thing; the highest point of a hill or mountain. This word makes *apices* in the plural, and not *apexes*.

**A'PHANITE.** (from *a*, priv. and *φαίνω*, Gr. *luceo*.) A mineral, a variety of amphibole.

**APHÉLION.** (from *ἀπὸ*, from, and *ἥλιος*, the sun, Gr.) That point of any planet which is most distant from the sun; the point of an orbit farthest from the sun.

**A'PHIS.** Plural aphides. The puceron, or plant-louse. Class *Insecta*, order *Hemiptera*. The numerous tribes of this family of insects are most annoying to the florist, and most destructive to the plants. The best means of destroying them is either by fumigations of tobacco, or by watering the plants with a weak solution of the chloride of lime. They are astonishingly prolific; they live in society on trees and plants, of which they suck the juices with their trunk.

**A'PHRITE.** (from *ἀφρος*, spuma, Gr.) A species of stone composed of carbonate of lime, and thus named from its frothy, silver-white, appearance.

**A'PHRIZITE.** A variety of black tourmaline.

**APHYLLA'NTES.** (from *a*, priv. *φύλλον*, a leaf, and *άνθος*, a flower.) An apetalous flower; a genus of plants, class *Hexandria*, order *Monogynia*.

**APHY'LLOUS.** (from *a*, priv. and *φύλλον*, a leaf.) Without leaves; leafless.

**APIOCRINITE.** } The pear  
**APIOCRINITES ROTUNDUS.** } encrinite,  
 so named from the remains of the animal  
 possessing a pear-like form. The Apio-  
 crinites rotundus, or Pear encrinite has  
 been plentifully found in the neighbour-  
 hood of Bradford, near Bath, and at  
 Pffingen, in Germany. In reference to  
 this species of encrinite, Professor Buck-  
 land thus writes: "When living, their  
 roots were confluent, and formed a thin  
 pavement at this place, over the bottom  
 of the sea, from which their stems and  
 branches rose into a thick submarine  
 forest, composed of these beautiful zoo-  
 phytes. The stems and bodies are occa-  
 sionally found united, as in their living  
 state; the arms and fingers have almost  
 always been separated, but their dislo-  
 cated fragments still remain, covering  
 the pavement of roots that overspreads  
 the surface of the subjacent oolitic lime-  
 stone rock.

**ΑΡΟΔΑ.** An order of animals belonging  
 to the class Echinodermata; division  
 Radiata. They are distinguished from  
 Pedicellata by the absence of the vesicu-  
 lar feet, which peculiarly belong to animals  
 of that order.

**ΑΡΟΓΕΕ.** (*apogee*, Fr. *apogeo*, It. *apo-  
 gæum*, Lat. from *ἀπό* and *γαῖα*, Gr.)  
 That point of an orbit furthest from the  
 earth. The apogee of the sun is that  
 part of the earth's orbit which is at the  
 greatest distance from the sun.

**ΑΡΟΦΥΛΛΙΤΗ.** A mineral whose consti-  
 tuent parts are silica 50·76, lime 22·39,  
 potash 4·18, water 17·36, and a trace of  
 fluoric acid. This substance is called  
 also Ichthyophthalmite, and Fish-eye  
 stone. It occurs both massive and regu-  
 larly crystallized. It is found in  
 Sweden, in secondary traprocks in Scot-  
 land and the Hebrides, and in Iceland,  
 whence the finest specimens are ob-  
 tained.

**ΑΡΟΦΥΣΙΣ.** (*ἀρόφυσις*, Gr. *apophyse*,  
 Fr.) A process of a bone, and part of  
 the same bone; herein differing from  
 epiphysis, which is a process attached to  
 a bone, and not a part of the same bone;  
 an excrescence.

**ΑΡΡΕΝΔΑΓΕ.** Something added to another  
 thing, without being necessary to its  
 essence. In botany, applied to additional  
 organs of plants, which are not universal  
 or essential; neither is any one plant  
 furnished with them all. Botanists distin-  
 guish seven kinds of appendages, namely,  
 stipules, floral leaves, thorns, prickles,  
 tendrils, glands, and hairs.

**ΑΡΡΕΝΔΑΝΤ.** (from *appendo*, Lat.) Hang-  
 ing to something else, but not forming an  
 integral part.

**ΑΡΡΕΝΔΑΝΤ.** That which belongs to

another thing, as an accidental, or ad-  
 ventitious, part.

**ΑΡΡΕΝΔΙΚΛΗ.** (*appendicula*, Lat.) A small  
 appendage.

**ΑΡΡΕΝΔΙΚΥΛΑΤΗ.** Appendicled, or ap-  
 pended. Applied to flowers furnished  
 with some addition distinct from the  
 tube; to petioles with leafy films at the  
 base; to seeds furnished with hooks,  
 scales, &c.

**ΑΡΡΕΤΕΝΚΥ.** (*appetentia*, Lat. *appetence*,  
 Fr.) The disposition of organized bodies  
 to select and imbibe such portions of  
 matter as serve to support and nourish  
 them.—*Webster*.

**ΑΡΡΕΤΙΘΗ.** (*appositio*, Lat. *apposition*,  
 Fr. *addizione*, It.) The addition of new  
 matter.

**ΑΡΡΕΣΣΕΔ.** (*apressus*, Lat.) In bot-  
 any, applied to leaves pressed to the  
 stem; also to peduncles.

**ΑΡΡΥΛΣΗ.** (*appulsus*, Lat. *appulse*, Fr.  
*appulso*, It.)  
 1. The act of striking against anything.  
 2. The approach of any planet to a con-  
 junction.

**ΑΡΡΥΣΙΔΕΣ.** (*apsides*, Fr. from *ἀψίς*, Gr.)  
 The plural of *apsis*.) Those two points  
 in the orbit of a planet, one of which is  
 the farthest from, and the other the  
 nearest to the sun. The motion of the  
 apsides may be represented, by supposing  
 a planet to move in an ellipse, while the  
 ellipse itself is slowly revolving about  
 the sun in the same plane. This motion  
 of the major axis, which is direct in all  
 the orbits except that of the planet  
 Venus, is irregular, and so slow, that it  
 requires more than 109,830 years for the  
 major axis of the earth's orbit to accom-  
 plish a sidereal revolution.

**ΑΡΡΥΣΙΣ.** (*ἀψίς*, Gr. *apsis*, Lat.) A term  
 used indifferently for either of the two  
 points of a planet's orbit, where it is at  
 the greatest or least distance from the sun  
 or earth; and hence the line connecting  
 those points is called the line of the  
 apsides. The *apsis* at the greatest dis-  
 tance from the sun is called the *aphelion*,  
 and at the greatest distance from the  
 earth is called the *apogee*; while that at  
 the least distance from the sun is termed  
 the *perihelion*, and at the least distance  
 from the earth, the *perigee*.

**ΑΡΡΥΤΕΡ.** } (from *α*, priv. and *πτερον*, a  
**ΑΡΡΥΤΕΡΑ.** } wing.) Insects which have  
 no wings, forming, according to the Lin-  
 naean system, the seventh order of in-  
 sects.

**ΑΡΡΥΤΕΡΟΥΣ.** Destitute of wings; wingless.

**ΑΡΡΥΛΜ.** The name of a metallic substance  
 obtained from alumina.

**ΑΡΡΥΡΟΥΣ.** (from *α*, priv. and *πύρ*, Gr.  
*apyre*, Fr.) Capable of resisting the  
 action of fire.

**AQUARIUS.** The water-bearer, or eleventh sign in the zodiac. A constellation which is supposed to have obtained this name from the opinion that its rising brings with it an abundance of rain. It rises in January and sets in February. This constellation contains, according to Ptolemy and Kepler 45 stars, but according to Flamsted 108.

**AQUATIC.** } (*aquaticus*, Lat. *aquatique*,  
**AQUATICAL.** } Fr. *aquatico*, It.) Relat-  
**AQUATICK.** } ing to the water; that in-  
 habits, or frequents, the water; that grows  
 in the water.

**AQUATILE.** (*aquatilis*, Lat. *aquatile*, Fr. *aquatile*, It.) See *Aquatic*.

**AQUEOUS.** (*aqueus*, Lat. *aqueux*, Fr. *acqueus*, It.) Watery.

**AQUEOUSNESS.** Waterishness.

**ARACHNIDA.** } (from *αράχνη* and *είδος*,  
**ARACHNIDAN.** } Gr. resembling a spider.)

The arachnida are members of that series of annulose animals possessing jointed feet, and belong to the third class of articulated animals. The two great families in the higher order of living arachnidans are spiders and scorpions.—*Buckland*. In the arrangement of Cuvier, the arachnidans compose the second class of articulated animals provided with moveable feet. They have no wings, and do not undergo any metamorphosis, merely casting their skin. The majority of the arachnidans feed on insects; some are parasitical, living on vertebrated animals; others are found in flour, in cheese, and on vegetables. Cuvier has divided the arachnidans into two orders, Pulmonariæ and Tracheariæ; the former he subdivided into families, Araneides and Pedipalpi; the latter into three families, Pseudo-Scorpiones, Pycnogonides, and Holaria.

**ARACHNOID.** }

**ARACHNOIDES.** }

1. A cobweb-like membrane, forming one of the tunics or coats of the brain.
2. One of the tunics, or coats, of the eye.
3. A species of fossil madreporæ.

**ARBOREOUS.** (*arboreus*, Lat.)

1. Belonging to trees; resembling trees.
2. A term used to distinguish such mosses, or funguses, as grow upon trees, from those that grow on the ground.

**ARBORESCENCE.** (from *arboresco*, Lat.) The likeness of a tree, frequently observed in crystallizations and in mineral productions.

**ARBORESCENT.** Resembling a tree; growing like a tree; becoming woody.

**ARC OF A CIRCLE.** An arc of a circle is any part of its circumference; and the chord, or subtense of an arc, is a straight line joining the two extremities of that arc.

**ARCHED.** (*arcuatus*, Lat.) In the form of a bow.

**ARCA.** A transverse inequilateral shell: the beaks distant; the hinge with many teeth disposed in a straight line. These are marine shells. Lamarck particularizes seven species.

**ARCHÆOLOGICAL.** } Relating to a discourse  
**ARCHEOLOGICAL.** } on antiquity.

**ARCHÆOLOGŸ.** } (from *ἀρχαῖος*, ancient, and  
**ARCHEOLOGY.** } *λόγος*, discourse, Gr.) A  
 discourse on subjects connected with anti-  
 quity; the science which treats of anti-  
 quities.

**ARCHETYPE.** (*archétype*, Fr.) The original of which any resemblance is made.

**ARCTIC.** } (from *ἄρκτος*, ursus; *arctique*,  
**ARCTICK.** } Fr. *artico*, It.) Northern;  
 lying under the arctos, or bear.

**ARCTIC CIRCLE.** One of the lesser circles of the sphere, twenty-three degrees and twenty-eight minutes from the north pole. The circle at which the northern frigid zone begins. This and its opposite, the antarctic, are called the two polar circles.

**ARCUATE.** (*arcuatus*, Lat.) Bent like a bow; in the form of an arch; incurvated.

**ARCUATILE.** (*arcuatilis*, Lat.) Bent in the form of an arch; crooked like a bow; bowed.

**ARCUATION.** The act of bending anything; the state of being bent in the form of an arch; curving; bending.

**ARCUATURE.** The curvature of an arch.

**AREA.** (*area*, Lat.) The surface contained between lines and boundaries.

**AREFACTION.** (from *arefacio*, Lat.) The state of growing dry; the act of drying.

**AREFY.** To dry; to free from moisture.

**ARENACEOUS.** (*arenaceus*, Lat.) Sandy; having the properties, or appearance, of sand.

**ARENILITIC.** Resembling sandstone; having the quality of sandstone; composed of sandstone.

**ARENLOSE.** } Sandy; full of sand.

**ARENOUS.** }

**ARENALOUS.** Full of sand; sandy; gravelly.

**AREOMETER.** (from *ἀραιός*, and *μετρέω*, Gr. *areomètre*, Fr.) An instrument for measuring the density or weight of any liquid.

**AREOMETRY.** The art of measuring the density or gravity of fluids.

**ARGAL.** Crude tartar, as deposited by vinous fermentation.

**ARGENTAL.** (from *argentum*, Lat.) Containing silver; combined with silver.)

**ARGENTIFEROUS.** (from *argentum* and *fero*, Lat.) Producing silver.

**ARGENTINA.** A genus of fishes of the order of abdominales.

**ARGENTINE.** (*argentin*, Fr.) Appearing like silver; resembling silver.

**ARGENTINE.** Slate-spar; a mineral of

a lamellated, or slaty structure; a nearly pure sub-species of carbonate of lime.

**A'RGIL.** } (*argilla*, Lat. ἄργιλλος, or ἄρ-  
**A'RGILL.** } γιλος, Gr. *argille*, Fr. *argilla*,  
 It.) In 1754, Margraff showed that the basis of alum is an earth of a peculiar nature different from every other; an earth which is an essential ingredient in clays, and gives them their peculiar properties. Hence this earth was called argill; Morveau afterwards gave it the name of alumina, because it is obtained in the state of greatest purity from alum.

**ARGILLA.** A genus of argillaceous earths.  
**ARGILLA'CEOUS.** (*argillaceous*, Latin.) Clayey; of the nature of argil; containing argil.

**ARGILLA'CEOUS-SCHIST.** Clay slate. An indurated clay, or shale, common to the fossiliferous and metamorphic series.

**ARGILLI'FEROUS.** (from *argilla* and *fero*, Lat.) Producing or yielding clay.

**A'RGILLITE.** Argillaceous-schist, or clay-slate. Slate is a very extensive formation, composing entire mountains in many alpine districts. The prevailing colours are bluish, or greenish grey: it has a silky lustre.

**ARGILLI'TIC.** Containing argillite; of the quality of argillite; resembling argillite.

**ARGILLOUS.** (*argillosus*, Lat. *argilleux*, Fr. *argilloso*, It.) Containing clay; of the nature or quality of clay.

**ARGONA'UTA.** The Paper Sailor; a genus of animals; class Vermes, order Testacea. There are several species, but the most remarkable one is the Argonauta Argo, or Paper Nautilus. "Doubts still exist whether the Sepia found within this shell be really the constructor of it, or a parasitic intruder into a shell formed by some other animal not yet discovered. Broderip, Gray, and Sowerby, are of opinion, that this shell is constructed by an animal allied to Carinaria."—*Buckland*.

Cuvier placed argonauta among the subgenera of Sepia, and Dr. M'Murtrie, in his translation, says, "These mollusca are always found in a very thin shell, symmetrically fluted and spirally convoluted, the last whorl so large that it bears some resemblance to a galley of which the spine is the poop. The animal makes a consequent use of it, and in calm weather whole fleets of them may be observed navigating the surface of the ocean, employing six of their tentacula as oars, and elevating the two membranous ones by way of a sail. If the sea become rough, or they perceive any danger, the argonaut withdraws all its arms, concentrates itself in its shell, and descends to the bottom."

**A'RID.** (*aridus*, Lat. *aride*, Fr. *arido*, It.) Dry; parched up; devoid of moisture.

**ARIDITY.** } *ariditas*, Lat. *aridité*, Fr.  
**A'RIDNESS.** } *aridità*, It.) Dryness; the state of being without moisture.

**ARMADI'LO.** (*armadille*, Fr.) The Dasy-pus of Linnæus, and placed by him in the order Brady-poda, class Mammalia. Cuvier has placed the armadillo in the order Edentata, or quadrupeds having no front teeth, class Mammalia. The armadillo is constructed with unusual adaptations to the habit of burrowing in search of its food, and shelter in the sand; its fore feet forming instruments of peculiar power for the purpose of digging; and presenting an extraordinary enlargement and elongation of the extreme bones of the toes, for the support of long and massive claws. The armadillo and chlamyphorus are the only known animals that have a compact coat of plated armour. There are several subgenera.

**ARI'LLUS.** } (*arillus*, Lat.) A substance

**A'RIL.** } enclosing the seed in some plants: it is either a complete or partial covering of a seed, fixed to its base only, and more or less loosely or closely enveloping its other parts. Mace is the *arillus* of the nutmeg: the red arillus of the seed of the common spindle-tree is well known, and is very ornamental in our hedges in the autumn.

**A'RMATURE.** (*armatura*, Lat. *armature*, Fr.)

1. That by which the body is protected from injury.
2. Weapons of attack.

**ARME'NIAN STONE.** A blue mineral, or earth, variously spotted. It much resembles Lapis lazuli.

**ARRA'GONITE.** A variety of carbonate of lime, found originally in Arragon, in Spain, from which circumstance it has obtained its name. Its colours are white, grey, green, and blue; it is found both crystallized and massive. It is frequently combined with a small proportion, about four per cent. of carbonate of strontites.

**ARSE'NIATE.** A compound of arsenical acid with a metallic oxide; many arseniates are found native; when heated along with charcoal powder, they are decomposed, and arsenic sublimes.

**A'RSENIC.** (*ἀρσενικόν*, Gr. *arsenic*, Fr. *arsenico*, It.) Native arsenic is a mineral found in Germany, France, and England. It occurs generally in masses of various shapes; its colour is that of blue steel; it is brittle: its surface readily tarnishes on exposure to the atmosphere. When struck it gives a smell resembling garlic; before the blow-pipe it emits a white smoke, burns with a bluish flame, gives a

strong garlicky smell, and deposits a white powder. This metal and all its compounds are virulent poisons. Combined with sulphur it forms orpiment or realgar, or the yellow and red sulphurets of arsenic. The term *ἀρσενικόν*, from which the word arsenic is derived, was an ancient epithet, applied to those natural substances which possessed strong and acrimonious qualities, and as the poisonous quality of arsenic was found to be remarkably powerful, the term was especially applied to orpiment, the form in which this metal more usually occurred. Dr. Paris, from whose work the above is quoted, states that in the celebrated plague of London, amulets of arsenic were worn, suspended over the region of the heart, as a preservative against infection; on the principle, so prevalent at one period, that all poisonous substances possess a powerful and mutual elective attraction for each other.

**ARSENICAL.** Containing arsenic.

**ARSENITE.** A name given by Fourcroy to the combinations formed between oxide of arsenic, or arsenious acid, and the earths and alkalis. Arsenite of potassa is the active ingredient in Fowler's Ague Drop, and in the Liquor Potassæ Arsenitis of the Pharmacopœia.

**ARTERIAL.** (*arterialis*, Lat. *arterial*, Fr. *arteriale*, It.) Pertaining to an artery; that is contained in an artery.

**ARTERY.** (from *ἀρ*, and *τήρῆω*, Gr. *artère*, Fr. *arterio*, It. Thus called because the ancients thought that only air was contained in the arteries.) The arteries are strong elastic canals, which convey the blood from the heart to the different parts of the body, and, during life, are distinguished from the veins by their pulsation. The original trunks of the arteries are two in number, and from these all the other arteries are derived.

**ARTESIAN WELLS.** Springs of water, or fountains, obtained by boring through strata destitute of water into lower strata loaded with this fluid, to sometimes great depths; thus named from its having been first practised at Artois, the ancient Artesium, in France. In forming an Artesian well, if the boring penetrate a bed containing impure water, it should be continued deeper until it arrives at another stratum containing pure water; the bottom of the pipe being plunged into this pure water, it ascends within it, and is conducted to the surface through whatever impurities may exist in the superior strata. The impure water, through which the boring may pass in its descent, being excluded by the pipe from mixing with the pure water ascending from below. The height to which these springs will

rise above the surface must depend on the quantum of hydrostatic pressure from below; this is sometimes very great. The water of an Artesian well in Rousillon rises from thirty to fifty feet above the surface. At Perpignan and Tours, M. Arago states that the water rushes up with such extreme force as violently to eject a cannon ball placed in the pipe. An economical and easy method of sinking Artesian wells has recently been practised. Instead of the tardy and costly process of boring with a number of iron rods screwed to each other, one heavy bar of cast iron, about six feet long, and four inches in diameter, armed at its lower end with a cutting chisel, and surrounded by a hollow chamber, to receive through valves, and bring up the detritus of the perforated stratum, is suspended from the end of a strong rope, which passes over a wheel or pulley fixed above the spot in which the hole is made. As this rope is moved up and down over the wheel, its torsion gives to the bar of iron a circular motion, sufficient to vary the place of the cutting chisel at each descent. When the chamber is full, the whole apparatus is raised quickly to the surface to be unloaded, and is again let down by the action of the wheel.—*Buckland.*

**ARTICULAR.** (*articularis*, Lat. *articulaire*, Fr. *articolare*, It.) Belonging to the joints.

**ARTICULATA.** One of the four great existing divisions of the animal kingdom; the third in Cuvier's arrangement, the other three being the Vertebrata, the Mollusca, and the Radiata. The earliest examples furnished by geological research, of articulated animals, or such as belong to the division Articulata, are those afforded by the extinct family of Trilobites. This division of the animal kingdom comprehends four classes: 1. The Annelidans, or worms with red blood; 2. The Crustaceans, as the lobster, shrimp, &c.; 3. The Arachnidans; 4. Insects. In the Articulata is observed the transition from circulation in closed vessels to nutrition by imbibition, and the corresponding transition from respiration in circumscribed organs to that effected by tracheæ, or air vessels, distributed through the body. This third division of the animal kingdom has been named by Professor Grant, *Diplo-Neura*. It comprises Crustacea, Arachnida, Insecta, Myriapoda, Annelida, Cirrhopoda, Rotifera, and Entozoa. In the Crustacea, the nervous system is disposed in the form of two abdominal chords, and this form can be traced through the whole of the third division, from Crustacea to Entozoa inclusive.

**ARTICULATED.** Jointed; having joints; united by joints. In botany, the term articulated is applied to leaves, when one leaflet, or pair of leaflets, grow out of the summit of another, with a sort of joint; to stems divided by joints or knots, or divided from space to space by contractions; to culm with joints.

**ARTICULATING.** Fitting by means of joints.

**ARTICULATION.** (*articulatio*, Lat. *articulation*, Fr. *articolazione*, It.) The juncture or joint of bones. There are three kinds of articulation, 1. Immoveable, called Synarthrosis; 2. Moveable, or Diarthrosis; 3. Mixed, or Amphiarthrosis.

**ARTICULO'SA.** See *Articulata*.

**ARUNDINACEOUS.** (Lat.) Resembling reeds.

**ARUNDINEOUS.** } (*arundineus*, Latin)

**ARUNDINOSE.** } Reedy; abounding with reeds.

**ARYTÆNOID.** (from *ἄρυταινα*, a ewer, and *ἕδος*, resemblance, Gr.) A name given to some of the cartilages, glands, and muscles of the larynx.

**A'SAPHUS.** (*ἀσαφής*, Gr. *obscurus*.) A genus of Trilobites. Professor Buckland observes, in writing of Trilobites, "Fossils of this family were long confounded with insects, under the name of *Entomolithus paradoxus*; after many disputes respecting their true nature, their place has now been fixed in a separate section of the class Crustaceans, and although the entire family appears to have been annihilated at so early a period as the termination of the carboniferous strata, they nevertheless present analogies of structure, which place them in near approximation to the inhabitants of the existing seas.

**ASBESTINE.** Incombustible; partaking of the properties of asbestos.

**ASBESTINITE.** A species of asbestos. This mineral is amorphous. Texture foliated. Lustre silky, 3. Specific gravity 2·880. Colour white, with shades of red, yellow, blue, and green. At 150° Wedgewood, it melts into a green glass.

**ASBESTOID.** A mineral, thus called from its resemblance to Asbestos. It is amorphous. Texture foliated or striated. Specific gravity from ·3 to 3·30. Colour olive or green. It consists of silica 46, oxide of iron 25, lime 11, oxide of manganese 10, magnesia 8.

**ASBESTOS.** } (*ἄσβεστος*, Gr. *nomen lapidis*,  
**ASBESTUS.** } *unde telæ fiunt, quæ non comburuntur in igni; asbeste*, Fr. *asbeste*, It.) A mineral of which there are several varieties, all marked by their fibrous flexible quality. Asbestos is itself a variety of hornblende. It was well known to the ancients, by whom a kind of cloth was

made of one of its varieties, which was esteemed to be incombustible. It is found abundantly in most mountainous countries, and in the isle of Anglesea it lies in considerable quantities between the beds of serpentine. Although fire acts slowly on its fibres, yet it will, in the course of time, consume them. It is commonly amorphous. Texture fibrous. Lustre from 0 to 2. Hardness from 3 to 7. It absorbs water. Colours white, green, blue, yellow, and brown. Its constituent parts are, silica 60, magnesia 30, lime 6, alumina 4. It feels soapy or greasy. For one of its varieties, flexible asbestos, see *Anianthus*. Another variety has obtained the name of mountain cork, from its swimming when thrown into water. This variety has a strong resemblance to common cork. Its fibres are interwoven. Specific gravity from 0·6806 to 0·9933. It feels meagre; yields to the fingers like cork, and is somewhat elastic. Colour white or grey. Its constituent parts are, silica 62, carbonate of magnesia 23, carbonate of lime 12, alumina 2·7, oxide of iron 2·3. One variety is called rigid or common asbestos. Of this the colours are usually green, and disposed in straight, pearly, rigid fibrous concretions. Soapy or unctuous to the feel. Another variety is known by the names of rockwood, mountainwood, or ligneous asbestos. The colour of this variety is brown, and its general appearance greatly resembles fossil wood.

**A'SCARIS.** (*ἀσκαρίς*, Gr.) Cuvier placed the ascaris in the order Nematodea, class Entozoa. The thread-worm.

**ASCIDIA.** A genus of animals found in the sea, adhering to the rocks. Class Vermes, order Mollusca.

**ASCITIOUS.** (*ascitius*, Lat.) Supplemental; additional; not originally forming part of.

**ASH-COLOURED.** Coloured between brown and grey.

**A'SHLAR.** A name given to freestone as it is taken from the quarry.

**ASIPHONIBRANCHIATA.** In De Blainville's system, the second order of the class Paracephalophora Dicoica, comprising the genera Gonistomata, Cristostomata, Hemicyclostomata, Ellipsostomata, and Oxy-stomata.

**ASLANT.** Obliquely; not perpendicularly.

**A'SPHALT.** } (*ἀσφαλτος*, Gr. *bitumen*, *as-*

**ASPHAL'TOS.** } *phalte*, Fr.) A bituminous

**ASPHALTUM.** } substance, found abundantly on the shores of the Dead Sea, in the island of Trinidad, in China, America, and various parts of Europe. Its colour is brown or black; it is lighter than water, and easily soluble in naphtha, but quite

- insoluble in water. Fracture conchoidal. Brittle. Feels smooth, but not unctuous. Does not stain the fingers. On the surface of the Dead Sea it is found floating in a state of liquidity, but exposure to the air soon renders it hard. It melts easily when heated, and, if pure, burns without leaving any ashes.
- A'SPEROUS.** Rough; uneven.
- ASPIDORHY'NCHUS.** The name given to a fossil Sauroid fish from the lime stone of Solenhofen. An example of this is given by Professor Buckland in his Bridge-water Treatise, pl. 27 *a*, fig. 5.
- ASSA'Y.** The operation of determining the proportion of precious metal contained in any mineral or metallic compound, by analyzing a portion thereof.
- A'STACID.** } The craw-fish, or lobster; a  
**A'STACITE.** } genus of the family Macroura; it is divided into four sections each consisting of many subgenera. The lobster, crab, craw-fish, prawn, and shrimp are included.
- A'STACUS.** (from *αστακος*, Gr. *astacus*, Lat.) The lobster or craw-fish.
- ASTA'COLITE.** (from *αστακος* and *λιθος*, Gr.) Fossil or petrified craw-fish, or lobster.
- ASTERIA.** (*asterias*, Lat. *asterie*, Fr.) A variety of sapphire, or bastard opal.
- ASTERIA.** (from *αστηρ*, Gr. a star.) The star-fish, or sea-star, a genus of animals, class Vermes, order Mollusca. These animals have their mouth in the centre, and placed downwards; from their bodies five or more rays, or arms, are given off, furnished with numerous retractile tentacula. They have the power of reproducing their rays if destroyed. They are all inhabitants of the sea, and they are frequently found fossil, in great perfection, in the chalk. Some remarkably fine impressions have been discovered in flint. The whetstone of Devonshire affords similar remains. Linnæus has placed them in the order Pedicellata, class Echinodermata.
- ASTERIATED.** Radiated.
- ASTERIALITE.** (from *αστηρ* and *λιθος*, Gr.) Fossilized, petrified, or silicified *asterias*, or star-fish.
- A'STERITE.** } (*astroite*, Fr. Espèce de ma-  
**A'STRITE.** } dreopore ou de corps marin,  
**A'STROITE.** } sur lequel on voit représentée la figure d'une étoile.) Star stone. This name is given to certain varieties of the perfect corundum.
- A'STEROID.** (from *αστηρ* and *ειδος*, Gr.) The name assigned by Herschel to some newly discovered planets.
- ASTERO'IDAL.** Resembling a star-fish.
- ASTEROPHY'LLITE.** (from *αστηρ* and *φύλλον*, Gr.) A plant discovered in the coal formation, and thus named from the stellular disposition of the leaves around the branches.
- ASTRE'A.** A species of madreporæ. The appearance of groups of *astrea*, and other corals, is described as being most beautiful when viewed with the animals alive and in activity; looking down through the clear sea-water, the surface of the rocks appears one living mass, and the polypi present the most vivid hues.
- ASTRI'FEROUS.** } Bearing stars; having  
**ASTRI'GEROUS.** } stars; carrying stars.
- A'STRITE.** See *Asterite*.
- A'STROITE.** See *Asterite*.
- ATA'CAMITE.** Prismatic green malachite. Native muriate of copper, of a green colour, occurring both massive and crystallized. It consists of oxide of copper 76·6, muriatic acid 12·4, water 11. It has obtained its name from having been found in alluvial sand in the river Lipas, in the desert of Atacama in Peru. It has also been found in some of the Vesuvian lavas. The primitive form is an octoëdron. It is the *Cuivre muriaté* of Haüy.
- ATMOMETER.** (from *ατμος*, vapour, and *μετρω*, to measure, Gr.) An instrument contrived by Professor Leslie, for ascertaining the quantity of moisture exhaled from a damp surface in a given period.
- ATRAMENTAL.** } (from *atramentum*, Lat.)  
**ATRAMENTOUS.** } Black; ink-coloured; dark.
- A'TROUS.** (from *ater*, Lat.) Intensely black.
- ATTENUATED.** (*attenuatus*, Lat. *atténué*, Fr.) Thin; slender; tapering. An epithet for a leaf tapering at one or both extremities.
- ATTIGUOUS.** (*attiguus*, Lat.) Adjoining; hard by.
- ATTRITE.** (*attritus*, Lat.) Worn by friction, or rubbing.
- ATTRITENESS.** The state of being much worn.
- ATTRITION.** (*attritio*, Lat. *attrition*, Fr. *attrizione*, It.)  
 1. The act of wearing by friction; abrasion.  
 2. The state of being worn.
- A'TUS.** Terminations in *atus* and *itus*, show merely the existence of something in general; for example, *antennatus*, provided with antennæ; *alatus*, winged; *sulcatus*, furrowed; *auritus*, furnished with ears, or appendages.
- AU'DITORY.** (from *audio*, Lat.) Belonging to the parts connected with the sense of hearing, as the auditory canal, the auditory nerves, &c.
- AU'GITE.** (*αυγη*, Gr. splendour.) A mineral of a dark green, brown, or black colour, found in volcanic rocks. It is the *Pyroxène* of Haüy, the *Paratoma augit* of Mohs, and the *augit* of Werner. Its frac-

ture is conchoidal and uneven. It generally crystallizes in six or eight-sided prisms, terminated by dihedral summits. It is commonly attracted by the magnet. Scarcely fusible by the blow-pipe. With borax it melts into a yellowish glass, which while hot appears red. There are many varieties of augite, as the Diopside, Musite, Alalite, Sahlite, Pyrogome, Fassaita, Malacolite, Common Augite, Conchoidal Augite, Granular Augite, Coccolite and Amianthus. Augite consists of silica 52, lime 13, protoxide of iron and manganese 16, magnesia 10, alumina 9.

**AUG'ITIC.** Resembling augite; containing augite.

**AUG'ITIC PORPHY'RY.** A rock with a dark grey, or greenish, base, containing crystals of augite and Labrador felspar.

**AU'RATED.**

1. Resembling gold.

2. Eared; having ears, as in the scallop-shell.

**AURE'LIA.** The first change of the eruca, or maggot, of any kind of insect; a chrysalis, having a golden hue, previous to its becoming the perfect insect.

**AU'RICLE.** (*auricula*, Lat.)

1. That part of the ear which is prominent from the head.

2. A cavity of the heart. The heart is divided into four cavities, or chambers, namely, two auricles and two ventricles.

**AU'RICLED.** Having ears; having appendages resembling ears: applied to leaves when they are furnished with a pair of leaflets, generally distinct, but sometimes joined with them.

**AU'RICULA.** An ovate or oblong pyramidal univalve, with the spire extruded: the opening entire, oblong, and narrowed upwards; the columella plicated, with different plicæ in the opposite lip. Lamarck has placed those shells whose openings are entire, but whose columellæ are plicated, under this genus, *Auricula*.—*Parkinson*.

**AU'RICULATE.** Ear-shaped.

**AU'RIFEROUS.** That which yields gold; containing gold.

**AU'RIFORM.** (from *auris* and *forma*, Lat.)

Having the form of an ear; in the shape of an ear; the haliotis is an example.

**AUSTE'RE.** (*austerus*, Lat.) Sour or harsh to the taste; acrid.

**AUSTE'RENESS.** Roughness or harshness in taste.

**AU'STRAL.** } (*australis*, Lat. *austral*, Fr.

**AU'STRINE.** } *australe*, It.) Southern; southward.

**AUTO'MALITE.** Octahedral corundum. Spinelle zincifere of Haiiy. A variety of corundum containing oxide of zinc. It occurs imbedded in talc and associated with lead-glance. It is crystallized in regular

octahedrons, or in tetrahedrons with truncated angles. Its constituent parts are alumina, the oxides of zinc and iron, and silica. It has been found in America and in Sweden.

**AUTO'MOLITE.** See *Automalite*.

**A'VALANCHE.** (*avalanche*, ou *avalanche*, Fr.)

A mass of snow which, detached from any mountainous height, by rolling onwards accumulates frequently prodigious bulk and acquires great momentum. Avalanches are in mountainous countries productive of the direst misfortunes, sweeping before them in their irresistible and destructive progress every impeding object; breaking off large masses of rocks, uprooting, or tearing away, the noblest trees, damming up river courses, and burying beneath their volumes villages, with their whole population.

**AVI'CULA.** (from *avis*, Lat.) A free shell, a little gaping near the beaks, fixing itself by a byssus, and having its valves of unequal size; the hinge without a tooth, and rather callous. The cartilaginal pit oblong, marginal, and parallel to the edge by which it is sustained.—*Parkinson*.

**AXE-STONE.** A mineral found in New Zealand and the islands of the Pacific, and by the inhabitants made into axes and other cutting instruments, from which circumstance it has obtained its name. It is a sub-species of jade, and in many respects resembles nephrite, or nephritic stone. See *Jade*.

**AXI'LLA.** (*axilla*, Lat.)

1. In anatomy, the arm-pit.

2. In botany, the angle formed by the stalk of a leaf with the stem.

**AXI'LLARY.** (*axillaris*, Lat. *axillaire*, Fr.)

1. In botany, applied to peduncles when proceeding from the angle made by the leaf and stem, or branch and stem; also to flowers, and to spikes of flowers, proceeding from either of the above situations.

2. In anatomy, pertaining to the axilla, or arm-pit.

3. In entomology, applied to parts which spring from the point of union of two other parts.

**AXI'NITE.** The thumerstein or thumerstone of Werner. It has obtained the name of axinite in consequence of the axe-like shape of its crystals. Its colours are brown, grey, black, and blue. The name of thumerstein was given to it by Werner, from its having been found near Thum, in Saxony. Texture foliated. Fracture conchoidal. Before the blow-pipe it froths like zeolite, and melts into a hard black enamel. It has been found sparingly in Cornwall, but in no other part of Great Britain. A specimen analysed by Vauquelin was found to consist of silica 44,

alumina 18, lime 19, oxide of iron 14, oxide of manganese 4.

A'XIS. (*axis*, Lat.)

1. The line, real or imaginary, that passes through anything on which it may revolve.

2. In botany, the imaginary central line of different parts of a plant, round which leaves, or modified leaves, are produced.

The stem is also so called, for this reason.

AΧΟ'TOMOUS. (from *ἄζων*, and *τέμνω*, Gr.)

A mineralogical term, signifying cleavable in one particular direction.

A'ZOTE. (from *α*, priv. and *ζωή*, life, Gr.)

A constituent part of the atmosphere, receiving its name from its fatal effects on animal life. It is now usually called Nitrogen, which see.

A'ZOTIC. Consisting of azote; resembling azote in its properties; destructive of life.

A'ZURE-STONE. } Names given to the lapis  
A'ZURITE. } lazuli, or lazulite.

## B

BA'CCA. (*bacca*, Lat.) A fruit; a berry.

BACCIFEROUS. (from *bacca*, a berry, and *fero*, to bear, *baccifere*, Fr.) Berry-bearing; that produces berries.

BA'CVLITE. (from *baculus*, Lat. So named from its resemblance to a straight staff.)

A fossil, straight chambered, conical, elongated and symmetrical shell, depressed laterally, and divided into numerous chambers by transverse, sinuous, and imperfect septa; the articulations, or sutures, being indented in the manner of the battlements of a tower. The external chamber is considerably larger than the rest, and capable of containing a considerable portion of the animal. The remains of baculites have been hitherto found in the chalk formation only, and the baculite appears to have become extinct simultaneously with the last of the ammonites, at the termination of the chalk formation. This fossil may be seen beautifully figured in Professor Buckland's *Bridgewater Treatise*.

BA'KALITE. A variety of augite, of a whitish, or yellowish white, and pale green colour.

BA'LANITE. (*balanites*, Lat.) A fossil belonging to the genus *balanus*.

BA'LANUS. (*balanus*, Lat. *βάλανος*, Gr.) A conical multivalve, fixed by its base, and composed of six articulated valves; the opening being closed by an operculum, formed of four valves. The *balani* are not to be considered among those fossils which are frequently found.—*Parkinson*.

The recent *balanus* is observed on rocks and shells at a depth ranging to ten fathoms; and affixed to bottoms of ships and other floating bodies.—*De La Beche*.

*Balanus* is the only genus of sessile cirrhipedes, the shells of which consist of six principal valves, except *Coronula*.—*Sowerby*.

BA'LASS. } (Called also Spinel and Zeilant  
BA'LASS. } by Werner.) A sub-species of corundum; it is found in crystals of a regular octahedron, composed of two

four-sided pyramids applied base to base. Colour red. Balass is chiefly found in Ceylon, and the dark and black varieties have obtained the name Ceylanite. It ranks among the precious stones, and when of a certain size is deemed very valuable.

BALI'STES. The file-fish; a cartilaginous fish belonging to the fourth class. Professor Buckland, in his chapter on Ichthyodorulites, or fossil spines, states that the spines of balistes have not their base, like that of the spines of sharks, simply imbedded in the flesh, and attached to strong muscles; but articulate with a bone beneath them. The spine of balistes is also kept erect by a second spine behind its base, acting like a bolt or wedge, which is simultaneously inserted or withdrawn by the same muscular motion that draws or depresses the spine.

BA'LKSTONE. A provincial name given to an impure stratified limestone.

BA'NNER. The upper large petal of a papilionaceous flower.

BA'OBAL. A stone which has obtained its name from its resemblance to the fruit of the baobab tree.

BARB.

1. That which grows in place of a beard.

2. A sort of pubescence in plants.

BA'RBATE. } (from *barbatus*, Lat.)

BA'RBATED. } Bearded; awned.

BA'RBED. Bearded; awned.

BA'RIVM. The metallic basis of baryta, discovered by Sir H. Davy.

BARK. In botany, the covering of plants, composed of woody fibres, situated above the wood and under the cellular integument, consisting of from one to many layers, according to the age of the plant or branch, an additional layer being produced every year.

BA'RNACLE. (The *Lepas balanus* of Linneus. *Barnacle*, Fr. *barnacla*, It.) A species of shell-fish, a pedunculated cirrhipede, frequently found adhering to the bottoms of ships in such prodigious numbers, and of so great a length, as to ma-

terially impede their progress through the water. Some very fine specimens may be seen of them in the British Museum. The barnacle is known by the names *Anatifer*, and *Pentelasmis*. In the arrangement of Cuvier the barnacle is placed in the sixth class, namely, *Cirrhopoda*, of *Mollusca*. Linnaeus comprised them all in one genus, *Lepas*, which Brugières divided into two. The name *anatifer*, from the two Latin words *anas* and *fero*, signifying duck-bearing, was given to the barnacle from a ridiculous notion, formerly entertained, that they enclosed in an embryo state the young of the barnacle duck. Sowerby states that fossil specimens of this marine genus are found in the *calcaire-grossièr*, of Paris, and in other similar beds. Parkinson observes that *anatifa lævis* and *anatifa striata* are both said by Bosc to be found fossil; the latter is also said by Gmelin to be sometimes found fossil, but that he believes neither of these statements to be supported by sufficient authority. He, however, gives a representation of what he believes to be a fossil barnacle in a flint stone which he found in the gravel pits near Hackney-road, and the opinion he first formed, not only of its having derived its figure from animal organization, but of its affinity to the barnacle, received corroboration from different specimens which he subsequently met with. Large bunches of barnacles attached to pieces of wood are frequently thrown up by the waves upon our coasts.

**BA'ROLITE.** (from *βαρὺς*, heavy, and *λίθος*, a stone, Gr.) Carbonate of barytes. The Baryte carbonatée of Haüy. Barolite is found native, or it may be artificially prepared. It was first discovered native by Dr. Withering, from whom it was named *Witherite*. According to the analysis of Dr. Withering, carbonate of barytes consists of barytes 80, and carbonic acid 20. It is soluble in dilute nitric acid. It is poisonous. It occurs abundantly in lead veins, that traverse a secondary limestone in Cumberland and Durham, and at Anglesark, in Lancashire.

**BAROSE'LENITE.** (from *βαρὺς*, heavy, and *selenite*.) Heavy spar; native sulphate of barytes, or boroselenite. The Baryte sulphatée of Haüy. A mineral, found abundantly in this and other countries. It occurs both massive and crystallised. The varieties of its crystals are very numerous. It is of various colours, white, grey, yellow, brown, red, green, blue, and black. It consists of 66 per cent. of barytes and 34 per cent. of sulphuric acid. Its texture is generally

foliated. When heated it decrepitates. It is soluble in dilute sulphuric acid. It is found in veins, in primary, transition, and secondary rocks.

**BA'ROTE.** A name given to barytes by Morveau. See *Barytes*.

**BARYSTRO'NTIANITE.** (from *βαρὺς*, heavy, and *strontian*.) This mineral has also obtained the name of *Stromnite*, from its being found at Stromness, in the island of Pomona. Its principal constituent is carbonate of strontia, of which it contains nearly 70 per cent., combined with sulphate of baryta and a small proportion of carbonate of lime and oxide of iron. It occurs massive, of a greyish colour externally, and of a yellowish white internally.

**BARYTA.** } from *βαρὺς*, heavy, Gr.)

**BA'RYTE.** } Barytes has been also called

**BARYTES.** } ponderous spar, heavy spar,

and barote. The first account of the properties, &c. of barytes, was published by Scheele in his dissertation on Manganese. It has obtained its name from its great specific gravity, which is about 4, being the heaviest of all the known earths. It was called *barote* by Morveau, and *barytes* by Kirwan. Barytes converts vegetable blues to green. When exposed to the atmosphere it attracts moisture, and when water is poured upon it the same appearances present themselves as in the slacking of lime, with the evolution of great heat, the process being more rapid, and the evolution of heat greater. Barytes is found in two natural combinations only, with the sulphuric and carbonic acids, forming sulphate and carbonate of barytes. Nearly all the compounds of barytes are poisonous, the best antidotes being dilute sulphuric acid, or sulphate of soda in solution.

**BARY'TIC.** Containing barytes; resembling barytes; having the properties of barytes.

**BA'SAL.** Arising from the base of some other part.

**BA'SALT.** (Said to be derived from an Ethiopian word, *basal*, signifying iron.) A variety of trap-rock of a dark green or brownish black colour, composed of augite and felspar with some iron and olivine, the predominant mineral being felspar. Basalt occurs, sometimes, in veins or dykes, which traverse rocks of all ages, filling up fissures or crevices, and at others, in layers spread over the surface of the strata, or interposed between them. Many modern lavas differ so little from basalt, that it is unnecessary to adduce proof of the volcanic nature of this rock. It often occurs in the form of regular pillars, or columns, clustered together; or, in scientific language, has a columnar structure, a character

also observable in some recent lavas. This structure is found by some highly interesting and philosophical experiments, to have originated from the manner in which refrigeration took place. Mr. Gregory Watt melted seven hundred weight of basalt, and kept it in the furnace several days after the fire was reduced. It fused into a dark-coloured vitreous mass, with less heat than was required to melt pig-iron; as refrigeration proceeded, the mass changed into a stony substance, and globules appeared; these enlarged till they pressed laterally against each other, and became converted into polygonal prisms. The articulated structure and regular forms of basaltic columns have, therefore, resulted from the crystalline arrangements of the particles in cooling; and the concavities, or sockets, have been formed by one set of prisms pressing upon others, and occasioning the upper spheres to sink into those beneath.—*Mantell.*

On examination with a lens, even the more compact varieties of basalt are seen to be composed of minute crystalline grains. Basalt, in enormous masses, often covers the primary mountain in the Andes, and arranged in regular columns, which to the eye of the traveller appear like immense castles lifted into the sky. Basaltic dykes intersect both primary and secondary rocks. Few countries in the world present more magnificent basaltic columnar ranges than the north part of Ireland, and some of the Hebrides. The Giant's Causeway constitutes a small part of a vast basaltic range, along the north coast of Ireland, in the county of Antrim. The promontories of Fairhead and Borgue, in the same range, are situated eight miles from each other: these capes consist of various ranges of pillars and horizontal strata, which rise from the sea to the height of five hundred feet.—*Bakewell.*

**BASALTIC.** Composed of basalt; resembling basalt; containing basalt.

**BASALTIFORM.** Resembling basalt in its columnar form, or structure.

**BASALTIC HORNBLENDE.** } Two names  
**BASALTINE.** } given to the

same mineral. A variety of common hornblende to which these names have been given from its having been found commonly in basaltic rocks. The primitive form of its crystals is a rhomboidal prism. It has by analysis been found to consist of silica 58, alumina 27, iron 9, lime 4, and magnesia 1. Its colour is black, dark-green, or yellowish-green. Texture foliated.

**BA'SANITE.** (from *βάσανος*, Gr. *lapis quo probatur aurum, lapis Lydius.*) Lydian

stone, a variety of schistose hornstone. This stone acquired its name from its having been formerly used as a touchstone in trying the purity of metals: it also was called Lydian stone, from its being found abundantly in Lydia. According to an analysis of it, its constituents are, silica 75 per cent., lime, magnesia, carbon, and iron.

**BASILOSOURUS.** The name of an enormous fossil reptile, described by Dr. Harlan of Philadelphia. Neither the relation of the basilosaurus to other species, nor its geological position, has been accurately determined.—*Mantell.*

**BASE.** (from *basis*, Lat. *βάσις*, Gr. *base*, Fr. *basa*, It.)

1. The bottom, or lowest part, of any thing.

2. In conchology, that part of the shell in univalves by which they are attached to rocks, or other substances: in multivalves, the opposite extremity to the apex.

**BA'SIN.** (*bassin*, Fr. *bacino*, It.) In geology, large concavities filled with deposits, as the London basin, the Paris basin, &c. are called basins. The surface of the earth is covered with a series of irregular depressions or basins, divided from one another, and sometimes wholly surrounded by projecting portions of subjacent strata, or by unstratified crystalline rocks, which have been raised into hills and mountains of various degrees of height, direction, and continuity. This disposition in the form of basins, which is common to all formations, has been more particularly observed in the carboniferous series, from the beds of coal contained therein having been wrought throughout their whole extent. In consequence of this basin-shaped disposition of the carboniferous strata a most beneficial result obtains, namely, that these strata, which an uninterrupted inclination in one direction only would soon have plunged into depths inaccessible to man's greatest efforts, are, by their being placed around the circumference of the basin, all brought sufficiently near the surface to be attainable, and are thus made subservient to his benefit and comfort.

**BA'SSET.** A term, used by miners, to express an upward slanting direction of a vein, from below to the surface.

**BA'SSETING.** Slanting upwards.

**BA'STARD.** (*batard*, Fr. *bastardo*, It.) Spurious; not genuine.

**BATH-STONE.** A species of limestone, called also Bath-oolite. This member of the oolite formation has been called the great oolite; it is of considerable thickness, and yields an abundant supply of freestone for building. It has ob-

tained the name of oolite from its being composed of small rounded grains, or particles, supposed to resemble the roe of a fish. Bath-stone consists of minute globules, cemented together by yellowish earthy calcareous matter, and contains a considerable portion of broken shells. When first quarried, Bath-stone is soft, but it soon becomes hard by exposure to the atmosphere.

**BATH-OOLITE.** See *Bath-stone*.

**BATRA'CHIA.** (from *βάτραχος*, a frog, Gr.) The fourth order in Cuvier's arrangement of the class Reptilia; it comprises frogs, toads, salamanders, and sirens.

**BA'TRACHITE.** (from *βατράχειος*, Gr. *batrachites*, Lat.) A fossil of the colour of a frog; a fossil frog; a fossil resembling a frog, either in form or colour.

**BEACH.** The shore of the sea; the strand.

**BE'ACHY.** Having beaches.

**BEAK.**

1. In conchology, the continuation of the body of univalves in which the canal is situate.

2. In ornithology, the bill, or horny mouth of a bird.

3. In botany, applied to an elongation of the seed-vessel; proceeding also from the permanent style; also to naked seeds.

**BE'AKED.** Pointed; terminating in a bill-like point or process; having the form of a bill.

**BEARD.** (from *barba*, Lat. *barbe*, Fr. *barbe*, It.)

1. The hair which grows on the lower lip and chin.

2. In botany, a bristle-shaped projection, growing out from the glume or chaff, in corn and grasses; called also the awn.

3. In conchology, the process by which some univalves adhere to rocks, &c.

**BE'ARDED.** Having a beard; awned.

**BED.** A stratum of considerable thickness.

It is desirable that the geological student should draw a distinct line between the words bed and stratum. Whenever a layer, or stratum, is of the thickness of two yards, or more, it should be denominated a bed, but otherwise a stratum. There are sometimes found many distinct strata in the thickness of an inch; to denominate these as beds would be absurd. Let it therefore be kept in mind that the words bed and stratum are not synonymous.

**BEETLE.** A coleopterous insect, the scarabæus of Linnæus. Remains of beetles have been found in the oolite: wing covers of beetles occur in the shale of the Danby coal-pits, in the eastern moorlands of Yorkshire.

**BE'ETLE.** To jut out; to hang over: thus rocks are said to beetle.

**BE'ETLE-STONE.** A name given to coprolites, from their falsely imagined insect origin.

**BEHE'MOTH.** A huge animal spoken of in Scripture, supposed by some to mean the elephant, by others the ox, and by Borchart the hippopotamus.

**BE'LEMNITE.** (from *βέλεμνον*, Gr. a dart.) An extinct genus of chambered molluscous animals, having a straight tapering shell. Belemnites are found in the secondary formation only, the lowest stratum containing their remains being the muschel-kalk, and the highest the upper chalk of Maestricht. M. De Blainville has given a list of ninety-one authors, from Theophrastus downwards, who have written on the subject of belemnites. The most intelligent of these agree in supposing these bodies to have been formed by cephalopods allied to the modern sepia. That fossil which is called a belemnite was a compound internal shell, made up of three essential parts, which are rarely found together in perfect preservation. The belemnite is one of the most common fossils of the chalk, it resembles an elongated conical stone, of a crystalline, radiated structure, and is generally of a brown colour: some limestones on the continent of Europe are almost wholly composed of them. Ink-bags, resembling those of the Loligo have been found in connection with belemnites in the lias at Lyme Regis; these, in some instances, are nearly a foot long, and prove that the animal to which they belonged must have been of great size. The fact of these animals having been provided with a reservoir of ink, affords an *à priori* probability that they had no external shell, but recent discoveries decide the question; two specimens having been found each containing an ink-bag within the anterior portion of the sheath, and, consequently, all the species of belemnites may henceforth with certainty be referred to a family in the class of Cephalopods. Eighty-eight species of belemnites have already been discovered; and the vast numerical amount to which individuals of these species were extended, is proved by the myriads of their fossil remains that fill the oolitic and cretaceous formations. —*Buckland. Bakewell. Mantell.*

**BELE'MNO-SE'PIA.** The name proposed to be given by Professor Buckland, in concurrence with M. Agassiz, to a new family of cephalopods, to which family may be referred every species of belemnites.

**BELLE'ROPHON.** An extinct cephalopod, found in the mountain limestone, the

- shell of which was without chambers. Montfort placed the bellerophon among chambered shells; De Blainville assigned their position next to Bulla.
- BERYL.** (*beryllus*, Lat. *beryl*, Fr.) A crystallised compound of the earth glucina with silica, alumina, lime, and oxide of iron. The beryl is a gem, or precious stone, of the genus emerald, but less valuable than the emerald. It differs from the precious emerald in not possessing any of the oxide of chrome, from the presence of which the emerald obtains its splendid green colour. The aqua-marine is a variety of the beryl, having a more transparent texture. The beryl is of a greyish-green colour, blue, yellow, and sometimes nearly white; occasionally different colours appear in the same stone. Beryl is found in many parts of the world, but the finest specimens are brought from Siberia. Vauquelin first discovered the earth glucina from analyzing the beryl.
- BERYX LEWESIE'NSIS.** A fossil fish discovered in the Lewes chalk quarries, of the length of twelve inches, greatly resembling the dory, and, by the workmen, called the Johnny Dory. This is the most abundant of the Sussex ichthyolites; its scales are very frequent in all the pits of the South Downs, as well as in those of Surrey and Kent.—*Mantell*. Cuvier places the beryx in the family Percoides, order Acanthopterygii.
- BERYX RA'DIANS.** A fossil fish from the chalk-marl, of the length of seven inches. This, like the Beryx Lewesiensis, last described, belongs to the family Percoides, order Acanthopterygii.
- BIA'NGULAR.** } (from *bis* and *angulus*,  
**BIA'NGULOUS.** } Lat.) Having two angles.
- BIA'NGULATED.** Having two angles or corners.
- BICA'PSULAR.** Having two capsules, or seed-vessels.
- BICI'PITAL.** } (from *biceps*, Lat.) Having  
**BICI'PETOUS.** } two heads. It is a term applied to muscles, which have two distinct origins.
- BICO'RNOUS.** (*bicornis*, Lat.) Having two horns.
- BICO'RPOREAL.** Having two bodies.
- BICU'SPID.** (from *bis* and *cuspis*, a spear, Lat.) Two-pointed; two-fanged.
- BIDE'NTAL.** }  
**BIDE'NTED.** } (*bidens*, Lat.) Having two  
**BI'DENTATED.** } teeth.
- BIE'NNIAL.** (*biennis*, Lat.) Enduring throughout two years and then perishing; plants which do not bear flowers and seed till the second year, and then die.
- BI'FID.** } (from *bifidis*, Lat.) Cleft,  
**BI'FIDATED.** } or cloven, into two; opening with a cleft; two-cleft, but not very deeply divided.
- BIFA'RIOUS.** (*bifarius*, Lat.) Parting in opposite directions.
- BI'FURCATED.** (from *bis* and *furca*, Lat.) Divided into two heads or branches; forked.
- BIFURCA'TION.** Division into two parts, as in a fork.
- BIGE'MINATE.** In botany, applied to a compound leaf, having a forked petiole, with several petioles, or leaflets, at the end of each division.
- BILA'BIATE.** (from *bis* and *labium*, a lip, Lat.) Two-lipped; furnished both with an outer and inner lip.
- BILA'TERAL.** (from *bis* and *latus*, side, Lat.) Two-sided; having two sides.
- BI'LDSTEIN.** (from *bild*, shape, and *stein*, stone, German.) A massive mineral with, sometimes, an imperfect slaty structure. It is also called agalmatolite. By M. Brongniart it has been named steatite pagodite, but it is wanting in magnesia, which is present in all steatites.
- BILL.** The beak of a bird.
- BI'LOBED.** } (from *bis* and *lobus*, Lat.)  
**BILO'BATE.** } Divided into two lobes.
- BILO'CLAR.** (from *bis* and *oculus*, Lat.) Two-celled; divided into two cells.
- BIMA'RGINATE.** In conchology, furnished with a double margin as far as the lip.
- BI'MANOUS.** (from *bis* and *manus*, Lat.) Two-handed; having two hands.
- BI'NARY.** (*binarius*, Lat.) Arranged by twos.
- BI'NATE.** (from *binus*, Lat.) Two and two; by couples; growing in pairs; a fingered leaf of two leaflets, inserted at the same point, precisely on the summit of the petiole.
- BIND.** Called also clunch; a name given to the soil on which the coal strata rest. An argillaceous shale, more or less indurated, sometimes coloured black by bitumen, and sometimes intermixed with sand resembling sandstone, but generally decomposing into a clayey soil on exposure to the atmosphere.—*Bakewell*.
- BINO'CLAR.** (from *binus* and *oculus*, Lat.) Having two eyes.
- BI'PAROUS.** (from *bis* and *pario*, Lat.) Bringing forth two at one birth.
- BI'PARTITE.** (from *bis* and *partitus*, Lat.) Having two correspondent parts; an epithet for the corolla, leaf, and other parts of plants, when divided into two correspondent parts at the base.
- BI'PED.** (from *bipes*, Lat. *bipède*, Fr. *bipede*, *che ha due piedi*, It.) Any animal having two feet only.
- BI'PEDAL.** (*bipedal*, Fr.) Having two feet.
- BIE'NNATE.** } (*bipennis*, Lat.) Having  
**BIE'NNATED.** } two wings.
- BIPE'TALOUS.** (from *bis*, Lat. and *πέταλον*,

- Gr.) Consisting of two flower leaves; having two petals.
- BIPINNATE.** (*bipinnatum*, Lat.) Doubly pinnate; applied to a compound leaf, having a common petiole, which produces two partial ones, upon which the leaflets are inserted.
- BIPINNA'TIFID.** Having pinnatifid leaves on each side the petiole.
- BIRA'DIATE.** } (from *bis* and *radiatus*,  
**BIRA'DIATED.** } Lat.) Consisting of two rays.
- BIRHOMBO'IDAL.** Having a surface of twelve rhombic faces.
- BIRO'STRATE.** (from *binus* and *rostrum*, Lat.) Having a two-beaked prominence; two beaked.
- BIROSTRIT'ES.** A fossil bivalve with conical umbones.
- BI'SMUTH.** (*bismut*, German, *bismuth* and *bismut*, Fr.) A metal of a reddish-white, or cream colour. It is neither malleable nor ductile, its specific gravity is 98, it fuses at a temperature of 476 Fahrenheit. In hardness it is intermediate between gold and silver. Bismuth unites with most metals, rendering them generally more fusible, and in some cases remarkably so. Eight parts of bismuth, five of lead, and three of tin, constitute what has been called Sir I. Newton's fusible metal, which liquefies at the temperature of boiling water, 212°, and may be fused over the flame of a candle in a piece of stiff paper. Bismuth was discovered in the early part of the sixteenth century, and is mentioned by Bermannus. It occurs in veins in primitive rocks, as gneiss, granite, mica-slate, and clay-slate, in Saxony, Bohemia, France, Sweden, and Cornwall. One part of bismuth with five of lead and three of tin form the soft solder used by pewterers; it is also used in the manufacture of printer's types. It is with a compound of two parts of bismuth, one of lead, one of tin, and four of mercury, the whole being fusible at a temperature under that of boiling water, that glass globes are silvered on the inside; a piece of this compound being placed within the globe, the latter is plunged into hot water, the metallic compound readily melts, and the globe being turned round, the fluid metal is spread over the internal surface.
- BISMUTHAL.** Resembling bismuth; containing bismuth.
- BISMUTHIC.** Containing bismuth.
- BI'SON.** (*bison*, Fr. *bison*, Lat.) A large wild untameable herbivorous and gregarious animal, often confounded with the buffalo. The bison has a large fleshy protuberance, or hunch, growing upon the top and between the shoulders; its horns are short, black, and bent forwards;
- its back gibbous; mane long; tail about a foot in length, and naked, except some hairs at the end. Immense herds of bisons are often seen in South America, and Mr. James states that in one place on the banks of the Plata, he saw ten thousand bisons at once.
- BISULCOUS.** (*bisulcus*, Lat.) Cloven-footed, as the ox, or the pig.
- BITERNATE.** (*biterdatum*, Lat.) A term given to compound leaves when the common petiole divides into two, each of which bears three leaflets.
- BITU'ME,** } (*bitumen*, Lat. *bitume*, It.  
**BITUMEN,** } *bitume*, Fr. *matière liquide, épaisse, noire et inflammable, qui se trouve dans le sein de la terre, et dont on prétend qu'on se servoit autrefois au lieu de ciment.*) The term bitumen is applied to a number of inflammable substances found in the earth, or issuing from the earth's surface, and these are known under their names of naphtha, petroleum, mineral tar, mineral pitch or maltha, asphalt, elastic bitumen, jet, mineral coal, amber, and mineral tallow. These, however, may perhaps be more correctly called bituminous varieties. Bitumen is a substance of a peculiar kind, seeming to partake both of an oily and resinous nature, and is found either buried in, or proceeding from, different parts of the earth, in different states of consistence. Bitumen is composed of carbon and hydrogen. It appears that formerly bitumen was generally used instead of mortar, and authors suppose that the tower of Babel, the walls of Babylon, of Sodom, and other places, were built of bricks cemented together by bitumen, and that the ark of Noah, and the vessel of bull-rushes in which Moses was exposed, were coated with this substance. Bitumen, when fluid, has been called by some Latin writers, *oleum vivum*. Lyell says that the tar-like substance, which is often seen to ooze out of the Newcastle coal when on fire, and which makes it cake, is a good example of bitumen. The varieties of bitumen will be separately described under their different names. — *Parkinson. Lyell. Bakewell.*
- BITUMINATED.** (*bituminatus*, Lat.) Prepared with bitumen; impregnated with bitumen.
- BITUMINIFEROUS.** Yielding bitumen; containing bitumen.
- BITUMINISE.** To prepare with, or coat with, bitumen.
- BITUMINISA'TION.** The preparing, or impregnating, with bitumen.
- BITUMINOUS.** (*bituminosus*, Lat.) Containing bitumen; having the nature and qualities of bitumen.
- BITUMINOUS SHALE.** An argillaceous shale,

much impregnated with bitumen, which is very common in the coal measures.—*Lyell.*

**BITUMINOUS SPRINGS.** We are informed by Mr. Lyell that springs impregnated with petroleum, and the various minerals allied to it, are very numerous, and are, in many cases, undoubtedly connected with subterranean fires. The most powerful yet known, are those on the Irawadi, in the Burman empire, which, from one locality, are said to yield 400,000 hogs-heads of petroleum annually.

**BI'VALVE.** (*bivalvis*, Lat. *bivalve*, Fr.) An animal having two valves, shells, or shutters, as the oyster, muscle, &c.

**BI'VALVE.** } Consisting of two valves  
**BIVA'LVULAR.** } or divisions; having two  
**BIVA'LVIOUS.** } valves, or shells.

**BLACK CHALK.** A clay of a bluish black colour, extremely soft, a quality which it owes to the presence of about twelve per cent. of carbon. That most esteemed is found in Italy and Germany, and takes its name from those countries respectively.

**BLACK-JACK.** A name given by miners to a sulphuret of zinc. See *Blende*.

**BLACK-LEAD.** The substance about to be described has been thus named from its leaden appearance, or general resemblance to lead, but it does not in fact contain a single particle of lead in its composition. It is the same as plumbago and graphite. Black-lead is a compound of carbon, with a small portion of iron, and some earthy matters. It is of a dark steel-grey colour, inclining to iron-black; it occurs regularly crystallised; in granular concretions; massive and disseminated; it has a greasy feel, and blackens the fingers, or any other substance to which it is applied; it is infusible, and burns with much difficulty. According to Vauquelin its constituent parts are carbon 92.0, iron 8.0; but according to Allen and others, it contains only five parts per centum of iron. Its nature was first investigated by Scheele, who, by combustion, converted nearly the whole into carbonic acid gas, the residuum being oxide of iron. Black-lead, or carburet of iron, is used for many domestic purposes, but its principal use is in its manufacture into black-lead pencils. It is found in the primitive, transition, and secondary rocks. Anthracite resembles and appears to pass into plumbago, or black-lead; common coal, also, according to Bakewell, sometimes graduates into plumbago.

**BLACK-WADD.** An ore of manganese, used as a drying ingredient in paints.

**BLA'TTA.** (*blatta*, Lat.) The cockroach, placed by Linnæus in the second order, Hemiptera, of the seventh class, Insects.

**BLLENDE.** (from *blenden*, Germ. to dazzle, or blind.) Sulphuret of zinc; a metallic ore whose constituent parts are zinc, iron, sulphur, and a trace of quartz. Blende is called by the English miners black-jack. The primitive form of its crystals is a rhomboidal dodecahedron; there are several varieties known, as; brown blende, yellow blende, black blende.

**BLOOD-STONE.** Hematites; a variety of agate to which the name blood-stone has been applied from some absurd notion of its efficacy in restraining hemorrhage.

**BLUE-JOHN.** A name given by the miners to fluor spar;—called also Derbyshire spar, in which county it occurs in great abundance. It is manufactured into vases and ornamental figures, being capable of being turned by the lathe. Bakewell, in describing the blue-john, or fluor spar mine near Castleton, in Derbyshire, observes, "the crystallisations and mineral incrustations on the roof and sides of the natural caverns which are passed through in this mine, far exceed in beauty those of any other cavern in England; and were the descriptions of the grotto of Antiparos translated into the simple language of truth, I am inclined to believe it would be found inferior in magnificence and splendour of mineral decoration, to the natural caverns of the fluor mine.

**BLUE VITRIOL.** Sulphate of copper.

**BLUFF.** Any high head-land, or bank, presenting a precipitous front.

**Bog.** (*bog*, Irish, soft.) A kind of morass, too soft to bear a man's weight, and partly composed of decayed vegetable matter.

**BOG-IRON-ORE.** } Iron ore peculiar to bog-  
**BOG-ORE.** } gyland. Mr. Lyell observes, "at the bottom of peat mosses there is sometimes found a cake, or pan, of oxide of iron, and the frequency of bog-iron ore is familiar to the mineralogist. From what source the iron is derived is by no means obvious, since we cannot in all cases suppose that it has been precipitated from the waters of mineral springs. It has been suggested that iron, being soluble in acids, may be diffused through the whole mass of vegetables, when they decay in a bog, and may, by its superior gravity, sink to the bottom, and be there precipitated so as to form bog-iron ore. Dr. Mantell observes, "the formation of what is termed bog-iron ore, found in marshes and peat bogs, is supposed to have been derived from the decomposition of rocks over which water has flowed; but the observations of Ehrenbergh, seem to indicate a different origin."

**BOLE.** (from βῶλος, Gr.) A friable clay, or earth, often highly coloured with iron.

**BOLETUS.** A genus of mushrooms, of the order Fungi.

**BOLO'GNA STONE.** } A variety of sulphate  
**BOLO'GNIAN STONE.** } of barytes, possessing phosphoric properties. These properties were first discovered accidentally by Vicenzo Casciarolo, an Italian shoemaker.

**BORA'CIC.** Pertaining to borax; containing borax.

**BORA'CIC ACID.** A compound of boron and oxygen, containing about 26 per cent. of boron and 74 of oxygen. It is found native on the edges of certain hot mineral springs in Italy. It occurs in scaly crusts, or small pearly scales, and massive. Homberg was the discoverer of boracic acid. Boracic acid may be obtained by adding to a solution of borax half its weight of sulphuric acid. The term Sassolin has been applied to boracic acid from its presence in the hot springs of Sasso.

**BO'RACITE.** Borate of magnesia; a combination of boracic acid with magnesian earth. Boracite is found imbedded in gypsum, in Hanover and Holstein; its colours are white and greyish; it is generally of a cubic form, and possesses, when heated, strong electrical properties. Borate of magnesia may be artificially obtained. Before the blow-pipe boracite froths, emits a greenish light, and is converted into a yellowish enamel.

**BO'RATE.** A combination of boracic acid with any saturated base; a salt formed by the combination of any base with the acid of borax.—*Parkes.*

**BO'RAX.** (*borax*, Lat. *borax*, Fr. *borace*, It.) Subborate or borate of soda; a salt of soda formed of the alkali with boracic acid. It is prepared artificially by purifying the natural borate of soda, a mineral found in Thibet, where it is held in solution in the waters of a lake, which also contains common salt. Borax in its impure state is called *tinca*, and is purified by calcination, solution, and crystallization after its importation. Borax is an important article in the arts, as a flux in the reduction of many metals, especially in assaying; it is also used in medicine. According to Berzelius, borax consists of soda 16·31, boracic acid 36·59, water 47·10. Bergman states the proportions to be boracic acid 34, soda 17, water 49; and Kirwan gives, as his analysis, boracic acid 34, soda 17, water 47.

**BORE.** A violent rush of tidal water.

**BO'RON.** The undecomposable base of boracic acid; this may be obtained by heating in a copper tube two parts of

potassium with one of boracic acid previously powdered and fused.

**Boss.** (*bosse*, Fr.) A protuberance or swelling; a kind of knob or stud.

**BOSSED.** Knobbed or studded.

**BOTHRODE'NDRON.** (from βόθρος and ἐνδρῶν, Gr.) An extinct genus of coniferæ belonging to the coal formation. The bothrodendron has a stem not furrowed, covered with dots. Scars of cones, obliquely oval. The stems are marked with deep oval or circular concavities, which appear to have been made up by the bases of large cones. These cavities are ranged in two vertical rows, on opposite sides of the trunk, and in some species are nearly five inches in diameter.—*Prof. Buckland.*

**BO'TRYOID.** } (from βότρυς, a bunch of  
**BOTRYO'IDAL.** } grapes, and ἴδιος, form.)  
Resembling a bunch of grapes; clustered like grapes.

**BOTRY'OLITE.** (from βότρυς, a cluster of grapes, and λίθος, Gr.) Grape-stone; a variety of prismatic datolite, occurring in mamillary concretions.

**BO'VEY-COAL.** A name given to wood-coal from its having been found in abundance at Bovey Heathfield near Exeter; called also brown-coal. In wood-coal we may almost seize nature in the act of making coal, before the process is completed. These formations of coal are far more recent than those of common coal, and have been referred to the first, or Eocene period of the tertiary formations. Heat and pressure appear to be required to convert wood-coal into mineral coal. Bovey-coal contains carbon 77·10, oxygen 19·35, hydrogen 2·54, earthy parts 1·00.

**BOULDER.** } Large fragments, or rounded  
**BO'WLDER.** } masses of any rock found lying on the surface, or, sometimes, imbedded in soil, and differing from the rocks where they are found; these fragments or outlying boulders, are of no determinate size, they are supposed to have been transported by the force of water, and are occasionally found at very great distances from their parent rocks. The mass of rock on which is placed the statue of Peter the Great at St. Petersburg, is a detached block of granite, or a boulder, forty-two feet in length, twenty-seven feet broad, and twenty-one feet high, and was removed from the Gulf of Finland.

**BRACHELY'TRA.** A family of coleopterous insects, having but one palpus to the maxillæ. It comprises only one genus, namely *Staphylinus*.

**BRA'CTEA.** (*bractea*, Lat.) In botany, a leafy appendage to the flower or stalk, differing from the other leaves of the

plant in form or colour; the floral leaf. Bractæ vary greatly in appearance; most commonly they are green and herbaceous. The leaf, in the axilla of which a flower-bud is produced, is called a bractea. The most remarkable sort of bractea is that called spathe; the spathe or bractea of many flowers is membranous. When two or more bractæ, instead of appearing singly on the principal flower-stalk, are opposite, or verticillate, they form an involucre.

**BRA'CHIAL.** (from *brachium*, an arm, Lat. *brachial*, Fr. *del braccio*, It.) Belonging to the arm.

**BRA'CHIATE.** (*brachiatus*, Lat.) Four-ranked; applied to stems, when they divide and spread in four directions, crossing each other.

**BRANCHI'FERA.** In the conchological system of De Blainville, we find branchifera placed in the order Cervicobranchiata, and it comprises three genera, namely, *Fissurella*, *Emarginula*, and *Parmophorus*.

**BRACHIO'PODA.** (from *βραχιών*, an arm, and *πούς*, a foot, Gr.) Animals having arms instead of feet. The brachiopoda are all bivalves. The brachiopoda, as placed by Cuvier, form his fifth class of Mollusca; like the acephala, they have an open bilobed mantle. Instead of feet, the brachiopoda have two fleshy arms, which are furnished with numerous filaments, which they have the power of thrusting out of or drawing into their shell at pleasure. This class, or family, comprises three genera, *Orbicula*, *Terebratula*, and *Lingula*. Lamarck places brachiopoda in the order Monomyaria.

**BRACHIO'PODOUS.** Having arms in the place of feet and legs; belonging to the class Brachiopoda.

**BRADY'PODA.** Slow-moving animals, with their bodies generally covered by a hard crust. Some want the incisor teeth; others want the incisors and cuspidati; in others, the jaws are destitute of teeth. Placed by Linnæus in the class Mammalia, and composing the third order. The order Bradyroda includes the genera *Bradypus*, or Sloth, *Mermecophaga*, *Ant-eaters*, *Manis*, *Scaly Lizard* or *Bangolin*, *Dasytus*, *Armadillo*, *Ornithorrhynchus*. Duck-billed animal.

**BRA'DYPUS.** (*βραδύπους*, Gr.) The sloth, a genus of the order Bradyroda, class Mammalia. These animals have no fore-teeth; they have six grinders in either jaw; and their bodies are covered with hair. There are several species.

**BRA'NCHIA.** (from *βράγχια*, Gr.) This word is rarely used substantively; it makes branchiæ in the plural. Branchiæ are filamentous organs for breathing in water; gills.

**BRANCHIO'PODA.** (from *βράγχια*, and *πούς*, Gr.) An order of crustaceans, mostly microscopic, and many monoculous. The order contains only one genus, monoculus, having either but one eye, or two so closely placed as to appear but one.

**BRANCHIO'PODOUS.** Gill-footed; belonging to the order Branchiopoda.

**BRANCHIO'STEGI.** (from *βράγχια*, gills, and *στέγος*, or *στέγη*, a covering.) A term used to express one of the orders of fishes, the characters of which are, that the rays of the fins are of a bony substance.

**BRANCHIO'STEGOUS.** Having the characters of the branchiostegi; belonging to the order Branchiostegi; having the gills covered.

**BRAN'CHIPUS.** The cancer stagnalis of Linnæus; an animal belonging to the crustaceans, having the legs reduced to soft paddles, and combining the functions of respiration with those of locomotion. In the branchipus, we find antennæ, but no crustaceous legs. The soft branchiæ of branchipus perform the double office of lungs and feet.

**BRAU'NITE.** (The Brachytipes manganerz of Mohs.) A mineral of a brownish black colour, occurring massive and crystallized, consisting of protoxide of manganese 87 per cent.; oxygen 10 per cent.; baryta 2.26 per cent.; and water nearly 1. It has been thus named after Mr. Braun of Gotha.

**BRE'CCIA.** (Ital.) Any rock composed of angular fragments cemented together.

**BRE'CCIATED.** Composed of angular fragments united into a mass by cement.

**BREI'SLAKITE.** A Vesuvian mineral, thus named after Breislak.

**BRI'LLIANT.** (*brillant*, Fr. *brillante*, It.) A diamond cut into angles, by which the rays of light are refracted, and a greater brilliancy is obtained.

**BRI'MSTONE.** A name for sulphur, *which see*.

**BRI'NDED.** In conchology, streaked.

**BRI'NDLED.** Spotted; variegated; streaked.

**BRI'STOL-STONE.** } Rock-crystal, or crys-

**BRI'STOL-DIAMOND.** } tallized quartz.

Very fine specimens are found in the rocks near Bristol, and these have thence obtained the name of Bristol diamonds. They are pure silica, crystallized in six-sided prisms, terminated by six-sided pyramids.

**BRO'ME.** } (from *βρωμος*, Gr.) A simple,

**BRO'MINE.** } or elementary substance, being non-metallic. Bromine has obtained its name from its powerful and unpleasant smell.

**BRO'NTIA.** (from *βροννη*, Gr. thunder; from its being supposed that these fossils

were thrown to the earth by thunder.) A fossil echinite of the family Cidaris.

**BRONZITE.** A mineral called by Werner Blättriger anthophyllite, and by Haüy Diallage metalloïde. It has a yellowish brown colour, with a semi-metallic lustre. It is found in serpentine in Shetland and in Upper Stiria, and in greenstone in many other places. According to Klaproth, it consists of, silica 60; magnesia 27.5; oxide of iron 10.5; water 0.5.

**BROWN-COAL.** A fresh-water formation of the tertiary series, but to which subdivision of the tertiary period it may belong is considered uncertain by Mr. Lyell, from the extreme rarity of shells found in it. Professor Buckland states, "In some parts of Germany this brown-coal occurs in strata of more than thirty feet in thickness, chiefly composed of trees which have been drifted, apparently by fresh water, from their place of growth, and spread forth in beds, usually alternating with sand and clay, at the bottom of then existing lakes or estuaries."

**BRUCITE.** Called also Chondrodite and Hemiprismatic Chrysolite. This mineral was named Brucite, after Bruce, an American mineralogist; it occurs massive and in small grains; colours from a pale yellow to a brownish red; it possesses a vitreous lustre, is translucent, with a fracture imperfectly conchoidal. It contains a small portion of fluoric acid, and scratches glass. It is found in America, Scotland, and Finland. It consists of magnesia, silica, fluoric acid, about four per cent. oxide of iron, potash, and water.

**BUCARDIUM.** An acephalous bivalve, having powers of locomotion.

**BUCCINUM.** (*buccinum*, Lat.) The whelk. An ovate elongated univalve; opening oblong, notched in the lower part, and with no canal; columella convex, full and naked.—*Parkinson*.

Linneus places this genus, the Buccinum, or Whelk, in the order Gasteropoda, class Mollusca: it comprises all the shells furnished with an emargination inflected to the left, and in which the columella is destitute of plicæ. Many fossil species have been discovered, the greater number in the crag; some in the London-clay; six species have been

found in the environs of Paris. De Blainville places the buccinum in the family Entomostomata.

**BUCCINITE.** The fossil remains of the *buccinum*. The greater part of the genus buccinum is littoral.

**BUCCINOÏDA.** The third family in the order Pectinibranchiata, division Mollusca.

**BUFONITE.** (from *bufo*, Lat.) Fossil teeth of fishes belonging to the family of Pycnodonts; they occur in great abundance throughout the oolite formation. These bufonites have been also called Serpent's-eyes, Batrachites, and Crapaudines, from the notion of their having been formed in the heads of serpents, toads, and frogs; and, from presumed virtues which it was thought they possessed, they were worn in rings and as amulets.

**BULLA.** An ovate, gibbous, and cylindrical univalve: the fossil occurring in tertiary formations: the spire not standing out, but concealed: the opening the length of the shell: the lip acute. The recent *bulla* is marine, and found in sands and sandy mud, at depths varying to twelve fathoms.—*Parkinson*. *De la Beche*.

**BULLITE.** The fossil remains of the *bulla*.

**BULLATE.** Of a blistered appearance.

**BULIMUS.** A fossil ovate or oblong sutured shell: the opening entire, oblong, and longitudinal, and this is the chief characteristic of this genus. The *bulimus* is a land shell.—*Parkinson*.

**BUNT.** In conchology, an increasing cavity; a tunnel.

**BURR-STONE.** This word is sometimes written *buhr-stone*. Mill-stone. The substance of burr-stone, or mill-stone, when unmixed is pure silex; it has generally a reddish or yellowish colour, but that of the best quality is nearly white; it is full of pores and cavities, which give it a corroded and cellular appearance.

**BYSSUS.** (from *βυσσός*, Gr.) A beard, as in the *mytilus* and *pinna*. The *byssus* is peculiar to bivalves.

**BYSSOLITE.** (from *βυσσός*, flax, and *λίθος*, a stone.) A rare mineral, occurring massive, in short, delicate, and stiffish filaments, of an olive-green, or brownish colour, with a silky lustre.

## C

**CACHOLONG.** A milk-white variety of quartz, having a pearly, or glistening lustre, a flat conchoidal fracture, and perfect opacity. It is found on the river Cach, in Bucharia, and obtains its name from that river and cholong, the Calmuc word for stone. It is said by Brongniart that the *cacholong* has been found in calcareous breccia in France.

**CADMIUM.** A metal of a bluish-white colour, with a specific gravity of 86. It is the least malleable and ductile of all metals which possess those properties. It was discovered by Professor Stromeyer, of Gottingen, in 1817, in some oxide, or carbonate, of zinc; it has subsequently been found in the silicates of zinc of Derbyshire, and in ores of that metal found in other situations. The equivalent number of cadmium is 52.5. Cadmium has not as yet been usefully employed in the arts.

**CADUCOUS.** (*caducus*, Lat.) In botany, applied to leaves falling before the end of summer; to corollas falling off before the dropping of the stamens; to perianths falling before the corolla is well unfolded.

**CAIRN.** (Gael.) A name given to a heap of stones covering a dead body.

**CA'LAITE.** Mineral turquois.

**CA'LAMAR.** A name given to the cuttle-fish.

**CA'LAMINE.** (*calamine*, Fr. *giallamina*, It.) Carbonate of zinc. Calamine is found either loose, or in masses, or crystallized; colour white, grey, or yellow. Before the blow-pipe it decrepitates, but does not melt. It is used in the manufacture of brass. It consists of oxide of zinc 65, and carbonic acid 34. It contains also some sesquioxide of iron.

**CA'LAMITE.** (from *calamus*, Lat. *κάλαμος*, Gr.)

1. A genus of fossil equisetaceæ. Calamites abound universally in the most ancient coal formations, occur but sparingly in the lower strata of the secondary series, and are entirely wanting in the tertiary formations, and also on the actual surface of the earth. Brongniart enumerates twelve species of calamites. Calamites are characterized by large and simple cylindrical stems, articulated at intervals, but either without sheaths, or presenting them under forms unknown among existing equiseta; they however most differ from equiseta in their height and bulk, sometimes exceeding seven inches in diameter, whilst that of a living equiseta rarely exceeds half an inch. A calamite fourteen inches in diameter has lately been placed in the museum at Leeds.

2. A mineral variety of hornblende, called also Actynolite, or Actinolite. See *Actynolite*.

**CALC-SINTER.** Stalactitical or stalagmitical carbonate of lime. This is so called from the German kalk, lime, and sintern, to drop. It is deposited from thermal springs holding carbonate of lime in solution.

**CALCA'IRE GRO'SSIER.** (Fr.) A coarse limestone, often passing into sand, and abounding in marine shells. According to Lyell, it belongs to the eocene tertiary period, and is found in the Paris basin.

**CALCA'IRE SILI'CIEUX.** (Fr.) A compact silicious limestone, occupying, according to the early opinion of Brongniart, the place of the calcaire grossier where that is wanting, who discovered in it the silicate of magnesia. Like the calcaire grossier, the calcaire silicieux belongs to the eocene tertiary period; it has been found in the Paris basin, in the Isle of Wight, and in several parts of France.

**CALCA'REOUS.** } (*calcarius*, Lat. *calcaire*,  
**CALCA'RIOUS.** } Fr. I do not remember to have met with this word as here given, spelt with an i, except in Webster, and I believe, in this instance, his orthography to be incorrect.) Partaking of the properties of lime; containing lime in composition; of a limy nature.

**CALCA'REOUS ROCK.** Limestone.

**CALCA'REOUS SPAR.** Crystallized carbonate of lime. Calcareous spar occurs crystallized in a vast variety of forms, but its primitive form is invariably a rhomboid with obtuse angles of  $105^{\circ} 5'$ , and  $74^{\circ} 55'$ , the crystals break easily with the stroke of a hammer. It consists of nearly 57 parts of lime and 43 parts and a fraction of carbonic acid. The finest specimens are brought from Derbyshire, but it is found almost in all parts of the globe. Calcareous spar is often as transparent as rock-crystal, but it is usually coloured of various tints by the presence of oxide of iron. All its forms, which amount to nearly 500, are derived from the rhomb. When in irregular forms, it may always be distinguished from quartz by its admitting of being scratched with a knife, and by its effervescing when weak nitrous acid is applied to it. Iceland spar is this mineral in its purest form, and affords the readiest means of observing the optical phenomenon of double refraction. Its almost universal diffusion is probably owing to its partial solubility in water; in this condition it filters through the crevices abounding in all

strata, and recrystallizes as the water evaporates. When this filtration continues so uninterruptedly as to prevent by its mechanical action crystallization from taking place, and yet so gradually as to admit of the solid mineral being deposited from the water, those curious and beautiful concretions called stalactites are produced, which ornament, in so singular a manner, most caverns in rocks or mountains formed principally of limestone.

**CALCA'REOUS TUFFA.** Beds of calcareous tufa are sometimes formed in valleys, and at the bottom of lakes, by a process which bears some resemblance to chemical formations. Springs containing carbonic acid, that issue from limestone strata, contain particles of carbonate of lime chemically dissolved in water; but on exposure to air and light, the carbonic acid, which had but a slight affinity for the particles of limestone, separates, and the particles of lime are precipitated, and form calcareous incrustations: these, in the course of time, form beds, and occasionally are of sufficient hardness to be used for architectural purposes. Thermal springs holding in solution calcareous earth, rapidly deposit beds of calcareous tufa.

**CALCEDO'NIC.** Containing calcedony; resembling calcedony.

**CALCE'DONY.** (*calcedonius*, Lat. *calcedoine*, Fr. *calcedonia*, It. Sometimes spelt chalcodony.) A semi-transparent and translucent variety of quartz, to which this name has been applied, from its having been formerly found at Calcedon. It is a simple, siliceous, uncrystallized mineral. Flint nodules are frequently calcedonic. When flints contain calcedony, there may generally be perceived some small bubbles, or a mammillated appearance, in some part of the exterior of the flint; between calcedony and flint there is a near resemblance, being only different modes of the same substance. Specific gravity 2.56. There are several subspecies; the beautiful apple-green is called chrysoptase; the grass-green varieties, plasma; those with red, brown, yellow, and green tints, carnelian; others are known as heliotrope, jasper, &c. these will all be described under their several names, and in their proper order.

**CALCI'FEROUS.** (from *calx* and *fero*, Lat.) Producing lime; containing lime; yielding lime.

**CALCINABLE.** That is capable of being calcined.

**CALCINATE.** (*calciner*, Fr. *calcinare*, It.) To calcine; to burn by fire to a calx, or friable substance.

**CALCINATION.** (*calcination*, Fr. *calcinatione*, It.) The reduction by the

action of fire of any substance to a condition that it may be converted into a state of powder.

**CALCINE.** (*calciner*, Fr. *calcinare*, It.) To burn by fire to a calx, or friable substance.

**CALCIUM.** The metallic base of lime; this metal was obtained by Sir H. Davy from lime by means of galvanic agency. Being received during the process into a vessel filled with naphtha, it was excluded from oxygen, and consequently retained its metallic appearance, which resembles that of silver. But no further investigations can be made in the present state of science, regarding its properties as a metal, for the instant atmospheric air is admitted to it, it absorbs oxygen rapidly, burns with an intense white light, and reproduces lime, which is an oxide of calcium.

**CALC-TUFF.** A deposit of carbonate of lime from calcareous springs. See *Calcareous Tufa*.

**CAL'IX.** } (*κύλιξ*, Gr. *calix*; Lat. *calice*,  
**CAL'YX.** } Fr. *calice*, It.) The calyx, or flower-cup, is the outer expanded part, or external covering of a flower, generally resembling the leaves in colour and texture; there are seven kinds of calyces, or calyces, namely, periantheum, amentum, spatha, gluma, involucreum, volva, perichætium.

The calyx is the outer set of the floral envelopes, when there are more than one verticil of these. It is composed of two at least, but generally more leaves, called sepals. When the sepals are distinct, or separate from each other, the calyx is said to be *polysepalous*. In many plants the sepals are joined together, more or less, by their edges, so as to form one piece in appearance; in this case the calyx is said to be *monosepalous*. When all the sepals are alike in size and form, the calyx is said to be *regular*. When the sepals vary in size or form, the calyx is said to be *irregular*. When the calyx has one of its sepals hollowed out into a long thin tube, as in the larkspur, geranium, &c. it is said to be *spurred*. When the calyx dies off soon after or immediately on its expanding, it is termed *deciduous*; this is commonly the case with polysepalous calyces. When the calyx survives the rest of the flower, either enclosing or forming part of the fruit, it is said to be *persistent*: most monosepalous calyces are persistent.

**CALP.** A subspecies of carbonate of lime; an argillo-ferruginous limestone.

**CALY' MENE.** (from *καλυμμένη*, Gr. concealed.) A genus of trilobites, which appears to have been annihilated at the termination of the carboniferous strata.

Fossils of this family were long confounded with insects under the name of *Entomolithus paradoxus*.

**CALYPTRA.** (*καλύπτρα*, Gr. *calyptra*, Lat.) The calyx of mosses, according to some writers. In the mosses, the organs of reproduction consist of sporules, contained within an urn, or theca, placed at the top of a thin stalk: this is closed with a lid, called an operculum, and that again is covered with a hood, termed a *calyptra*.

**CALYPTREA.** A fossil conoidal univalve, with the apex entire, erect, and somewhat pointed, the cavity furnished with a spirally convoluted lip.—*Parkinson*.

**CAMBIVM.** (*cambium*, Lat.) In botany, a juice exuded between the bark and the album, supposed to serve the purpose of nourishing the fibres of the leaf-buds.

**CAMBRIAN.** (from *Cambria*, a name for the principality of Wales.) A name given by Professor Sedgwick to a group of rocks, placed below the Silurian, from their being largely developed in North Wales; they principally consist of slaty sandstone and conglomerate.

**CAMPA'NULATE.** (from *campanula*, Lat.) Bell-shaped; in the form of a bell. A term applied to the calyx or corolla.

**CAMPA'NIFORM.** The same as campanulate.

**CAMPANULA'RIA.** A zoophyte, found abundantly on our shores, and thus named from its bell-shaped cells placed on foot-stalks.

**CANALICULATED.** (from *canaliculatus*, Lat.) Channelled; furrowed; made like a pipe or gutter. Applied to any distinct groove or furrow in shells.

**CANCELLA'RIA.** A genus of shell comprising many species. It is an ovate, or subtruncated univalve, with the lip internally sulcated; the base of the opening slightly channelled. The columella having sharp, but compressed, plicæ. Fossils of this genus have been found in the Lunday clay and calc-grossièr of Paris. The recent cancellaria is found in sandy mud at depths varying from 5 to 15 fathoms.

**CANCELLATED.** (from *cancelli*, lattice-work, Lat.) Cross-barred; marked with lines crossing each other. In conchology, surrounded with arched longitudinal ribs.

**CAN'CEER.**

1. One of the twelve signs of the zodiac, being the sign of the summer solstice, and represented by the figure of a crab.

2. The crab-fish.

**CAN'DENT.** (*candens*, Lat.) Hot in the highest degree, to a white heat.

**CA'NDLE-COAL.** } (This substance has pro-  
**CA'NNEL-COAL.** } bably obtained its name  
from the bright flame, unmixed with  
smoke, which it yields during combustion,  
lighting a room as with candles,  
candle being provincially pronounced  
*cannel*.) Candle, or cannel, coal is a  
bituminous substance next in purity to  
jet. It is black, opaque, compact, and  
brittle; breaking with a conchoidal fracture.  
Cannel-coal does not soil the fingers  
when handled, is susceptible of polish,  
and is capable, like jet, of being worked  
into trinkets and ornaments. The difference  
between jet and cannel-coal appears to  
consist entirely in the presence or absence  
of foreign earthy matters. When these are  
absent, or exist in minute proportion only,  
the bituminous mass is so light as to float  
on water, and then the term jet is properly  
applicable; but when the presence of foreign  
earthy matters is considerable, and the mass  
is specifically heavier than water, and does  
not readily manifest electric properties,  
it is with more propriety termed cannel-coal.  
—*Parkinson*.

**CA'PSTONE.** The name for a fossil echinite,  
or that genus of echinite known as  
*conulus*.

The capstone, thus called from its supposed  
resemblance to a cap, rises from a circular  
base into a cone, with an acute or obtuse  
vertex, from which five pairs of punctuated  
or crenulated lines pass, dividing the shell  
into five large and five small areas, that  
in which the anal aperture is placed being  
rather the largest.—*Parkinson*.

**CA'PSULE.** (*capsula*, Lat. *capsule*, Fr.)

1. In botany, a membranous or woody seed  
vessel, internally consisting of one or more  
cells, splitting into several valves, and  
sometimes discharging its contents through  
pores or orifices, or falling off entire with  
the seed.

2. A membranous or ligamentous bag.

**CAOU'TCHOU.**

1. Vegetable caoutchouc, called also  
elastic-gum, and India-rubber, is the milky  
exudation from certain trees, more especially  
the *Hevea caoutchouc* and the *Iatropa  
elastica*, but it is obtained from several  
others.

2. Mineral caoutchouc. A bituminous  
fossil, elastic when soft, but brittle when  
hard. It was discovered in 1786 near  
Castletown in Derbyshire. In its appearance  
it much resembles India-rubber, whence  
it has obtained its name.

**CA'RAPACE.** The upper shell of reptiles.

**CA'RBON.** (*carbo*, Lat. *carbon*, Sp. *carb-  
bone*, It. *charbon*, Fr.) The pure inflammable  
principle of charcoal. If a piece of wood,  
or any vegetable matter,

be placed in a closed vessel, and kept red-hot for some time, it is converted into a shining black brittle substance, possessing neither smell nor taste, commonly known as charcoal. Charcoal is infusible, insoluble in water, is capable of combining both with hydrogen and sulphur, is a conductor of electricity, and has a powerful affinity for oxygen. Carbon is obtained nearly pure in charcoal; but, what is astonishing, the diamond appears to be this elementary substance in its purest known form. Why it is, or how it is, that the same elementary substance can, with little or no addition, form two bodies so dissimilar in every respect as charcoal and diamond, the one a soft, black, brittle mass, the other the clearest and hardest body we know of, is a mystery beyond our weak comprehensions to understand. Carbon enters as a constituent part into many of the slate rocks, to which it generally communicates a dark colour: it forms also regular beds of considerable thickness, being the principal constituent part of coal. Combined with oxygen, carbon forms carbonic acid or fixed air.

**CARBONA'CEOUS.** (from *carbon.*) Containing carbon; pertaining to carbon.

**CARBONATE.** A combination of carbonic acid with a base. Carbonic acid is capable of combining with earths, oxides, and alkalies, and to these combinations the term carbonate has been applied; thus we have the carbonate of lime, carbonate of magnesia, carbonate of lead, carbonate of iron, carbonate of ammonia, &c. &c. &c.

**CARBONATED.** Combined with carbon.

**CARBONATE OF LIME.** A union of carbonic acid and lime, consisting of 57 parts of lime and 43 of carbonic acid. Carbonate of lime, under the several names of chalk, lime-stone, marble, &c. is found most abundantly throughout nature. All limestones effervesce when a drop of strong acid is thrown on them, and they entirely dissolve in nitric or muriatic acid.

**CARBONIC ACID.** A compound of carbon and oxygen; it has been called aerial acid, fixed air, cretaceous acid, and mephitic gas. Carbonic acid is very plentifully disengaged from springs in almost all countries, but especially near active or extinct volcanoes. This elastic fluid has the property of decomposing many of the hardest rocks with which it comes in contact, particularly that numerous class in whose composition felspar is an ingredient. In volcanic countries these gaseous emanations are not confined to springs, but rise up in the state of pure gas from the soil in various places. The Grotto del Cane, near Naples, affords an

excellent example. The acid is invisible, is specifically heavier than atmospheric air, and on this account it accumulates in any cavities on the surface of the ground. It may be dipped out of any excavations in which it has accumulated, poured into a bottle, like water, corked, and carried to any distance. It is fatal to human life when breathed undiluted, and by the miners it is called choke-damp.

**CARBONIFEROUS.** (from *carbo* and *fero*, Lat.) Containing carbon; yielding carbon.

**CARBONISED.** Converted into charcoal, or carbon.

**CARBONIZA'TION.** The converting into carbon.

**CARBURET.** A compound formed by the combination of carbon with any metal, alkali, or earth.

**CARBURETTED HYDROGEN GAS.** The fire-damp of miners.

**CARBUNCLE.** (*carbunculus*, Lat.) A precious stone, supposed by some authors to be the ruby, by others the garnet; called by the Greeks anthrax.

**CARDIAC.** } (from *κάρδια*, the heart, Gr.  
**CARDI'ACAL.** } *cardiaque*, Fr.) Relating to the heart, as the cardiac nerves, &c.

**CARDIA'CEA.** In Cuvier's arrangement a family of bivalves of the class Testacea, comprising Cardium, Donax, Cyclades, Corbis, Tellina, Lucina, and Venus.

**CARDITA.** An inequilateral bivalve, found at various depths to thirteen fathoms, in mud and sands; sometimes attached to stones. The hinge with two unequal teeth; the hinge tooth the shortest, beneath the beak; the other longitudinal, beneath the insertion of the cartilage. Lamarck places Cardium in the family Cardicea.

**CARDIUM.** The cockle; animal a tethys. A genus of bivalves, the shells of which are characterized by the teeth of their hinge, and by the projection of their beaks; the latter giving them a cordiform appearance. They are generally ornamented with longitudinal ridges, and frequently with striæ, scales or spines. The different species are found at depths varying to thirteen fathoms, in mud, sands, and gravel. This genus belongs to the class Vermes, order Testacea. Many of the species, as the *C. aculeatum*, *arcuatum*, *ciliare*, *discors*, *inud*, *elongatum*, *lævigatum*, *nodosum*, *spinosum*, &c. &c. are found on our coasts. The cardium, with the exception of one species, *cardium fluviatile*, has only been found to inhabit the ocean; generally they live just under the surface of the sand. Fifty-two species have been described.

**CARINA.** (Lat.) The keel; a term applied to two of the petals in papilionaceous flowers. The carina is composed of two petals, separate or united, and encloses the internal organs of fructification.

**CARINARIA.** A very thin univalve, in the form of a cone flattened on its sides, the apex terminating in a very small convoluted spire, and the back having a dentated keel. De Blainville places Carinaria in the family Nectopoda. It derives its name from its dorsal keel. Parkinson states that it has not been found fossil, nor is its inhabitant known. Sowerby mentions that this beautiful shell was once so rare, that a specimen would fetch one hundred guineas.

**CARINATED.** (*carinatus*, Lat.) Keel-shaped; in conchology, having a longitudinal prominence like the keel of a vessel.

**CARINTHINE.** A variety of augite, of a dark green or black colour. It obtains its name from being found in Carinthia.

**CARNA'RIA.** (*carnarius*, Lat.) Flesh-eating animals. In Cuvier's arrangement, the third order of Mammalia.

**CARNE'LIAN.** } (*cornaline*, Fr. *cornalina*,  
**CARNE'LION.** } It.) A precious stone of various colours, as red, brown, yellow, and white. It is a variety of rhombohedral quartz. The finest specimens are brought from India. Carnelian is composed of 94 parts silica, 3.50 alumina, and a trace of oxide of iron. Carnelian differs from calcedony only in being more or less transparent. It varies in its constituents from being nearly pure siliceous, to a mixture of this earth with alumine and iron, in small quantities.

**CARNEOUS.** See *Carnous*.

**CARNI'VORA.** (from *carnis*, and *voro*, Lat.)

1. Animals which subsist solely on flesh. They belong to the order Mammalia. Fossil remains of carnivora are abundant in the pliocene strata. Cuvier placed the carnivora as a family in the order Carnaria, class Mammalia.

2. In entomology, a family of coleopterous insects. These insects pursue and devour others.

**CARNI'VOROUS.** (*carnivorus*, Lat. *carnivore*, Fr.) Living on flesh; devouring flesh.

**CAR'NEOUS.** } (from *carneus*, Lat.) Fleishy.

**CAR'ROTI'D.** (from *καρωτιδες*, Gr. *carotides*, Lat. *carotides*, Fr.) The name given to certain arteries of the neck.

**CAR'PAL.** (from *carpus*. Lat. *καρπός*, Gr.) Relating to the wrist.

**CARPE'LLUM.** (from *καρπός*, Gr.) In botany, a leaf in a particular state of modification. Each modified leaf which

forms the pistil, is called a *carpellum*, and has its under side turned outwards, and its upper inwards, or towards the centre of the flower. The *carpella* are folded so that the margins of the leaf are next to the axis, or centre: from these a kind of bud is produced, which is the seed. On the form of the carpella, on their number, and on their arrangement around the centre, depends, necessarily, the form of the pistil.

**CAR'POLITE.** } (from *καρπός*, *fructus*,  
**CAR'POLITHUS.** } and *λίθος*, *lapis*.) Any fruit which by silification has been converted into stone.

**CARPO'LOGY.** (from *καρπός* and *λόγος*, Gr.) That branch of the science of botany which treats of fruits.

**CAR'TILAGE.** (*cartilago*, Lat. *cartilage*, Fr. *cartilagine*, It.) Smooth, solid, animal matter, softer than bone, and harder than ligament; gristle.

**CARTILA'GINOUS.** (*cartilagineux*, Fr. *cartilaginoso*, It.) Consisting of cartilage; resembling cartilage; gristly.

**CARTILA'GINOUS.**

1. A name given to all fish whose muscles are supported by cartilages instead of bones.

2. A term applied to leaves, the borders of which are hard and horny.

**CARYOPH'YLLIA.** A coral zoophyte. In the caryophyllia possessing more than one cell, each receptacle contains a polypus. A branched madreporæ with a star at the end of each branch; each star having a mouth and tentacula.—*Bakewell*.

**CASSIDA'RIA.** A genus of univalve molluscs found both recent and fossil. The recent species are found near the shore, and at small depths from the surface. The fossil specimens occur in the tertiary strata.

**CASSIS.**

1. The helmet-stone. An echinite, a section of the class of Catocysti.

2. A gibbose ventricose univalve; the aperture longitudinal and sub-dentated, and terminating in a short reflected canal. The columella plicated in its lower part; the left lip flattened, and forming a ridge on the body of the shell.—*Parkinson*.

This genus of shells is found both recent and fossil: the recent is an inhabitant of tropical seas; the fossil occurs in the tertiary deposits. Some species are figured in Parkinson's Organic Remains.

**CASSIDITE.** A fossil shell of the genus cassidaria. The hills of Tuscany yield these fossils.

**CATA'CLYSM.** (from *κατακλυσμός*, Gr. *cataclysmé*, Fr.) A great inundation or deluge: used generally to describe the Noachian deluge.

**CAT'S-EYE.** A beautiful mineral, a variety of rhombohedral quartz, having an opal-

escence resembling the light from the eye of the cat; whence its name. The peculiar play of light arising from the structure of this stone, is better known than susceptible of description. The finest specimens are brought from Ceylon. Cat's-eye is harder than quartz, and consists of siliceous 95, alumine 1.75, lime 1.25, oxide of iron 0.25.

**CATODON.** A name given to the spermæcet whale. Of the genus *Catodon*, Ray mentions a large one stranded on the coast of Holland.

**CATOCYSTI.** The second great division, or family, of Echini. The catocysti have the opening for the vent in some part of the base of the shell; they are divided into fibulæ, cassides, scuta, and placentæ.

**CAUDA.** (Lat.) In conchology, the elongated base of the ventre, lip, and columella.

**CAUDAL.** (from *cauda*, Lat.) Relating to the tail; as the caudal fin of a fish.

**CAUDATE.** } (*caudatus*, Lat.) That hath  
**CAUDATED.** } a tail; tailed; having a long termination like a tail.

**CAUDEX.** (Lat.) The stock or trunk, the stem or body of a tree.

**CAVERNOUS.** (*cavernosus*, Lat. *caverneux*, Fr. *cavernoso*, It.) Full of caverns or hollows.

**CAWK.** A name for sulphate of barytes.

**CELESTINE.** Sulphate of strontia, or sulphate of strontites. It has obtained the name of *celestine* from being frequently found possessing a blue colour, but as it does not invariably possess that colour, and is often found either colourless or red, the name appears to be inappropriate. It occurs both massive and crystallized. It is composed of 58 parts of strontia, and 42 of sulphuric acid. It is found in Scotland, in Yorkshire, and in Somersetshire, near Bristol; also in the neighbourhood of Paris, and in Sicily, from which last place we obtain the finest specimens.

**CELLEPORA.** Animals belonging to the class Vermes, order Zoophytes. Generic characters:—Animal an hydra or polype; coral somewhat membranaceous, composed of cells. Species:—The principal species are the *Cellepora pumicosa*, *annulata*, *spongites*, &c.—*Crabb*.

**CELL.** (*cella*, Lat. *cellule*, Fr. *cella*, It.) A cavity or hollow.

**CELLIFEROUS.** (from *cella* and *fero*, Lat.) Producing cells; containing cells.

**CELLULAR.** Having small cavities, hollows, or cells. In botany, containing cells, opposed to vascular.

**CELLULAR MEMBRANE.** In anatomy, that tissue of filmy meshes which connects the minute component parts of most of the structures of the body.

**CELLULAR INTEGUMENT.** In botany, the

succulent pulpy substance, situated immediately under the cuticle; the seat of colour, mostly green, particularly in the leaves or branches. Leaves consist almost entirely of this substance, covered on each side by the cuticle; the stems and branches of both annual and perennial plants are invested with it. This tissue is membranous and transparent: in its simplest state, it appears like a mass of globules or vesicles, crowded together; these, by pressing against each other, assume a six-sided, or hexagonal form. This cellular tissue allows of the passage of fluids, and is, consequently, porous, but no pores or openings have been discovered in it. Cellular integument is in itself colourless, but its vesicles contain that colouring matter which gives to the corolla its brilliant colours, and to the herbaceous parts of plants their green.

**CELLULE.** (from *cellula*, Lat.) This may be considered as the diminutive of cell, and though, probably, frequently used synonymously with cell, yet is strictly not so: a small cell or hollow.

**CELLULIFEROUS.** Bearing, or producing, cellulæ.

**CEMENT.** (*ciment*, Fr. *cimento*, It.) The matter with which any two, or more, bodies are made to cohere.

**CEMENTATION.** (*cementation*, Fr.)

1. The act of uniting by means of cement.
2. A chemical process by which iron is converted into steel; glass into porcelain, &c. This process is effected by surrounding the body to be acted on with some other substance, as iron with charcoal, and subjecting it to the action of fire in a closed vessel.

**CEMENTITIOUS.** Having the property or quality of uniting.

**CENTIFOLIUS.** (from *centum* and *folium*, Lat.) Having a hundred leaves.

**CENTRIFUGAL.** (*centrifugo*, It. *centrifuge*, Fr. *Terme de Physique*. *Un corps qui se meut en rond, à une force centrifuge*.) That power which bodies in rapid rotatory motion acquire of flying off from the centre. The force with which a revolving body tends to fly from the centre of motion: a sling tends to fly from the hand in consequence of the centrifugal force. The centrifugal force arising from the velocity of the moon in her orbit, balances the attraction of the earth. The dimensions of the earth being known, as well as the time of its rotation, it is easy thence to calculate the exact amount of the centrifugal force, which, at the equator, appears to be  $\frac{1}{255}$ th part of the force or weight by which all bodies, whether solid or liquid, tend to fall towards the earth.

**CENTRIPETAL.** (*centripète*, Fr. *Qui tende*

à *approcher d'un centre. Les planètes ont une force centripète vers le soleil.*) The contrary power to centrifugal, for while the one drives, as it were, the surrounding bodies from the centre, the other, the centripetal, attracts and holds them to it.

**CEPHALASPIS.** A fossil fish of the carboniferous series. It has received its name from its head being covered by a sort of shield, having the bones united into one osseous case. In form, this fish bears a resemblance to the elongated trilobites of the transition rocks.—*Mantell.*

**CEPHALOPOD.** } (from *κεφαλή*, head,  
**CEPHALOPODA.** } and *πόδα*, feet, Gr.)  
**CEPHALOPODES.** } A term applied by Cuvier to a large family of molluscous animals, from their having the feet placed around their heads, and walking with their heads downwards. The feet are lined internally with ranges of horny cups, or suckers, by which the animal seizes on its prey, and adheres to extraneous bodies. The mouth, both in form and substance, resembles a parrot's beak, and is surrounded by the feet. It is now well established that the living species of cephalopods which possess no external shell, are protected from their enemies by a peculiar internal provision, consisting of a bladder-shaped sac, containing a black and viscid fluid, or ink, the ejection of which, by rendering the surrounding water opaque, conceals and defends them. The *sepia vulgaris* and *loliigo* afford us familiar examples.—*Buckland.*

According to Prof. Phillips, the following are the genera of Cephalopoda: Bellerophon, Orthoceras, Belemnite, Nautilus, Ammonite, Hamite, Scaphite, Baculite, Nummulite. The only living species belong to the genus *Nautilus*, of which there are two.

The Cephalopoda, in the arrangement of Cuvier, form the first class of mollusca, and comprise the following genera, which he divided according to the nature of the shell, *Sepia*, *Nautilus*, *Belemnites*, *Ammonites*, and *Nummulites*.

**CERAVNI LAPIDES.** (from *κεραυνός*, Gr.) A name formerly given to fossil echinites, from a supposition that they were formed in the air.

**CERATOPHYTA.** In Linnæus's arrangement, an order, the 6th, of the class Zoophytes, or animal plants, comprising *Gorgonia*, *Corallium*, *Pennatula*, &c. They have a horny axis, covered with a fleshy substance, from the cavities of which polypi occasionally appear.

**CEREBELLUM.** (Lat.) Dim. of *cerebrum*; the little brain, situate behind the brain, or *cerebrum*.

**CEREBRUM.** (Lat.) The brain.

**CEREBRAL.** } (*cerebral*, Fr. *cerebrale*, It.)

**CEREBRINE.** } Belonging to the brain; relating to the brain.

**CERITHIUM.** A turreted or turriculated univalve, with an oblique opening. Lamarck has discovered sixty fossil species of the genus *Cerithium* in the neighbourhood of Paris. The recent *cerithium* is found at depths varying to seventeen fathoms, and it is stated that so tenacious of life is at least one species, the *cerithium telescopium*, that a specimen sent from Calcutta in sea water, lived out of water in a tin-box for more than a week. The recent *cerithium* has a veil on its head, with two separated tentacula.

**CERITHITE.** The fossil *cerithium*.

**CERITE.** The siliceous oxide of cerium.

**CERIUM.** A metallic substance discovered by Berzelius and Hisinger in 1804. It was obtained from a mineral called *cerite*, which was formerly supposed to be an ore of tungsten; it is also found in *allanite*.

**CERULEAN.** } (*cæruleus*, Lat.) Blue;

**CERULEOUS.** } sky-coloured.

**CERVIX.** (Lat.) The neck.

**CERVICAL.** (*cervicalis*, Lat. *cervical*, Fr. *cervicale*, It.) Belonging to the neck, as the *cervical* vertebræ, the *cervical* muscles, the *cervical* arteries.

**CERVI-COBRANCHIATA.** In the conchological system of De Blainville, the name given to an order of shells, comprising the two families *Retifera* and *Branchifera*, and the genera *Patella*, *Fissurella*, *Emarginula*, and *Parmophorus*.

**CESTRACIONTS.** The first and oldest sub-family of sharks. The *cestracionts* begin with the transition strata, appear in every subsequent formation, and have only one living representative, the *Cestracion* *Phillipi*, or *Port Jackson Shark*. The character of this sub-family of sharks is marked by the presence of large polygonal obtuse enamelled teeth, covering the interior of the mouth with a kind of tessellated pavement. In some species not fewer than sixty of these teeth occupied each jaw. They are rarely found connected together in a fossil state, in consequence of the perishable nature of the cartilaginous bones to which they are attached. They are found abundantly dispersed throughout all the strata, from the carboniferous to the most recent chalk series.—*Buckland.*

**CETACEA.** Vertebral, warm-blooded animals living in the sea; they have no gills; there is an orifice on the top of the head through which they breathe, and eject water; and they have a flat horizontal tail. The *cetacea* breathe by means of lungs, and this compels them to rise frequently to the surface of the water for the purpose of respiration; they also

sleep on the surface. The cetacea both bring forth their young alive, and suckle them. In the order Cetacea are found the narwal, or sea-unicorn, the proper whale or balæna, the physeter or spermæceti whale, the dolphin, porpoise, &c.

Cetaceous animals being incapable of coming upon shore to rear their young, we find the form and structure of their arms remarkably approaching to those of the extinct aquatic saurians, and to those of fishes, and this resemblance is seen also in the general form of the trunk, and in the lengthened tapering form of the muzzle, and of the whole head of these animals. This lengthened, fish-like, tapering form is especially marked in the horizontal head of such cetaceous animals as the dolphins and porpoises, the food of which consists of living prey, which they find swimming before them in the water. But there are some cetaceous animals, as the dugong and the lamantine, that are not piscivorous, feeding only on marine plants; these have the face bent downwards, instead of projecting forwards. That bent form, which is so remarkable in the lamantine and the dugong, is the best position for enabling them to take the marine plants from the rocks below them, and they have the neck long and flexible, so that they can with facility bend down the whole head. Breathing atmospheric air, like other mammalia, they require to have the nostrils elevated; the shortness of the neck, however, and the magnitude of the head, render it almost impossible for them every time they wish to breathe to raise it to the surface of the water, so that we find the nostrils raised to the vertex of the head; these are the blowing-holes of the cetacea. In consequence of the extension of the intermaxillary bones, the exterior openings of the nostrils are raised thus high upon the head, and frequently also the cartilages of the nose are directed upwards so as to reach above the level of the highest part of the head, so that gliding along the ocean, immediately beneath the surface of the water, they can breathe, having only their lengthened and elevated nostrils in contact with the atmosphere. The tail of cetacea is their organ of progressive motion; it is supported by cylindrical vertebræ, almost without processes, to admit of the freest motion, and it is directed horizontally; that of a fish is directed perpendicularly. This horizontal direction of the tail of cetacea is necessary, in consequence of their breathing atmospheric air, to arrive at which they must ascend in the water, and again descend when seeking their food.—*Prof. Grant.*

In Cuvier's arrangement we find the cetacea forming the ninth order of Mammalia, and comprising two families, namely, Cetacea herbivora, which includes Manatus or Lamantin, Halicore or Dugong, and Stellerus, and Cetacea ordinaria, which includes Delphinus, or Dolphin, Phocœna or Porpoise, Monodon or Narwhal, Physeter or Cachalot, and Balœna, or Whale. The seas of the Miocene and Pliocene periods were inhabited by marine mammalia, but no traces of them have been discovered in the secondary deposits.

**CETA'CEOUS.** (*cetacé*, Fr. *cetaceo*, It. *cetaceous*, Lat.) Belonging to the order Cetacea.

**CÉ'YLANITE.** A dark-green or black variety of dodecahedral corundum. It occurs in the sand of the rivers of Ceylon, from which island it obtains its name.

**CHA'BASITE.** Rhombohedral zeolite. The chabasie of Haüy, and schabasit of Werner. A mineral of a white colour, with sometimes a rosy tinge. It occurs crystallized and massive. It is composed of silica, alumina, lime, potass, soda, and water, silica forming about fifty per cent. of the whole.

**CHALA'ZA.** (*χάλαζα*, Gr.) In botany, a small swelling on the outside of the seeds of some plants, it is sometimes coloured: the lemon and orange afford examples of the chalaza.

**CHALCE'DONY.** See *Calcedony*.

**CHALK.** (*kalk*, Germ.) A white earthy limestone, composed of lime and carbonic acid; a carbonate of lime. It has an earthy fracture, is meagre to the touch, and adheres to the tongue; it is dull, opaque, soft, and light; its specific gravity being 2.3. It contains an inconsiderable proportion of silex and iron. The harder varieties of this substance were formerly used for building, and, when protected from the influence of the atmosphere by a thin casing of limestone or flint, proved very durable. The ruins of the Priory of St. Pancras, near Lewes, which have stood nearly 800 years, prove this.—*Dr. Mantell.*

**CHALK FORMATION.** This term is applied in the nomenclature of geology to a group of deposits very dissimilar in their lithological compositions, but agreeing in the character of the organic remains which they contain, and referrible to the same epoch of formation. The chalk, with its subjacent beds of green sand, comprises a formation, or series of strata, of great depth, which are spread over a large portion of the eastern and south-eastern counties of England. Scarcely a trace of chalk can be found in Scotland or Wales, but it occurs in Ireland on the

north coast. The chalk formation is composed of six divisions, namely, 1. The Maestricht beds; 2. The upper chalk with flints; 3. The lower chalk without flints; 4. The Upper green sand; 5. The gault; 6. The lower green sand. The whole of these are marine deposits. It must however be kept in mind that this order is far from constant. The members of the cretaceous group are ranked as the last of the secondary period; and, in the order of superposition, are placed above the wealden, and below the earliest of the tertiary period, or eocene. The greatest thickness of the chalk strata in England may be estimated at from 600 to 1000 feet. The organic remains in the chalk formation are exclusively marine. The nodules and veins of flint which occur in the chalk, show that water holding siliceous solution must have been very abundant at the cretaceous period, although we are ignorant by what means siliceous solution may be dissolved in water. Mammalia are not known in the cretaceous rocks.

The chalk hills of England are bounded by a line which stretches from south-west to north-east, and they form three principal mountain ranges. The first, leaving Berkshire, runs north through Bucks, Bedfordshire, and Hertfordshire, to Gogmagog hills, near Cambridge. The second, passing from Berkshire eastward, stretches through Surrey, where it forms the Hog's Back, a beautiful ridge extending from Farnham to Guildford, and then appears at Boxhill. This branch forms the hilly country and the Downs north of Reigate, Bletchingly, and Godstone. It enters Kent to the north of Westerham, and extends to Folkstone and Dover. One division of this ridge is continued to the north coast of Kent, and terminates at the North Foreland. The third range, leaving Wilts and Berks, enters Hants, and to the south passes round Petersfield, then stretching to the east, forms a barrier against the sea along the coast from Chichester, constituting the South Downs, ranging from Mapledurham to Beach-head.

**CHA'LICO-THERIUM.** An extinct animal, belonging to the order of Mammalia, allied to the tapir, and referrible to the miocene period.

**CHALYBEATE.** (from *chalybeus*, Lat. *chalybée*, Fr.) Impregnated with iron or steel; holding iron in solution, as chalybeate springs.

**CHAMA.** (*animal a chiton*.) A genus of inequivalved adhering bivalves, with unequal incurved beaks. It is placed both by De Blainville and Lamarck in the family Chamacea, together with *Diceras*,

*Etheria*, &c. Bruguiere limits this genus to those shells possessing a single hinge-tooth only. Many species have been found fossil, more particularly in the neighbourhood of Paris. The shells of this genus are inhabitants of the ocean, and live in deep water. Twenty-five species have been described; one only of these has been discovered in our seas, namely, the *Chama Cor*.

**CHAMA'CEA.** A family of bivalves, placed by Lamarck in the order *Dimyaria*, and by De Blainville in the order *Lamelli-branchiata*. It comprises the genera *chama*, *diceras*, *etheria*, *isocardium*, *trigonia*, &c.

**CHA'MA GIGAS.** A species of *chama* inhabiting the Indian ocean; it is the largest and heaviest shell yet discovered, being sometimes of the enormous weight of 530 pounds, and its occupant so large as to furnish one hundred and twenty men with a meal; it is said to be very palatable.

**CHA'MBERED.** (*chambré*, Fr.) Divided into compartments by septa: The chambered shells have also been called multilocular. The fossil chambered shells are exceedingly numerous, and afford proofs of not only having performed the office of ordinary shells, as a defence for the body of their inhabitants, but, also, of having been hydraulic instruments of nice operation, and delicate adjustment, constructed to act in subordination to those universal and unchanging laws, which appear to have ever regulated the movement of fluids. The history of chambered shells illustrates also some of those phenomena of fossil conchology, which relate to the limitation of species to particular geological formations; and affords striking proofs of the curious fact, that many genera, and even whole families, have been called into existence, and again totally annihilated, at various and successive periods, during the progress of the construction of the crust of our globe.—*Prof. Buckland*.

**CHA'OS.** (Lat. *chaos*, Fr.) A matter without form; the first matter of which poets supposed all things to have been made in the beginning.

**CHA'OTIC.** Confused; thrown together in one vast heap, without any order or regularity.

**CHEIRO'PTER.** (from *χειρ*, manus, and *πτερον*, ala.) An animal having the fingers elongated, for the expansion of membranes which act as wings, as in the *Vespertilio* or bat. The *Cheiroptera*, according to the arrangement of Cuvier, form the first family of *Carnaria*.

**CHEIRO'PTEROSA.** Furnished with elongated fingers, or toes, for the expansion

- of membranes which serve as wings ; belonging to the family Chieroptera.
- CHELIFEROUS.** (from *χηλή*, Gr. a claw, and *fero*, Lat.) Furnished with claws ; armed with claws.
- CHELO'NIA.** (from *χελώνη*, *testudo*.) The tortoise tribe. In the arrangement of Cuvier, *chelonina* forms the first order of Reptilia. Linnæus includes chelonina in the genus *testudo*, but the order has been, by subsequent writers, divided into five genera, namely, *testudo*, or land-tortoise ; *emys*, or fresh-water tortoise ; *chelonina*, or sea-tortoise ; *chelys* ; and *tryonx*, or soft-shelled tortoise.
- CHELO'NIAN.** Having the form or characters of the tortoise.
- CHE'LOHITE.** A name given to some fossil echinites, from their resemblance, in their sutures, to the shells of the tortoise. The chelonite belongs to the family *Cidaris*, class *Anocysti*.
- CHEROPOTAMUS.** An extinct genus in the order *Pachydermata* ; or animals having thick skins. The cheropotamus was an animal most nearly allied to the hog ; forming a link between the *Anaplotherium* and the *Peccary*.—*Buckland*.
- CHERT.** (Dr. Johnson deduces chert from *quartz*.) A kind of flint. Chert is also, by some, called horn-stone. A siliceous stone, resembling flint, but less splintery in the fracture, and fusible ; which latter property is probably owing to some admixture of calcareous matter. A gradual passage from chert to limestone is not uncommon.
- CHERTY.** Containing chert ; resembling chert.
- CHIA'STOLITE.** (from *χιαστός*, *decussationis formam habens*, and *λίθος*.) A mineral whose crystals are arranged in four-sided nearly rectangular prisms. Its constituent parts are, silica 68.49, alumina 30.17, magnesia 4.12, oxide of iron 2.7, water 0.27. It is the *Holspath* of Werner, and the *Macle* of Haiy. It is found in Cumberland and Argyleshire, occurring in clay-slate.
- CHIASTOLITIC.** Composed of chialstolite ; containing chialstolite. A mass of chialstolitic and hornblendic slates forms the base of the clay-slate system of Cumberland.
- CHIMÆ'RA.** (from *χίμαιρα*, Gr.) A genus of animals, placed in Cuvier's arrangement in the order *Sturiones*, or *Chondropterygii Branchiis Liberis*, class *Pisces*. Professor *Buckland* observes, "The *Chimæra* is one of the most remarkable among living fishes, as a link in the family of *Chondropterygians* ; and the discovery of a similar link, in the geological epochs of the oolitic and cretaceous formations, shows that the dura-
- tion of this curious genus has extended through a greater range of geological epochs, than that of any other genus of fishes yet ascertained by Professor *Agassiz*. The jaws of four extinct species of fossil fishes of the genus *Chimæra* have been discovered, and Dr. *Mantell* states that the jaw, or mandible of a *Chimæra*, has been found in the Kentish Rag. The only known species is the *Chimæra monstrosa*, or *Arctic chimæra*, two or three feet in length, of a silvery colour, and spotted with brown. This species has the first ray of the dorsal fin enlarged into a strong bony spine, armed with sharp hooks, and placed over the pectorals ; like the *Ichthyodorulite* of the earliest fossil sharks. It produces large coriaceous eggs with flattened and hairy borders.
- CHINE.** A narrow ravine with vertical sides. These are numerous in the Isle of Wight, and are objects of curiosity and admiration, being sometimes of great depth.
- CHIROTHERIUM.** A name proposed to be given by Professor *Kaup* to the great unknown animal whose footsteps have been discovered in beds of red sandstone. These footsteps are beautifully figured in Professor *Buckland's* *Bridgewater Treatise*. The name proposed by *Kaup* is on account of a distant resemblance, both of the fore and hind feet, to the impression of a human hand.
- These impressions of feet are partly hollow, and partly in relief ; all the depressions are upon the upper surfaces of slabs or sandstone, while the reliefs are only upon the lower surfaces, covering those which bear the depressions. These footsteps follow one another in pairs, at intervals of fourteen inches, from pair to pair, each pair being in the same line. Both large and small steps have the great-toes alternately on the left and right side ; each has the print of five toes, and the first, or great-toe, is bent inwards like a thumb. The fore and hind foot resemble each other in form, though they differ greatly in size.
- CHI'TON.** (from *χιτών*, Gr.) An oval, convex, multivalved shell, having eight arcuated valves, partly lying over each other, in a row across the back of the animal. The *chiton* is found both fossil and recent ; recent, attached to rocks in the southern seas ; fossil, at *Grignon*. The animal inhabiting the shell, a *Doris*. In *Turton's* *Linné*, twenty-eight species of chitons are described, seven of which have been found in the seas of our coasts.
- CHLAMY'PHORUS.** (from *chlamys*, Lat. *χλαμύς*, Gr. and *fero*.) The name it possesses has been given to this animal from its

being cased in a coat of armour. The chlamyphorus and armadillo are the only known animals that have a compact coat of plated armour. The chlamyphorus lives almost entirely in burrows beneath the surface of sandy plains; its scales are of a dense substance, resembling hard leather.

**CHLORITE.** (from *χλωρός*, Gr.) A mineral, consisting of silica 27·43, alumina 17·9, lime 0·50, oxide of iron 30·63, magnesia 14·56, potash 1·56, water 6·92. It is a dark green variety of talc; has a glistening lustre; minutely foliated structure; is soft and unctuous to the feel; and has obtained its name from its colour. There are several varieties of talc having a dark green colour, and these are known as compact chlorite, earthy chlorite, chlorite slate, foliated chlorite, &c. Chlorite and talc pass by insensible gradations into each other, and in this state they supply the place of mica, in most of the granitic rocks in the vicinity of Mont Blanc.

**CHLORITE-SCHIST.** A metamorphic rock, of a green slaty character, abounding with chlorite.

**CHLORITIC-SAND.** Sand, coloured green by an admixture of chlorite.—*Lyell*.

**CHLORITIC.** Resembling chlorite; containing chlorite.

**CHLORITIC GRANITE.** Granite containing particles of chlorite.

**CHOANITE.** A zoophyte of the chalk formation, intermediate between Alcyonia and Ventriculites. Dr. Mantell, in his "Wonders of Geology," states, "the choanite, called petrified sea-anemone by lapidaries, bears a close resemblance to the recent Alcyonia. In the choanite, crucial spines, resembling those in the recent Alcyonia, may be detected. The choanite is of a sub-cylindrical form, with root-like processes, and having a cavity or sac, which is deep and small in comparison to the bulk of the animal. The inner surface is studded with pores, which are the terminal openings of tubes, disposed in a radiating manner, and ramifying through the mass." The beautiful pebbles found on the shores of Bognor and Worthing owe their markings to the internal structure of the choanite, and these are worked into a variety of ornaments, as brooches, buckles, earrings, &c. &c. Some lately found at Worthing have been sold, when cut and polished, at high prices. One of the finest collections has been made by Captain Tompkins, of that town.

**CHOANITES KÖNIGI.** A species of choanite to which this name has been given, by Dr. Mantell, "in honour to Charles König of the British Museum." This

fossil is figured in Dr. Mantell's Geology of the south-east of England, who therein states that it is inversely conical; externally marked with irregular fibres, some of which penetrate the substance, and terminate in openings on the inner surface; central cavity, cylindrical, deep, narrow; base fixed by radical processes. This species is for the most part enveloped in large irregular flints, which exhibit but slight traces externally of the body they enclose.—*Dr. Mantell*.

**CHOKO-DAMP.** A name given by miners to carbonic acid.

**CHONDRODITE.** Hemiprismatic chrysolite. Another name for brucite; a mineral composed of magnesia 54, silica 32, fluoric acid 4, oxide of iron 2, potash 1, and water 1.

**CHROME.** } (from *χρῶμα*, colour, Gr.)

**CHROMIUM.** } This mineral is said to have obtained its name from the property it possesses of imparting colour to other bodies in a very remarkable degree. Chromium was first discovered by Vauquelin in 1797, after a variety of discordant analyses made by Macquart, Bindheim and others. Its principal ore is found in Siberia, and is a salt of lead, formed by an acid oxide of chromium. To the presence of chrome the emerald and the ruby owe their hues. It is used in tinting glass of an emerald green.

**CHRY'SALIS.** (from *χρῶσις*, gold, because of the golden colour in the nymphæ of some insects.) A state of rest and seeming insensibility, which butterflies, moths, and several other kinds of insects, pass through before they arrive at their winged or most perfect state. It is also called aurelia. The figure of the aurelia or chrysalis generally approaches to that of a cone, and in this state it appears to have neither legs nor wings, nor any power of locomotion; it seems indeed to have hardly so much as life. The time of the duration of the animal in its chrysalis state is different in different species, for while some remain a few days only, others continue eight months.

**CHRYSOBERYL.** (from *χρῶσις*, gold, and *βηρύλλιον*, gemma.) The cymophane of Haüy. Chrysopal of Delametherie. Werner first made the chrysoberyl a distinct species, and gave it the name which it now bears. Colour, a light yellowish or asparagus green. This gem is found in the Brazils, in Ceylon, in America, and in Siberia. It consists of alumina 76·75, glucina 17·79, and protoxide of iron 4·50.

**CHRY'SOLITE.** (from *χρῶσις*, gold, and *λίθος*, a stone, *chrysolite*, Fr.) The Peridot of Haüy, and Krisolith and Olivin of Werner. The term chrysolite was applied, without any regard to distinction,

or any discrimination, to a great variety of precious stones, till Werner defined it accurately, and confined it to that stone which the French mineralogists distinguish by the appellation of Peridot (sorte de pierre précieuse, peu recherchée, qui tire un peu sur le vert.) Chrysolite contains a very large proportion of magnesia, according to some authorities more than half its weight, but agreeably to the analysis of others from forty to fifty per cent. Chrysolite is of a green colour, inclining to yellow; its texture is foliated; fracture conchoidal. It causes double refraction. It is infusible at 150°, but at that temperature loses its transparency, and becomes of a dark grey. With borax it melts, without effervescence, into a transparent glass of a light green colour. The chrysolites of commerce come from Upper Egypt and the Brazils; they are also found in Ceylon, in South America, and in Bohemia. The variety called Olivine is met with in Scotland; of this the colour is olive-green. According to the analysis of Klapproth, chrysolite consists of magnesia 43.5, silica 38.5, oxide of iron 19.

**CHRY'SOPRASE.** (from χρῦσος, gold, and prasinus, green; *chryso-prase*, Fr. *Pierre précieuse d'un vert clair mêlé d'une nuance de jaune.*) A precious stone of an apple-green colour. It is a variety of quartz, or of calcedony. It owes its colour to the presence of the metals nickel and iron, in small quantities. It is found in different parts of Germany, particularly in Silesia. It is always amorphous, and possesses but little lustre. It consists of 96 per cent. silica, 1 per cent. oxide of nickel, with a trace of iron, alumina, and lime.

**CICATRICE.** } (*cicatrix*, Lat. *cicatrix*, Fr.  
**CICA'TRIX.** } *cicatrice*, It.)

1. The scar remaining after a wound.
2. In conchology, the glossy impression in the inside of the valves, to which the muscles of the animal have been affixed.

**CIDARIS.** (*cidaris*, Lat.) A family of echinites, characterised by being hemispherical, globular, or sub-oval; with porous ambulacra, diverging equally on all sides, from the vent to the mouth; vent vertical; mouth beneath, and central. The name cidaris has been given to them from their supposed resemblance to turbans. From other characters, derived from their spines, they have obtained the names of sea-urchins, sea-hedgehogs, sea-thistles, &c., and those in a petrified state, have obtained various names, according to the particular, fanciful, and erroneous notions which have been entertained respecting their origin. Thus, they were called ombria, from ὄμβρος, Gr.

signifying the heavy rain, in which it was supposed they fell; brontia, from βροντή, from an idea that they were thrown to the earth by thunder; ceraunii lapides, from κεραυνός, under an impression that they were formed in the air and generated by lightning; chelonites, from their resemblance to the shells of the tortoise; and ova anguina, from their being supposed to be the eggs of serpents.—*Parkinson.*

The species are numerous.

**CILIA.** (from *cilium*, Lat.)

1. The eye-lashes.
2. Hair-like vibratile organs. The organs of motion in the radiated animals. The cilia resemble very minute hairs, and are only visible with the microscope. In the simpler forms of animals, the cilia are the organs for motion, respiration, and the obtaining of food. Dr. Grant has calculated four hundred millions of them on a single *flustra foliacea*.

**CILIATED.** Fringed, or edged, with parallel hair, bristles, or appendages; occupied with short stiff hairs.

**CINEREOUS.** (*cinereus*, Lat.) Of a dark grey, with a prevalence of black; of the colour of wood-ashes.

**CINERITIOUS.** (*cinericus*, Lat.) Ash-coloured; resembling ashes.

**CINNABAR.** (from κιννάβαρι, Gr. *cinabre*, Fr. *cinabro*, It.) The mercure sulphurée of Haüy. Native cinnabar is a red, heavy, sulphureous ore of quicksilver, the principal mines of which are at Idria in Carinthia, and at Almaden in Spain. Cinnabar is called "ore of mercury," since from it mercury is obtained.

**CINNAMON-STONE.** A blood-red, or hyacinth-red, variety of the dodecahedral garnet. It consists of silica, alumina, lime, and oxide of iron. The finest specimens are brought from Ceylon, where it is found in the sand of the rivers. It is also called *Essonite*.

**CIRCULAR.** A round surface with its diameter equal on all sides.

**CIRRIPEDE.** An annulose, articulated, animal without jointed feet. Cirripedes are not plentiful, and are found only in the upper secondary, and in tertiary deposits.

**CIRRHOPOD.** (from *cirrus*, Lat. and πούς, Gr.) The cirrhopods, or cirrhopoda, like the entomostraceous crustacea, are articulated animals, enclosed in shells like those of mollusca, so that they present both forms of the skeleton. The cirrhopods are almost always inclosed in multivalve shells, secreted from the outer surface of a fleshy, thin, enveloping mantle, and are attached to submarine bodies either directly, by their base, or by means of a fleshy tubular peduncle. The barnacle is an example of the cirrhopoda.

In Cuvier's arrangement the cirrhopoda form the sixth class of Mollusca. Linnaeus comprised them all in one genus, *Lepas*; they have since been divided into two, and again, by others, subdivided.

**CIRRUS.** (*cirrus*, Lat.) A genus of fossil spiral shells of the chalk deposit. This genus bears great resemblance to trochus, from which, however, it may be distinguished by its deep funnel-shaped umbilicus. Two species of cirrus, namely, cirrus depressus and cirrus perspectivus, are figured in Dr. Mantell's "Geology of the South-east of England."

**CLATHRA'RIA LYE'LLII.** A fossil plant discovered by Dr. Mantell, and thus named by him in honour of Charles Lyell, Esq. The following description is extracted from Dr. Mantell's works. The *Clathraria Lyellii* bears an analogy to the yucca, and dracæna or dragon-blood plant. Stems, with the markings of the bases of the leaves, point out the relation of this vegetable to the arborescent ferns, while its internal structure is essentially different. The clathraria has only been found in the quarries in Felgate Forest. This vegetable appears to have possessed a thick epidermis, or false bark, formed by the union of the bases of the leaves, and covered externally with distinct rhomboidal scales, each scale being surrounded by an elevated ridge. The form of the leaves is not positively known, although, from some imperfect traces on the stone in a specimen bearing the impressions of the cicatrices of the bases of the leaves, there is reason to conclude that they were of a linear-lanceolate form. The axis, or interior part of the trunk, originally enclosed by the bark, occurs in the state of solid subcylindrical blocks of sandstone, attenuated at their base, the surfaces of which are marked with longitudinal interrupted ridges, and, in some instances, are deeply imbricated; they are generally of a dark-brown colour.

**CLAVAGE'LLA.** A genus of bivalves, of which only one species has been found recent in the Sicilian seas. It has two irregular, flattish valves, one of which is clasped by the tube, the other being left free. Mr. Sowerby observes, "The shells composing this genus are found in stones, madrepores, &c. and appear to form the connecting link between *Aspergillum*, which has both valves cemented into the tube, and *Fistulana* which has both free."

**CLAVICLE.** (*clavicula*, Lat. *clavicule*, Fr. *clavicula*, It.) The collar-bone.

**CLAY.** When clay is quite pure and unmixed (and in this state it is one of the

rarest substances in the mineral kingdom) it is termed alumina, but under the term clay is comprehended an extensive class of compounds, of which silex is a principal constituent. Clay, then, may be defined an unctuous and tenacious earth, capable of being moulded into form. Clays are firmly coherent, weighty, compact and hard when dry, but stiff, viscid, and ductile when moist; being smooth also and unctuous to the touch. Besides alumina and silica, clays often contain carbonate of lime, magnesia, barytes, oxide of iron, &c. When clay is breathed on, it yields a peculiar smell; it has also a strong affinity for moisture, which is shewn by its sticking to the tongue, when applied to it.

**CLAY-SLATE.** (The argillite of Kirwan.) An indurated clay or shale, common to the fossiliferous and metamorphic series. Clay-slate is opaque, of various shades of colour, and of different degrees of hardness, but easily scratched by iron. It is composed of about fifty per cent. of silex, twenty-five of alumine, and ten or twelve of oxide of iron. Some varieties are used as whetstones. The common one is a variety of slate containing a smaller proportion of alumine and some lime.

**CLAYSTONE.** An earthy stone resembling indurated clay, and generally of a colour approaching to purple; it is a variety of prismatic felspar.

**CLAVAGE.** A peculiar fracture, impressed by nature, which is sometimes mistaken for stratification. This is prettily described by Dr. Mantell: "If I take a flint and break it at random, it still preserves a conchoidal fracture, a sharp cutting edge; and subdivide it as I may, it still retains the same character. If I shiver to pieces calcareous spar, every fragment presents, more or less distinctly, a rhomboidal form; so true is the remark, that we cannot break a stone but in one of nature's joinings."

The regular partings or cleavages in many slate rocks which intersect the beds, nearly at right angles to their dip or inclination, have often been mistaken for strata seams, and have led geologists of some eminence to draw very erroneous inferences.

**CLEAVELANDITE.** A mineral, to which this name has been given after Professor Cleaveland; it has been also called albite.

**CLEFT.** A space made by the separation of parts; in rocks, a crack or crevice.

**CLEFT.** Divided; cloven.

**CLIMBING.** In botany, plants are called climbing, when they mount up other bodies (namely, walls, trees, &c.), and

support themselves by means of their tendrils, or adhesive fibres.

**CLINKSTONE.** (So named from its yielding a metallic sound when struck.) Called also phonolite, a felspathic rock of the trap family. In basalt or wacke, when the felspar greatly prevails, and the texture becomes nearly compact, basalt passes into clinkstone; again, when clinkstone has a more earthy texture, it passes into claystone. Clinkstone often contains imbedded crystals of felspar, and then becomes a trap-porphry, varying in colour according to the prevailing ingredients of its base. The colour of clinkstone is grey, of various shades.

**CLINOMETER.** (from κλίνω and μέτρον, Gr.) An instrument, invented by R. Griffith, Esq., for measuring the dip of mineral strata.

**CLOVEN.** In botany, leaves are called cloven, when the margins of the segments and fissures are straight.

**CLOVATE.** In conchology, thicker towards the top, elongated towards the base.

**CLUNCH.** A provincial term for a sort of indurated clay which is found dividing the coal seams.

**CLYPEUS.** (Lat.) A division of the first class of echinites. The fossil echinites of the second division of anocysti are distinguished as clypei, from their similitude in form to the round bucklers of the ancient foot-soldiers.

**COAL.** (col, Sax. kol, Germ. kole, Dutch.) Coal is composed of charcoal, bitumen, and earthy matter; the latter forms the ashes which remain after combustion. Common coal is a black, solid, and compact substance, generally of a foliated, or rather laminated, structure, which necessarily directs its fracture. Its specific gravity is 1.25 to 1.37. It cokes into cinders during combustion in proportion to its degree of purity, and the nature of the earths which enter into its composition. Coal has obtained various names from varieties of appearance, hardness, situation whence obtained, &c. &c.

**COAL FORMATION.** The carboniferous group succeeds the grauwacke in the ascending series of Europe, and is so called because the great mass of European coal is included among the rocks of which it is composed. Considered in its greatest generality, and with reference to where the masses appear in the greatest simplicity, the carboniferous system consists of three formations, namely, the *coal formation*, a mass 1000 yards or more in thickness, consisting of indefinite alternations of shales and sandstones of different kinds, with about fifty feet of coal in many beds, some ironstone layers, and (very rarely) thin layers of limestone; *mountain lime-*

*stone*, a mass of calcareous rocks, from 500 to 1500 feet in thickness; and *old red sandstone*, a mass of arenaceous and argillaceous rocks, varying in thickness from 100 to 10,000 feet. The total thickness of coal existing in the English and Scotch fields is generally about 50 or 60 feet, divided into 20 or more beds, of a thickness of from six feet to a few inches, alternating with from twenty to fifty or one hundred times as great a thickness of shales and sandstones. Every coal district has its peculiar series of strata, unconnected with any other. A district with its peculiar series of strata is called a coal-field. Coal-fields are of limited extent, and the strata frequently dip to a common centre, being often arranged in basin-shaped concavities, which appear to have been originally detached lakes, that were gradually filled up by repeated depositions of carbonaceous and mineral matter. In some of the larger coal-fields, the original form of the lake cannot be traced, but in the smaller ones it is distinctly preserved. The stratum lying over a bed of coal is called its roof, and the stratum under it, the floor. On the eastern side of England, the coal strata generally dip to the south-east point: on the western side the strata are more frequently thrown into different and opposite directions, by what are termed, faults and dykes. A fault is a break or intersection of strata, by which they are commonly either suddenly raised or depressed, so that in working a coal-mine, the miners come suddenly to its apparent termination. A dyke is a wall of mineral matter which from igneous or volcanic action has forced upwards through the strata, cutting them in a direction nearly vertical. In these cases sometimes the coal is reduced to a cinder for some distance on either side of the wall or dyke. One of the green-stone dykes of Ireland, passing through a bed of coal, has reduced it to a cinder for the space of nine feet on each side. Our ancient *coal formation* has not been found in Italy, Spain, Sicily, or in any of the more southern countries in Europe. Coal is now universally admitted to be of vegetable origin, a question which was long disputed. It is not uncommon to find among the cinders beneath our grates, traces of fossil plants, whose cavities having been filled with silt, at the time of their deposition in the vegetable mass, that gave origin to the coal, have left the impression of their forms upon clay and sand enclosed within them, sharp as those received by a cast from the interior of a mould. Mr. Hutton has recently discovered the most decisive and indisputable proof of the vegetable origin even of the

most bituminous coal; he has ascertained that if any of the three varieties of coal found near Newcastle be cut into very thin slices and submitted to the microscope, more or less of vegetable structure can be recognised. He says, "each of these three kinds of coal, besides the fine distinct reticulation of the original vegetable texture, exhibits other cells, which are filled with a light wine-yellow-coloured matter, apparently of a bituminous nature, and which is so volatile as to be entirely expelled by heat, before any change is effected in the other constituents of the coal." The plants of the carboniferous group are by no means confined to the simplest forms of vegetation, as to cryptogamic plants; but, on the contrary, belong to all the leading divisions of the vegetable kingdom; some of the more fully developed forms, both of the dicotyledonous and monocotyledonous class, having been already discovered, in the first three or four hundred species brought to light. If violence had attended the transport of the plants now converted into coal, or discovered fossil in the associated beds, the appearance of those in the latter would not be as we now find them: instead of appearing as if spread out by the botanist for examination, we should have had them crushed and disfigured. Moreover, tranquillity seems requisite to explain the condition of those vertical, or nearly vertical, stems of plants discovered in the coal measures of different situations, where they have been gradually enveloped by different beds of sandstone or shale through which they appear to pierce. The alternations of limestones containing marine remains, and of sandstones, shales, and coal-beds, with no trace of a marine animal in them, are exceedingly remarkable, and seem difficult of explanation, without calling in the aid of oscillations of the solid surface of the earth, by which very gradual risings and depressions are effected.

The study of the more ancient coal deposits has yielded the most extraordinary evidence of an extremely hot climate; for it appears from the fossils of that period that the flora consisted almost exclusively of large vascular cryptogamic plants. M. Ad. Brongniart states that there existed at that epoch *equiseta* upwards of ten feet high, and from five to six inches in diameter; tree-ferns, or plants allied to them, of from forty to fifty feet in height, and arborescent *lycopodiaceæ*, of from sixty to seventy feet high, exceeding in their development those now found in the hottest parts of the globe. The Newcastle coal-field is supplying rich materials to the fossil flora of Great Britain.

The finest example of distinctly preserved vegetable remains is that witnessed in the coal-mines of Bohemia. "The most elaborate imitations," says Prof. Buckland, "of living foliage upon the painted ceilings of Italian palaces, bear no comparison with the beauteous profusion of extinct vegetable forms, with which the galleries of these instructive coal-mines are overhung. The roof is covered as with a canopy of gorgeous tapestry, enriched with festoons of most graceful foliage, flung in wild, irregular profusion over every portion of its surface. The spectator feels himself transported, as if by enchantment, into the forests of another world; he beholds trees, of forms and characters now unknown upon the surface of the earth, presented to his senses almost in the beauty and vigour of their primeval life; their scaly stems, and bending branches, with their delicate apparatus of foliage, are all spread forth before him; little impaired by the lapse of countless ages, and bearing faithful records of extinct systems of vegetation, which began and terminated in times of which these relics are the infallible historians." I can hardly conclude this article better, than by again drawing on the composition of the above quoted elegant and eloquent author, in transferring to my page from his delightful work on *Geology and Mineralogy* the following beautiful passage. "The important uses of coal and iron in administering to the supply of our daily wants, give to every individual amongst us, in almost every moment of our lives, a personal concern in the geological events of these very distant eras. We are all brought into immediate connexion with the vegetation that clothed the ancient earth, before one-half of its actual surface had yet been formed. The trees of the primeval forests have not, like modern trees, undergone decay, yielding back their elements to the soil and atmosphere by which they had been nourished; but treasured up in subterranean storehouses, have been transformed into enduring beds of coal, which in these later ages have become to man the sources of heat, and light, and wealth. My fire now burns with fuel, and my lamp is shining with the light of gas, derived from coal which has been buried for countless ages in the deep and dark recesses of the earth. We prepare our food, and maintain our forges and furnaces, and the power of our steam-engines, with the remains of plants of ancient forms and extinct species, which were swept from the earth ere the formation of the transition series was completed. Thus, from the wreck of forests that waved upon the surface of the primeval lands, and

from ferruginous mud that was lodged at the bottom of the primeval waters, we derive our chief supplies of coal and iron; those two fundamental elements of art and industry, which contribute more than any other mineral productions of the earth, to increase the riches, and multiply the comforts, and ameliorate the condition of mankind."

**COARCTATE.** (*coarctatus*, Lat.) Pressed together. A term used in entomology, to express that state wherein the larva is.

**CO'BALT.** (The word cobalt seems to be derived from *cobalus*, or *kobold*, the name of a spirit, or goblin, that, according to the superstitious notions of the times, haunted mines, destroyed the works of the miners, and often gave them much unnecessary trouble. It was once customary in Germany to introduce into the church service a prayer that God would preserve miners and their works from kobalts and spirits.)

This metal is of a gray colour, with a shade of red, with but little lustre; its texture is fibrous; specific gravity 8.6. Fusible only at a temperature of 16.677 of Fahrenheit. When heated, cobalt is partly malleable; it is permanently magnetic. The fine blue mineral called zaffre is an impure oxide of this metal. The colour of this oxide is so intense that a single grain of it will impart a full blue to 240 grains of glass. An oxide of cobalt, dissolved in muriatic acid, forms a sympathetic ink; the characters written with it being invisible when cold, but on exposure to heat assuming a bright green colour, which on cooling they again lose. The principal use of cobalt is to give to glass and porcelain a beautiful blue colour.

**CO'BLE.** } A pebble. This word is  
**CO'BLE-STONE.** } given by Ray as be-  
longing to the northern counties. Cob-  
ble has the same signification as boulder.

**COCCIFEROUS.** (from *κόκκος*, a berry, and *fero*, to bear.) Any plant or tree bearing berries.

**CO'CCOLITE.** (from *κόκκος* and *λίθος*, Gr.) A mineral of a green colour, a variety of augite: called also Granular Augite.

**CO'CHLEÆ.** (*cochlea*, Lat.) Univalves; shells of one piece.

**CO'CHLEATE.** } Twisted like a screw, or the  
**CO'CHLEATED.** } shell of a snail; of a  
screwed or turbinated form.

**CO'CKLE.** See *Cardium*.

**CO'cos.** Petrifications resembling nuts of that genus.

**COETA'NEOUS.** (from *con* and *ætas*, Lat.) Of the same age with another.

**COE'VAL.** } (*coævus*, Lat.) Of the same  
**COE'VOUS.** } age. The word coeval re-  
quires to be followed by *with*, coetaneous  
by *to*.

**COE'LIAC.** Relating or pertaining to the abdominal cavity, or belly.

**COHE'RE.** (*cohereo*, Lat.) To stick together; to hold fast one to another, as parts of the same mass. Particles of clay are said to *cohere*.

**COHE'RENCE.** } That state of bodies in which  
**COHE'RENCY.** } their parts are joined to-  
gether, so that they resist divulsion or  
separation.

**COHE'SION.** (*cohésion*, Fr. *coesione*, It.) The act of sticking together, or being united, by natural attraction; one of the different kinds of attraction.

**COHE'SIVE.** That has the property of uniting in a mass so as to resist separation.

**COHE'SIVENESS.** The quality of being cohesive; the property of resisting separation.

**COLEO'PTERA.** (from *κολαός*, a sheath, and *πτερόν*, Gr. a wing.) An order of insects, according to the arrangement of Linnæus, having four wings, the two upper being crustaceous, and forming a shield. In this order are included *Scarabæus*, *Lucanus*, *Dermestes*, *Coccinella*, *Curculio*, *Lampyris*, *Meloe*, *Staphylinus*, *Forficula*, &c. In Cuvier's arrangement coleoptera forms the fifth order, class Insecta, and it comprises four sections, divided according to the number of joints in the tarsi. The first, *Pentamera*, comprises those in which all the tarsi consist of five joints; these are *Carnivora*, *Brachelytra*, *Serricornes*, *Clavicornes*, and *Palpicornes*. The second, *Heteromera*, in which the four first tarsi have five joints, and the two last four each; this section comprises *Melasoma*, *Taxicornes*, *Stenelytra*, and *Trachelides*. The third section includes those in which all the tarsi have four joints; these are *Rhyncophora*, *Xylophagi*, *Platysoma*, *Longicornes*, *Eupoda*, *Cyclica*, and *Vivalpi*. The fourth section, *Trimera*, consists of such as have only three joints to each tarsus, and comprises *Fungicolæ*, *Aphidiphagi*, and *Pselaphii*. Nearly all these families of the four sections are subdivided into genera, but some consist of a single genus.

**COLEO'PTEROUS.** Belonging to the order Coleoptera; having a horny hollow case under which the wings are folded. Coleopterous insects have four wings, the two superior resembling horizontal scales, and joining in a straight line along the inner margin; the inferior wings are merely folded transversely, and covered with cases, commonly called elytra.

**CO'LOLITE.** (from *κώλον*, and *λίθος*, Gr.) The name given to the fossil intestines of fishes by M. Agassiz.

**CO'LON.** (*κώλον*, Gr. *colon*, Lat. *colon*, Fr.) One of the large intestines, and by much the longest. The colon com-

- mences at the cœcum, and terminates in the rectum.
- COLO'PHONITE.** A brown or red variety of dodecahedral garnet, having a resino-adamantine lustre; it is chiefly found at Arendal, in Norway. It consists of silica 37.0, alumina 13.6, lime 29.0, oxide of iron 7.4, magnesia 6.5, oxide of manganese 4.0, water 1.0.
- COLU'MBITE.** A mineral ore, the ore of columbium.
- COLU'MBIUM.** A metal first discovered in 1801 in a mineral brought from North America, from which it received its name. It is of a dark grey colour, very dense, and difficult of fusion.
- COLUME'LLA.** (Lat.) In conchology, the upright pillar in the centre of most of the univalve shells.
- COLU'MN.** In botany the central point of union of the partitions of the seed-vessel, (that is in a capsule containing many cells) to which the seeds are usually attached.
- COLU'MNAR.** Formed in columns; having the form of columns; having the circumference always circular, but the thickness indeterminate.
- CO'MATE.** (*comatus*, Lat.) Hairy. In entomology, having the upper part of the head, or vertex, alone covered with long hairs.
- COMA'TULA.** An existing species of the family of Crinoidea. The comatula presents a conformity of structure with that of the pentacrinite, almost perfect in every essential part, except that the column is either wanting, or at least reduced to a single plate. Peron states that the comatula suspends itself by its side arms from fuci, and in this position watches for its prey, and obtains it by its spreading arms and fingers.—*Miller.*
- COMB.** } These words, thus differently written,  
**COMBE.** } ten, appear to be of Saxon origin.  
**COOMB.** } Ray gives the second as a south and east country word, and defines it to be a valley, "*vallis utrinque collibus insita.*" Lyell states it to be a provincial name for a valley on the declivity of a hill, and which is generally without water. Buckland says, "the term Combe is usually applied to that unwatered portion of a valley, which forms its continuation beyond, and above the most elevated spring that issues into it; at this point, or spring-head, the valley ends and the *combe* begins." A narrow undulating ravine.
- COMBU'STIBLE.** (Fr.) Having the quality of catching fire; susceptible of fire.
- COMBU'STION.** (*combustion*, Fr. *combustione*, It.) Consumption by fire; the disengagement of light and heat which accompanies chemical combination.
- CO'MMINUTE.** (from *comminuo*, Lat.) To pulverise; to break into small portions; to grind.
- COMMINU'TION.** The act of pulverising, or breaking into small parts.
- CO'MMISSURE.** (*commissura*, Lat.) A joint, seam, or suture.
- COMPA'CTED.** (*compactus*, Lat.) Firmly pressed together; closely pressed.
- COMPA'CTLY.** Closely; densely.
- COMPRES'SED.** (*compressus*, Lat.)
1. In botany, leaves are so termed when flattened laterally.
  2. In conchology, having one valve flatter than the other.
- COMPRESSI'BILITY.** The quality of being brought into a smaller compass; thus air is compressible, water is not.
- COMPRES'SIBLE.** (*compressible*, Fr. *che può essere compresso*, It.) That may be forced by pressure into a smaller space.
- COMPRES'SURE.** The force of one body pressing against or upon another.
- CO'MPTONITE.** A mineral thus named after Lord Compton, who first brought it to England, found in the erupted matter of Vesuvius.
- CONCA'MERATED.** (from *concamero*, Lat.) Arched over; vaulted.
- CONCAMERA'TION.** (*concameratio*, Lat.) An arched chamber. In conchology concamerations are those small chambers into which multilocular shells are divided by transverse septa, as in the nautilus, ammonite, &c.
- CO'NCAVE.** (*concavus*, Lat. *concave*, Fr. *concavo*, It.) Hollow, as the inner surface of an egg-shell: opposed to convex; when the surface gradually declines towards its centre, the centre being the deepest point.
- CONCA'VENESS.** Hollowness.
- CONCA'VITY.** (*concavité*, Fr. *concavita*, It.) The internal surface of a hollow spherical or spheroidal body.
- CONCA'VO-CO'NCAVE.** Concave, or hollow, on both sides.
- CONCA'VO-CO'NVEX.** Having one side concave, the other convex.
- CONCENTRIC.** (*concentrique*, Fr. *concentrico*, It.) Having one common centre, as the coats of the onion; running to a centre. A term applied to the direction taken by the lines of growth in spiral bodies.
- CONCH.** (*concha*, Lat. *κογχη*, Gr.) A marine shell.
- CONCHÆ.** Shells consisting of two or more pieces or valves, as bivalves, and multivalves.
- CONCHIFER.** A class of mollusca, the constructors and inhabitants of bivalves. All turbinated and simple shells are constructed by molluscs of a higher order than the conchifers, which construct bi-

valves; the former have heads and eyes; conchifers are without either, and possess but a low degree of any other sense than touch and taste. Thus the whelk is an animal of a higher order than the muscle or oyster.—*Buckland*. Lamark divides Conchifera, which includes all the bivalves, into two orders, Dimyaria and Monomyaria.

**CONCHIFEROUS.** (from *concha*, and *fero*, Lat.) Animals having shelly coverings; producing shells.

**CONCHIPHERA.** A class of mollusca, inhabiting bivalve shells. See *Conchifer*.

**CO'NCHITE.** (*conchytes*, Fr. *coquilles pétrifiées*.) Petrified, or fossil, shells.

**CO'NCHOID.** In geometry, the name given to the curve invented by Nicomedes.

**CONCHOIDAL.** Shelly; shell-like. The fracture of flint is said to be conchoidal, that is to resemble a shell, having convex elevations and concave depressions.

**CONCHÓLEPAS.** A genus of oval vaulted univalvular molluscs; one species only is known, the concholepas peruviana, brought from Peru.

**CONCHOLO'GICAL.** Relating to the science of conchology.

**CONCHOLO'GIST.** (from *conchology*.) One versed in the science of conchology.

**CONCHÓLOGY.** (from *κόγχη*, *concha*, and *λόγος*, Gr. *conchyliogogie*, Fr.) That branch of natural history which treats of testaceous animals, or animals having a testaceous covering, whether they inhabit the ocean, or fresh water, or the land.

It is upon the exclusive shape of the shell, and not the animal inhabitant, that the arrangement of conchology is founded. In early periods, naturalists hesitated whether to construct the arrangement from the animal or the shell; it was, however, very wisely determined that it should be from the latter. The greater part of shells are found without the animal in them, and all fossil shells can only be determined by their form. The Linnean arrangement of shells consists of three orders, namely, Univalves, Bivalves, and Multivalves. Univalves consist of shells complete in one piece, as the cyprea, bulla, buccinum, &c. Bivalves are shells of two parts, or valves, generally connected by a cartilage or ligament, as the oyster, muscle, cockle, &c. Multivalves are shells consisting of more parts than two, as chiton, lepas, and pholas. Every part of a shell which is connected by a cartilage, ligament, hinge, or teeth, is called a valve of such shell. Of the three orders of shells, the univalves are the most numerous, both in genera and species.

**CONCRE'SCENCE.** (from *concreresco*, Lat.)

The act or quality of growing by the union of separate particles.

**CONCHYLIO'LITHUS.** } (from *κόγχη*, and  
**CONCHY'LIOLITE.** } *λίθος*.) A fossil shell.

**CONCRE'TE.** (from *concreresco*, Lat.) To coalesce into one mass; to grow by the union and cohesion of particles.

**CONCRE'TE.** (*concrete*, Fr. *concreto*, It. *concretum*, Lat.) A mass formed by the union and cohesion of various particles.

**CONCRE'TION.** (*concrétion*, Fr. *concrezione*, It.) A coalition, union, or cohesion of separate particles.

**CONDE'NSABLE.** That which is capable of being drawn or pressed into a narrower space or compass.

**CONDENSA'TION.** (*condensation*, Fr. *condensazione*, It.) The act of forcing bodies into a smaller space.

**CONDE'NSE.** (from *condenso*, Lat. *condenser*, Fr. *condensare*, It.) To force into smaller compass.

**CONDE'NSITY.** The state of being condensed.

**CONDU'CTOR.** (from *conduco*, Lat. *conducteur*, Fr. *conduttore*, It.) Any substance capable of receiving and transmitting electricity, or the electric virtue, or fluid, or spark.

**CO'NDUIT.** (*conduite*, Fr. *condotto*, It.) Any hollow vessel for the conveyance of water, or any other fluid, from one place to another.

**CO'NDYLE.** (*κόνδυλος*, Gr. *condylus*, Lat. *condyle*, Fr.) The condyles are bony projections, or eminences, at the ends of bones, as the condyles of the shoulder-bone at the elbow; the condyles of the thigh-bone at the knee.

**CO'NDYLOID.** (from *κόνδυλος* and *είδος*, form, Gr.) An apophysis of a bone.

**CONE.** (*κώνος*, Gr. *conus*, Lat. *cōne*, Fr. *cono*, It.)

1. A solid figure having a circle for its base, and terminating in a point; a figure resembling a sugar-loaf.

2. The fruit of the fir-tree; a catkin hardened, and enlarged into a seed-vessel.

**CONFERVA.** A genus of plants, class Cryptogama, order Algæ.

**CONFLU'ATION.** (Fr. *Forme extérieure, ou surface qui borne les corps, et leur donne une figure particulière*.)

1. The form of a body in relation to its various parts, and their mutual adaptation.

2. The conjunction, or mutual aspect of the planets.

**CONFLA'TION.** (*conflatio*, Lat.) The casting or melting of metal.

**CO'NFLUENCE.** (from *confluo*, Lat. to flow or run together.)

1. The junction, or flowing together, of two or more streams.
2. The point of junction between two or more bodies of water; thus, we speak of a river at its *confluence* with the sea.
- CO'NFLUENT.** (*confluent*, Fr. *confluente*, It.) Running into one another; running into one channel.
- CO'NFLUX.** (*confluxio*, Lat.) A flowing together by the union of two or more currents or streams.
- CONFO'RMABLE.** (*conforme*, Fr. *conforme*, It.) A term used in geology to express parallel strata lying upon each other; thus, when several horizontal strata are deposited one upon another, they are said to be in a *conformable* position, but when horizontal are placed over vertical strata, they are said to be *unconformable*, so far as regards the horizontal in relation to the vertical strata.
- CONFO'RMABLY.** In agreement with one another. Horizontal strata placed on parallel strata lie *conformably*; when placed on vertical strata, or strata having an inclination, or dip, they rest *unconformably*.
- CONFORMA'TION.** (*conformatio*, Lat. *conformation*, Fr. *conformazione*, It.) The form, shape, or structure of a body, as regards the disposition of the various parts, and their relation to each other.
- CONFO'RMITY.** (*conformité*, Fr. *conformità*, It.) Similitude; resemblance.
- CONFRICA'TION.** (from *con* and *frico*, Lat.) The act of rubbing against another body.
- CONGE'NER.** (Lat.) A thing of the same kind or nature; species of the same genus.
- CONGE'NEROUS.** (*congenereux*, Fr.) Of the same kind or nature.
1. In anatomy, muscles which act together to produce the same movement are called *congenereous*.
2. In botany, plants of the same genera.
- CONGE'NERACY.** Similarity of origin.
- CONGE'NERIC.** Of the same nature or kind; belonging to the same genus.
- CONGE'RIES.** (Lat.) A collection of many particles into one mass; an aggregate, or mass, of particles.
- CONGLACIA'TION.** (from *conglacio*, Lat.) The state of being converted into ice; the act of changing into ice.
- CONGLO'BATE.** (*conglobatus*, Lat.) Gathered together in a round ball; conglobate glands are such as are smooth in their surface, and seem to be made up of one continued surface.
- CONGLO'BATELY.** In a spherical form or shape.
- CONGLO'BULATE.** To gather into a round mass.
- CONGLO'MERATE.** (*conglomeratus*, Lat.) This in geology has the same meaning as *breccia*, and *pudding-stone*. A mass of fragments united by some cement. Geological writers have chosen to define the term variously, and oppositely, to one another; thus Lyell states a conglomerate to be "rounded water-worn fragments of rock or pebbles, cemented together by another mineral substance." Mantell defines it "fragments cemented together." Bakewell "large fragments of stone, whether rounded or angular, and imbedded in clay or sandstone." Ure "a compound mineral mass, in which angular fragments of rock are imbedded. The Italian word *breccia* has the same meaning." Mantell, in his "Wonders of Geology," p. 417, has "the most interesting beds of these conglomerates, or *breccias*, in this country."
- CONGLO'MERATE GLAND.** A gland composed of several glomerate glands, whose excretory ducts unite in one common duct: the liver, kidneys, pancreas, &c. are all conglomerate glands.
- CONGLOMERA'TION.** Accumulation into a ball, or mass.
- CONGLU'TINATE.** (*conglutino*, Lat. *conglutiner*, Fr. *conglutinare*, It.) To glue together; to cement, or unite, by some viscid or glutinous medium.
- CONGLU'TINATED.** Cemented; glued; united by some glutinous matter.
- CONGLUTINA'TION.** (*conglutination*, Fr. *conglutinazione*, It.) The act of gluing together; of healing by the first intention.
- CONGLU'TINATIVE.** Having the property of uniting.
- CO'NIC.** } (from *conicus*, Lat.) Having
- CON'ICAL.** } the form of a cone; a round
- CON'ICK.** } decreasing from its base upwards; rounded, and having a flat circle for its base, and a point for its apex.
- CO'NIC SECTIONS.** Lines formed by any plane cutting a cone. If a right cone with a circular base be cut at right angles to the base by a plane passing through the apex, the section will be a triangle. If the cone be cut through both sides by a plane parallel to the base, the section will be a circle. If the cone be cut slanting quite through both sides, the section will be an ellipse. If the cone be cut parallel to one of the sloping sides, the section will be a parabola. And if the plain cut only one side of the cone, and be not parallel to the other, the section will be a hyperbola.
- CO'NICALLY.** In the form of a cone.
- CO'NICALNESS.** The state or quality of being conical.
- CONIFEREÆ.** (from *conus* and *fero*, Lat.) An order of trees bearing cones or tops,

containing the seeds; the fifteenth order in Linneus's *Fragmenta Methodi Naturalis*, and the fifty-first of his natural orders. The *Coniferæ* are plants whose female flowers, placed at a distance from the male, either on the same or distinct roots, are formed into a cone.

"The *Coniferæ*," says Professor Buckland, "form a large and very important tribe among living plants, which are characterised not only by peculiarities in their fructification, (having their seeds originally naked, and not enclosed within an ovary; for which reason they have been arranged in a distinct order, as *Gymnospermous Phanegoramia*;) but also by certain remarkable arrangements in the structure of their wood, whereby the smallest fragment may be identified. The recognition of these peculiar characters in the structure of the stem, is especially important to the geological botanist, because the stems of plants are often the only parts which are found preserved in a fossil state. A transverse section of any coniferous wood, in addition to the radiating and concentric lines, exhibits under the microscope a system of reticulations by which *coniferæ* are distinguishable from other plants. It appears that the *coniferæ* are common to fossiliferous strata of all periods; they are least abundant in the transition series, more numerous in the secondary, and most frequent in the tertiary series. All the trees of this order secrete resin, have branched trunks, and linear, rigid, entire leaves: species are found in the coldest as well as in the hottest regions."

**CONIFEROUS.** (*conifère*, Fr.) Bearing fruit in the form of a pine-apple, or cone.

**CONIFORM.** Conical; in the form of a cone.

**CONILITE.** A genus of molluscous univalves, placed both by Lamarck and De Blainville in the family *Orthocerata*. It is conical, straight, or slightly curved.

"The difference between conilites and baculites, is that the external sheath of the latter is thin, and not filled up with solid matter, from the point of the alveole to the apex, as in the former."—*Sowerby*.

**CONITE.** An ash-coloured mineral, becoming brown by exposure to the atmosphere.

**CONJUGATE.** (*conjugatus*, Lat.) A pinnate leaf having only one pair of leaflets; leaves that consist of one pair of pinnæ or leaflets.

**CONNATE.** (*connatum*, Lat.) Applied to leaves, when two leaves are so united at their base as to have the appearance of one leaf.

**CONOID.** (from *κωνος* and *είδος*, Gr.)

Resembling a cone in form; sugar-loaf shaped.

**CONSO'LIDATE.** (from *consolider*, Fr. *rendre ferme*.) To form into a compact and solid body; to unite into a solid mass.

**CONSO'LIDATED.** (*consolidatus*, Lat. *consolidé*, Fr.) Made firm, solid, compact.

**CONSOLIDA'TION.** (*consolidation*, Fr. *consolidazione*, It.) The act of making into a compact and solid mass.

**CONSTRINGENT.** (*constringens*, Lat.) Having the power or quality of compressing, binding, or contracting into a smaller compass.

**CONTEMPORANE'ITY.** (*contemporanéité*, Fr.) The state of being contemporary with. This word is used by J. Phillips: "it becomes a very curious problem to determine what are the lines of *contemporaneity* in the oolitic system."

**CONTEMPORA'NEOUS.** } (*contemporain*, Fr.  
**CONTEMPORARY.** } *coetaneo*, It.)  
Existing at the same period.

**CONTE'MPORARY.** One who lives at the same time with another.

**CONTE'RMINOUS.** (*conterminus*, Lat.) Bordering upon; contiguous; touching at the boundaries.

**CONTE'RRANE'OUS.** (*conterraneus*, Lat.) Of the same country.

**CONTIGU'ITY.** (*contiguité*, Fr. *contiguità*, It.) Actual contact.

**CONTINU'ITY.** (*continuitas*, Lat. *continuité*, Fr. *continuità*, It.) Uninterrupted connection, without the intervention of any space.

**CONTI'NUOUS.** (*continu*, Fr.) Joined together, without interruption or intervention.

**CONTO'RSION.** } (*contorsion*, Fr. *contorsio*,  
**CONTO'RSION.** } Lat. *contorsione*, It.) A twisting, or writhing; wry motion; flexure.

**CONTO'RTED.** (*contortus*, Lat.) Twisted; ravelled; wound. In conchology, twisted on each other in an oblique direction.

**CONTRA'CTILE.** Having the power of contracting itself; having the power of contraction.

**CONTRA'CTIBLE.** Capable of contraction.

**CONTRA'CTIBLENESS.** The quality of undergoing contraction.

**CONTRACTI'LITY.** The inherent property by which bodies contract.

**CONVE'RGE.** (*convergo*, Lat. *converger*, Fr.) To tend to one point from different quarters.

**CONVE'RGENT.** } Tending to one point.  
**CONVE'RGING.** }

**CONVEX.** (*convexus*, Lat. *convexe*, Fr. *convesso*, It.) Rising on the exterior into a circular or spherical form; the opposite to concave.

**CONVEXED.** Protuberant in a spherical form.

**CONVE'XEDLY.** In a convex form.

**CONVE'XITY.** (*convexité*, Fr. *convessità*, It.) Protuberance in a circular or spherical form.

**CO'NVEXLY.** In a convex form.

**CO'NVEXNESS.** Convexity.

**CONVE'XO-CONCAVE.** Convex on one side, and concave on the other, but having the convexity on the inside.

**CO'NVEXO-CO'NVEX.** Convex, or protuberant, on both sides.

**CO'NVOLUTE.** } (*convolutus*, from *con-*  
**CO'NVOLUTED.** } *volvo*, Lat.) Rolled up;  
 twisted spirally; rolled upon itself.

**CONVOLU'TION.** (*convolutio*, Lat.) The state of being rolled upon itself; the act of twisting anything spirally, or of rolling it upon itself.

**CONVO'LTE.** (*convolvo*, Lat.) To roll up; to roll together; to roll upon itself.

**CONULA'RIA.** A genus of orthocerata, of a conical shape, and polythalamous, the transverse septa being imperforate. The conularia has no siphon, and in this character differs from orthoceras.

**CO'NULUS.** A genus of echinites; in it are contained those which rise from a circular base into a cone, (from which form they obtain their name,) with an acute or obtuse vertex, from which five pairs of punctated or crenulated lines, or ambulacra, pass; dividing the shell into five large and five small aræ, that in which the anus is placed being rather the largest. All the species which constitute the genus are known only as fossils, and are distinguished by the modification of their form.

**CO'NUS.** (*κῶνος*, Gr. *conus*, Lat.) Animal, a Limax; shell univalve, convolute, turbinate; aperture effuse, longitudinal, linear, without teeth, entire at the base; pillar smooth. This genus is divided by some into five families. The recent conus is an inhabitant of the ocean, and is generally found on rocky shores. Some of the shells are very beautiful, and are both rare and valuable; one species, the *cedo nulli*, is valued at one hundred guineas. The conus does not inhabit our seas.

**COOMB.** } See *Comb.*  
**COOMBE.** }

**CO'PPER.** (*cuprum*, Lat. *kupfer*, Germ. *koper*, Dutch. The word is derived from the island of Cyprus, where it was first wrought.) When pure, copper is of a red colour; its specific gravity is from 8.6 to 8.9, or nearly nine times as heavy as water. Copper is found in primary and secondary rocks, and is often native, i. e. in a pure metallic state; it is also found crystallized. In smell and taste copper is excessively nauseous. It is very malleable, next so in degree after gold and silver, and can be hammered

out into extremely thin leaves, so thin as to be blown about by the slightest breeze. In ductility it ranks after gold, silver, platinum, and iron; while in tenacity it yields only to iron. A copper wire one-tenth of an inch in diameter will sustain a weight of 385 lbs. Copper is the most sonorous of all metals: its fusing point is 1450 Fah., and it can be volatilized by an increased temperature; when allowed to cool slowly, it assumes a crystalline form. At common temperatures, copper is not acted on by water, but, if long exposed to the action of the atmosphere and moisture, it oxidizes; as it does in the air alone, if heated to redness. It combines with oxygen in two proportions. Copper admits of a greater degree of condensation by hammering than any other metal. Copper has been known from the earliest ages. As stated before, it occurs frequently in the native state, either in masses, grains, or crystallized in cubes and octohedrons. The most abundant, and most generally diffused ore, and that from which the metal is chiefly obtained, is the sulphuret of copper, termed copper pyrites, composed of copper, sulphur, and a small portion of iron. Copper has never been combined with carbon, hydrogen, or azote; but it combines readily with sulphur and phosphorus, forming with them compounds called sulphuret and phosphuret of copper. Copper, having the property of increasing the hardness of gold without injuring its colour, is used in the making of gold coin; that of Great Britain is an alloy of 11 parts of gold and 1 of copper.

**CO'PPERAS.** (*copparosa*, It. *couperose*, Fr. *kupferwasser*, Germ.) Sulphate of iron; green vitriol. Sulphate of iron has a fine green colour; its crystals are transparent rhomboidal prisms, the faces of which are rhombs with angles of 79° 50' and 100° 10' inclined to each other at angles of 98° 37' and 81° 23'. It has a strong styptic taste, and reddens vegetable blues. It is prepared by moistening the sulphurets of iron, which are found native in abundance, and exposing them to the open air. These are slowly covered with a crust of sulphate of iron, which is first dissolved in water and subsequently, by means of evaporation, obtained in crystals.

**CO'PPLE-STONES.** Boulders; cobble-stones, which see.

**CO'PROLITE.** The petrified faecal matter of carnivorous reptiles. The following description of coprolites is taken from a memoir on the subject, by Professor Buckland, published in the transactions of the Geological Society, as well as from

his splendid Bridgewater Treatise:—"In variety of size and external form, the coprolites resemble oblong pebbles or kidney potatoes. They, for the most part, vary from two to four inches in length, and from one to two inches in diameter. Some few are much larger, and bear a due proportion to the gigantic calibre of the largest ichthyosauri; some are flat and amorphous, as if the substance had been voided in a semifluid state; others are flattened by pressure of the shale. Their usual colour is ash-grey, sometimes interspersed with black, and sometimes wholly black. Their substance is of a compact earthy texture, resembling indurated clay, and having a conchoidal and glassy fracture. Their structure is in most cases tortuous, but the number of coils is very unequal; the most common number is three. Some coprolites, especially the small ones, shew no traces of contortion. The sections of these fecal balls, show their interior to be arranged in a folded plate, wrapped spirally round from the centre outwards, like the whorls of a turbinated shell; their exterior also retains the corrugations and minute impressions, which, in their plastic state, they may have received from the intestines of the living animals. Dispersed irregularly throughout the petrified fæces, are the scales, and occasionally the teeth and bones of fishes, that seem to have passed undigested through the bodies of the saurians; just as the enamel of teeth, and sometimes fragments of bones are found undigested both in the recent and fossil album græcum of hyænas." On the shore at Lyme Regis, in Dorsetshire, coprolites are found in great abundance, lying scattered in the ground like potatoes. The true character and real nature of the coprolite was long misunderstood, having formerly been called Juli, and believed to be fossil fir cones. Coprolites are found in all strata which contain the remains of carnivorous reptiles. The real origin of these coprolites is placed beyond all doubt by their being found frequently within the intestinal canal of fossil skeletons of ichthyosauri. The preservation of such fecal matter, and its lapidification, result from the imperishable nature of the phosphate of lime, one of the constituents of bony matter.

**COPROLITIC.** Composed of coprolites; resembling coprolites; containing coprolites.

**CORACOID.** (from *κόραξ*, and *ἴδος*, Gr.) Resembling the beak of a crow. A name given to the upper anterior point or process of the scapula.

**CORAL.** (*κοράλλιον*, Gr. *corallium*, Lat.

*corail*, Fr. *coralla*, It. It is somewhat marvellous to find Todd following Johnson in his description of coral, and stating it to be a plant.) The red coral is a branched zoophyte, somewhat resembling in miniature a tree deprived of its leaves and twigs. It seldom exceeds one foot in height, and is attached to the rocks by a broad expansion or base. It consists of a bright red, stony axis, invested with a fleshy, or gelatinous substance of a pale blue colour, which is studded over with stellar polypi. Coral is composed of carbonate of lime and animal matter. The powers of the organic creation, says Lyell, in modifying the form and structure of the earth's crust, which may be said to be undergoing repair, or where new rock formations are continually in progress, are most conspicuously displayed in the labours of the coral animals. We may compare the operation of these zoophytes in the sea to the effects produced on a smaller scale upon the land, by the plants which generate peat. In corals, the more durable materials of the generation that has passed away serve as the foundation on which living animals are continuing to rear a similar structure. Of the numerous species of zoophytes which are engaged in the production of coral banks, some of the most common belong to the genera *meandrina*, *caryophyllia*, *millepora*, and *astrea*, but especially the latter. It has been asked, "From whence do these innumerable zoophytes and molluscous animals procure the lime, which, mixed with a small quantity of animal matter, forms the solid covering by which they are protected? Have they the power of separating it from other substances, or the still more extraordinary faculty of producing it from simple elements? The latter I consider the more probable; for the polypi which accumulate rocks of coral have no power of locomotion; their growth is rapid, and the quantity of calcareous matter they produce, in a short space of time, can scarcely be supposed to exist in the waters of the ocean to which they have access, as sea-water contains but a minute portion of lime." Le Sueur, who observed them in the West Indies, describes these polypes, when expanded in calm weather at the bottom of the sea, as covering their stony receptacles with a continuous sheet of most brilliant colours. Ehrenberg, the distinguished German naturalist, was so struck with the splendid spectacle presented by living polyparia covering every portion of the bottom of the Red Sea, that he is said to have exclaimed, "Where is the paradise of flowers that can rival in variety and

beauty these living wonders of the ocean!"

—*Lyell. Mantell. Buckland. Bakewell.*

**CORALL'FERI.** An order of polypi, embracing those species which were so long considered to be marine plants.

**CO'RALLINE.** Belonging to the class Zoophyta, order Eschara, each polypus being contained in a calcareous or horny shell, without any central axis. The animal which secretes and inhabits coral.

**CO'RALLINE.** (*corallin*, Fr. *corallino*, It.) Composed of coral; resembling coral; of the colour of coral.

**CO'RAL-RAG.** A member of the middle division of oolite, of the thickness of about forty feet in the Bath district.

**CO'RAL REEF.** } It is a curious, but in-

**CO'RAL ISLAND.** } disputable fact, that a

considerable portion of the earth's surface is the result of organic secretion, and the

same process is still going on extensively in the Pacific and Indian seas, where in-

numerable coral islands rise above and innumerable reefs and shoals lie just be-

low the surface of the waves. The observations of modern voyagers have thrown

much light on the formation of coral islands and reefs; they concur in the opinion

that these reefs and islands do not rise from the depth even of many hundred

yards, but commence on the summit of some volcanic elevations, or other sub-

marine ridges and rocks, not far below the surface of the sea. The calcareous

masses usually termed coral reefs are by no means exclusively composed of zoo-

phytes; a great variety of shells, and among them some of the largest and hea-

viest of known species, contributing to augment the mass. The reefs, which just

raise themselves above the level of the sea, are usually of a circular or oval form,

and surrounded by a deep, and often unfathomable ocean. In the centre of each,

there is usually a comparatively shallow lagoon, where there is still water, and

where the smaller and more delicate kind of zoophytes find a tranquil abode, while

the stronger species live on the exterior margin of the isle. When the reef is of

such a height that it remains almost dry at low water, the corals leave off building.

Fragments of coral limestone are thrown up by the waves, until the ridge becomes

so high, that it is covered only during some seasons of the year by the high tides.

The heat of the sun often penetrates the mass when it is dry, and splits it. The

force of the waves subsequently separates blocks of the coral and throws them upon

the reef. Afterwards the calcareous sand, removed from the action of the waves, lies

undisturbed, and offers to the seeds of trees and plants, cast upon it by the waves,

a soil upon which they rapidly vegetate.

Entire trunks of trees, carried by the rivers from other countries, find here a resting-place: with these come small animals, such as insects, lizards, &c., as the first inhabitants. Even before the trees form a wood, the sea-birds nestle here; strayed land-birds take refuge in the bushes: and at a much later period, man appears, and builds his hut on the fruitful soil.—*Phillips. Lyell. Kotzebue. Bakewell.*

**CORALL'GENOUS.** Producing coral. The depth at which the coralligenous zoophyta commence their labours is said not to exceed fifteen or twenty fathoms.

**CO'RALLOID.** } (from *coral* and *εἶδος*,

**CORALLOI'DAL.** } Gr.) Resembling coral;

having the form of coral.

**CORALLOI'DES.** (*coralloides*, Fr. *seme del corallo bianco*, It.) Coral-wort; the clavaria coralloides of Linnæus.

**CO'RBU'LA.** (*corbula*, Lat.) A genus of bivalves belonging to the family Corbula-

acea in Lamarck's arrangement, and to that of Conchacea in De Blainville's.

The corbula is a marine animal, found at depths varying to thirteen fathoms, in

sandy mud. Some authors place the genus corbula in Solen; others in Mya.

Corbulæ are found both fossil and recent. Fossil corbulæ occur in the London clay,

calcaire grossier, and Norfolk crag. They are also found in the Shanklin sand,

at Parham, and elsewhere.

**CORBULA'CEA.** A family of bivalves in Lamarck's system, belonging to the order

Dimyaria, and comprising the two genera Pandora and Corbula.

**CO'RDATE.** } (*cordatus*.) Heart-shaped.

**CO'RDATED.** } Resembling the form of a heart; heart-

shaped.

**CORIA'CEOUS.** (*coriaceus*, Lat. *coriacee*, Fr.) Resembling leather; consisting of

leather; of a leather-like consistence.

**COR-MARINUM.** A genus of echinites, characterized by the bilabiated mouth

being in the third region of the axis of the base, and the anus in the side of the

truncated extremity. In this genus, or, as he terms it, family, Leske, with Muller,

includes spatangus, spatagoides, brissus, and brissoides, not considering the

absence of the groove to be a generic distinction.—*Parkinson.*

**CORDI'ERITE.** Another name for iolite, or prismatic quartz.

**CO'RINDON.** Another name for corundum or spinel.

**CO'RNEA.** (from *cornu*, Lat. *cornée*, Fr. *cornea dell'occhio*, It.) The anterior

transparent portion of the ball of the eye, or that portion of the front of the eye

which allows the rays of light to pass

through, and permits objects to be reflected on the retina at the back.

**CORNEAN.** A variety of clay-stone.

**CORNEOUS.** (*corneus*, Lat.) Horny; of a substance resembling horn; of a horn-colour.

**CORNE'LIAN.** For an account of this subspecies of calcedony, see *Carnelian*.

**CORNBRAH.** A coarse shelly limestone; a provincial term. Cornbrash is a marine deposit, a member of the oolite; it occurs in Wiltshire.

**COR'NSTONE.** A red limestone, occurring in the old red sandstone. The name of this and of the preceding word may be considered as provincial, and given to them from their presumed utility in producing fertile corn-land.

**CORNU'TED.** (*cornutus*, Lat.) Horned.

**CORO'LLA.** (Lat.) The corolla consists of the delicate petal, or petals, forming what, in common language, are termed the blossoms; and in polypetalous flowers, the petals are usually called the leaves of the flower. The corolla constitutes the beauty of the flower, and the odour and fragrant of the plant frequently reside therein, as in the rose, jessamine, violet, &c. The *corolla* has a diversity of forms, as well as of colour, being found of every shade and variety except black. It includes two parts, the petals and the nectary: the latter is sometimes a part of the former, and sometimes separate from it. The leaves of the *corolla* are called petals, and these are either distinct, when the corolla is termed polypetalous, as in the rose, ranunculus, &c. or they are united by their edges, in which case the *corolla* is said to be monopetalous, as in the honey-suckle, convolvulus, &c. The *corolla* is either regular or irregular: when the petals are all alike in size and form, the corolla having a symmetrical appearance, it is called regular; but when the petals are unequal, or unlike each other, it is termed irregular, as in the geranium, violet, &c. A *papilionaceous corolla* consists of five petals of particular forms, of which the uppermost is turned back, and is called the vexillum or standard; the two next resemble each other, but differ from the first; they have their faces towards each other; they are called the alæ, or wings; the remaining two, which are placed below the others, also resemble each other, but differ from the three already mentioned; they are usually united by their lower edge, and form a figure resembling the keel of a boat, whence they obtain the name of carina, or keel. This *corolla* is the characteristic of the leguminosæ, a very large order of plants, of which the broom, lupin, sweet-pea, vetch, &c. are examples.

In some plants the *corolla* has one or more of its petals spurred, as in the violet.

In the orchideæ, the *corolla* consists of three pieces, one differing very greatly in form and size from the other two; it is called the *labellum*, or little lip, and is often spurred. In many species, this resembles an insect.

The lower part of the single petal of a *corolla*, by which it is fixed to the receptacle, is named the claw.

The cruciferous plants have four petals, and these are so arranged as to resemble a cross, from which circumstance they have been named Crucifereæ. The stock, radish, cabbage, mustard, &c. are examples.

The outer part of the heads of many composite flowers is formed of the ligulate *corollas* of the exterior florets, and these are commonly white, blue, or yellow, as in the aster, daisy, &c.; this part of the head is termed the *ray*, the central part being called the *disk*, which disk is composed of florets, with regular *corollas*.

A *corolla* with two lips is called *bilabiate*: when the two lips present an appearance resembling the mouth of an animal, the *corolla* is called *ringent*.

The petals of all *corollas* are placed alternately with the sepals of the calyx.

**CORO'NA.** (Lat.) In botany, an appendage of the corolla or perianth.

**CORO'NOID.** See *Coracoid*.

**CORO'NULA.** A regular subrotund, or subconical shell, divided into twelve aræ, with an opening both in the superior and inferior part; that in the superior closed by a four-valved operculum.

**CORO'NATED.** (*coronatus*, Lat.) In conchology, crowned, or girt towards the apex with a single row of eminences.

**CORPUSCLE.** } (*corpusculum*, Lat. *corpuscule*, Fr. *corpuscolo*, It.) A minute particle of a body; an atom.

**CORRO'DED.** (from *corrodo*, Lat. *corrodé*, Fr.) Eaten away by degrees; consumed; worn away.

**CORRO'DENT.** (from *corrodo*, Lat.) Having the power of wasting, of wearing anything away by degrees.

**CORRODIBI'LITY.** The quality of being corrosible.

**CORRO'DIBLE.** } That may be worn away,  
**CORRO'SIBLE.** } consumed, or corroded.

**CORRO'SION.** (Fr. *l'action ou l'effet de ce qui est corrosif*; *corrosione*, It.) A dissolution of bodies by means of acids or corrosive menstua.

**CORRO'SIVE.** (*corrosif*, Fr. *corrosivo*, It.) Having the power of dissolving or gradually wearing away.

**CO'RRUGATED.** (from *corrugo*, Lat.) Contracted; wrinkled; as the skin by cold.

**CORRUGA'TION.** Contraction into wrinkles.

**CO'RTEX.** (Lat.) The exterior skin, or epidermis; the bark or rind.

**CO'RTICAL.** (from *cortex*, Lat. *cortical*, Fr. *corticale*, It.) Belonging to the bark or rind; resembling the bark or rind.

**CO'RTICATED.** (*corticatus*, Lat.) That hath a rind or bark.

**CO'RTICOSE.** (from *corticosus*, Lat.) Full of bark; abounding in rind.

**CORTICI'FEROUS.** (from *cortex* and *fero*, Lat.) Producing bark.

**CORU'NDUM.** A genus of gems comprising four species.

1. Spinel, or dodecahedral corundum.
2. Automolite, or octahedral corundum.
3. Sapphire, or rhombohedral corundum.
4. Chrysoberyl, or prismatic corundum.

These will all be described under their several names.

**CO'RYMB.** (*corymbe*, Fr. *corymbus*, Lat.) A kind of efflorescence. A raceme. A spike of flowers, whose partial peduncles take their rise from different heights upon the common stalk, but the lower peduncles being longer than the upper ones, they all form nearly a level surface at the top.

**CORY'MBIATED.** Garnished with bunches of berries or blossoms in the form of corymbs.

**CORYMBI'FEROUS.** (from *corymbus* and *fero*, Lat.) Bearing berries or blossoms in the form of corymbs.

**CO'SMICAL.** (from *κοσμικός*, Gr.)

1. Relating to the world.
2. Rising or setting with the sun: thus a star is said to rise cosmically, when it rises together with the sun; and to set cosmically when it sets at the same instant that the sun rises: but to rise and set cosmically, according to Kepler, is to ascend above, or descend below the horizon.

**CO'SMICALLY.** With the sun.

**COSMO'GONIST.** One who makes a study of the origin and creation of the world.

**COSMO'GONY.** (*κοσμογένεια*, Gr. *cosmogonie*, Fr.) The science of the formation of the universe.

**COSMO'GRAPHER.** (from *cosmographie*, Fr. *cosmografo*, It. *κόσμος* and *γράφω*, *κοσμογράφος*, Gr.) One who describes the several parts of the creation by writing.

**COSMO'GRAPHY.** (*cosmographie*, Fr. *cosmografia*, It. *κοσμογραφία*, Gr.) The science which describes the several parts of the creation, delineating them according to their number, positions, motions, magnitudes, figures, &c.

**COSMOLO'GICAL.** (*cosmologique*, Fr. *κοσμολογικός*, Gr.) Pertaining to the science of cosmology.

**COSMO'LOGIST.** A pursuer of the science of cosmology; who describes the several parts of creation.

**COSMO'LOGY.** (*cosmologie*, Fr. *κοσμολογία*, Gr.) The science which treats of the general laws by which the physical world is governed; the study of the world in general.

**CO'STA.** (*costa*, Lat.) A rib.

**CO'STAL.** (*costal*, *costale*, Fr.) Belonging to the ribs.

**CO'STATE.** } (from *costatus*, Lat.) Rib-  
**CO'STATED.** } bed, or having ribs.

**COTE'MPORANEUS.** } (*contemporain*, Fr.  
**COTE'MPORARY.** } (*coetaneo*, It.) Liv-  
ing at the same time; coetaneous.

**COTE'MPORARY.** One living at the same time.

**CO'TTONOUS.** } (*cotonneux*, Fr.) Resem-  
**CO'TTONY.** } bling cotton, either in its  
feel or appearance; downy.

**CO'TYLE.** (from *κοτύλη*, Gr. *cotyle*, Fr. *cavité d'un os dans laquelle un autre os s'articule*.) The cavity or socket of a bone which receives another bone in articulation, as the socket of the hip which receives the head of the femur, or thigh-bone.

**COTYLE'DON.** (*κοτυληδών*, Gr. *cotyledon*, Fr.) The side lobe, or seed-lobe of seeds, furnishing nourishment and protection to the corculum, and forming the chief bulk of the seeds: these lobes swell and expand in the ground, and as the stem ascends they are usually raised out of the ground, assume a green colour, and perform the functions of leaves until the young leaves unfold, when they generally wither. The cotyledon is found at the point of union of the radicle and plumule. The most essential difference in the structure, mode of growth, and character of the plants growing from the seeds, is found connected with the number or position of the cotyledons. Those plants, the seeds of which have only one cotyledon, or if more, these alternate on the embryo, are called monocotyledonous. All monocotyledonous plants can be recognised without any difficulty, by a characteristic feature of the leaf, the veins of the leaf being parallel, and not reticulated; all the palms, the tulip, lily, aloe, &c. are instances. Those plants which have two cotyledons, and those opposite, are called dicotyledonous; all dicotyledonous plants have the veins of their leaves reticulated.

**COTYLE'DONOUS.** Having cotyledons.

**CO'UNTER-CURRENT.** A stream, or current, which runs in an opposite direction to another.

**CO'UNTER-CURRENT.** Running in an opposite direction.

**COVE.** (*covum*, Lat.) A small bay, creek, or inlet.

**Co'WRY.** The common or familiar name for shells belonging to the genus *Cypræa*.

**Crag.** A tertiary deposit of the older pliocene period, which has obtained this name from a provincial term signifying gravel. The crag is chiefly developed in the eastern parts of Norfolk and Suffolk, extending thence into Essex: it is seen to rest on the chalk and on the London clay, but generally on the chalk. By some the crag has been divided into two groups, the lower, or coralline, which is, in some places, fifty feet or more in thickness, and the upper, or red crag, thus named from its ferruginous colour. The fossils of the crag are very numerous.

**CRA'NIA.** (from *cranium*, Lat. a skull, in consequence of a supposed resemblance of the interior of the shells to a skull, arising from some deep muscular impressions.) A regular inequivalved bivalve; the upper valve very convex, patelliform, with the umbo near the centre, the lower valve flat, and nearly round, and pierced internally with three unequal and oblique holes. The arms of the animal are ciliated. Cuvier places *crania* in the class Brachiopoda, division Mollusca. By Lamarck this genus is placed in the family Rudistes, order Monomyaria; and by De Blainville in the order Palliobranchiata. *Crania* are found attached to stones and shells, and are brought up, probably from great depths, by cod-lines off the coast of Shetland, and with corals in the Mediterranean. Several species of fossil *crania* are found in the chalk formation.

**CRA'NIUM.** The skull.

**CRASSATE'LLA.** (from *crassus*, Lat.) A genus of equivalved inequilateral close bivalves. The hinge teeth two, with an adjoining fossa; the lateral teeth obsolete. The cartilage inserted in a pit formed in the hinge.

As the crassatella advances in age the valves become very greatly thickened, from which circumstance it obtains its name. Cuvier places this genus in the family Mytilacia, order Acephala; Lamarck in the family Mactracea; and De Blainville in the family Conchacea. Recent crassatellæ inhabit sandy mud at depths varying from eight to twelve fathoms. Some species of fossil crassatellæ have been found in the tertiary formations.

**CRA'TER.** (*cratère*, Fr. *κράτηρ*, Gr. *κράτῆρες*, *montis foramina, quibus ignis cinis evomitur.*) The basin-shaped hollow in volcanic mountains whence issue the flames and erupted matter.

**CRATE'RIFORM.** (from *crater* and *forma*, Lat.) Hollowed out like a crater; of the form of a crater; bowl-shaped.

**CREMA'TION.** (*crematio*, Lat.) A burning.

**CRE'NATE.** } (*crenatus*, Lat.) Notched  
**CRE'NATED.** } at the margin; scalloped; indented.

1. It is applied to leaves when the notches or teeth on the borders are rounded, and the notches not directed to either end of the leaf.

2. In entomology, a margin with indentations, not sufficient to be called teeth, the exterior whereof is rounded.

**CRE'NATURE.** The notch or indentation of a leaf.

**CRENA'TULA.** (from *crenatus*, Lat.) This name has been given to this genus of bivalves from the hinge showing a row of roundish or oval pits, making it appear as if crenulated. An irregularly formed flat bivalve; closed, not giving passage to any byssus; the hinge linear, excavated, and crenulated; umbones terminal. It is found in sponges, and moored to corallines, &c. Parkinson, in describing the *crenatula*, says, "there are very few among the fossil shells of this or of any other country, which, at first sight, are more dissimilar from any of the recent shells than the fossil *crenatula*. It is very rarely found.

**CRE'NULATE.** } (*crenelé*, Fr.) Indented  
**CRE'NULATED.** } round the margin with small notches. The fine saw-like edge of the shell of the cockle, which so nicely fits into the opposite shells, is a familiar example of a crenulated margin.

**CRE'PITATE.** (*crepito*, Lat.) To crackle.

**CREPITA'TION.** (*crepitation*, Fr.) A low crackling noise.

**CRE'SCIVE.** (from *cresco*, Lat.) Growing; increasing.

**CRE'TA.** (Lat.) Chalk; carbonate of lime.

**CRETA'CEOUS.** Having the qualities of chalk; containing chalk; chalky.

**CRETA'CEOUS GROUP.** This group comprises the different strata from the chalk of Maestricht to the lower green-sand inclusive. In Lyell's Principles, they are thus arranged: 1. Maestricht beds; 2. Chalk with flints; 3. Chalk without flints; 4. Upper green-sand; 5. Gault; 6. Lower green-sand. The whole of these formations are marine.

**CRICHTONITE.** The name given to a black, opaque, shining mineral, after Dr. Crichton.

**CRIO'CEATES.** A genus of ammonites, having the whorls disconnected.

**CRINI'GEROUS.** (from *criniger*, Lat.) That hath much hair; hairy; overgrown with hair.

**CRINITE.** (*crinitus*, Lat.) Having tufts of hair; having the hair long, slender, and dispersed.

**CRINO'IDAL.** Containing fossil crinoïdean remains. The Derbyshire encrinital

marble is composed principally of the fossilized remains of crinoïdea, cemented together by carbonate of lime.

**CRINOÏDEAN.** Belonging to the order of Crinoïdea.

Although the representatives of crinoïdeans in our modern seas are of rare occurrence, this family was of vast numerical importance among the earliest inhabitants of the ancient deep. The extensive range which it formerly occupied among the earliest inhabitants of our planet, may be estimated from the fact, that the crinoïdeans already discovered have been arranged in four divisions, comprising nine genera, most of them containing several species, and each individual exhibiting, in every one of its many thousand component little bones, or ossicula, a mechanism which shows them all to have formed parts of a well-contrived and delicate mechanical instrument.—*Prof. Buckland.*

**CRINOÏDE'A.** (from *κρίνον* and *εἶδος*, Gr.) Lily-shaped zoophytes. A name given to the whole class of encrinites and pentacrinites, from their resemblance to the head of the lily.

The fossil remains of this order have been long known by the name of stone lilies, or encrinites, and have lately been classed under a separate order by the name of Crinoïdea. This order comprehends many genera and species, and is ranged by Cuvier after the asteriæ, in the division of zoophytes. The skeleton of the crinoïdea is composed of numerous ossicula, the number of bones in one skeleton being computed at upwards of thirty thousand. Mr. Miller, in his work, entitled "a Natural History of the Crinoïdea," thus defines them: "An animal with a round, oval, or angular column, composed of numerous articulating joints, supporting at its summit a series of plates, or joints, which form a cup-like body, containing the viscera, from whose upper rim proceed five articulated arms, divided into tentaculated fingers, more or less numerous, surrounding the aperture of the mouth, situated in the centre of a plated integument, which extends over the abdominal cavity, and is capable of being contracted into a conical or proboscis shape."

The detached ossicula of the crinoïdea occur in myriads in the mountain limestone and transition rocks, forming successions of strata, each many feet in thickness, and miles in extent; showing how largely the bodies of animals have contributed by their remains, to increase the mass of materials which compose the mineral world. If we imagine a starfish to possess a long flexible column, the base of which is attached to a rock, we

shall have a correct idea of the general character of the crinoïdea, or lily-shaped animals; which are so called from their fancied resemblance, when in a state of repose, to a closed lily.—*Buckland.*

*Mantell.*

**CRISP.** (*crispus*, Lat.)

1. Curled; crisped; wrinkled; veined or grained.

2. Indented.

3. Brittle; friable.

**CRISPA'TION.** (*crispation*, Fr.) The act of curling; the state of being curled.

**CRIS'PATED.** (*crispé*, Fr.) Rough with waving lines.

**CRISPISU'LCANT.** (*crispisulcans*, Lat.) Waved, or undulating.

**CRIS'TATE.** } (*cristatus*, Lat.) Crested;

**CRIS'TATED.** } tufted; plumed; combed.

**CRO'CODILE.** (*κροκόδειλος*, Gr. *crocodilus*, Lat. *cocodrillo*, It. *crocodile*, Fr.) An amphibious voracious animal of the genus *Lacerta*, or lizard. It is covered with very hard scales, which can be pierced with great difficulty, except under the belly. It has four feet, and a tail, with five toes on each of the fore, and four toes on each of the hind feet, of which only the three internal ones on each foot are armed with nails. It has a wide throat, with several rows of teeth. The fossil remains of crocodiles are common and abundant. Crocodiles are omnivorous. The living species of the crocodile family are twelve, one Gavial, three Alligators, and eight true Crocodiles. Crocodiles, it is said, continue to grow throughout the whole of their existence, and *Buckland* states their increase to be no less than four hundred times their original bulk, between the period at which they leave the egg and their full maturity. Crocodiles are furnished with a frequent succession of teeth, in order to maintain a duly proportioned supply during every period of their life. The vertebræ of the neck rest on each other through the medium of small false ribs, whereby all lateral motion is rendered difficult, and the crocodile is unable to deviate suddenly from his course; this renders escape from them facile, by either running round them, or pursuing a zigzag course. The eggs of the crocodile are as large as those of the goose. They inhabit fresh water, but they cannot swallow their food under water.

**CROCODI'LEAN.** } Relating to the crocodile.

**CROCODI'LIAN.** }

**CROP-OUT.** A term used by miners to express the rising up at the surface of one or more strata. A stratum rising to the surface is said to crop out.

**CROSS-STONE.** Called also *Staurolite*, and *Harmotome*; it is the *Paratome* *Kuphonspath* of *Mohs*, and the *Kreutzstein* of

Werner. Colours white and grey; occasionally it is found with a reddish and yellowish cast. It is composed of 47 parts silica, 21 baryta, 15 alumina, 0.88 potash, 0.10 lime, 15 water. It occurs in small quadrangular prisms terminated by four rhombic planes, crossing each other. The surface of the smaller lateral planes is double plumosely streaked. It is found in galena veins and agate balls in the mines of Strontian, in Argyleshire, and in other parts of Scotland; also at Andrasburg, in the Hartz, and in Norway.

**CRYLSTONE.** Crystallized cauk. In this the crystals are small.

**CRUCIAL.** (from *crux*, Lat. *crucial*, Fr.) Transverse; intersecting one another; in form of a cross.

**CRUCIFEROUS.** (from *crux* and *fero*, Lat.) The name given to a large order of plants, whose petals, four in number, are so arranged as to resemble a cross. The radish, cabbage, stock, &c., are *cruciferous* plants.

**CRUCIFORM.** (from *crux* and *forma*, Lat.) Cross-shaped; in the form of a cross. In botany, polypetalous flowers are so called, when the petals are placed in the form of a cross; this is particularly the case in a very large order of plants, which have four petals, so arranged as to resemble a cross.

**CRUCIBLE.** (*crucibulum*, Lat.) A vessel, or melting-pot, made of earth, so named, according to some, from its having been formerly made in the shape of a cross; but, according to others, from the metals being tortured in it by fire to compel them to become gold.

**CRURA.** (The plural of *crus*, Lat.) Applied to parts from their resemblance to legs; the legs.

**CRURAL.** (*crural*, Fr. *cruralis*, Lat.) Belonging to the leg.

**CRUST.** (*kruste*, Germ. *crusta*, Lat. *croûte*, Fr. *crosta*, It.) Any shell, hard coat, or external covering. That portion of our globe which is accessible to our inspection and observation is called by geologists, the earth's crust. It is this crust which offers proper occupation to the geologist. The greatest depth to which he has been hitherto able to extend his observations, from the uppermost strata to the lowest beds, is from eight to ten miles; a thickness which, compared with the bulk of the earth, does not exceed that of the thickness of the paper which covers a globe a foot in diameter. The inequalities and crevices in the varnish applied over the surface of such a globe would fairly represent, and be in proportion to, the highest mountains and deepest valleys of the world. The mean density of the earth's mineral crust has generally been

taken at 2.5: according to De la Beche 2.6 would be a nearer approximation.

**CRUSTA'CEA.** } (from *crusta*, Lat.) The  
**CRUSTA'CEANS.** } crustacea possess a hard external covering, and numerous articulated limbs; antennæ, and palpi. A heart, with circulating vessels and gills, and a nervous system. The crab, lobster, sea-urchin, shrimp, &c., are examples. Crustaceous animals possess the most solid form of the skeleton met with in the articulated classes. It is found in the larger decopods to contain nearly half its weight of carbonate of lime, and there is also a considerable proportion of phosphate of lime, with traces of magnesia, iron, and soda. These substances are exuded from the surface of the true skin, along with a tough coagulable animal gluten, which connects all their particles, and forms a thin varnish on the surface. The colouring matter is generally beneath this varnish, and on the exterior surface of the calcareous deposit, but sometimes it pervades the whole substance of the shell. The history of fossil crustaceans has been hitherto almost untouched by palæontologists, and their relations to the existing genera of this great class of the animal kingdom are but little known. Some idea may be formed of their extent in certain formations, from the fact, that in the cabinet of Count Munster, there are nearly sixty species collected from a single stratum of the Jurassic Limestone of Solenhofen.—*Dr. Rob. Grant. Professors Buckland and Fyfe.*

The crustacea respire by means of branchiæ; these branchiæ, sometimes situated at the bottom of the feet, at others on the inferior abdominal appendages, either form pyramids composed of laminae in piles, or bristled with setæ; and in some cases consist seemingly wholly of hairs. The crustacea differ from the testacea in one most striking point of view: lobsters, crabs, &c., cast their shell or covering every year, whereas the testaceous animals retain theirs as long as they exist. The shells of crustaceous animals appear to grow all at once, whereas those of testaceous animals are evidently formed by the animal adding gradually to them, either annually or periodically, and they are all composed of layers.

**CRUSTA'CEAN.** } (*crustacée*, Fr. *crustaceo*,  
**CRUSTA'CEOUS.** } It.) Shelly, with joints.

The crustaceous animals possess a hard shelly covering divided into parts by joints, while the testaceous have a continued uninterrupted shell. The crustaceous animals are the spiders of the sea.

**CRUSTA'CEOUSNESS.** The quality of having

a jointed, hard, external covering, or shell.

**CRUSTATED.** (*crustatus*, Lat.) Covered with a crust, or shell.

**CRUSTATION.** A hard shelly covering; incrustation.

**CRYOLITE.** (from *κρύος* and *λίθος*, Gr.) Ice-stone. A rare mineral of a white, brown, or red colour, hitherto found only in Greenland, at the arm of the sea named Arksut, where it occurs in gneiss, associated with iron-pyrites and galena. It consists of fluoric acid 44, soda 32, alumina 24.

**CRYPTOGAMIA.** (from *κρύπτος*, concealed, and *γάμος*, nuptials, Gr.) The 24th class of plants in the Linnæan artificial system, comprehending those whose fructifications are concealed, either through minuteness, or within the fruit. The carboniferous era abounded in the vascular cryptogamia to a degree unexampled at the present time; the plants belong to species and genera now extinct, but allied to existing types by common principles of organization. The numerical preponderance of the cryptogamia in the coal is such, that while in the present order of nature, they are to the whole number of known plants as one to thirty, at that epoch they were in the proportion of twenty-five to thirty. In the saliferous system, about fifty species have been ascertained, some of which differ from any observed in the coal measures. The class Cryptogamia contains the ferns, mosses, funguses, and seaweeds: in all of which the parts of the flowers are either little known, or too minute to be evident.

**CRYPTOGAMIC.** A term applied to plants not bearing flowers with stamens and ovarium visible. Belonging to the class Cryptogamia. Ferns, mosses, fungi, &c., are cryptogamic plants. In the transition rocks, about thirteen species of cryptogamic plants, four of which are algæ, and the remainder ferns, comprise all that is known of the vegetable kingdom, anterior to the carboniferous system.

**CRYPTOGAMOUS.** See *Cryptogamic*. The family of ferns, both in the living and fossil flora, is the most numerous of vascular cryptogamous plants.

**CRYSTALS.** (from *κρυστάλλος*, Gr. *crystalus*, Lat. *crystal*, Fr. *cristallo*, It. *krystall*, Germ.) There are many mineral, or inorganic, substances, which assume certain regular forms when becoming solid from a fluid state, or when, after being dissolved in a fluid, this fluid is evaporated. These regular figures are termed crystals. The cause of a body's possessing this power, or property, is unknown, but it is supposed to be connected with the form of the molecules of which it is

composed. Crystals are symmetrical forms. There are six primitive forms of crystals.

1. The regular tetrahedron, having four equilateral triangles for its faces.

2. The regular cube of six squares for its faces.

3. A dodecahedron, or solid of twelve faces, each being a rhombus.

4. The octohedron, having eight triangles for its faces.

5. A six-sided prism.

6. A parallelopiped, or a solid of six faces, each two of which are parallel and equal, as a cube, a rhomboid, &c. From these six primitive forms of crystals, every variety may be supposed to be produced by cutting away its angles or edges in various manners; or by additions supposed to be made on its faces. The regularity of the figure will be influenced by the rapidity of the evaporation, as when the evaporation is hurried the crystals will be confused, and wanting in regularity; sometimes the evaporation must be spontaneous, or not assisted by the addition of heat, for procuring regular and large crystals. It must not be supposed that every mineral crystallizes naturally in, or can be cut into, all the forms, which might be deduced from its primitive form; but it never occurs that the same mineral is found assuming a form, which cannot be shown on these principles to be related to its primitive, or in which primitive it either is occasionally found, or to which the other forms in which it occurs may not be reduced.—*Min. and Metals.*

When bodies dissolved in any fluid are separated by crystallization, they are always found to retain a part of the fluid. The water thus retained by saline crystals is called the water of crystallization. This water appears to be essential to the transparent crystalline form of salts. Most salts may be deprived of their water of crystallization by heat; some lose it in the common temperature of the atmosphere, and fall into a pulverulent mass; others attract moisture so strongly that they, from exposure to the atmosphere, deliquesce.

**CRYSTAL.** Resembling crystal; bright; clear; transparent.

**CRYSTALLINE.** (*krystallen*, Germ. *crystallin*, Fr. *cristallino*, It.) Resembling crystals; bright; clear; transparent.

**CRYSTALLINE HUMOUR.** } (*κρυστάλινος*, Gr. *crystal-*

**CRYSTALLINE LENS.** } *linus*, Lat.) A solid body of a lenticular form, being a part of the eye. It appears most absurd ever to have given to this solid body the name of humour. The crystalline lens is situated behind the aqueous humour, opposite to the pupil,

and its posterior portion is received into a depression on the fore part of the vitreous humour. It has two convex surfaces, like a common lens, the anterior being the less convex; the two being formed of segments of spheres of unequal size.

**CRYSTALLIZABLE.** } That is capable of  
**CRYSTALLIZABLE.** } being crystallized.

**CRYSTALLIZATION.** } (*crystallisation*, Fr.)  
**CRYSTALLIZATION.** } (*cristallizzazione*, It.)

A methodical arrangement of the particles of matter according to fixed laws; conglomeration into crystals.

**CRYSTALLIZED.** Formed into crystals.

**CRYSTALLOGRAPHER.** } (from *κρύσταλλος*  
**CRYSTALLOGRAPHER.** } and *γράφω*, Gr.)

One who describes crystals. The crystallographer has shewn that the several ingredients of all kinds of crystalline rocks are composed of molecules which are invisibly minute.

**CRYSTALLOGRAPHY.** The science of crystallization.

**CTENOIDEAN.** Belonging to the third order of fishes, according to the arrangement of M. Agassiz.

**CTENOIDIAN.** (from *κτεεις*, *pecten*, a comb; and *είδος*, Gr.) The third order of fishes in the arrangement of M. Agassiz. The ctenoidians have their scales jagged on the posterior margin, resembling the teeth of a comb, from which circumstance they derive their name; the perch is an example. The ctenoidians first appear at the commencement of the cretaceous formations, succeeding the placoidian and ganoidian orders.—*Prof. Buckland.*

**CUBATURE.** The finding exactly the solid content of any proposed body.

**CUBE.** (from *κύβος*, Gr. *cubeus*, Lat. *cube*, Fr. *cube*, It.) A regular solid body consisting of six square and equal faces, with right, and therefore equal, angles: a die is a small cube; a prism contained by six equal squares.

**CUBE-ORE.** A name given to the mineral hexahedral olivenite.

**CUBIC.** } (*cubisch*, Germ.) Having the  
**CUBICAL.** } form or properties of a cube.

**CUBICALNESS.** The state of being cubical.

**CUBIFORM.** Of the form, or shape, of a cube.

**CUBIT.**

1. A measure, according to Dr. Arbuthnot, equal to one foot nine inches, and 888 decimal parts.—*Horne.*

2. That part of the arm which extends from the elbow to the wrist.

**CUBITAL.** (*cubital*, Fr.) Relating to the fore arm, or cubit.

**CUBIZITE.** A name given by Werner to analcime.

**CUBOID.** } Having the form of a cube;  
**CUBOIDAL.** } cubiform.

**CUBOIDS.** A bone of the foot, in shape somewhat resembling a cube; it is placed at the fore and outer part of the tarsus.

**CUBO-OCTAHEDRAL.** A combination of a cube and an octahedron.

**CUCULLATE.** } (*cucullatus*, Lat.) Hooded;  
**CUCULLATED.** } having the shape of a hood.

Applied to leaves when their edges meet in the lower and expand towards the upper part.

**CUCUMERINA.** (from *cucumer*, Lat.) A species of fossil spine belonging to the echinus, and possessing something of the form of a cucumber, whence its name is derived. There are several varieties.

**CUCUMERINE.** Fossil spines of the species *cucumerina*. Several varieties of cucumerine spines are figured in Parkinson's Organic Remains.

**CUIRASS.** (*cuirasse*, Fr. *corazza*, It.) A defensive armour which protects the body from the shoulders to the waist.

**CULM.** (Welsh.)

1. A kind of fossil coal, of indifferent quality, burning with little flame, and emitting a disagreeable smell.

2. An herbaceous stem peculiar to grasses, rushes, and some other plants allied to them. Culms are either hollow or solid, jointed or without joints, round or triangular, rough or smooth, hairy or downy, and bear both leaves and flowers.

**CULTRATED.** (*cultratus*, Lat.) Sharp-edged.

**CUMBRIAN SYSTEM.** The Cumbrian or slate system, as described by Professor Sedgwick, extends over a large portion of Cumberland, Lancashire, and Westmoreland, attaining an elevation in some places of upwards of three thousand feet, and affording the splendid scenery of North Wales and of the lakes. The strata are of great, but unknown, thickness, possessing a slaty character, and nearly destitute of organic remains. The Cumbrian, or, as it has been also called, *Grauwacké* system, includes the Plynymmon rocks, the Bala limestone, and the Snowdon rocks.

**CUMULATE.** (from *cumulo*, Lat.) To heap together.

**CUMULATION.** A heap; the act of heaping together.

**CUMULATIVE.** (*cumulatif*, Fr.) Composed of parts heaped together.

**CUNEAL.** (*cuneus*, Lat.) Having the form of a wedge.

**CUNEATE.** } In the shape of a wedge.  
**CUNEATED.** }

**CUNEIFORM.** } Having the form of a wedge.  
**CUNIFORM.** }

Three bones of the foot have obtained the name of cuneiform bones from their wedge-like shape; they are situated at the fore part of the tarsus and inner side of the os cuboides, and are

applied to each other like the stones of an arch.

**CUPREOUS.** (*cupreus*, Lat.) Coppery; consisting of copper.

**CUPRIFEROUS.** (from *cuprum* and *fero*, Lat.) Yielding copper; containing copper.

**CUPULE.** (*cupula*, Lat.) The cup of the acorn and of similar fruits.

**CURVATE.** } (*curvatus*, Lat.) Crooked;   
 **CURVATED.** } bent.

**CURVATION.** (*curvo*, Lat.) The act of bending or making crooked.

**CURVATURE.** (*curvatura*, Lat.) Flexure; crookedness; inflexion.

**CURVE.** A flexure, or bending, in a regular form; a portion of a circle.

**CURVED.** Bent; flexed.

**CURVILINEAR.** (from *curvus* and *linea*, Lat.) Consisting of curved or crooked lines.

**CURVITY.** Crookedness.

**CUSPATED.** (from *cuspis*, Lat.) Pointed; terminating in a point, as the leaves of the thistle.

**CUSPIDAL.** Ending in a point.

**CUSPIDATED.**

1. A botanical term, applied to leaves terminating in sharp rigid spines.

2. In entomology, having a pointed process much extended, and nearly setiform.

**CUTANEOUS.** (*cutané*, Fr. *cutaneo*, It.) Pertaining to the skin.

**CUTICLE.** (*cuticula*, Lat. *cuticule*, Fr.)

1. The scarf-skin; the outermost skin. The cuticle is a thin, greyish, semi-transparent, insensible membrane, which covers the skin, and adheres to it by small vascular filaments. It is this which is separated by the application of blisters.

2. In botany, the outward covering of plants. Every plant is covered by a cuticular expansion, analogous to the scarf-skin that covers animal bodies. The cuticle, or epidermis, of plants varies in thickness, being extremely delicate on some parts of a flower, and very thick, hard, and coarse on the trunks of many trees.

**CUTICULAR.** Pertaining to the cuticle, or external covering of the body.

**CUTIS.** (Lat.) The skin, dermis, or true skin, as distinguished from the cuticle or scarf-skin. It lies immediately under the corpus mucosum, and gives a covering to the whole body. It is formed of fibres intimately interwoven, and running in every direction, like the hairs in the felt of a hat, and is so plentifully supplied with nerves and blood-vessels, that the smallest puncture cannot be made in any part of it, without occasioning pain and a discharge of blood. It is that part of quadrupeds of which leather is made. The cutis can be entirely dissolved by the

action of boiling water, and consists chiefly of gelatin, from which circumstance it is a principal article in the manufacture of glue.

**CUTTLE.** } The sepia of Linnæus. A

**CUTTLE FISH.** } species of Cephalopoda, genus Mollusca. The bone of the sepia (which is an internal bone, flat and broad somewhat resembling a sole in its appearance,) is found, commonly, washed up on our coasts, and when ground into fine powder is used as pounce, and is sometimes employed in the making of tooth-powder. The sepia attains to an immense size in the seas of India and China, and it is said that its arms, which are eight in number, are sometimes several fathoms long, so that it will, by throwing them around a boat, endanger the safety of the boat's crew, and that it is usual to keep on board a hatchet for the purpose of severing them on such occasions. The cuttle-fish having no external shell, is protected from its enemies by a peculiar internal provision, consisting of a bladder-shaped sac, containing a black and viscid ink, soluble in water, the ejection of which, by rendering the surrounding water opaque, conceals and defends the animal. The sepia has its feet around its head, and walks along the bottom of the sea with its head downwards. The feet are lined internally with little round serrated cups, or suckers, by which the animal both seizes its prey and adheres to other bodies. The mouth, which resembles a parrot's beak, or the bill of a hawk, is placed in the centre of the arms. The ink of the cuttle-fish is said to form an ingredient in the composition of Indian ink.

Professor Buckland states, in describing the ink found in a fossil ink-bag of the cuttle-fish, "So completely are the characters and qualities of the ink retained in its fossil state, that when, in 1826, I submitted a portion of it to my friend Sir Francis Chantrey, requesting him to try its power as a pigment, and he had prepared a drawing with a triturated portion of this fossil substance; the drawing was shown to a celebrated painter, without any information as to its origin, and he immediately pronounced it to be tinted with *sepia* of excellent quality."

The common sepia used in drawing is from the ink-bag of an oriental species of cuttle-fish.

**CYANITE.** (from *κίανος*, Gr. *color cæruleus*, or sky-coloured.) Called also Kyanite, and by Saussure, Sappare, is a mineral of a grey, blue, and blueish-green colour. It occurs regularly crystallized, as well as massive and disseminated. Its texture is foliated; laminæ long; frag-

ments splintery. It feels somewhat greasy. Before the blow-pipe it becomes almost perfectly white, but it does not melt. Its constituent parts are, alumina 64.30, silica 34.33, with a trace of oxide of iron and a very small portion of lime.

**CYATHIFORM.** (from *cyathus* and *forma*, Lat.) In the form of a cup, or drinking-vessel; cup-shaped.

**CYATHOPHYLLOUS.** (from *κύαθος*, and *φύλλον*, Gr.) Having cup-shaped leaves.

**CYCADEA.** (from *κύκας*, *cycas*, Gr.) A genus of plants. The cycadæ hold an intermediate place between the palms, ferns, and coniferæ. Some species are very short, as the zamia; others attain a height of thirty feet and upwards. This beautiful family of plants in their external habit resemble that of palms, whilst their internal structure approximates to that of coniferæ. The cycadæ are natives of warm climates, mostly tropical, though some are found at the Cape of Good Hope. Leaves of cycadæ are of frequent occurrence in the shale of the oolitic formation near Scarborough, and they have been found in the Stonesfield slate. Cycadæ have been found in the coal formation of Bohemia. The trunk of the cycadea has no true bark, but it is surrounded by a dense case, composed of persistent scales, which have formed the bases of fallen leaves; these, together with other abortive scales, constitute a compact covering that supplies the place of bark. The prevalence of cycadæ gives a distinctive character to the flora of the upper secondary formations. The stems found in the Isle of Portland, and the leaves and fruits in the oolitic formations of Yorkshire, show considerable analogy to the existing forms of the tribe at the Cape of Good Hope, in India, and Australia.

**CYCADEOUS.** Possessing the characters of cycadæ; belonging to the genus cycadea.

**CYCADITES.** A name applied to some fossil species of *cycas*. Our fossil cycadites are closely allied by many remarkable characters of structure to existing cycadæ.—*Buckland*.

**CYCAS.** (*κύκας*, Gr.) A genus of plants, belonging to the first natural order Palmæ, according to the first arrangement of Linnæus, but subsequently placed among the ferns.

**CYCLAS.** (pl. *cyclades*.) A genus of lacustrines, or fresh-water bivalves. The calciferous grit near Hastings is full of cyclades, and several species of *cyclus* occur, in myriads, in the shales and clays of the Wealden formation.—*Mantell*.

The *cyclus* is an ovato-transverse bivalve, not inflected on the fore part; the

hinge with three hinge-teeth and two lateral teeth, compressed and rather remote.—*Parkinson*.

While the *cyclus* of Europe is described as small, thin, and horny, abounding in ditches, ponds, and slow streams, that of Asia is stated to be very large. The *cyclus* is viviparous.

**CYCLE.** (from *κύκλος*, Gr. *cycle*, Fr. *ciclo*, It.) A round of years which go on from first to last, and then return to the same order as before; a space in which the same revolutions begin again.

**CYCLOID.** (from *κύκλος*, and *εἶδος*, Gr. *cycloïde*, Fr.) A geometrical curve; a figure made by the upper end of the diameter of a circle, turning about a right line.

**CYCLOIDAL.** Relating to a cycloid.

**CYCLOIDIANS.** (from *κύκλος*, Gr.) The fourth order of fishes according to the arrangement of M. Agassiz. Families of this order have their scales smooth and simple at their margin, and often ornamented with various figures at the upper surface. The salmon and herring are examples.

**CYCLOIDEAN.** Belonging to the fourth order of fishes, according to the arrangement of M. Agassiz. The cycloidean and ctenoidean orders succeeded the placoidæan and ganoidean.

**CYCLOLITE.** (from *κύκλος* and *λίθος*, Gr.) Another name for madreporæ.

**CYGNET.** (from *cygnus*, Lat.) A young swan.

**CYLINDER.** (*κύλινδρος*, Gr. *cylindrus*, Lat. *cylindre*, Fr. *cilindro*, It.) A solid, formed by the revolution of a rectangular parallelogram about one of its sides, so that it is extended in length equally round, and its ends or extremities are equal circles.

**CYLINDRIC.** } Partaking of the nature of  
**CYLINDRICAL.** } a cylinder; having the form of a cylinder; having its circumference round, of indeterminate length, but of equal thickness throughout.

**CYLINDRIFORM.** Of the form of a cylinder; round like a roller.

**CYLINDROID.** A solid, in many respects resembling a cylinder, but having elliptical instead of circular extremities, yet parallel and equal.

**CYLINDRICOÏDON.** The name given to a genus of oviparous quadrupeds.

**CYME.** (*κύμα*, Lat. *cūma*, Gr.)

1. A form of inflorescence, the general appearance of which resembles an umbel, and agrees with it in this respect, that its common stalks all spring from one centre; but differs in having those stalks alternately and variously divided. The olean-der and elder are examples.

2. A sprout, as of a cabbage.

**CYMO'PHANE.** A name given by Haüy to the chrysoberyl, which see.

**CYMO'SÆ.** Plants whose inflorescence is disposed in the form of a cyme; the sixty-third natural order of Linnæus.

**CYPERA'CEÆ.** A tribe of plants answering to the English sedges; they are distinguished from grasses by their stems being solid and generally triangular, instead of being hollow and round. Together with gramineæ, they constitute what writers on botanical geography often call glumaceæ.—*Lyell, Principles of Geology.*

**CYPRÆ'A.** (The cowry.) Animal a slug; shell univalve, oval, or oblong, involute, smooth, obtuse at each end; aperture long, narrow, extending the whole length of the shell, and dentated on each side. The mantle sufficiently ample to fold over and envelope the shell, which at a certain age it covers with a layer of another colour. The genus cypræa consists of beautifully coloured shells very highly polished. They live in sand at the bottom of the ocean; the animal is provided with a membrane, which it throws over its shell, which not only preserves the fine polish, but prevents testaceæ from fixing on it. One hundred and twenty species have been described, one only of which belongs to our seas; the rest are all tropical. In some parts the shell of this animal is used in the place of money, and passes current. By some it is thought that the cypræa casts its shell annually.

**CYPRIFEROUS.** Containing shells of the genus Cypris. Entire layers of stone are sometimes composed of the consolidated remains of the cypris; these shells occur in the Hastings sand and sandstone, in the Sussex marble, and in the Purbeck limestone.

**CYPRIS.** A genus of animals, enclosed within two flat valves, like those of a bivalve shell, inhabiting the waters of lakes and marshes. The cypris throws off its integuments every year. The cypris is a microscopic crustacean, with which certain clay beds of the Wealden are so abundantly charged, that the surfaces of many laminæ into which this clay is easily divided, are often entirely covered with them as with small seeds. The Sussex marble abounds in the shells of the cypris.

**CYPRINA.** An equivalve, inequilateral, sub-orbicular, marine bivalve; living in sandy mud. Fossil species occur in the tertiary deposits.

**CYTHERÆ'A.** A marine bivalve; equivalve, lenticular, oval; hinge with two cardinal teeth; one anterior lateral tooth in each valve, which distinguishes this genus from Venus. It is found in depths of the ocean varying to fifty fathoms, in mud and coarse sands. Several species have been found fossil in the tertiary deposits. Cytheræa nitidula is mentioned by Dr. Mantell as occurring in the London clay, and cytheræa convexa in the Plactic clay.

## D

**DA'OURITE.** The siberite of Lermina. A variety of the red schorl of Siberia, called also rubellite. This stone is found in Siberia mixed with white quartz. It is composed of silica 56, alumina 36, with some oxide of manganese, and oxide of iron.

**DASY'PUS.** (δασύπους, from δασύς and πούς, Gr.) The armadillo, which see.

**DASYU'RUS.** An animal of the marsupial order. The dasyurus is said to be the largest of the carnivorous marsupial animals. The head of a species of dasyurus has been discovered in the Eocene freshwater limestone of Auvergne.

**DA'THOLITE.** } The Dystom-spath of Mohs.

**DA'TOLITE.** } A sort of spar-stone; the siliceous borate of lime. According to Menil, it is a combination of silica 38.50, lime 35.60, boracic acid 21.30, water 4.60. Its varieties are named Botryolite, Earthy Botryoidal Datolite, and Common Datolite. It has been found prin-

cipally in Norway, in beds of magnetic iron-ore.

**DEBA'CLE.** (*Deacle*, Fr. *Amas de glaçons qui arrivent avec impétuosité, dans un dégel subit, après qu'une rivière a été prise long-temps.*) A violent torrent or rush of waters, which, overcoming all opposing barriers, carries with it stones, rocks, and other fragments, spreading them in all directions.

**DEBOU'CHE.** (*débouché*, Fr. *L'extrémité d'un défilé, d'un col de montagnes.*) The outlet of a narrow pass.

**DEBRI'S.** (*débris*, Fr.) The fragments of rocks; the ruins of strata; the rubbish, sand, grit, &c., brought down by torrents.

**DECAHE'DRAL.** (from δέκα, and ἔδρα, Gr.) Having ten sides.

**DECAHE'DRON.** A figure which hath ten sides.

**DECA'NDRIA.** (from δέκα, and ἀνήρ, Gr.) A class of plants characterized by having

- ten stamens; it includes cassia, ruta, saxifraga, &c.
- DECANDRIAN.** Belonging to the class Decandria; having ten stamens.
- DECAPHYLLOUS.** (from *δέκα*, and *φύλλον*, Gr.) A calyx which hath ten leaves.
- DECAPODA.** (from *δέκα*, ten, and *πόδι*, foot.) The first order of crustacea. This order includes the lobster, crab, crawfish, shrimp, &c.
- DECAPODAL.** Belonging to the order Decapoda; having ten feet. Synonymous with decempedal.
- DECEMPID.** (from *decem* and *fissus*, Lat.) Ten-cleft; in botany, a term for a calyx, cleft, or divided, into ten parts.
- DECEMLO'ULAR.** (from *decem* and *loculus*, Lat.) Ten-celled; in botany, an epithet for a pericarp divided into ten loculi or cells.
- DECI'DUOUS.** (*deciduus*, Lat.)
1. In botany, falling off; plants which lose their leaves in autumn are called deciduous; applied also to stipules falling in the autumn; to calyces falling soon after the expansion of the corolla; and to the corolla when falling with the stamens.
  2. In conchology, to shells having a tendency in the apex of the spire to fall off; to crustaceans, annually casting their shells.
- DECLENSION.** (from *declinatio*, Lat.) Declination; descent; slope from or downwards.
- DECLINATION.** (*declinatio*, Lat.) Deviation from a right line.
- DECLIVITY.** (*declivitas*, Lat. *declivité*, Fr.) Gradual descent of land, as distinguished from precipitous or perpendicular.
- DECLIVOUS.** } (*declivis*, Lat.) Gradually  
**DECLIVITOUS.** } descending, as distinguished from sudden and precipitous descent.
- DECOMPOSABLE.** That may be resolved into its constituent elements; capable of being decomposed.
- DECOMPOSE.** (*decomposer*, Fr. *Réduire un corps à ses principes, ou séparer les parties dont il est composé.*) To resolve a body into its constituent elements; to overcome the power of affinity, and thereby to separate elementary particles.
- DECOMPOSITION.** (*décomposition*, Fr.) Separation of parts previously united. Decomposition may be effected by various methods; it is of two kinds, simple, or single, and complex, or double.
- DE'COMPOUND.** Doubly compound. Leaves are so called when the petioles, instead of bearing leaflets, branch out into other petioles to which the leaflets are attached.
- DECORTICATE.** (*decortico*, Lat.) To deprive of the bark or husk; to peel; to strip off.
- DECORTICATED.** (*decorticatus*, Lat.) Worn or divested of the epidermis, bark, husk, or skin.
- DECORTICA'TION.** The stripping off the bark or peel.
- DE'CREMENT.** (*decrementum*, Lat.) Gradual waste, or wearing away, as of rocks by the action of water; gradual diminution.
- DECRE'PITATE.** (from *decrepo*, Lat.) To fall into pieces with a crackling noise.
- DECREPITA'TION.** (*décrépitation*, Fr.) The crackling noise made by certain substances in falling to pieces when heated.
- DECRE'SCENT.** (*decreseent*, Lat.) Gradually becoming less.
- DECU'RRENT.** (from *decurro*, Lat.) Running downwards. Applied to sessile leaves when the base runs down the stem and forms a border or wing; applied also to stipules when extending downwards along the stem. In some plants, as in some of the thistles, the margins of sessile leaves run down on each side of the stem, so as to appear to be of one piece with it; these leaves are called *decurent*.
- DECU'RSION.** The act of running down, as of a stream of water.
- DECU'RSIVE.** Running down.
- DECU'RSIVELY PINNATE.** Applied to leaves having their leaflets decurrent, or running along the petiole.
- DECU'SSATE.** (*decusso*, Lat.) To intersect at acute angles; to cross each other at right angles. Applied to branches growing in pairs, and alternately crossing each other at right angles; applied also to leaves alternately opposite. In conchology, applied to striæ, crossing or intersecting each other at acute angles.
- DECUSSA'TION.** The act of crossing at unequal angles; the crossing of two lines, rays, or threads, when they meet in a point, and then proceed separately.
- DEDENTIT'ION.** (from *de* and *dentitio*, Lat.) The loss or shedding of the teeth, as distinguished from dentition or the appearing of the teeth.
- DEFLAGRAB'ILITY.** (from *deflagro*, Lat.) Combustibility; the property of igniting, and entirely consuming away.
- DEFLA'GRABLE.** That may be entirely consumed by fire.
- DE'FLAGRATE.** To entirely consume by fire.
- DEFLA'GRATION.** (*deflagratio*, Lat. *deflagration*, Fr.) The operation by which a body is wholly consumed by fire.
- DEFLE'CT.** (*deflecto*, Lat.) To turn aside.
- DEFLE'CTED.** Turned aside; bent aside from its straight course.

**DEFLE'CTION.** The act of turning aside from its straight course; deviation.

**DEFLE'XED.** (*deflexus*, Lat.) In entomology, having the sharp edge bent downwards.

**DEFLE'XURE.** A turning aside from a straight course.

**DEGRADA'TION.** (*degradation*, Fr. *Il signifie dépérissement, etat de décadence, de ruine.*) This term is used by geologists to signify the lessening or wearing away of rocks, strata, &c., by the action of water, or other causes.

**DEGRA'DE.** (*dégrader*, Fr.) To diminish; to wear away; to reduce in size.

**DEGRA'DED.** Worn away; reduced in size by attrition, &c.

**DEHI'SCENT.** (*dehiscens*, Lat.) In botany, fruits which open when ripe, so as to enable the seeds to escape, are termed dehiscent. Gaping; opening.

**DEI'NTEGRATE.** To diminish; to separate the integrant parts of.

**DELIQU'ESCE.** (*deliquesco*, Lat.) To become fluid by the attraction of water from the atmosphere.

**DELIQUE'SCENT.** That which by exposure to the atmosphere attracts moisture, and becomes from a solid a fluid body.

**DELL.** A narrow opening between hills; a small valley.

**DELPHI'NULA.** (from *delphinus*, Lat.) A turbinated, subdiscoidal, umbilicated univalve. The aperture round and pearly; operculum horny. The delphinula creeps on rocks and sea-weeds. This genus is formed of shells formerly included by Linnæus in his genus Turbo. Lamarck places delphinula in the family Scalariana. The fossil delphinula occurs in the tertiary deposits.

**DELTA.** A term applied by geologists to the alluvial deposits formed at the mouths of rivers. It has obtained its name from a supposed resemblance to the Greek letter Δ. Deltas are occasionally of immense size, and they are divided into lacustrine, mediterranean, and oceanic, the first being those formed in lakes, as the delta at the mouth of the Rhone, at the upper end of the lake of Geneva; the second, or mediterranean, are those formed in inland seas, as that at the mouth of the Rhone, where it enters the Mediterranean; the third, or oceanic, are those formed on the borders of the ocean, as the delta of the Ganges.

**DEL'TOID.** (from *delta*, the fourth letter of the Greek alphabet.) The name of a muscle of the shoulder, from its supposed resemblance to the Greek letter Δ; triangular.

**DE'NDRACHATE.** (from *δένδρον* and *ἀχάτης*, Gr.) An agate with delineations of

trees, ferns, moss, &c. Some of these are exceedingly beautiful, and are so elegantly depicted that they have been erroneously taken for real plants, whence their name. These pebbles are found abundantly on the shore from Bognor to Brighton, and when cut and polished, are made into very beautiful necklaces, brooches, snuff-boxes, &c. &c.

**DE'NDRITE.** (*δένδριτις*, Gr.) The same as dendrachate.

**DENDRI'TICAL.** Containing the resemblance of trees, ferns, or mosses.

**DE'NDROITE.** A fossil resembling the branch of a tree.

**DE'NDROLITE.** (from *δένδρον* and *λίθος*, Gr.) Fossil wood; the fossil branch of a tree.

**DE'NSITY.** (*densitas*, Lat. *densité*, Fr. *densità*, It.) Closeness; compactness; that property directly opposite to rarity, whereby bodies contain such a quantity of matter in such a bulk. The densities of bodies are proportional to their masses, divided by their volumes. Hence if the sun and planets be assumed to be spheres, their volumes will be as the cubes of their diameters. The strata of the terrestrial spheroid are not only concentric and elliptical, but the lunar inequalities show that they increase in density from the surface of the earth to its centre.

The absolute density of, or the quantity of matter contained in, the earth, compared with an equal bulk of any known substance, may be nearly determined by the attractive force which any given mass of matter exerts upon a plummet, when suspended in its vicinity, to draw it from a vertical line. By this method it has been found that the mean density of the earth is about five times greater than that of water, or nearly twice the average density of the rocks and stones on the surface. The mean density of the ocean is only about one-fifth part of the mean density of the earth.

**DE'NTAL.** (*dentalis*, Lat. *dentale*, Fr. *dentale*, It.) Relating to the teeth; resembling a tooth, as a dental process.

**DE'NTAL.** } (from *dens*, Lat.) A shell-  
**DENTA'LIUM.** } fish belonging, according to Linnæus, to the class Vermes, order Testacea. The shell consists of one tubulous arcuated cone, open at both ends. There are many species, distinguished by the angles, striæ, &c. of their shells.

The observations of Deshayes lead to the conclusion that the genus Dentalium approaches very closely to the molluscs, if, indeed, it does not belong to them. The dentalia are found in deep water, frequently near the shore, inhabiting the ocean only; they are solitary. The animal is a terebella. The shells are known

- commonly by the name of tooth-shells, or sea teeth. Twenty-two species have been described, seven of which inhabit our coasts.
- DE'NTALITE. } (from *dens*, a tooth, and  
DE'NTALITHE. } λιθος, a stone.) A fossil  
dentalium found in the tertiary formations,  
in the gault and in the lower green sand.  
Of these there are many species; as the  
Dentalium planum, D. striatum, D. ellip-  
ticum, D. decussatum, &c.
- DENTA'TA. A name given to the second  
vertebra of the spinal column, from a  
tooth-like process which it possesses.
- DE'NTATE. } (*dentatus*, Lat.) Indented;  
DE'NTATED. } jagged; notched; toothed.  
In botany, leaves are called dentated,  
when the border is beset with horizontal  
projecting points or teeth, with rather a  
distant space between each, and of the  
same consistence as the substance of the  
leaf itself: applied also to stipules hav-  
ing spreading teeth about the margin,  
remote from each other.
- DE'NTED. (*denté*, Fr. *decoupé en pointes*  
*serrées les unes contre les autres*.)  
Notched; indented.
- DE'NTILE. A small tooth, as that of a  
saw: a term used in conchology.
- DENTI'LATED. (*denticulatus*, Lat.) Set  
with small teeth, as in the *arca*.
- DENTICULA'TION. The state of being set  
with small teeth.
- DE'NTIFORM. (from *dens* and *forma*, Lat.)  
Tooth-shaped.
- DENTI'TION. (*dentition*, Fr.) The period  
at which the teeth are being formed within  
the jaws, and protruded through the  
gums.
- DE'NTOID. (from *dens* and εἶδος, Gr.) Of  
the shape, or form, of a tooth.
- DE'NUDATE. (*denudo*, Lat.) To lay bare;  
to strip; to divest of its covering.
- DENUA'TION. (*denudatio*, Lat. *denuda-*  
*tion*, Fr.) The laying bare; the act of  
divesting of its covering; the uncovering  
of strata by the washing away of their  
covering.
- DENU'DE. (*denudo*, Lat. *dénuer*, Fr. *de-*  
*nudare*, It.) To lay bare; to divest of  
its covering; to strip.
- DENU'DED. Laid bare; exposed; divested  
of its covering; stripped.
- DEOBSTRU'CT. (from *deobstruo*, Lat.) To  
free from impediments.
- DEO'XYDATE. } To reduce from the state of  
DEO'XYDIZE. } an oxyd by depriving it  
of its oxygen.
- DEO'XIDIZED. } Deprived of oxygen; dis-  
DEO'XYDIZED. } united, or separated  
DEO'XIDATED. } from the oxygen with  
DEO'XYDATED. } which it was previously  
joined.
- DE'PILATE. (*depilo*, Lat. *dépiler*, Fr.  
*depilare*, It.) To deprive of hair.
- DE'PILOUS. (from *de* and *pilus*, Lat.)  
Having no hair.
- DEPLUMA'TION. (*deplumatio*, Lat.) The  
plucking off the feathers.
- DEPLU'ME. (*déplumer*, Fr.) To pluck, or  
strip, of its feathers.
- DEPLU'MED. (*déplumé*, Fr.) Stripped of  
its feathers.
- DEPO'SIT. Matter laid or thrown down;  
that which having been suspended or  
carried along in a medium lighter than  
itself at length subsides, as mud, gravel,  
stones, detritus, organic remains, &c.
- DEPOSI'TION. That which is deposited or  
thrown down.
- DEPRE'SSED. (*depressus*, Lat.) Pressed  
down; low; shallow; flat. In botany,  
leaves are called depressed when flattened  
vertically: radical leaves are thus called  
when they are pressed close to the ground.
- DEPRE'SSION. (*depressio*, Lat. *depression*,  
Fr. *depressionne*, It.) The sinking, or  
falling in, of a surface.
- DEPRE'SSOR. The name given to such  
muscles as have the power of depressing,  
as the depressor anguli oris, &c.
- DE'PURATE. } (*dépurer*, Fr. *rendre plus*  
DEPU'RE. } *pur*: *depurare*, It.) To  
free from impurities; to cleanse.
- DE'PURATE. } (*dépuré*, Fr.) Cleansed;  
DE'PURATED. } freed from impurities.
- DEPURA'TION. (*dépuration*, Fr. *depara-*  
*zione*, It. *depuratio*, Lat.) The action  
of freeing from impurities, of cleansing.
- DERA'CINATE. (*déraciner*, Fr. *tirer de*  
*terre, arracher de terre un arbre*.) To  
tear up by the roots; to extirpate.
- DERA'CINATING. Tearing up by the roots;  
violently extirpating.
- DE'RBYSHIRE SPAR. This beautiful sub-  
stance is fluete of lime, a combination of  
calcareous earth with fluoric acid; it oc-  
curs in nodular masses, and in crystals.  
It is found in great beauty and abun-  
dant in Derbyshire, whence it has ob-  
tained its name, but it is also plentiful in  
other parts of England. It is also called  
flour-spar and blue-john, *which latter*  
*see*.
- DERIVA'TION. (*derivatio*, Lat. *dérivation*,  
Fr. *détour qu'on fait prendre aux eaux*.)  
The turning of water from its usual  
course; the drawing off of water from its  
regular channel.
- DERI'VE. (from *derivo*, Lat. *dériver*, Fr.)  
To turn the current of water from its  
course.
- DE'RMAL. (from *δέρμα*, Gr.) Belonging  
to the skin; composed of skin. Thus  
we read of the dermal fringe of the  
iguana; the dermal bones of the hylæo-  
saurus.
- DE'RMA. } (*δέρμα*, Gr.) The true skin,  
DE'RMISS. } as distinguished from the  
cuticle, epidermis, or scarf-skin.

- DE'RMOID.** (from *δέρμα*, and *εἶδος* Gr.) Belonging to the skin; resembling the skin.
- DESI'CCATE.** (from *desicco*, Lat.) To dry up; to exhaust of moisture.
- DESI'CCATE.** To grow dry; to be freed of moisture.
- DESI'CCATED.** Dried; exhausted of moisture.
- DESICCA'TION.** (*desiccatio*, Lat.) The state of being dried; the act of making dry.
- DESI'CCATIVE.** That has the quality of making dry.
- DE'SMINE.** A mineral found in the lava of extinct volcanoes accompanying spinellane; its form of crystallization is in small silken tufts.
- DE'SPUMATE.** (*despumato*, Lat.) To throw off in froth or foam; to discharge impurities, or excrementitious matter in foam or scum.
- DESPUMA'TION.** (*despumatio*, Lat.) The throwing off of excrementitious matter and impurities in froth, foam, or scum.
- DESQUAMA'TION.** (*desquamatio*, from *de* and *squama*, Lat.) The falling off of the cuticle in the form of scales.
- DE'SQUAMATE.** (*desquamo*, Lat.) To scale off; to fall off in small scales.
- DETRI'TION.** The act of wearing away.
- DETRI'TAL.** Composed of detritus; consisting of the disintegrated materials of rocks.
- DETRI'TUS.** (Lat.) The worn off, or rubbed off, materials of rocks. "Beneath the whole series of stratified rocks," says Professor Buckland, "that appear on the surface of the globe, there probably exists a foundation of unstratified crystalline rocks, bearing an irregular surface, from the detritus of which the materials of stratified rocks have in great measure been derived."
- DEUTO'XIDE.** } (from *δευτερος* and *oxyd.*)
- DEUTO'XYDE.** } A substance in the second degree of oxidation, or containing two prime proportions of oxygen: a protoxide is in the first or smallest degree; a tritoxide denotes a third proportion, and a peroxide has the greatest degree of oxidation.
- DEVE'LOPE.** (*développeur*, Fr.) To unfold; to disclose; to clear from its covering; to unravel.
- DEVE'LOPEMENT.** (*développement*, Fr.) In this word and that which precedes it, the French derivation is incorrectly spelt, in the former by Johnson, in the latter by Todd, who introduces it.) The act of unfolding; the discovering of something hidden.
- DE'VEX.** (*devexus*, Lat.) Inclining downwards; declivous; bending downwards.
- DEVE'XITY.** (*devexitas*, Lat.) Declivity; a bending downwards.
- DEVOLU'TION.** (*devolutio*, Lat. *dévolution*, Fr. *devoluzione*, It.) The act of rolling down, as the removal of earth or strata into a valley.
- DEVO'LVE.** (*devolvo*, Lat.) To roll down, as "every headlong stream devolves its winding waters to the main." In this sense, however, the word is not modernly used: in its common acceptation, at the present day, it signifies to pass by succession from one person to another.
- DEW.** The following account of dew is extracted from "Mrs. Somerville's Connection of the Physical Sciences:"—"Our sensations only measure comparative degrees of heat: when a body, such as ice, appears to be cold, it imparts fewer calorific rays than it receives; and when a substance seems to be warm, for example, a fire, it gives more caloric than it receives. The phenomena of dew and hoar-frost are owing to this inequality of exchange; the caloric radiated during the night by substances on the surface of the earth into a clear expanse of sky is lost, and no return is made from the blue vault, so that their temperature sinks below that of the air, whence they abstract a part of that caloric which holds the atmospheric humidity in solution, and a deposition of dew takes place. If the radiation be great, the dew is frozen and becomes hoar-frost, which is the ice of dew. Cloudy weather is unfavourable to the formation of dew, by preventing the free radiation of caloric; and actual contact is requisite for its deposition, since it is never suspended in the air like fog. Plants derive a great part of their nourishment from this source; and as each possesses a power of radiation peculiar to itself, they are capable of procuring a sufficient supply for their wants."
- DEW-LAP.** The loose skin which hangs down under the throat of the cow and other animals, and thus called from its licking or lapping the dew when grazing.
- DEX'TER.** } (Lat.) The right, as op-
- DEX'TRAL.** } posed to the left. In conchology, shells are divided into dextral and sinistral. The more common turn of shells is with the apparent motion of the sun, or as the index or hand of a clock moves. On the contrary, a reversed, or sinistral, shell, when placed in a perpendicular position has its spiral volutions in an opposite direction to the motion of the index of a clock, and resembles what is called a sinistral, or left-handed, screw. The sinistral shells are sometimes termed heteroclitical, and heterostrophe shells. There has been considerable confusion amongst conchological writers in describ-

ing the position in which shells should be held to ascertain the right from the left side, &c. Perhaps, the most simple plan is, to place the apex of any spiral shell towards the eye with the mouth downwards; dextral shells will then be found to have their aperture on the right side of the *axis*; sinistral shells, on the contrary, will have theirs on the left of the *axis*.

**DI'ABASE.** The French name for greenstone; a trap-rock, composed of hornblende and feldspar.

**DIAD'ELPHIA.** (from *δις* and *ἄδελφος*, Gr.) The seventeenth class of plants in the artificial system of Linnæus. The stamens are united into two parcels at the base. This class has papilionaceous flowers and leguminous fruits. Familiar specimens will be found in the garden pea, bean, &c. &c.

**DIAD'ELPHOUS.** Having its stamens united into two parcels at the base; belonging to the class Diadelphia.

**DIA'GONAL.** (*διαγωνίος*, Gr. *ab angulo ad angulum perductus*: *diagonius*, Lat. *diagonal*, Fr. *diagonale*, It.) A line reaching from one angle to another, so as to divide a parallelogram into equal parts. Diagonals principally belong to quadrilateral figures.

**DIA'GONALLY.** (*diagonalement*, Fr. *diagonalemente*, It.) In a diagonal direction.

**DI'ALLAGE.** Schiller-spar; a variety of serpentine, or crystallized serpentine. The colour of diallage is dark-green.

**DIA'METER.** (*διάμετρος*, Gr. *diameter lineam dimentiens, per medium secans*: *diameter*, Lat. *diamètre*, Fr. *diametro*, It.) A straight line passing through a centre, and terminated both ways by the sides or surface of a figure.

**DIAM'ETRAL.** } (*diamétral*, Fr. *diame-*  
**DIAM'ETRICAL.** } *trale*, It.) Describing a diameter; relating to the diameter.

**DIA'METRALLY.** } (*diamétralement*, Fr.  
**DIAM'ETRICALLY.** } *diamétralemente*, It.) In a diametrical direction; in direct opposition; directly.

**DI'AMOND.** (*diamant*, Fr. *diamante*, It. *ἀδάμας*, Gr. *adamas*, Lat.) The hardest and most valuable of all the precious stones. Strange as it may appear, diamond consists of pure carbon. If the best charcoal be burnt in oxygen, carbonic acid gas is formed, the weight of which is nearly equal to that of the charcoal and the oxygen, there being a small residuum of earthy ashes left after the combustion; but if, in like manner, a diamond be burnt in oxygen, carbonic acid gas is equally the result, though, in the latter case, there is no residuum, and the carbonic acid gas obtained is precisely equal in weight to the two elements, the oxygen

and the diamond. Why, or how, it is that the same elementary substance can, with little or no addition, form two such excessively dissimilar bodies as diamond and charcoal,—the former the hardest and clearest body in nature, the latter a mere black, soft, brittle mass,—is a mystery beyond our finite powers to comprehend. The primitive crystal of the diamond is the regular octohedron, each triangular facet of which is sometimes replaced by six secondary triangles bounded by curved lines; so that the crystal becomes spheroidal, with 48 facets. When rubbed, the diamond shews positive electricity. It reflects all the light falling on its posterior surface at an angle of incidence greater than 24° 13', whence its great brilliancy is derived. It is the natural edge of the diamond only that has the property of cutting glass, all artificially formed edges will only tear or scratch it. Diamonds are found of nearly every shade of colour, those which are colourless are deemed the most valuable. The largest diamond known is said to be that which belonged to the late Emperor of the Brazils; it is uncut, and weighs 1680 carats, or 11 ounces 96 grains. This magnificent gem would be worth, supposing the table of rates to be applicable to stones above a certain size, 5,645,000*l.*, but the highest price that has ever been given for a single diamond is 150,000*l.* A diamond in the possession of the Great Mogul is of the size of half a hen's egg. The Pitt diamond, now the property of the king of the French, was sold for 100,000*l.*; it weighs 136 carats, or nearly 1 ounce.

**DI'AMOND-SHAPED.** Leaves are so called when approaching to a square, having four sides, of which those opposite are equal: the four angles are generally, two obtuse, and two acute.

**DIA'NDRIA.** (from *δις*, and *ἀνήρ*, Gr.) The second class of plants in Linnæus' artificial arrangement; they have two stamens. This is a very numerous class, consisting of three orders, and comprehends all hermaphrodite flowers having two stamens.

**DIA'NDRIAN.** Having two stamens; belonging to the class Diandria.

**DIAPHANE'ITY.** (*διaphanéité*, Fr.) Transparency.

**DIA'PHANOUS.** (*διαφανής*, from *διαφαίνω*, Gr. *diaphane*, Fr.) Which may be seen through; transparent; pellucid.

**DI'APHRAGM.** (*διάφραγμα*, Gr. *diaphragma*, Lat. *diaphragme*, Fr. *diaphragma*, It.) A large transverse muscle, which separates the chest from the belly; the midriff.

**DI' CERAS.** (from *δις* and *κίρας*, Gr.) A genus of fossil shells discovered in

- granular limestone, and thus named from possessing two prominent spiral umbones, which resemble two twisted horns.
- DICHO'TOMOUS.** (from *δίχα* and *τέμνω*, Gr. *dichotome*, Fr. *dicotomo*, It.) Forked; regularly and continually divided by pairs from the top to the bottom: applied to stems dividing into two parts; example, the misletoe.
- DICHROIT.** } A mineral, called also io-  
**DICHROITE.** } lite. The prismatic quartz of Mohs; iolithe of Haüy. Dichroite is of a blue colour, shining lustre, and conchoidal fracture. It consists of nearly 50 per cent. of silica, alumina 30, magnesia 11, oxide of iron 5, with a trace of oxide of manganese. It occurs in granite and gneiss.
- DICOCCOUS.** (from *δῖς* and *κόκκος*, Gr.) A capsule which consists of two cohering grains, or cells, with one seed in each.
- DICOTYLEDON.** (from *εἷς* and *κοτυληδών*.) A plant which has two cotyledons or seminal leaves.
- DICOTYLEDONOUS.** Every plant the embryo of whose seed is made up of two lobes, or which possesses two cotyledons, or seminal leaves, is included in this great division of the vegetable kingdom; or is a dicotyledonous plant. The stems of dicotyledonous plants are all exogenous, that is, they increase externally by the addition of concentric layers from without; these concentric additions being made annually, a vertical section of a tree of this division will shew, at once, its age; the number of rings or circles marking its number of years. Dicotyledonous plants may always be distinguished from monocotyledonous by their leaves: monocotyledonous plants have the veins of their leaves parallel and not reticulated, while all dicotyledonous plants have the veins of their leaves reticulated.
- DIDA'CTYLE.** (*διδάκτυλος*, Gr.) An animal having two toes only.
- DIDA'CTYLOUS.** Two-toed; having two toes only.
- DIDELPHIS.** } (from *δῖς* and *δελφύς*, Gr.  
**DIDELPHYS.** } having two wombs.) A genus of animals, belonging to the class Mammalia, order Feræ. All the animals of this genus are marsupial, that is, possess an external abdominal pouch, marsupium, or sac, in which the fœtus is placed after a very short period of uterine gestation, and where it remains suspended to the nipple by its mouth, until sufficiently matured to come forth to the external air. The opossum and kangaroo are examples. The didelphys affords the only known example of mammalian remains in the secondary formations.
- DIDELPHOID.** Belonging to the genus didelphys.
- DIDYNA'MIA.** (from *δῖς* and *δύναμις*, Gr.) The name given to the 14th class in Linnæus's artificial arrangement: it has four stamens, two long and two short. This class is easily distinguishable from the 4th class, Tetrandria, which has also four stamens. The flowers of this class are generally labiate; corolla monopetalous. It is divided into two orders: Gymnospermia, with four naked seeds in the bottom of the calyx, and Angiospermia, the seeds numerous and contained in a seed-vessel. In the first order, with the naked seeds, the plants are mostly aromatic and wholesome, including the mint, lavender, &c. In the second, where the seeds are contained in a seed-vessel, we find digitalis, and other poisonous plants.
- DIDYNA'MIC.** } Belonging to the class  
**DIDYNA'MOUS.** } Didynamia. Plants having four stamens, two of which are shorter than the others, are called *didynamous*.
- DIFFLUENT.** } (*diffluens*, Lat.) The  
**DIFFLUENCY.** } quality of flowing away on all sides, as does water; the effect of fluidity.
- DIFFLUENT.** Flowing every way; not fixed. Water is diffluent, but if it be converted into ice it ceases to be so, becoming fixed.
- DIFFU'SE.** (from *diffundo*, Lat.) To pour out; to spread; to disperse.
- DIFFU'SE.** } (*diffus*, Fr. *diffuso*, It.)  
**DIFFU'SED.** } Poured out; scattered; spread. Widely spread out; scattered; dispersed.
- DIFFU'SEDLY.** (*diffusément*, Fr. *diffusamente*, It. *diffusè*, Lat.) In a scattered manner.
- DIFFU'SEDNESS.** The state of being widely spread out, of being scattered.
- DIFFU'SIVE.** Having the quality of spreading in all directions, as water.
- DIGA'STRIC.** (from *δῖς* and *γαστήρ*, Gr.) Having two bellies.
- DIGITAGRA.** In Cuvier's arrangement, the second tribe of carnivora. The name *digitagrada* has been applied to them from the circumstance of the animals which compose this tribe walking on the ends of their toes.
- DIGITATE.** } (*digitatus*, Lat.) A sort of  
**DIGITATED.** } compound leaf, composed of two or more leaflets. Botanists include under the name digitate, binate and ternate leaves, as well as those having more than five leaflets, as the horse-chestnut, which has seven leaflets.
- DIGY'NIA.** (from *δῖς* and *γυνή*, Gr.) The second order in Linnæus's artificial system, comprehending such plants as have two styles, or pistils.
- DIGY'NIAN.** } Having two styles, or pis-  
**DIGY'NIUS.** } tils; belonging to the order Digynia.

**DIKE.** (Sax.)

1. A ditch ; a channel to receive water.
2. A mound ; defence ; wall ; fortification.
3. Geologists use the word *dike* to express a wall of mineral matter, cutting through strata in nearly a vertical direction. Lyell observes, "That it is not easy to draw the line between dikes and veins ; the former are generally of larger dimensions, and have their sides parallel for considerable distances ; while veins have generally many ramifications, and these often thin away into slender threads."

**DILU'VIAL.** (*diluvialis*, Lat.) Relating to the deluge. A term introduced by Professor Buckland to distinguish accumulations consequent on the deluge. "It is always," says Dr. Mantell, "in *diluvial* beds spread over the surface of plains, or accumulated in the bottoms of valleys, that the teeth and bones of mammalia have been discovered in various parts of England."

**DILU'VIALIST.** One who attributes certain effects, denied by others, as consequent on the Noachian deluge.

**DILU'VIAN.** (Lat.) A name applied by Professor Buckland to the superficial beds of gravel, clay, and sand which he considers to have been produced by the Noachian deluge: loose and water-worn strata not at all consolidated, and deposited by an inundation of water.

**DI'NGLE.** A dale ; a narrow valley between hills ; a hollow.

**DINOTHE'RIUM.** (from *δινος*, and *θηριον*, Gr.) An extinct genus of terrestrial mammalia. There are two known species of dinotherium. The dinotherium may be considered to have been the largest of terrestrial mammalia. The most abundant fossil remains of this genus have been found at Epplesheim, in Germany. In various parts of the south of France, large molar teeth and osseous fragments of dinotheria have been found occasionally, and these were referred by Cuvier to a gigantic species of tapir, and named by him *Tapir giganteus*.

Subsequent discoveries have enabled Prof. Kaup to place the dinotherium in a new genus, and to establish the fact that it was an herbivorous aquatic animal, inhabiting marshes and lakes, and that it sometimes attained the length of eighteen feet. The dinotherium holds an intermediate place between the tapir and the mastodon, supplying a link between the cetacea and pachydermata. The scapula, or shoulder-blade, is the most remarkable bone hitherto discovered, belonging to this animal ; it resembles that of the mole, and seems to indicate that the fore-leg was adapted for digging up the earth. It appears also certain that this huge

creature was furnished with a proboscis. The dinotherium may be found figured in Prof. Buckland's *Bridgewater Treatise*, and in Mantell's *Wonders of Geology*, from which works much of the preceding account has been extracted. The dinotherium is referrible to the miocene period.

**DI'ODON.** In Cuvier's arrangement, a genus of fishes belonging to the family *Gymnodontes*, and thus named in consequence of their jaws being undivided, and forming one piece only above and one below. Their skin is in all parts so armed with spines, that they resemble the case of the fruit of the horse-chestnut. Teeth supposed to belong to *diodon histrix* have been found in the chalk.

**DIÆ'CIA.** (from *δις* and *οικος*, Gr.) The twenty-second class of plants in Linnæus's artificial system. The stamens and pistils are in separate flowers, and situated on two separate plants. The orders in this class depend on the circumstances of their male flowers.

**DIÆ'CIOUS.** Belonging to the class *Dicecia* ; plants which have the barren and fertile flowers growing from the two separate roots.

**DIOP'SIDE.** (from *διοψις*, Gr. *transpectus*.) A mineral known also as *alalite*, *baikalite*, and *musite*. It is a white or pale green variety of *augite*. It occurs massive, disseminated, and crystallized. It is found, generally imbedded in *Serpentine*, in *Piedmont*. It consists of more than half silica, one fourth lime, about eighteen per cent. *magnesia*, with a trace of *alumina* and *protoxide of iron*.

**DIOP'TASE.** The *Cuivre Dioptase* of *Haüy*. *Emerald copper-ore*, a very rare mineral of an emerald-green colour, consisting of oxide of copper and silica in nearly equal proportions, with about eleven per cent. of water.

**DI'ORITE.** A variety of *greenstone*.

**DIORI'TIC.** Resembling *diorite* ; containing *diorite* ; of the nature of *diorite*.

**DIP.** To incline downwards ; to sink ; to immerge.

**DIP.** In geology, the downward inclination of strata. The point of the compass towards which strata incline is called their dip, and the angle of such inclination with the horizon is termed the dip, or angle, of inclination. It sometimes happens that a stratum, without varying its direction, may be so bent as to dip two ways in the same mountain, like the sloping sides of the roof of a house, or the letter V reversed Δ.

**DIPET'ALOUS.** (from *δις* and *πέταλον*, Gr.) Having two flower-leaves or petals.

**DI'PTERA.** (from *δις* and *πτερον*, Gr.) The sixth order of insects in the Lin-

- næan system, or insects having two wings. The musca, or common fly; the culex, or gnat; and the œstrus, or gad-fly, are familiar examples. In Cuvier's arrangement diptera forms the twelfth class of insecta, and their distinguishing characters are said to be the possessing six feet, and two membranous extended wings, accompanied generally by two moveable bodies, called halteres, which are placed behind the wings; the organs of manducation are a sucker composed of squamous, sectaceous pieces, varying in number from two to six, enclosed in an articulated sheath, most frequently in the form of a proboscis. In these divisions almost every entomologist is disposed to make alterations, and the systems proposed are far too numerous to be recounted.
- DIPTEROUS.** Two-winged insects; belonging to the order Diptera.
- DIPYRE.** A mineral, a variety of scapolite found in the Pyrenees, thus named by Haüy. It consists of silica 60·0, alumina 20·0, lime 10·0, and some water or loss.
- DIRUPTION.** (*diruptio*, Lat.) A forcible rending asunder; a breaking, or tearing away.
- DIRUPTED.** (*diruptus*, Lat.) Rent asunder; broken away.
- DISC.** } (*discus*, Lat.)
- DISK.** } 1. In conchology, the middle part of the valves, or that which lies between the umbo and the margin; the convex centre of a valve, or most prominent part of the valve, supposing it to lie with its inside undermost.
2. In botany, the central florets of a compound flower; the whole surface of a leaf.
- DISCOBOLI.** The name given to a family of fishes, in Cuvier's arrangement, from the disk formed by their ventrals. The fishes of this family form two genera.
- DISCOID.** } 1. In the form of a disc. In
- DISCOIDAL.** } botany, plants, the petals of whose flowers are set so closely and evenly as to make the surface plain and flat like a dish.
2. In conchology, when the whorls are so horizontal as to form a flattened spire.
- DISCOIDES.** A genus of fossil echinus, one species only of which has been found, namely, discoides subuculus.
- DISCOIBIS.** A genus of microscopic spiral discoidal univalves.
- These have been thought by some authors, and the number includes Lamarck, to be found in a fossil state only; but Parkinson states that they are found recent on our coasts.
- DISCORBITES.** Fossil shells of the genus discorbis.
- DISCOUS.** Broad; flat; wide, but of a rounded form.
- DISCONTINUITY.** Disunity of parts; absence of cohesion.
- DISCONTINUOUS.** Separated; interrupted.
- DISEMBOGUE.** (Bailey and Johnson give the etymology of this word from *deseimboucher*, Fr.; but I do not find any such word as *deseimboucher* in the Dictionnaire de L'Académie; indeed, the word itself is rarely modernly used.) To roll or discharge itself into the sea, as a large river does; to gain a vent; to flow.
- DISGORGE.** (*dégorger*, Fr.) To vomit forth; to eject with violence.
- DISGORGED.** Vomited out; ejected with violence.
- DISINTEGRATED.** Separated into its integrant parts by mechanical division.
- DISINTEGRATION.** The separation of a body into its integrant parts by mechanical division; the wearing down of rocks.
- DISK.** See *Disc*.
- DISLOCATE.** (*disloguer*, Fr. *dislogare*, It.) To put out of its proper place.
- DISLOCATION.** (*dislocation*, Fr. *dislogazione*, It.) The state of being displaced; displacement of portions of the earth's crust. According to the theory of M. De Beaumont, the principal dislocations of the earth's crust of the same geological age range in lines parallel to one and the same great circle of the sphere; those of different ages are parallel to different circles. The geological era, consequently, of the elevation of mountains, may be ascertained from the direction of their axes of movement.
- DISPERMOUS.** (from *δισ*, and *σπέρμα*, Gr.) Two-seeded; an epithet for fruit containing two seeds only; stellate and umbel-like plants are thus termed.
- DISROOT.** To tear away by the roots; to tear from its foundation.
- DISROOTED.** Torn up with its roots; torn from its foundation.
- DISRUPTED.** Rent asunder; broken forcibly away.
- DISRUPTION.** A forcible rending asunder; a tearing away.
- DISSEPIMENT.** (*dissepimentum*, Lat.) In botany, the partition which divides a capsule into cells. In many plants the *dissepiments* do not reach to the axis or centre, in some plants the *dissepiments* are not formed, or subsequently disappear, and leave the placenta in the centre of the ovarium, like a column, with the seeds adhering to it.
- DISTHENE.** } Disthene is the name
- DISTHEN-SPATH.** } given by Haüy, and Disthen-spath by Mohs, to the mineral Kyanite or Cyanite, *which last, see*.
- DISTICHOUS.** (*διστιχος*, Gr. *distichum*, Lat.) Two-ranked; applied to leaves

occupying two sides of a branch, but not regularly opposite at their insertion, as the fir, yew, &c.; applied also to branches when they spread into two horizontal directions; and to flowers, placed in two opposite ranks.

**DISTORT.** (*distortus* from *distorqueo*, Lat.)

To twist from its usual, or natural, shape; to turn away.

**DISTORTED.** (*distortus*, Lat.) Twisted from its usual or natural form; turned away.

**DISTORTION.** (*distortio*, Lat.) Unnatural crookedness; the turning awry; the act of twisting from its natural form.

**DIVARICATE.** (*divarico*, Lat.) To separate into two; to divide into two.

**DIVARICATION.** (*divaricatio*, Lat.) Separation into two.

**DIVELLENT.** (*divellens*, Lat.) Separating; drawing apart, in different directions.

**DIVERGE.** (*divergo*, Lat.) To tend from one point in various directions.

**DIVERGENCE.** A tending from one point, as a centre, in various directions.

**DIVERGENT.** (*divergent*, Fr. *divergente*, It.) Radiating from a centre in different directions; tending to various parts from one point.

**DIVERGING.** In botany, applied to the position of leaves during sleep, signifying that the leaflets approach at their base, and are open at their summits.

**DIVERSIFORM.** Of forms differing from one another.

**DIVERSITY.** (*diversitas*, Lat. *diversité*, Fr. *diversité*, It.) Dissimilarity; variety.

**DIVERT.** (*diverto*, Lat. *divertir*, Fr. *divertire*, It.) To turn aside from its course.

**DIVULSION.** (*divulsio*, Lat.) A pulling in pieces; a forcible tearing asunder.

**DIVULSIVE.** That tends asunder.

**DODECAGON.** (from *δώδεκα* and *γωνία*, Gr. *dodecagone*, Fr. *dodecagone*, It.) A regular polygon having twelve equal sides and angles.

**DODECAHEDRON.** (from *δώδεκα* and *ἔδρα*, Gr.) A geometrical solid, comprehended under twelve equal sides, each whereof is a pentagon. It is one of the regular or plutonic bodies.

**DODECAHEDRAL.** Having twelve equal sides; relating to a dodecahedron.

**DODECAHEDRAL CORUNDUM.** Called also Spinel; the Spinelle and Pleonaste of Haüy. There are two varieties, the Ceylanite and Spinel Ruby. Colours red, blue, brown, black, green and white. It consists of alumina 74, silica 16, magnesia 8, oxide of iron one and a half, and lime 0.75 per cent.

**DODECAHEDRAL GARNET.** A species of garnet containing ten subspecies or varieties; these are the Grossulaire, or asparagus-green variety; the Pyrenaite,

or greyish black variety; the Colophonite, or red variety in granular concretions; the Precious Garnet, or highly crystallized and transparent red variety; the Topazolite, or yellow variety; the Melanite, or velvet-black opaque variety; the Allochroite, or brown, green, and grey massive variety; the Pyrope, or deep blood-red variety; the Essonite, or hyacinthine and orange-yellow variety; the Common Garnet, or brown and green variety in granular concretions and translucent.

**DODECAHEDRAL MERCURY.** Called also native amalgam, the Mercur Argentale of Haüy. A mixture of mercury and silver in the proportions of nearly three-fourths of the former, and rather more than one-fourth of the latter. It is found in quicksilver mines together with cinnabar. It is of the colour of silver, and regularly crystallized.

**DODECANDRIA.** (from *δώδεκα* and *ἀνήρ*, Gr.) The eleventh class of plants in Linnæus's artificial system. The plants in this class have from twelve to nineteen stamens: the common houseleek will illustrate it.

**DODECANDRIAN.** Belonging to the class Dodecandria; having from twelve to nineteen stamens.

**Do'do.** A genus of birds belonging to the order of gallinæ. The bill is contracted in the middle by two transverse rugæ; each mandible is inflected at the point; and the face is bare behind the eyes. The dodo is a case in point serving strongly to illustrate the views and opinions of those who argue for the extinction of species, even in the present day. Lyell says, "The most striking example of the loss, even within the last two centuries, of a remarkable species, is that of the dodo, a bird first seen by the Dutch, when they landed on the isle of France, at that time uninhabited, immediately after the discovery of the passage to the East Indies by the Cape of Good Hope. It was of a large size, and singular form; its wings short like those of an ostrich, and wholly incapable of sustaining its heavy body, even for a short flight. In its general appearance it differed from the ostrich, cassowary, or any known bird. Many naturalists gave figures of the dodo after the commencement of the seventeenth century; and there is a painting of it in the British Museum, which is said to have been taken from a living individual. Beneath the painting is a leg, in a fine state of preservation, which ornithologists are agreed cannot have belonged to any other known bird. In the museum at Oxford, also, there is a foot and a head." "The

dodo," as Dr. Mantell observes, "has been annihilated, and become a denizen of the fossil kingdom, almost before our eyes. The bones of the dodo have been found in a tuffaceous deposit, beneath a bed of lava, in the Isle of France; so that if the very few remains of the recent bird, above alluded to, had not been preserved, these fossil relics would have constituted the only record that such a creature had ever existed on our planet." Nevertheless, two centuries since, the dodo formed the principal food of the inhabitants of the isle of France.

**DOLABE LLA.** A genus of univalvular molluscs the known species of which are found in the Indian ocean and in the Mediterranean. They differ from *Aplysiaz* only in the position of their branchiæ and their surrounding envelope.

**DOLA'BRIFORM.** (from *dolabra* and *forma*, Lat.) Hatchet-shaped; a term more commonly applied to leaves, cylindrical at the base and having the upper part dilated, thick on one edge and cutting on the other.

**DO'LERITE.** A variety of trap-rock, or greenstone, composed of augite and Labrador-felspar.

**DO'LIIUM.** (*dolium*, Lat. a tub, a tun.) A subglobular ventrose univalve, spirally ribbed in the direction of the whorls; the inferior whorl ample and ventricose; outer lip crenated, or dentated, throughout its whole length. Aperture oblong, ample, and notched; epidermis light and horny. Parkinson states that the *dolium* has not been found fossil: this is not the case; one species, *Dolium nodosum*, has been found at Clayton, near Hurst, in Sussex, by R. Weekes, Esq. of Hurst.

**DO'LOMITE.** A variety, or modification, of limestone, consisting of magnesian earth 48 parts, and calcareous earth 52 parts. It derives its name from Dolomieu, a French geologist. There are three subspecies. Von Buch maintains that limestone has been converted into dolomite by its proximity to porphyry in fusion, and that the magnesia has been transferred from magnesian minerals in the porphyry to the limestone; the magnesia being reduced to vapour or gas.—*Bakewell*.

The name Zechstein (from *zeche* and *stein*, Germ.) has also been given to dolomite or magnesian limestone. This is a calcareous deposit, of a somewhat variable aspect; it is fossiliferous. The zechstein has not yet afforded any remains of trilobites. It does not appear to be a deposit widely spread over the European area. As yet, it is principally known in Germany and England. Dolomite is generally of a light fawn or yellow colour, and

in some parts of a crystalline, in others of a concretionary, character. It is included in the new red sandstone group, its position being immediately above the coal measures. It is frequently traversed by veins of carbonate of lime, and there are sometimes met with enclosed in it hollow geodes of calcareous spar, with sulphate of strontian and sulphate of barytes.

**DO'LOMITE MA'RBLE.** A variety of dolomite of a white colour, occurring in small granular concretions; these concretions are frequently so loosely united as to fall apart by the slightest pressure.

**DOLOMI'TIC.** Containing dolomite; of the nature of dolomite.

**DO'MITE.** A variety of trachyte, and thus named from being found in the Puy de Dome, in Auvergne, in France. It has the appearance and gritty feel of sandy chalk.

**DO'NAX.** (*donax*, Lat. *δόναξ*, Gr.) Animal a tethys; an equivalved inequilateral bivalve, with a crenulate margin, the frontal margin obtuse; hinge with two cardinal teeth in one valve, one in the other; the lateral teeth one or two, rather distant. The shells of this genus are in general triangular, inequilateral, flattened, truncated before, and wedge-shaped. It is found in sands and sandy mud, at depths varying to ten fathoms. Nineteen species have been described, six of which have been found in our seas. Several fossil species occur in the neighbourhood of Paris.

**DO'RIS.** In the Linnæan arrangement, a genus of gasteropoda, belonging to the class Mollusca. An animal inhabiting a shell; body, creeping, oblong, and flat beneath; mouth below, on the fore part; vent behind, on the dorsum, surrounded by a fringe; feelers two and four, retractile, and placed on the front of the upper part of the body. They are all marine, and are found in every sea. In Cuvier's arrangement *doris* is placed in the order Nudibranchiata.

**DO'RSAL.** (*dorsal*, Fr. *dorsale*, It. from *dorsum*, Lat.) Appertaining to the back, as the dorsal fin, the dorsal ligaments, &c.

**DO'RSUM.** (*dorsum*, Lat.) The back: the ridge of a hill is sometimes called the dorsum. In conchology, it generally means the upper surface of the body of the shell, when laid upon the aperture or opening. In the genera of patella and haliotis, the dorsum means the upper convex surface.

**DOWN.**

1. The fine soft under feathers of many birds, as the swan, goose, &c.
2. The pubescence of plants, or very soft, short hairs, covering various parts of plants.

3. A considerable tract of elevated land, generally covered with short grass.

**Do'wny.** Soft ; cottony ; nappy ; covered with soft hairs.

**DRUPE.** (*drupa*, Lat. *δρυπετης*, Gr.) A pulpy pericarp, or seed-vessel, containing a single hard and bony nut, to which it is attached : the epicarp and sarcocarp separable from each other, and from the endocarp, which is stony ; the nectarine, peach, apricot, &c., furnish us with familiar examples.

**DRUPA'CEOUS.**

1. Having the characters of a drupe, as drupaceous fruit.

2. Bearing drupes, as drupaceous trees.

**DRUSE.** A hollow space in veins of ore, generally lined with crystals.

**DUCT.** (*ductus*, Lat.) A tube, canal, or passage through which anything is conveyed.

1. In anatomy the ducts are very numerous ; thus we have the cystic duct, the hepatic duct, the nasal duct, &c. &c.

2. In botany, ducts are membranous tubes, having their sides dotted or barred ; they are large enough to be visible to the naked eye, and are plainly seen when a cane, or oak, or vine-branch, is cut across.

**DUC'TILE.** (*ductilis*, Lat. *ductile*, Fr. *ductile*, It.) That may be drawn out into greater length without breaking. The term is applied to metals only, and is sometimes confounded with malleable, whereas the two have very different significations ; thus copper is both malleable and ductile, but lead is only malleable and not ductile ; some metals are neither malleable nor ductile, but brittle, as antimony, manganese, tellurium, &c. &c.

**DUCTILITY.** (*ductilité*, Fr. *ductilità*, It.) That property which metals possess of being drawn out into greater length with diminished thickness, without separation of parts. The French used the word *ductilité* to express malleability ; but we do not. "La ductilité est un synonyme de malléabilité." — *Dict. De L'Acad. Française.*

**DUG.** The teat or nipple.

**DU'GONG.** A species of phytophagous, or herbivorous, cetacea.

**DUNE.** By geological writers, this word is used to signify a low hill, or bank, of drifted sand, and in no respect is synonymous with down, as might be inferred from Todd and Webster. The downs, both north and south, are very extensive ranges of chalk hills, principally covered with short grass, affording excellent herbage for sheep, whereas dunes are banks of drifted sand, scarcely of sufficient heights to be ranked as hills.

**DUODENUM.** (*duodenum*, Lat. *duodenum*, Fr.) The first of the small intestines, immediately adjoining the stomach, and called duodenum from its length, supposed to be twelve inches.

**DUPlica'TION.** (*duplicatio*, Lat. *duplicatio*, Fr. *duplicazione*, It.) A doubling, or folding, of any part.

**DUP'licATURE.** Duplication.

**DUST.** In botany, the pollen of the anther.

The pollen or dust is contained in the anther. In dry and warm weather the anther contracts and bursts, when the pollen is thrown out. It is found, from microscopic examination, that each particle of dust is generally a membranous bag, either round or angular, smooth or rough, which on meeting with any moisture instantly bursts and discharges a subtle vapour. To the perfecting the seeds of plants, it is necessary that the pistil, or female organ, be impregnated by the pollen of the anther ; the fluid contained in the pollen, when the anther bursts, penetrates the stigma, and is conveyed to the seeds, whereby they are rendered fertile, or endued with the property of growing, and producing a plant resembling the parent one.

**DYKE.** See *Dike*.

**DY'NAMICS GEOLOGICAL.** These include the nature and mode of operation of all kinds of physical agents, that have at any time, and in any manner, affected the surface and interior of the earth.—*Buckland's Bridgewater Treatise.*

**DYSO'DILE.** (from *δυσώδης*, *gravier olens*, *fœtidus*, Gr.) A mineral of a greenish colour found near Syracuse, which burns like coal, but gives out during its combustion a most intolerable odour.

## E

**EA'GLE-STONE.** Called also *ætites*. A variety of argillaceous iron ore, of a nodular form, something resembling a kidney in shape, and containing a sort of loose kernel. It obtained its name from a supposition that it was either found in, or had dropped from, the nests of eagles.

**EARTH'S CRUST.** That portion of our planet which is accessible to our observation and inspection.

**EBOU'LEMENT.** (Fr.) Fall of any detached rock. The fall of parts of mountains is so common an occurrence in the Alps, that it is expressively called an

éboulement, from the verb ébouler.—  
*Bakewell.*

**EBULLITION.** (*ebullitio*, Lat. *ebullition*, Fr. *ebollizione*, It.) Intestine motion or agitation, occasioned by the struggling of particles of different properties; boiling or bubbling.

**EBURNA.** (from *eburnus*, Lat. ivory.) An oval or elongated univalve with a deeply umbilicated columella; the aperture oblong, and notched at the bottom. The recent eburna lives in sandy mud. Fossil eburnæ are rarely met with. Parkinson states that Lamarck does not notice them among the Paris fossils, but that a shell exists among the Essex fossils which he names *Eburna glabrata*. Dr. Mantell gives eburna as a fossil of the chalk mark, but affixes a note of interrogation to it, as though doubtful.

**ECCE'NTRIC.** See *Excentric*.

**ECCENTRI'CITY.** See *Excentricity*.

**ECCHYMO'SIS.** (*ἐκχύμωσις*, Gr. *sanguinis subcutem per grumos effusio*.) A dark spot on the skin, caused by an extravasation of blood.

**ECHIDNA.** (*ἔχιδνα*, Gr.) A genus of quadrupeds belonging to the order Monotremata, an order comprising only two genera, the Ornithorhynchus and Echidna. The spiny ant-eater of New Holland, a land quadruped, with a peculiar construction of clavicles and furcula. There are two species, echidna hystrix, or spiny echidna, and echidna setosa, or bristly echidna.

**ECHINATE.** } (*echinatus*, Lat.) Bristled  
**E'CHINATED.** } like a hedge-hog; set with spines; having sharp points or spines.

**ECHINIDAN.** A fossil belonging to the class Echinoderms. Prof. Buckland states that the family of Echinidans appears to have extended through all formations, from the epoch of the transition series to the present time.

**ECHINITE.** The fossil echinus, or sea-urchin. Echinites vary greatly both in form and structure, and are arranged accordingly into many sub-genera; they are all marine. The chalk formation abounds with these fossil shells, some of which are exceedingly beautiful from their elegant and minute decorations. The *Ananchytes cretosus*, a sub-genus, is found in some places in shoals, and in every condition from the youngest to the oldest age. The *Spatangus cor-marinum*, another sub-genus, silicified, is frequently found on our shores and in our gravel-pits, and the spines of the different sub-genera, detached from the shells, are very numerously dispersed throughout the chalk.

**ECHINUS.** (*echinus*, Lat. *ἐχῖνος*, Gr.)

The sea-urchin, or egg. The echinus is included in the order Echinodermata, being covered by a hard and coriaceous skin. The shell is spherical, and composed of polygonal plates, closely fitted to each other, and has attached to it many spines or prickles, which serve as instruments of motion. Some species of the echinus are edible, more especially the *E. Esculentus*. The echinus feeds principally on small shell-fish, which it seizes with its feet.

**ECHINODER'MATA.** } (from *ἐχῖνος*, and  
**ECHI'NODERMS.** } *δέσμα*, Gr.) An order of radiated animals, including the Echinus, or sea-urchin; the Asterias, or star-fish; the Holothuria, and the Siphunculus. The skeletons of the animals of this class are generally in the form of external crusts, or shells, covered with projecting spines. Echinoderms extend through all the formations, from the epoch of the transition series to the present time. They are composed of the carbonate, mixed with a small, but variable, proportion of the phosphate of lime, and are hardened by animal matter. Of the radiated animals, Cuvier states that the Echinodermata are the most complicated. He divides them into two orders: 1. The Pedicellata, or those furnished with feet, or with vesicular organs fulfilling the functions of feet.

2. The Apoda, or those destitute of the vesicular organs of progressive motion which the Pedicellata possess. In the first order he places the Asterias, Encrinus, Echinus, and Holothuria; in the second, or Apoda, the Molpadia, Minyas, Priapulul, Lithodermis, Siphunculus, Bonellia, and Thalassema. Agassiz has recently shown, contrary to the opinion always previously entertained, that the rays of Echinoderms are dissimilar, and not always connected with a uniform centre; and that a bilateral symmetry, analogous to that of the more perfect classes of animals, exists throughout the different families.

**ECHINANTHUS.** The name given to a section of Catocysti by Leske. The genus echinanthus comprises all the echinites of this section. Of this genus there are many species, namely, *Echinanthus humilis*, *Ech. altus*, *Ech. ovatus*, *Ech. orbicularis*. The echinanthus was named Scutum by Klein. The shells are of an irregular figure, resembling a buckler. On the base, which is concave, five grooves pass from the margin, and terminate at the mouth in the centre. Five rays ornament the upper part. The mouth is placed in the centre of the base, and is of a pentagonal form. The whole of the surface is marked with very small

- depressions, of a circular form, with central tubercles.—*Parkinson*.
- ECHINARA'CHNIUS.** (from *ἐχίνος* and *ἀράχνη*, Gr.) A genus of echini belonging to the class Pleurocysti. To this genus Klein gave the name *Arachnoides*.
- ECHINOC'RYIS.** A genus of fossil echinites, thus named by Leske, belonging to the class of Catocysti. This genus comprises all those echinites which Klein divided into *Galeæ* and *Galeolæ*. There are several species.
- ECHINOD'ISCUS.** The name given by Breynius to a section of echini belonging to the class Catocysti. The echinodiscus is of a depressed discoidal figure, whence it has its name, nearly flat on both sides. Echinodiscs are found both recent and fossil. There are many species.
- EDA'CIOUS.** (from *edax*, Lat.) Predacious; voracious; rapacious.
- EDENTA'TA.** The sixth order of Mammalia, in Cuvier's arrangement, or quadrupeds without front teeth. This order comprises three tribes, *Targigrada*, *Edentata ordinaria*, and *Monotremata*.
- EDENTA'TED.** (*edentatus*, Lat. *edenté*, Fr. *edentato*, It.) Without teeth.
- E'DIBLE.** (from *edo*, Lat.) That may be eaten; fit for food.
- EDI'NGTONITE.** A mineral, resembling some varieties of felspar and prehnite.
- EFFERVE'SCE.** (*effervesco*, Lat.) To be in a state of intestine motion from the generation of gas, which is continually rushing to the surface and making its escape.
- EFFERVE'SCENCE.** (*effervescentia*, Lat. *effervescence*, Fr. *effervescenza*, It.) That commotion which takes place in fluids when gas is generated, rises to the surface in small bubbles, and escapes; it is accompanied by a kind of hissing noise.
- EFFLORE'SCENCE.** (*effloresco*, Lat. *efflorescence*, Fr. *efflorescenza*, It.)
1. Production of flowers.
  2. Excrescences in the form of flowers.
  3. The pulverescence of crystals on exposure to the atmosphere.
- EFFLORE'SCENT.**
1. Shooting out in the form of flowers.
  2. Becoming pulverulent on exposure to the atmosphere; the reverse of deliquescent.
- E'FFLUX.** } (*effluxio*, Lat.) The act of  
**EFFLU'XION.** } flowing out; as the efflux of a river or tide.
- EFFO'SSION.** (from *effodio*, Lat.) The digging out of the earth, as of fossils, &c.
- EFFU'SE.** In conchology, a term applied to shells where the aperture is not whole behind, but the lips are separated by a gap.
- EGE'RIA.** A genus of fossil bivalves belonging to the tertiary formation.
- ELA'OLITE.** (from *ἐλαία*, an olive, and *λίθος*, a stone.) A sub-species of pyramidal felspar, known also as fettstein, or fatstone, a name given to it from its greasy feel.
- ELA'STIC MINERAL PITCH.** Called also elaterite and mineral caoutchouc; a brown, massive, elastic variety of bitumen: it consists of about 52 per cent. of carbon, 40 per cent. of oxygen, 0.15 of nitrogen, and 8 per cent. of hydrogen.
- ELA'TERITE.** Another name for elastic mineral pitch.
- ELE'CTRUM.** Argentiferous gold ore, a variety of hexahedral gold, of a pale brass-yellow colour. Pliny informs us that it was a mixture of gold and silver, and thus writes, "Omni auro inest argentum vario pondere. Ubiqunque quinta argenti portio est, electrum vocatur." It has been attempted to prove that platinum is the electrum of the ancients, but such is not the case.
- ELEME'NTARY.** (*elementarius*, Lat. *élémentaire*, Fr. *elementario*, It.) Uncompounded; uncombined; simple; primary.
- ELEME'NTARY SUBSTANCES.** There are fifty-five simple, or elementary substances at present known, that is, substances which, under the conditions yet applied to them, are found to be incapable of further analysis, and are therefore called simple, or elementary, substances. Five of these exist in a separate state as gases, namely, oxygen, hydrogen, chlorine, azote, and fluorine; the last, however, of these has not yet been obtained in a separate state, and is only known to be a distinct substance from the qualities of the compounds it forms with other matter. Seven are non-metallic solids and liquids, namely, sulphur, phosphorus, selenium, boron, carbon, bromine, and iodine; of these, the two last, bromine and iodine, are either gaseous, liquid, or solid, according to the temperature. Sulphur, phosphorus, selenium, boron, and carbon, are solids, but differ from the remaining forty-one in being non-conductors of electricity. Of the remainder, thirteen are metallic or metalloïd bodies, uniting with oxygen to form the earths and alkalies; namely, sodium, aluminum, magnesium, calcium, lithium, potassium, glucinum, barium, silicium, thorinum, strontium, yttrium, zirconium. Twenty-nine are what are commonly called metals; of these, five, namely, iron, tin, cadmium, zinc, and manganese, decompose water at a red heat; the others do not decompose water, namely, arsenic, antimony, copper, molybdenum, uranium, tellurium, chromium, cerium, nickel, vanadium, cobalt, lead, tungstenum, titanium, mercury, columbium, bismuth, osmium, silver, palla-

dium, rhodium, platinum, gold, iridium.

To the class of metals an addition has recently been made by the discovery of *Lantane*, which makes the 55th elementary body. "L'oxide de cerium, extrait de la cérite par le procédé ordinaire, contient à peu près les deux cinquièmes de son poids de l'oxide du nouveau métal, qui ne change que peu les propriétés du cérium, et qui s'y tient pour ainsi dire caché. Cette raison a engagé M. Mosander à donner au nouveau métal le nom de *Lantane*. L'oxide de *lantane* a une couleur rouge de brique, qui ne paraît pas être due à la présence de l'oxide cérique."—*Annales de Chimie*.

**ELEVATION.** The question of the elevation and subsidence of the earth's surface is one which long gave rise to controversy, and various were the arguments adduced in support of, and in opposition to, opinions which now are unhesitatingly and universally received, and on which the vitality, as it were, of geology depends. It may not, however, be amiss to quote here some of the views of our best and soundest geologists, on a point of so great importance, and one which, to the Neophyte, seems often so startling. The fact of great and frequent alteration in the relative level of the sea and land is so well established, that the only remaining questions regard the mode in which these alterations have been effected. The evidence in proof of great and frequent movements of the land itself, both by protrusion and subsidence, and of the connection of these movements with the operations of volcanoes, is so various and so strong, derived from so many different quarters on the surface of the globe, and every day so much extended by recent inquiry, as almost to demonstrate that these have been the causes by which those great revolutions were effected; and that although the action of the inward forces which protrude the land has varied greatly in different countries, and at different periods, they are now, and ever have been, incessantly at work in operating present change, and preparing the way for future alteration in the exterior of our globe.—*Dr. Fitton*.

Mr. Lyell says, "We may regard the doctrine of the sudden elevation of whole continents by paroxysmal eruptions as invalidated. In 1822, the coast of Chili was visited by a most destructive earthquake; when the district round Valparaiso was examined on the following day, the whole line of coast, for the distance of above 100 miles was found raised above its former level. The area over which this permanent alteration of level extended

was estimated at 100,000 square miles; the rise upon the coast was from two to four feet, inland it was from five to seven feet." The following extracts are from Mr. Bakewell's Introduction to Geology. "The granite-beds in the Alps were not elevated till a late geological epoch, after the deposition of the oolites and chalk. M. Elie de Beaumont has proved, that whole mountain-chains have been elevated at one geological period, that great physical regions have partaken of the same movement at the same time, and that these paroxysms of elevatory force have come into action at many successive periods. I agree with Professor Sedgwick, and M. Elie de Beaumont, that the elevation of mountain-ranges, where the beds are nearly vertical, was effected by a sudden and violent upheaving, yet I am persuaded that the elevation of continents, or extensive tracts of country, was (as Mr. Lyell observes) a long continued process, and that these operations were distinct from each other. The elevation of large continents and islands, was not effected by the same operation, which upraised the primary rocks.—I consider it probable, that all large tracts of country or continents emerged slowly from the ocean, forming at first mountainous islands, before the lower countries were raised above the level of the sea. In the Wealden beds the strata have been upheaved and submerged more than once. All the coal-basins were either formed in inland marshes or lakes, or were surrounded by dry land; but a great submergence of the land took place, and they were covered in many parts by thick depositions of marine limestone. At a subsequent period they again emerged from the ocean with a covering of marine secondary strata. The elevations of limited portions of the earth's surface, at a distance from any known volcanic agency, are not uncommon. Loose stones, or shingles of an ancient sea-beach, are found at heights considerably above the present level of the sea in many parts of England. The elevation of extensive islands or continents was probably always accompanied by the depression of other portions of the earth's crust." M. Elie de Beaumont has discovered probable evidence of no less than twelve periods of elevation, affecting the strata of Europe. The Isle of Portland affords us an admirable example of alternate elevations and submersions of strata.

1. We have evidence of the rise of Portland stone, till it reached the surface of the sea, wherein it was formed.

2. This surface became, for a time, dry land, covered by a temporary forest, dur-

ing an interval which is indicated by the thickness of a bed of black mould, called the dirt-bed, and by the rings of annual growth in large petrified trunks of prostrate trees, whose roots had grown in this mould.

3. We find this forest to have been gradually submerged, first beneath the waters of a fresh water lake, next of an estuary, and afterwards beneath those of a deep sea, in which cretaceous and tertiary strata were deposited.

4. The whole of these have been elevated by subterranean violence.—*Prof. Buckland.*

It is now clearly ascertained that the whole country from Frederickshall, in Sweden, to Abo, in Finland, is slowly and visibly rising, while the coast of Greenland is being gradually depressed. Certain parts of Sweden are being gradually elevated at the rate of two or three feet in a century.

**ELLIPTICAL.** (*elliptique*, Fr. *ellittico*, It.) Having the form of an ellipsis; oval.

**ELYTRA.** (from *ἐλυτρον*, Gr.) The hard cases which cover the wings of coleopterous insects; the wing-sheaths, or upper crustaceous membranes, which cover the true membranous wings of insects of the beetle tribe.

**EMA'RGINATE.** } (*emargino*, Lat.)

1. In botany, applied to leaves terminating in a small acute notch at the summit.
2. In conchology, to shells having no margin; or when the edges, instead of being level, are hollowed out.
3. In mineralogy, to minerals having all the edges of the primitive form truncated, each by one face.

**EMBE'DDED.** Sunk in, and surrounded by, another substance.

**E'MBRYO.** (*ἐμβρυον*, Gr. *embryon*, Lat.)

1. In botany, the germ, or most essential part of a seed, and without which no seed is perfect, or capable of re-production. The embryo is usually placed within the substance of the seed, either central, external out of the centre, or external; its direction is curved or straight, and in some instances spiral.—*Flora Medica.*
2. The offspring yet enclosed in the uterus, and in the early stage only of uterogestation; afterwards called the foetus.

**EMBOUCHURE.** (Fr.) The mouth of a river, or that part where it enters the sea.

**E'MERALD.** (*emeraude*, Fr. *emeraldo*, It. *μάργαρος*, Gr. *smaragdus*, Lat.) A precious stone of a green colour, found crystallized. Under the genus emerald are comprised two species, the first, the prismatic emerald, or euclase of Werner and Häuy, and prismatischer smaragd of

Mohs; the second, the rhombohedral emerald, or rhomboedrischer smaragd of Mohs. This last species contains two varieties, the precious emerald and the beryl, or common emerald. The emerald and beryl are crystallized compounds of an earth called glycina, with silex, alumine, lime, and oxide of iron; the splendid green of the emerald is attributed to the presence of oxide of chromium. The finest emeralds are brought from Peru. Vauquelin, in analysing the emerald, first discovered the earth which he called glycina, or glucina.

**EME'ERGE.** (*emerge*, Lat.) To rise out of anything by which it is covered.

**EMERGENCE.** The act of rising out of that by which it has been covered.

**EME'RGENT.** Rising out of that by which it was covered.

**EME'RSION.** (*emersion*, Fr. *emersione*, It.) Emergence.

**E'MERY.** (*emeri*, Fr. *Pierre ferrugineuse fort dure, dont on se sert pour polir les métaux et les pierres.*) A massive, nearly opaque, greyish-black variety of rhombohedral corundum, consisting of alumina 86.0, silica 3.0, oxide of iron 4.0. Emery powder is used for the purpose of polishing metals and hard stones, and also for domestic purposes, sprinkled upon, and fastened to, brown paper; then called emery-paper.

**E'MYS.** (from *ἡμύω*, Gr.) Emydes, pl. The fresh-water turtle or tortoise. This has five nails to the fore feet, and four to the hind ones. Most of them feed on insects, small fishes, &c. Their envelope is generally more flattened than that of the land tortoises. In fresh-water tortoises all the toes are nearly equal, and of moderate length; in land tortoises the toes are also nearly equal, but they are short; in the marine tortoise, or turtle, the toes are all long, and the middle toe of the fore paddle is considerably longer than the rest. Fossil species of the emys have been discovered in the Wealden, as well as in lacustrine deposits of the tertiary period.

**ENCE'PHALON.** (*ἐγκέφαλος*, Gr.) The brain.

**ENCRIN'AL.** Pertaining to encrinites; composed of encrinites; containing encrinites.

**ENCRIN'ITE.** (from *κρίνον*, Gr. *lilium*.) A fossil encrinus. A genus of the order Crinoidea, known by the name of stone-lily. Dr. Mantell observes, "there are some kinds of star-fish which, instead of the five flat rays of the common species, have jointed arms, which surround the body and mouth, like the tentacula of the polypus. These arms are composed of thousands of little bones, or ossicula, and

the whole are inclosed in the common integument or skin. The asterias is a free animal, floating at liberty in the water. Now, if we imagine a star-fish, like that which I have described, to possess a long flexible column, the base of which is attached to a rock, we shall have a correct idea of the general character of the crinoidea, or lily-shaped animals." Prof. Buckland states, "successions of strata, each many feet in thickness, and many miles in extent, are often half made up of the calcareous skeletons of encrinites." The encrinite differs from the pentacrinite, another genus of the same order, in having the bones of its column circular, or elliptical, whereas those of the pentacrinite are angular or pentagonal. Two existing species, the pentacrinus caput medusæ and the comatula fimbriatæ, afford us considerable insight of the nature of these fossil remains. In the encrinites moniliformis, a species of encrinite, Mr. Parkinson states the upper part of the skeleton to consist of nearly 27,000 ossicula, or small bones. Fossil encrinites are so various that they have been divided into several subgenera, according to the formation of the central body.

**ENCRINI'TAL.** Containing the remains of encrinites. The Derbyshire *encrinital* marble is formed of the fossilized remains of the crinoidea, cemented together by carbonate of lime.

**ENCRINUS.** A genus of the order Pedicellata, class Echinodermata, in Cuvier's arrangement. For a description, see *Encrinite*.

**ENCYSTED.** (from ἐν and κύστις, Gr.) Contained in a cyst or sac.

**ENDOCARP.** (from ἔνδον, within, and καρπός, fruit, Gr.) The stone or shell of certain fruits is called the *endocarp*, as in the peach, cherry, &c.; the outer skin the *epicarp*; the fleshy substance, the *sarcocarp*.

**ENDOGENOUS.** Plants are called endogenous (from two Greek words, ἔνδον and γίνομαι) the growth of whose stems takes place by addition from within, while those whose growth takes place by addition from without are named exogenous. The ferns and equisetaceæ are endogenous plants.

**ENDOGENI'TES ECHINA'TUS.** The name assigned by M. Brongniart to the fossil trunk of a tree, nearly four feet in diameter, obtained from the calcaire grossier at Vailet, near Soissons.

**ENDOGENI'TES ERO'SA.** A fossil plant discovered by Dr. Fitton at Hastings, imbedded in clay. The stems, when cut and polished, exhibit the monocotyledonous structure, and were considered related to the palms. It occurs in the

strata of Tilgate forest. A small specimen exhibiting that very peculiar eroded appearance of the exterior, which its specific name denotes, is beautifully figured in Dr. Mantell's Geology of the South-East of England.

**ENDOSI'PHONITE.** (from ἔνδον and σίφων, Gr.) A cephalopod, found in the Cambrian rocks. The siphuncle is ventral, differing therein from the ammonite, in which it is dorsal, and from the nautilus, in which it is central.

**E'NNEAGON.** (from ἔννεα, nine, and γωνία, angle, Gr.) A polygon with nine faces.

**ENNEAPE'TALOUS.** (from ἔννεα, nine, and πέταλον, a petal, Gr.) In botany, a corolla having nine petals.

**E'NSIFORM.** (*ensiformis*, Lat.) Sword-shaped; two-edged; tapering towards the point like a sabre. In botany, applied to two-edged leaves, slightly convex on both surfaces, and gradually tapering to a point from the base to the apex.

**ENTI'RE.** (*entier*, Fr. *intero*, It.) Whole; undivided; complete in all its parts. In botany, a term applied to leaves when the margins are devoid of notches, serrations, or incisions. In conchology, when a shell is whole and undivided, neither interrupted nor intermarginated, it is termed entire.

**ENTO'MOLITE.** (from ἔντομα, an insect, and λίθος, a stone, Gr.) A fossil insect; a petrified insect.

**ENTOMOLI'THUS PARADOXUS.** The name given, erroneously, at one time to fossil trilobites. Fossil trilobites were long confounded with insects, under the name of entomolithus paradoxus; after many disputes, their place is now established in a separate section of the class Crustacea.

**ENTOMOLO'GICAL.** Relating to the science of entomology, or that part of the science of zoology which treats exclusively of insects.

**ENTOMO'LOGIST.** A person skilled in the science of entomology; one who studies entomology.

**ENTOMO'LOGY.** (from ἔντομα and λόγος, Gr.) That part of the science of zoology which treats exclusively of insects, of their history and habits; that branch of natural history which treats of insects. The object of entomology is, to investigate the nature of insects; its design is to show how the insect is organised and formed, and why it was obliged to adopt this particular conformation and internal structure; and, when this is accomplished, it proceeds to the generalisation and development of the various vital phenomena observable in the class. Its view, however, is not limited to show the mere general form of the body of the insect, but it also displays how this general form va-

ries in the several orders of insects, and how far this general transformation and change may extend, without destruction, to its identification.

**ENTOMOSTOMATA.** In the conchological system of De Blainville, the entomostomata form the second family of Siphobranchiata, and include many genera, as the buccinum, dolium, cerithium, eburna, and other univalves.

**ENTOMOSTRACA.** (from *έντομα*, an insect, and *όστρακον*, a shell, Gr.) Shelled insects. In Cuvier's arrangement the entomostraca form the second section of Crustacea. Entomostraca are both dentated and edentated; they are mostly microscopic, they are without exception aquatic, and they mostly, though not without exceptions, inhabit fresh water. The entomostracans appear to have been the only representatives of the class Crustaceans until after the deposition of the carboniferous strata.

**ENTOMOSTRACOUS.** Belonging to the family of Entomostracans.

**ENTOMOTOMY.** (from *έντομα*, an insect, and *τέμνω*, to cut, Gr.) The dissection of insects, by which we learn their internal construction, and become acquainted with the form and texture of their organs.

**ENTOZO'A.** (from *έντός* and *ζωή*, Gr.) Intestinal worms.

**ENTROCHAL.** (from *entrochite*.) Resembling an entrochite; containing entrochites.

**ENTROCHITE.** (from *εν* and *τροχός*, Gr.) Wheel-stone; a name given to the broken stems of fossil encrinites. Some beds of mountain limestone are almost entirely composed of broken stems and branches of encrinites, frequently called entrochites. The detached vertebræ of the radiaria are known by the name of trochitæ; and when several are united together, so as to form part of a column, the series is termed an entrochite. The perforations in the centre of the vertebræ afford a facility for stringing them as beads, from which, in ancient times, they were used as rosaries, and in the northern parts of England they still continue to be known under the name of St. Cuthbert's beads.

**ENVELOPE.** (*enveloppe*, Fr. *involuppare*, It.) To enclose on all sides; to invest with some covering.

**ENVOLPE.** (*enveloppe*, Fr. *involto*, It.) A wrapper; a cover; an investing integument.

**ENVIRON.** (*environner*, Fr.) To encompass; to surround; to enclose on every side; to encircle.

**EOCENE.** (from *ήώς*, *aurora*, and *καινός*, *recens*, because, as Mr. Lyell observes, the very small proportion of living spe-

cies contained in these strata indicates what may be considered the *dawn*, or first commencement, of the existing state of the animate creation.) M. Deshayes and Mr. Lyell have proposed a fourfold division of the marine formations of the tertiary series, founded on the proportions which their fossil shells bear to marine shells of existing species. To these divisions Mr. Lyell has, with the soundest judgment, applied the terms Eocene, Miocene, Older Pliocene, and Newer Pliocene, and well would it be for the advancement of geology, if its nomenclature were, in all instances, derived from some universal language. In fully explaining the meaning of these terms, I shall borrow largely from Mr. Lyell's Principles of Geology. In proportion as geological investigations have been extended over a larger area, it has become necessary to intercalate new groups of an age intermediate between those first examined; and we have every reason to believe that, as the science advances, new links in the chain will be supplied, and that the passage from one period to another will become less abrupt. All those geological monuments are by Mr. Lyell called tertiary, which are newer than the secondary formations, and which, on the other hand, cannot be proved to have originated since the earth was inhabited by man. All formations, whether igneous or aqueous, which can be shewn by any proofs to be of a date posterior to the introduction of man will be called recent. The European strata may be referred to four successive periods, each characterised by containing a very different proportion of fossil shells of recent species. These four periods will be called, Newer Pliocene, Older Pliocene, Miocene, and Eocene. In the older groups we find an extremely small number of fossils identifiable with species now living; but as we approach the superior and newer sets, we find the traces of recent testacea in abundance. The latest of the four periods before alluded to, is that which immediately preceded the recent era. To this more modern period may be referred a portion of the strata of Sicily, the district round Naples, and several others. They are characterised by a great preponderance of fossil shells referable to species still living, and may be called the Newer Pliocene strata.

Out of 226 fossil species brought from beds belonging to this division, M. Deshayes found that no less than 216 were of species still living, ten only being of extinct or unknown species. Nevertheless, the antiquity of some Newer Pliocene strata of Sicily, as contrasted with our

most remote historical eras, must be very great, embracing perhaps myriads of years. There are no data for supposing that there is any break, or strongly marked line of demarcation, between the strata of this and the recent epoch; but, on the contrary, the monuments of the one seem to pass insensibly into those of the other.

The Older Pliocene strata contain among their fossil shells a large proportion of recent species, amounting to nearly one-half. Thus out of 569 species examined from Older Pliocene strata in Italy, 238 were found to be still belonging to living, and 331 to extinct, or unknown, species.

The next division of the marine formations of the tertiary period is the Miocene, from *μείων*, minor, and *καινός*, recens. In this division a small minority, less than eighteen per centum, of fossil shells being referable to living species. From an examination of 1021 shells of the Miocene period, M. Deshayes found 176 only to be recent. As there are some fossil species which are exclusively confined to the Pliocene, so are there many shells equally characteristic of the Miocene period. The Miocene strata are largely developed in Touraine, and in the South of France, near Bourdeaux; in Piedmont; in the basin of Vienna, and other localities.

The oldest division of the marine formations of the tertiary period is the Eocene, the derivation of which term is given at the commencement of this article. To this era the formations, first called tertiary, of the Paris and London basins, are referable. The total number of fossil shells of this period known when the tables of M. Deshayes were constructed, was 1238, of which number 42 only are living species, being at the rate of three and a half per centum. Of fossil species, not known as recent, forty-two were found to be common to the Eocene and Miocene epochs. Of the present geographical distribution of those recent species which are found fossil, in formations of such high antiquity as those of the London and Paris basins, there is much of great interest and importance. Of the forty-two Eocene species, which occur fossil in England, France, and Belgium, and which are still living, about one-half now inhabit the seas within, or near the tropics, and almost all the rest are inhabitants of the more Southern parts of Europe.

As a summary of the preceding, the numerical proportion of recent to extinct species of fossil shells, in the four different tertiary periods, is as follows:—

|                       |          |                                 |
|-----------------------|----------|---------------------------------|
| Newer Pliocene period | 90 to 95 | } per centum of recent fossils. |
| Older Pliocene period | 35 to 50 |                                 |
| Miocene period        | 18       |                                 |
| Eocene period         | 3½       |                                 |

**ΕΡΗΜΕΡΑ.** (*εφημερία*, ex *ἐπι* et *ἡμέρα*, Gr.) Insects, so called from their short term of life in their perfect state. Their body is extremely soft, long, tapering, and terminated posteriorly by two or three long and articulated setæ. The antennæ are very small and composed of three joints, the last of which is very long, and in the form of a conical thread. The ephemera usually appear at sun-set, in fine weather, in summer and autumn, along the banks of rivers and lakes. The continuation of their species is the only function these animals have to perform, for they take no food, and frequently die on the day of their metamorphosis. In another condition, as larvæ, their existence is much longer, extending from two to three years. In this first state they live in water.

**ΕΡΗΜΕΡΑΛ.** } (*εφήμερος*, Gr. *ephemère*,  
**ΕΡΗΜΕΡΙΚ.** } Fr. *éphémère*, It.) Of transitory duration; short-lived; existing only one day.

**ΕΡΗΜΕΡΟΝ.** (*εφήμερον*, Gr. *ephemeron*, Lat.) A creature whose existence lasts but a day.

**ΕΨΙCΑΡΠ.** (from *ἐπι*, upon, and *καρπός*, fruit, Gr.) In botany, the outer skin of fruits is called the *epicarp*, the fleshy substance, or edible portion, is termed the *sarcocarp*, and the stone is called the *endocarp*.

**ΕΠΙΔΕΡΜΑΛ.** } Composed of epidermis; re-  
**ΕΠΙΔΕΡΜΙC.** } lating to the epidermis; resembling the epidermis.

**ΕΠΙΔΕΡΜΙC.** (*ἐπιδερμίς*, Gr. *epidermis*, Lat. *epiderme*, Fr. *epidermide*, It.) The scarf-skin, or cuticle of animals. In conchology, the outer skin or cuticle, with which the exterior surface of many of the univalve and bivalve shells is covered. It is membranaceous, and resembles the periosteum which covers the bones of animals. This skin seems to be formed entirely by the animal, and is always met with in some species, and never in others; those shells with a ragged surface have almost always an epidermis. In some it is laminated, velvety, fibrous, or rough; in others it is thin and pellucid, allowing the colours of the shell to show through it. It often falls off of its own accord, and without any injury to the surface of the shell: the beauty of many shells is hidden by this outer coat.—In botany, the outward covering of plants: every plant is covered by a skin, or membrane, analogous to the scarf-skin that covers animal bodies; this epidermis varies in thickness, being

- extremely delicate and diaphanous on some parts of a flower, and very thick, hard, and coarse, on the trunks of many trees.
- ΕΡΙΔΥΜΙΣ.** (*ἐπιδύμις*, from *ἐπι*, and *δύμος*, Gr.) A body principally composed of minute, tender, elastic tubes, intricately convoluted, termed tubuli seminiferi, and placed at the outer and back part of the testis.
- ΕΡΙΔΟΤΕ.** The Prismaticischer Augit-spath of Mohs, and Pistazit or Pistacite of Werner. A mineral of a green or grey colour; a subspecies of prismatic augite. It occurs regularly crystallized, in granular, prismatic, and fibrous concretions, and is said to derive its name from the Greek word *ἐπιδύωμι*, from an enlargement of the base of the prism in one direction. It is brittle and easily broken. It is found, principally, in primary rocks, and in many parts of Scotland, as well as in England, Norway, France, &c. It consists of silica 37·0, alumina 27·0, lime 14·0, oxide of iron 17·0, oxide of manganese 1·5. There are many varieties.
- ΕΡΙΓΑΣΤΡΙΚ.** (from *ἐπι*, above, and *γαστήρ*, the belly, Gr. *ἐπιγαστρική*, Fr.) Belonging to the upper part of the abdomen, or epigastric region.
- ΕΡΙΓΑΣΤΡΙΟΝ.** (*ἐπιγαστριον*, Gr. *epigastrium*, Lat. *épigastre*, Fr.) The upper part of the abdomen or belly.
- ΕΡΙΓΛΩΤΤΙΣ.** (*epiglottis*, Lat. *épiglote*, Fr. *ἐπιγλωσσις*, vel *ἐπιγλωττις*, Gr. *membrana cartilaginosa rotunditatis oblongæ gutturi claudendo et reserando*.) One of the five cartilages of the larynx, situated above the glottis, whose use is to close the glottis during the act of swallowing and thereby to prevent the passage of food into the trachea, or windpipe.
- ΕΡΙΦΥΛΛΟΣΠΕΡΜΟΥΣ.** (from *ἐπι*, φύλλον, and *σπέρμα*, Gr.) A term in botany, applied to plants bearing their seed on the back part of their leaves.
- ΕΡΙΦΥΣΙΣ.** (*ἐπίφυσις*, from *ἐπιφύω*, Gr.) A process of bone attached to a bone, but not being a part of the same bone, as is the case of apophysis.
- ΕΡΙΠΛΟΟΝ.** (*ἐπίπλοον*, from *ἐπιπλέω*, Gr. *epiploon*, Fr.) The omentum, or caul; that membranous expansion which hangs from the bottom of the stomach and covers the intestines.
- ΕΡΙΖΟΟΤΙΚ.** (from *ἐπι* and *ζῶον*, Gr.) Containing animal remains, as epizootic hills, or epizootic strata.
- ΕΡΟΧ.** (*ἐποχή*, Gr. *epocha*, Lat. *epoche*, Fr. *epoca*, It.) A term literally signifying a stop, a fixed point of time, from which succeeding years are numbered; the period at which a new computation, or reckoning, is begun.
- ΕΡΟΧΑ.** (Lat.) The same as epoch.
- ΕQUANGULAR.** (from *æquus* and *angulus*, Lat.) The harshness of this word has caused it to be supplanted by equiangular, one far more euphonic. Consisting of equal angles; having equal angles.
- ΕQUATOR.** (*equateur*, Fr. *æquator*, Lat. *æquatore*, It.) A great circle of the sphere, equally distant from the two poles of the world, or having the same poles with those of the world. It is called the equator, because when the sun is in it, the days and nights are equal; whence also it is called the equinoctial. Every point of the equator is a quadrant's distance from the poles of the world; whence it follows, that the equator divides the sphere into two hemispheres, in one of which is the northern, and in the other the southern pole.
- ΕQUATORIAL.** Pertaining to the equator: the equatorial diameter of our planet exceeds its polar diameter by about 27 miles; the length of the equatorial diameter being 7927 miles, that of the polar 7900.
- EQUIANGULAR.** (from *æquus* and *angulus*, Lat. *equiangule*, Fr. *equiangolo*, It.) A figure whose angles are all equal; consisting of equal angles; having equal angles.
- EQUICRURAL.** (from *æquus* and *crus*, Lat.) Having all its legs of equal length.
- EQUIDIFFERENT.** Arithmetically proportional; having equal differences.
- EQUIDISTANT.** (*équidistant*, Fr. *equidistante*, It.) Being at equal distance from some one point.
- EQUIFORM.** (*æquiformis*, Lat.) Having the same shape, form, or make.
- EQUIFORMITY.** Likeness, or resemblance, in form; uniform equality.
- EQUILATERAL.** (*æquilatus* and *æquilaterus*, Lat. *équilatéral*, Fr. *equilatero*, It.) Having all the sides equal. In conchology, shells whose sides are alike, as in those of ostræa; or when a line drawn perpendicularly from the apex of a bivalve would cut it into equal parts.
- EQUINAL.** } (*equinus*, Lat.) Pertaining
- EQUINE.** } to a horse; relating to a horse.
- EQUISETACEÆ.** (from *equisetum*, horse-tail.) The plants are known in this country as the horse-tail of our ditches. Equisetaceæ are found both fossil and recent. M. Ad. Brongniart has, in his "Histoire des Végétaux Fossiles," divided fossil equisetaceæ into two genera; the one exhibits the characters of living equisetæ, and as a fossil is rare; the other differs greatly in its form, frequently attaining an immense magnitude; these last have been arranged under the

distinct genus *Calamites*. Equisetaceæ are found from Lapland to the Torrid Zone; its species are most abundant in the temperate zone: as we approach a more frigid temperature they diminish in size and abundance, and in the warm and humid regions of the tropics they acquire their greatest magnitude.

**EQUISETUM.** (Lat. A genus of the order Filices, belonging to the Cryptogamia class of plants.) Horse-tail. Of this genus there are numerous species. The equisetum fluviatile of our marshes is the largest of all the species, growing sometimes to the height of three feet, and nearly an inch in diameter. It has a succulent, erect, jointed stem, with attenuated foliage surrounding the joints in whorls. In the coal measures, remains of equiseta are in great abundance, and occur of a magnitude quite unknown at the present day, some of the stems being fourteen inches in diameter. M. Ad. Brongniart enumerates twelve species of calamites and two of equiseta found in strata of the carboniferous series. Equiseta occasionally occur in the Wealden strata, and where they are found they are abundant.

**EQUISETUM LYELLI.** The name given by Dr. Mantell to a distinct species of equisetum, found in the grey and blue grit and limestone at Pounceford, in honour of Professor Lyell. When perfect, it probably attained a height of two feet or more. This plant is beautifully figured in Dr. Mantell's "Geology of the South-east of England."

**EQUISETIFORM.** (from *equisetum* and *forma*, Lat.) Having the shape of equisetum, or horse-tail; resembling equisetum.

**EQUIVALENT.** (from *æquus* and *valens*, Lat.) In geology, where one bed supplies the place of another which, in that situation, is wanting, such bed is called the *equivalent* of the wanting bed. When a stratum suddenly terminates, and its place is supplied by a stratum of a different character, the latter is called the *equivalent* of the former. In the beds of transition limestone at Llanymynah, says Mr. Bakewell, which are very regularly stratified, one stratum of the best limestone suddenly terminates, and its place is supplied by a bed of marle of equal thickness; in this case the marle is the *equivalent* of the absent limestone.

**EQUIVALVE.** (from *æquus* and *valva*, Lat.) In conchology, when the shells of bivalves are formed exactly alike, as regards their length, width, depth, &c. The shells of mya, solen, tellina, &c., are generally of the kind called *equivalve*, while those of ostra, pinna, &c., are inequivalve.

**E'RA.** (*æra*, Lat. Written frequently *æra*.) A particular account and reckoning of time and years, from some remarkable event. Webster, quoting from some encyclopædia, says, "it differs from epoch in this; era is a point of time fixed by some nation or denomination of men; epoch is a point fixed by historians and chronologists. The Christian era began at the epoch of the birth of Christ."

**ERADIA'TION.** (from *e* and *radiatio*, Lat.) Emission of rays.

**ERE'CTILE.** (from *erigo*, Lat.) A tissue peculiar to certain parts of the body, as the nipple, &c.

**ERE'CT.** (*erectus*, Lat.) In botany, leaves are so called when they form a very acute angle with the stem. The term also is applied to branches rising in an upright direction; to petioles rising nearly perpendicularly; and to flowers and pedicles rising perpendicularly.

**E'RINITE.** A name given to a species of native arseniate of copper, from its having been discovered in Ireland. It is of an emerald-green colour; its constituent parts are oxide of copper, arsenic acid, alumina, and water.

**ERO'DED.** (*erodo*, Lat.) Eaten away; corroded.

**ERO'SION.** (*erosio*, Lat.)

1. The act of gradually wearing away.
2. The state of being gradually eaten away or corroded.

**ERO'SIVE.** That has the property of gradually eating away.

**ERO'SE.** } (*erosus*, Lat.) Jagged; applied

**ERO'SUS.** } to leaves very irregularly cut or notched, and having the appearance of being gnawed or eaten by insects.

**ERO'TYLUS.** A genus of insects, belonging to the Vivalpi, or the seventh family of the Tetramera. In the erotyl the intermediate joints of the antennæ are almost cylindrical, and the club, formed by the last ones, is oblong; the interior and corneous division of their maxillæ is terminated by two teeth. They are peculiar to South America.

**ERINA'CEUS.** (Lat.) The hedgehog.

**ERPETO'LOGIST.** (from *erpetology*.) One who studies, or is skilled in, that branch of natural history, which relates to reptiles.

**ERPETO'LOGY.** (from *ἑρπετός* and *λόγος*, Gr.) That branch of natural history which treats of the structure, habits, &c. of reptiles.

**ERRA'TIC.** (*erraticus*, from *erro*, Lat. *erratique*, Fr. *erratico*, It.) Wandering; not fixed; irregular.

**ERRA'TIC BLOCK GROUP.** One of the subdivisions of detrital deposits. Professor Phillips observes, "In the British islands,

very considerable tracts of country have been traversed, since the land had its present general aspect of hill and dale, and was inhabited by large quadrupeds, by currents of water due to some unknown cause, which transported rock masses with so great a degree of force, to points so elevated, in such directions, and at such distances, that we cannot avoid feeling extreme astonishment, and look around in disappointment on the physical processes now at work on the earth, for anything similar. But it is only in particular tracts that the magnitude of the transported rocks is such as to deserve the name of *erratic blocks*. It appears to be certain that, in the dispersion of boulders, the present physical configuration of the neighbouring regions had great influence; they are found to descend from the Cumbrian mountains northward in the vale of Eden to Carlisle, eastward to the foot of the Penine chain, southward by the Lune and the Kent to the narrow tract between Bolland Forest and the bay of Morecambe; and from the vicinity of Lancaster they are traced at intervals through the comparatively low country of Preston and Manchester, lying between the sea and the Yorkshire and Derbyshire hills, to the valley of the Trent, the plains of Cheshire and Staffordshire, and the vale of the Severn, where they occur of great magnitude."—*Phillips' Treatise on Geology*.

**ERRATICALLY.** Irregularly; without order or method.

**ERUBESCENCE.** } (from *erubescere*, Lat.)  
**ERUBESCENCY.** } Redness; the act of growing red.

**ERUBESCENT.** Inclining to redness; reddish; blushing.

**ERUCTION.** (*eructatio*, Lat. *eructation*, Fr.) A violent belching forth of wind or other matter, as from a volcano or geyser.

**ERUGINOUS.** (from *erugo*, Lat. *erugineus*, Fr. *ruginoso*, It.) Of the nature of copper.

**ERUPTED.** (from *erumpo*, Lat.) Forcibly thrown out, as from a volcano.

**ERUPTION.** (*eruptio*, Lat. *eruption*, Fr. *eruzione*, It.) A violent bursting forth of contained matters.

**ERYCINA.** An equivalved, inequilateral, transverse bivalve. The hinge-teeth, two, diverging upwards, with a small intermediate pit; the lateral teeth compressed and oblong. The cartilage inserted in the hinge-pit. Lamarck is of opinion that the shells of this genus exist only fossil, and enumerates eleven species found in the environs of Paris. He places them in the family Mactracea.

**ESCALOP.** } Commonly called scallop. A  
**ESCALLOP.** } bivalve, whose shell is regularly indented.

**ESCARPMENT.** (*escarpement*, Fr.) The steep face of a ridge of high land; the escarpment of a mountain range is generally on that side which is nearest to the sea.

**ESCHARA.** (*eschara*, Lat.)

1. Fishes which are said to chew the cud.

2. In Linnæus' arrangement, *eschara* forms the fifth order of Zoophytes, each polypus being contained in a calcareous or horny shell, without any central axis.

**ESCULENT.** (*esculentus*, Lat.) Fit for food; that may be eaten.

**ESOPHAGUS.** (from *ὄσω* and *φαγεῖν*, Gr. *esophage*, Fr. *esofago*, It.) The canal, or passage, leading from the pharynx to the stomach, and through which the food passes from the mouth to the stomach. It is also written *oesophagus*.

**ESOX.** (Lat.) The pike, a genus of fishes of the order Abdominales. The *esox* has small intermaxillaries furnished with little pointed teeth in the middle of the upper jaw, of which they form the two-thirds, those on the sides of the jaw being edentated. The vomer, palatines, tongue, pharyngeals, and rays of the branchiæ, bristled with teeth resembling those of a carp.

**ESOX LEWESIENSIS.** The name given to a species of fossil pike, by Dr. Mantell, found in the chalk, the jaws of which are beautifully figured in his *Geology of the South-east of England*. He states that its recent prototype is unknown.

**ESSENTIAL CHARACTER.** That single circumstance which serves to distinguish a genus from every other genus.

**ESSONITE.** Another name for cinnamon-stone. A variety of dodecahedral garnet, of an orange-yellow or hyacinth colour. The finest are brought from Ceylon. See *Cinnamon-stone*.

**ESTIVAL.** (*æstivus*, Lat.) Pertaining to the summer.

**ESTUARY.** (*æstuarium*, Lat.) An inlet of the land entered by the tide of the sea, and by fresh water from a river; the mouth of a river or lake where the salt and fresh water alternately prevail.

**ESURINE.** (from *esurio*, Lat.) Corroding; eating.

**ETHERIA.** A genus of large inequivalve molluscs belonging to the family Ostracea. They differ from the ostrææ in having two elongated muscular impressions in each valve, which are united by a slender pallear impression. The animal is not known to produce a byssus.

**ETHMOID.** (from *ἕθμος*, a sieve, and *εἶδος*, like, Gr.) A bone of the nose to which the name ethmoid has been given

- from its being cribriform, or perforated like a sieve, for the passage of the olfactory nerves.
- E'TIOLATE.** (*étioier*, Fr.) To blanch by concealing from the light.
- ETIOLA'TION.** The becoming white or blanched by concealment from light. Thus the inner leaves of lettuces and endive are made white by being tied up, and celery is blanched by being earthed up.
- E'TITE.** See *Ætites*.
- E'TYUS.** A genus of crustaceans, some species of which have been discovered in the gale.
- EU'CLASE.** (from *εὔ* and *κλάω*, Gr.) The Prismatic Smaragd of Mohs. Prismatic Emerald. This stone has obtained its name from the ease with which it is broken. It is a rare and beautiful mineral, and was brought first from Peru by Dombey; it was at first confounded with the emerald, in consequence of its green colour. The primitive form of its crystals is a rectangular prism, whose bases are squares. It is of sufficient hardness to scratch quartz. Its constituents are silica, alumina, glucina, and the oxides of iron and tin.
- EUDI'ALITE.** A mineral of a brownish-red colour, having an octohedral cleavage.
- EUKAI'RITE.** Cupreous seleniuret of silver, consisting of silver 39, selenium 26, copper 23, alumina 8.
- EUO'MPHALUS.** A univalve unchambered fossil shell, found in the mountain limestone.
- EU'PHOTIDE.** } Names given by the French  
**EU'PHOTITE.** } mineralogists to Saussurite.
- EU'PODA.** The name given in Cuvier's "Règne Animale" to the fifth family of Tetramerous Coleoptera; Eupoda comprises two tribes, Sagrides and Criocerides.
- EU'RITE.** White-stone, the weiss-stein of Werner. A variety of granite in which felspar predominates, and named Eurite by the French mineralogists. It occurs in beds, in common granite, in Cornwall. In its most compact form, it becomes a porphyry, and is closely allied to volcanic rocks in Auvergne; felspathic granite.—*Bakewell*.
- EURI'TIC.** Containing eurite; composed of eurite; resembling eurite.
- EXCANDE'SCENCE.** (*excandescencia*, *excandescendo*, Lat.) White heat; extreme heat.
- E'XCAVATE.** (*excavo*, Lat. *excaver*, Fr.) To hollow out; to dig out; to make hollow.
- EXCAVA'TION.** (*excavatio*, Lat. *excavation*, Fr.) A cavity; a hollow formed by the removal of a portion of the interior.
- E'XCENTRICITY.** (*eccentricité*, Fr. *eccentricita*, It.) Deviation from circular form.
- EXCE'RN.** (*excerno*, Lat.) To excrete; to separate and emit through the pores.
- EXCE'RNED.** Excreted.
- EXCO'RIATED.** (from *excorio*, Lat. *excoriée*, Fr.) Abraded; deprived of its cuticle or external covering.
- EXCORIA'TION.** (*excoriation*, Fr. *exorizzazione*, It.) The state of being deprived of its cuticle, or external natural covering.
- EXCO'RTICATED.** Deprived of its bark.
- EXCREMENT.** (*excrementum*, Lat. *excrement*, Fr. *escremento*, It.) That which is separated from the aliment after digestion and is to be ejected downwards from the intestinal canal; fæcal matter; excreted matter.
- EXCREMENTITIOUS.** (*excrementeux*, Fr. *escrementoso*, It.) Containing excrements; consisting of excreted matter.
- EXCRE'SCENCE.** (from *exresco*, Lat. *excroissance*, Fr. *escrescenzo*, It.) A preternatural growth of any substance; a body growing upon, or out of, another in an unnatural manner; a deformity.
- EXCRE'SCENT.** Growing out of another body preternaturally.
- EXCRE'TE.** (from *excerno*, Lat.) To throw off by excretion.
- EXCRETION.** (*excretio*, Lat. *excretion*, Fr. *escrezione*, It.)
1. The act of separating and voiding excrementitious matter from the blood and food.
  2. The substance excreted.
- EXCRETORY.** (*excrétoire*, Fr. *escretorio*, It.) Organs which have the power of excreting.
- EXFO'LIATE.** (*exfolier*, Fr.) To separate in laminæ or scales.
- EXFOLIA'TION.** (*exfoliation*, Fr.) The process of separation of dead bone.
- EXHALA'TION.** (*exhalatio*, Lat. *exhalation*, Fr. *esalazione*, It.) A vapour from animal or vegetable substances.
- EXHA'LE.** (*exhalo*, Lat. *exhaler*, Fr. *esalare*, It.) To breathe out in vapours or fumes; to emit odours; to give out effluvia.
- EXHUMA'TION.** (*exhumation*, Fr. *esumazione*, It.) The digging out of the ground what has been buried therein.
- EXHU'ME.** (*exhumer*, Fr.) To dig out of the earth what has been buried.
- EXHU'MED.** Disinterred.
- E'XOGEN.** Exogens are plants which have a pith in the centre of their stems, not descending into the roots; or having their woody system separated from the cellular, and arranged in concentric zones. They increase by additions to the

outside of their wood, as the name implies. See the etymology of Exogenous.

**EXO'GENOUS.** (from *ἔξω* and *γεννάω*, Gr.)

Plants in which the growth takes place by additions from without, or by external increase.

**EXOLETE.** (*exoletus*, Lat.) Worn; faded.

**EXO'SSATED.** (*exossatus*, Lat.) Deprived of bones.

**EXO'SSEOUS.** (from *ex* and *ossa*, Lat.)

Destitute of bones; animals not possessing bones.

**EXOSTO'SIS.** (from *ἔξ* and *ὄστέον*, Gr.) A

diseased growth of bone.

**EXO'TIC.** (*exoticus*, Lat. *ἕξωτικός*, Gr.

*exotique*, Fr. *esotico*, It.) In botany,

plants not natives of the countries in which they are cultivated.

**EXSANGUINE'OUS.** } (from *ex et sanguineus*,

**EXS'ANGUINOUS.** } Lat.) Bloodless; without red blood.

**EXTENSOR.** (from *extendo*, Lat. *extenseur*,

Fr.) The name of such muscles as extend or straighten the parts, and serve as antagonist muscles to the flexors.

**EXTIRPATE.** (*extirpo*, Lat. *extirper*, Fr.

*esterpare*, It.) To entirely destroy; to root up; to eradicate.

**EXU'VIA.** (Lat.) Cast shells; cast skins;

organic remains.

**EXU'VIABLE.** That may be cast or thrown

off, as the skeletons of articulated animals.

## F

**FABA'CEOUS.** (*fabaceus*, Lat.) Of the nature of a bean; resembling a bean.

**FACE.** (*face*, Fr. *faccia*, It. *facies*, Lat.)

One of the figures which compose the superficies of a body; the surface which presents itself to the sight. Polyhedrons have several faces; a cube has six faces.

**FA'CET.** (*facetta*, It. *facette*, Fr. *l'un des*

*côtés d'un corps qui a plusieurs petits côtés.*) A superficies cut into several angles.

**FA'CIAL.** (from *facies*, Lat. *facial*, Fr.)

Belonging to the face, as the facial nerves, &c.

**FACIAL ANGLE.** An angle composed of

two lines, one drawn in the direction of the base of the skull, from the ear to the roots of the superior incisores, the other from that point to the superciliary ridge of the frontal bone.

**FA'CTITIOUS.** (*factitius*, Lat.) Made by

art as contrary to that formed by nature: thus we have factitious waters and factitious stones.

**FÆ'CAL.** (from *fæces*, Lat.) Containing

fæces.

**FÆ'CES.** (*fæx*, Lat. used plurally only.)

Excrement; sediment. The fossil fæces of certain fishes are called coprolites; the excrement of dogs and wolves, album græcum; of mice, album nigrum.

**FA'HLUNITE.** (from *Fahlun*, in Sweden,

where it is found.) Automolite, or octahedral corundum. See *Automolite*.

**FAIRY-RING.** In meadows and grass-lands,

circles of a different hue from the surrounding grass are often seen; these are commonly called fairy-rings, from a vulgar saying that at night fairies dance thereon. The true cause of these appearances, which have excited the astonishment of many, is as follows; they are external

indications of the centrifugal growth of the subterranean stems of certain agarics, which, originally springing from a common point, continually spread outwards upon the same plane, the centres, or first formed parts, perishing as the circumference, or last formed parts, develop themselves.

**FAIRY-STONE.** A name sometimes given to the echinite.

**FA'LCATE.** A figure formed by two curves bending the same way, and meeting in a point at the apex, the base terminating in a straight margin, resembling a sickle.

**FA'LCATED.** (*falcatus*, Lat.) Hooked; crooked like a reaping-hook.

**FALCA'TION.** Crookedness.

**FA'LCIFORM.** (from *falx* and *forma*, Lat.)

Shaped like a scythe or reaping-hook.

**FALLING-STONE.** A meteoric body, commonly called an aërolite.

**FA'LUN.** (Fr. *assemblage de coquilles*

*brisées, qu'on trouve en mass à une certaine profondeur de terre.*) A provincial name given to some shelly strata in

the neighbourhood of the Loire, and which resemble, in their lithological characters, what is denominated the crag.

The faluns, or marls of Tourraine and the Loire, constitute an extensive formation

of marl beds, which are now admitted to be of later date than the most recent of

the fresh-water beds in the Paris basin.

They are regular depositions, formed during an epoch of tranquillity, and sub-

jected to laws of which the action is continued on the present shores. The great

mass of fossil shells which these beds contain, differ from those of the Paris basin:

in nearly 400 species, there are only about 20 identical with the Paris fossils.

The terrestrial and river shells are in the

same state of mineralization as the marine shells. The bones of the mastodon, rhinoceros, and hippopotamus, are in the same state of preservation as those of whales, and other cetaceous animals, with which they are intermixed. They are coated with marine polyphi and serpulæ, which proves that they were long covered by a tranquil and stationary sea. These *fauns* are distinct from the tertiary beds of the Seine, and more recent than any of them; but they are themselves the lowest term of a new system, more important, and more extensive, than the formations of the Paris or London basins, and which has been continued to the present epoch, during all the numerous up-heavings of the ground, the changes in the relative level of seas and continents, and the successive modifications of organic beings.

**FARINA** (Lat.) Meal; flour: in botany, the pollen, or dust of the anther. The pollen, or farina, is contained in the anther contracts and bursts, when the pollen is thrown out. From microscopic observation we find each particle of dust to be generally a membranous bag, either round or angular, smooth or rough, which on meeting with any moisture instantly bursts with great force, and discharges a subtle vapour.

**FARINACEOUS**. Containing meal or flour. In botany, applied to those parts of vegetables which yield starch.

**FARINOSE**. In entomology, having the surface covered with dust, resembling flour, which the slightest touch will remove.

**FARRAGINOUS**. (*farrago*, Lat.) Composed of many materials; thus Kirwan writes "a ferruginous mountain." The word is rarely used by geologists.

**FASCIA** (Lat.) The tendinous expansion of a muscle, inclosing others like a band.

**FASCIATED**. Filleted, or enclosed with a band.

**FASCICLE**. (*fasciculus*, Lat.) A bundle, or little bundle: applied to flowers on small stalks, when many spring from one point, and are collected into a close and level bundle at the top; as the sweet-william.

**FASCICLED**. Clustered together as in a bundle.

**FASCICULAR**. (*fascicularis*, Lat.) United, or growing together, in a bundle, applied to leaves growing in a cluster, or tuft, as the larch, and some species of pine; applied also to roots, when many tubes proceed from the same centre, shooting forth in an elongated form.

**FASCIO'LA**. The fluke-worm. A genus of internal worm belonging to the order Parenchymata, family Tremadotea. There are many species; they are furnished

underneath the body, or at its extremity, with organs resembling cupping-glasses, by which they adhere to the viscera. In this genus is included the *Distoma hepatica*, or *Fasciola Hepatica* of Linnæus, which so infests, and is so common in, the hepatic vessels of sheep.

**FASCIOLA'RIA**. A subfusiform univalve, channelled at its base, without any projecting sutures, and having two or three very oblique folds on the columella.—*Parkinson*.

**FASCIOL'ITES**. A subcylindrical, shelly, or bony body, about half an inch in length, rather tapering at the ends, and formed by the spiral arrangement of perpendicular, concamerated tubes, the tapering end of which is obliquely and transversely folded on that of the preceding one. The tubes are seen to be distinct; and, where the outer surface has been removed, the concamerations are perceived, resulting from the interposition of very numerous and minute septa, transversely disposed. The tubes are placed perpendicularly round the centre, and it appears that round the first formed tube, or chamber, successive increasing columnar tubes were disposed, folding over each other at their ends. Whether these several tubes were internally connected with each other, or not, or whether the chambers communicated, or not, with each other, by a siphuncle, are questions not yet clearly ascertained. Like some of the nummulites, this body, when polished, has more the appearance of bone than of shell, and from this and other circumstances, it seems to approximate nearer to the nummulite than to any other fossil.—*Id.*

**FASSAITE**. (from *Fassa* in the Tyrol.) A mineral, a dark-green variety of augite; it is also found in Scotland and Ireland, in beds of primitive trap, limestone, and magnetic ore.

**FASTIGIATE**. } (*fastigiatus*, Lat.) Point-FASTIGIATED. } ed; a term applied to a stem, peduncles, umbel, &c.

**FATHOM**. A measure of length equal to six feet, or two yards.

**FATHOMLESS**. A depth which cannot be ascertained by sounding; a depth to which no bottom can be found.

**FAULT**. (*faute*, Fr.) A break or intersection of strata; interruption of the continuity of strata, with displacement; the sudden interruption of the continuity of strata, in the same plane, accompanied by a crack or fissure, varying in width from a mere line to several feet; such fissure being generally filled with fragments, &c. When a *fault* occurs in strata they are generally either elevated or depressed, so that in working a bed or vein there appears to be a sudden termi-

nation of it. *Faults* consist of fissures traversing the strata, extending often for several miles, and penetrating to a depth, in very few instances ascertained; they are accompanied by a subsidence of the strata on one side of their line, or, which amounts to the same thing, an elevation of them on the other; so that it appears, that the same force which has rent the rocks thus asunder, has caused one side of the fractured mass to rise, or the other to sink. If we suppose a thick sheet of ice to be broken into fragments of irregular area, and these fragments again united, after receiving a slight degree of irregular inclination to the plane of the original sheet, the re-united fragments of ice will represent the appearance of the component portions of the broken masses, while the intervening portion of more recent ice represents the clay and rubbish that fill the faults. In the coal-fields, these *faults* operate as coffer-dams, and are of the greatest possible advantage.

**FA'UNA.** (*fauni*, Lat.) As the plants peculiar to a country constitute its *flora*, so do the animals constitute its *fauna*; the zoology of a country.

**FAUX.** (Fr.) That portion of the cavity of the first chamber of a shell which may be seen by looking in at the aperture.

**FAVULA'RIA.** A genus of fossil plants. Stem-furrowed. Scars of leaves small, square, and of a breadth with the ridges of the stem. In the favularia, the trunk was entirely covered with a mass of densely imbricated foliage, the bases of the leaves are nearly square, and the rows of leaves separated by intermediate grooves. The genus is believed to be extinct, but is found fossil in the coal-formation.

**FEA'THERY.** Plumose; applied to plants furnished with lateral hairs.

**FE'CAL.** See *Fæcal*.

**FE'CES.** See *Fæces*,

**FECU'LA.** (from *fæx*, Lat. *fécule*, Fr.)

1. The sediment or grounds of any liquid. The word *fecula*, says Dr. Paris, originally meant to imply any substance which was derived by spontaneous subsidence from a liquid.

2. The green matter of plants.

**FECUND.** (*fæcundus*, Lat. *fècond*, Fr. *fècondo*, It.) Prolific; fruitful.

**FECUNDA'TION.** (*fècondation*, Fr. *fècondazione*, It.) Impregnation.

**FECUN'DATE.** (*fècondare*, It. *fèconder*, Fr.) To impregnate; to render fruitful.

**FECUN'DITY.** (*fæcunditas*, Lat. *fècondité*, Fr. *fècondità*, It.) Fruitfulness; productiveness; fertility; capability of producing.

**FEEL'ERS.** In conchology, those crenated arms, evolved from the side of the *Lepas* *anatifera*, and other shells of the second

division of *Lepas*. While the animal is in the water it continually moves its feelers, evidently for the purpose of entangling minute marine insects as food.—*Brown*.

**FE'LDSPAR.** } A mineral which enters into  
**FE'LSPAR.** } the composition of, and, next to quartz, constitutes the chief material of, many rocks. There are many species and subspecies, or varieties, of this mineral, though all agree nearly in their chemical composition, and all are found both crystallized and massive. Feldspar is lamellar in its structure, but not in so great a degree as mica; it scratches glass, and is nearly opaque. It is composed of siliceous 64, alumina 18, potash 13, lime 3, and some oxide of iron. Common feldspar is perhaps the most generally diffused mineral next to quartz and iron. It is one of the components of granite, gneiss, and some other primary rocks, and granite owes its variety of appearance and colour principally to the abundance, or otherwise, of the feldspar it contains. In some kinds of granite the feldspar is in large whitish crystals of irregular forms, occasionally of one or two inches in length. From the liability of feldspar to be decomposed by atmospheric action, granite containing large crystals of it is less durable than that which is finer grained, and it is said that Waterloo-bridge, being unfortunately built of granite containing large crystals of feldspar, will be less durable than could be wished for. Professor Jameson divides feldspar into five species, namely, 1. Rhombohedral Feldspar, or Nepheline. 2. Prismatic Feldspar, or Common Feldspar. 3. Tetarto-prismatic Feldspar, or Scapolite. 4. Polychromatic or Labrador Feldspar. 5. Pyramidal Feldspar, or Scapolite.

1. The rhombohedral feldspar, or nepheline of Häuy and Werner, is of a white or grey colour, and occurs both massive and crystallized; it is externally splendent, internally vitreous and shining. Cleavage fourfold. Fracture conchoidal, melts with difficulty before the blow-pipe. Its crystals form druses. It occurs in drusy cavities. Its constituent parts are, according to Gmelin, silica 43.36, alumina 33.49, soda 13.36, potash 7.13. Other authors, however, give a different analysis, stating lime and oxide of iron to form a portion of its constituents.

2. Prismatic feldspar, or common feldspar. The prismatischer feldspath of Mohs. Potash feldspar. Of this there are many varieties, namely, adularia, or moonstone, a transparent variety with a silvery or pearly opalescence; glassy feldspar, a grey variety; common feldspar, a translucent variety, with various

shades of colour, such as white and red, which from its abundance has obtained its name; amazon-stone, a blue or green variety; Norwegian Labrador feldspar, a dark-green variety with a beautiful changeableness of colour, obtained from Frederickswarn, in Norway; compact feldspar, a feebly translucent variety, with a splintery fracture; slaty feldspar, or clinkstone, a slaty variety; porcelain earth, earthy feldspar, and claystone, varieties, in a comparatively loose state of aggregation, without lustre or transparency, and varying in their degree of compactness.

3. Tetarto-prismatic feldspar, or albite. See *Albite*.

4. Polychromatic or Labrador feldspar. Lime feldspar. The polychromatischer feldspath of Mohs. This beautiful mineral was first discovered on the coast of Labrador as a constituent part of syenite. When light falls on it in certain directions it exhibits the most beautiful changeability of colour. It occurs massive and disseminated. Cleavage splendid. Fracture glistening. It has been subsequently found in different parts of Europe. It contains about eleven per cent. of lime and four of soda. It breaks into rhomboidal fragments. In its changeability of colour, it exhibits patches of blue, green, yellow, red, and grey colour.

5. Pyramidal feldspar, or scapolite. Meionite. Pyramidaler feldspath of Mohs. Of this species of feldspar there are many varieties, namely, Weionite, Scapolite, Paranthine, Wernerite, Dipyre, and Schmelzstein. These will be all described under their several heads.

FE'LDSPATH. } See *Feldspar*.

FE'LSPATH. }

FELSPA'THIC. } Any mineral in which  
FELSPA'THOSE. } feldspar greatly pre-  
dominates; of the nature of feldspar.

FE'LIS. (Lat.) A genus of quadrupeds belonging to the order of Feræ, the characters of which are these:—The fore-teeth are equal; the molares, or grinders, have three points; the tongue is furnished with rough sharp prickles, pointing backward; the claws are sheathed and retractile, and being raised perpendicularly, and hidden between the toes when at rest, by the action of an elastic ligament, lose neither point nor edge. The species of this genus are very numerous, and various with regard to size and colour, though they are all similar with respect to form.

FE'LINE. Belonging to the genus *Felis*.

FE'MORAL. (*femoralis*, Lat.) Belonging to the thigh.

FE'MUR. (Lat.) The thigh bone; the thigh.

FE'RGUSONITE. A brownish-black ore, occurring in quartz; thus named after Mr. Ferguson of Raith.

FERN. (Sax. *fearn*.) Ferns are distinguishable from all other vegetables by the peculiar division and distribution of the veins of the leaves; and in arboresecent species by their cylindrical stems without branches, and by the regular disposition and shape of the scars left upon the stem, at the point from which the petioles, or leaf-stalks, have fallen off. The brake, or fern, of our commons and waste lands, is a familiar example of this remarkable and numerous family of plants, distinguished by the peculiar distribution of the seed-vessels. The family of ferns, both in the living and fossil flora, is the most numerous of vascular cryptogamous plants. The total number of living species of ferns is about 1500. The large tree ferns are confined almost exclusively to the tropics; an elevated and uniform temperature and great humidity being the conditions most favourable to their development. The existence of immense fossil arboresecent ferns from thirty to forty feet in height in the coal formation, is one of the strongest possible evidences of the great diminution of temperature and change of climate which the earth has undergone. In the coal formation, there are not fewer than 130 known species of ferns, nearly all of which belong to the tribe of Polypodiaceæ. An arboresecent fern, forty-five feet high, from Silhet in Bengal, may be seen in the staircase of the British Museum. In the strata of the secondary series there is a considerable diminution in the absolute and relative number of ferns; and in the strata of the tertiary series the ferns seem to bear nearly the same proportion to other vegetables as in the temperate regions of the earth at the present day.—*Buckland. Lyell. Mantell.*

FE'RREOUS. (*ferreus*, Lat.) Irony; containing iron; resembling iron.

FERRIFEROUS. (from *ferrum* and *fero*, Lat.) Producing iron; yielding iron.

FERRUGINEOUS. } (*ferrugineus*, Lat. *fer-*

FERRUGINOUS. } *rugineus*, *euse*, Fr. *ferruginoso*, It.) Containing particles of iron; resembling iron ore; rust-coloured; impregnated with iron; anything containing iron.

FE'TID. (*fætidus*, Lat. *fétide*, Fr. *fetido*, It.) Having a strong and disagreeable smell.

FE'TIDNESS. The quality of smelling offensively.

FE'TOR. (*fætor*, Lat. *fêteur*, Fr. *fetore*, It.) A strong offensive smell.

FE'TUS. (*fætus*, Lat.) Commonly writ-

- ten *fetus*. Of viviparous animals, the young in utero; of oviparous, the young in the shell: in the earliest stages of utero-gestation, the young is usually called the embryo, and when fully formed, or after a certain period, the fetus.
- FI'BER.** } (*fibra*, Lat. *fibre*, Fr. *fibra*, It.)  
**FI'BRE.** } A filament or thread, whether of animal, vegetable, or mineral structure.
- FI'BRIL.** (*fibrille*, Fr. *petite fibre*, *fibrilla*, It.) A small fibre; the diminutive of fibre.
- FI'BROUS.** (*fibreaux*, Fr. *fibroso*, It.) Composed of fibres; containing fibres.
- In botany, a fibrous root consists of numerous fibres, either simple or branched; these are the most simple of all roots, conveying nourishment directly to the stem, or leaves.
- FI'BROLITE.** (from *fibra*, Lat. and *λίθος*, Gr.) A mineral of a white or grey colour, occurring with corundum. Cleavage imperfect. Hardness more considerable than that of quartz. Consists of alumina 46, silica 33, oxide of iron 13. It is composed of minute fibres, from which circumstance it obtains its name, some of which appear to be rhomboidal prisms. It is found in China and in the Carnatic.
- FI'BULA.** (Lat.)  
 1. The small bone of the leg, thus named, according to some authors, from being placed opposite to the part where the knee-buckle, or clasp, was formerly used.  
 2. A fossil echinite, resembling, not a buckle, but a button. By some oryctologists these have been termed *Bufonitæ* and *Scolopendritæ*, and by others *Pilei*; and, by the English, *Capstones*.—*Parkinson*.
- FI'GURE-STONE.** *Agalmatolite*, a variety of talc-mica, of a grey, green, white, red, or brown colour. The finest are brought from China.
- FI'LAMENT.** (*filamenta*, Lat. *filament*, Fr. *filamento*, It.)  
 1. A long thread or fibre; a slender thread-like process.  
 2. In botany, the long thread-like part that supports the anther; the filament is not essential, being sometimes wanting; the form is various, being sometimes short and thick, or long and slender, or forked, one point only supporting the anther; generally smooth, sometimes hairy; the number varies from one to many. Most filaments are simple, some are bifid; others tricuspidate or broad, and trifid at the extremity.
- FI'LAMENTOUS.** (*filamenteux*, Fr. *filamentoso*, It.) Composed of fine threads or fibres.
- FILA'RIA.** A genus of nematoidea, belonging to the class Entozoa.
- FILE.** A name given by the chalk-diggers to the striated and prolonged cucurmerine claviculæ of echinites.
- FILI'CES.** (*flixa*, Lat.) Ferns, the first order of Cryptogamia, in Linnaeus' artificial system; the first tribe of acotyledonous plants.
- FILICOIDE'Æ.** (from *flixa*, Lat. and *είδος*, Gr.) Fern-like plants.
- FI'LIFORM.** (from *filum* and *forma*, Lat.) Thread-like; thread-shaped; slender and of equal thickness. In botany, applied to peduncles when very fine, resembling threads; applied also to the tube of monopetalous flowers when of a thread-like form; and also to aments.
- FI'MBRIATE.** } (*fimbriatus*, Lat.) Fringed.  
**FI'MBRIATED.** }
- FIN.** (Sax.) The organ in fishes by which they steady and keep upright their bodies in the water: the caudal fin alone assists in progressive motion. The fin consists of a membrane supported by rays, or little bony or cartilaginous ossicles.
- FIN-FOOTED.** Palmipedous; having palmated feet, or feet with membranes between the toes, connecting them with each other.
- FI'NLESS.** Wanting fins; destitute of fins.
- FI'NNY.** Having fins.
- FIN-TOED.** Palmipedous; having membranes between the toes.
- FI'ORITE.** A siliceous incrustation deposited by the thermal waters of Ischia, first noticed by Dr. Thompson.
- FIRE-DAMP.** Choke-damp. Carburetted hydrogen gas. This is sometimes very abundantly evolved in coal mines, and is productive of the most dreadful results, occasionally nearly all employed in the mines perishing from its combustion. When carburetted hydrogen gas constitutes more than one-thirteenth of the volume of the atmosphere of pits and mines, the whole become explosive whenever a flame is brought into contact with it; to prevent the disastrous consequences which were so frequently resulting, Sir H. Davy invented a *safety-lamp*, which being formed of wire-gauze, in the form of a cylinder, consumes, but does not explode, the explosive mixture. *Fire-damp*, or carburetted hydrogen gas, appears to be generated by the decomposition of iron pyrites in coal, and may often be heard issuing from the fissures in coal-beds with a bubbling noise, as it forces the water out along with it.
- FIRE-STONE.** An arenaceous-argillaceous deposit of a greyish green colour, composed of marl and grains of silicate of iron; in some places, in a state of sand;

in others, forming a stone sufficiently hard for building. The transition from the marl to the *fire-stone* is in many localities so gradual, and the sandy particles are so sparingly distributed, that the chalk-marl may be said to repose immediately on the galt; in others, however, the characters of the *fire-stone* are very peculiar, and some geologists have deemed them of sufficient importance to rank this deposit as an independent formation. The *fire-stone* contains the same fossils as the grey marl, and a few species not found in any other bed.—*Dr. Mantell.*

**FI'SSILE.** (*fissilis*, Lat.) Capable of being split, or divided, in the direction of the grain or cleavage.

**FISSIL'ITY.** The quality of admitting to be split, or divided in the line of its cleavage.

**FISSIRO'STRES.** A family of aves, numerically small, but very distinct from all others in the beak, which is short, broad, horizontally flattened, slightly hooked, unemarginate, and with an extended commissure, so that the opening of the mouth is very large, which enables them to swallow with ease the insects they capture while on the wing: the swallow belongs to this family, and is an example.

**FI'SSURE.** (*fissura*, from *findo*, Lat. *fissure*, Fr. *fessura*, It.) A cleft; a narrow chasm.

**FI'SSURED.** Cracked; separated by narrow chasms; divided by clefts.

**FISSURE'LLA.** A gasteropod; a genus of the order Scutibranchiata. A buckler-formed univalve, without spire: the vertex perforated by a small ovate or oblong orifice, which affords a passage to the water required for respiration; this orifice penetrates into the cavity of the branchiæ, which are situated on the fore part of the back. The fissurella has been found in the Essex cliffs.

**FISTULA'NA.** A genus of the family Inclusa, class Acephala, division Mollusca. Nearly all of the family inclusa live buried in sand, stones, ooze, or wood. The external tube of fistulana is entirely closed at its larger end, and is more or less like a bottle or club. The fistulanæ are sometimes found buried in submerged fragments of wood, or in fruits, and the animal, like the teredo, has two small valves, and as many palettes. Recent specimens are only obtained from the Indian Ocean, but *fistulanæ* are found fossil in the Shanklin sand, where, in some instances, the wood is studded with the remains of a small species of fistulana, of a pyriform shape, about one-third of an inch long, to which the name of *Fistulana pyriformis* has been given. *Fistulanæ personatæ* are found in

the chalk formation, and in the arenaceous limestone, or sandstone of Bognor; and *Fistulana pyriformis*, at the junction of the Galt and Shanklin Sand, imbedded in wood.

**FI'STULAR.** (from *fistularis*, Lat.) Hollow like a pipe.

**FI'STULIFORM.** (from *fistula* and *forma*, Lat.) In round hollow columns.

**FI'STULOUS.** (*fistuleux*, Fr. *infistolito*, It.) Hollow; tube-like.

**FIXA'TION.** (*fixation*, Fr. *fissazione*, It.) Want of volatility; that condition which resists evaporation, or volatilization by heat.

**FI'XITY.** (*fixité*, Fr. *propriété qu'ont quelques corps de n'être point dissipés par l'action du feu.*) Coherence of parts: that property which some bodies possess of resisting dissipation by heat.

**FLAB'ELLIFORM.** (from *flabellum* and *forma*, Lat.) Fan-shaped.

**FLAKE.** (*floccus*, Lat. *flake*, Sw.) A stratum or layer; a sort of scale.

**FLA'KY.** Composed of small strata or layers; having scales or laminæ.

**FLAMMAB'ILITY.** The quality of being ignited so as to burn with a flame.

**FLA'MMABLE.** That may be set on fire so as to blaze.

**FLAMMI'VOMOUS.** (from *flamma* and *vomo*, Lat.) That vomits forth flames; volcanoes are *flamminvoraus*.

**FLA'VOUS.** (*flavus*, Lat.) Yellow; of a yellow colour.

**FLAW.** (from *φλάω*, Gr., to break.) A crack; a break or split; a defect.

**FLAWED.** Cracked.

**FLEXIB'ILITY.** (*flexibilité*, Fr. *flexibilita*, Fr. *flexibilitas*, Lat.) Pliancy; the quality of admitting to be bent.

**FLE'XIBLE.** (*flexibilis*, Lat. *flexibile*, Fr. *flexibile*, It.) That can be bent; not brittle: pliable; possessing elastic properties.

**FLE'XIBLENESS.** Pliancy; pliantness; the opposite to brittleness.

**FLE'XUOUS.** Winding; tortuous; bending in different directions; zigzag; with angles gently winding.

**FLE'XURE.** (*flexura*, Lat.) The direction in which anything is bent.

**FLINT.** (Sax.) Siliceous earth, nearly pure. Flint is the commonest form in which quartz exhibits itself; it is rather harder than quartz, and contains a minute portion of alumine and of oxide of iron; 98 per cent. being pure silice. A remarkable circumstance attending flint is, that it is found in masses, dispersed in regular parallel beds, in chalk-rocks. This is elucidated, and partly explained, in a beautiful manner in the manufacturing of porcelain. Porcelain is made of flint and clay, pounded extremely fine, and mingled

together with water so perfectly, as to form a smooth fluid, of the consistence and colour of cream; if this fluid be left a long time quite tranquil, the flint separates from the clay, and collects in small masses, in a manner analogous to that in which the natural masses occur in the chalk. When flint is first extracted from the quarry it is brittle, has a conchoidal fracture, and feeble lustre; thin fragments are translucent. Specific gravity 2.594. According to Klapproth's analysis, it consists of siliceous matter 98, lime 0.5, alumine 0.25, oxide of iron 0.25, water 1. The constant occurrence of flint in the upper chalk, and the apparent conversion of animal remains into flint, has given rise to much speculation respecting its origin; and it was at one time maintained, that flint and chalk were convertible, or capable of undergoing a mutual transmutation. I propose to submit a few observations from the pens of our first writers on this interesting and intricate subject, for after having considered the matter in every point of view; after having carefully read the opinions of others, and again and again examined strata of flint nodules and tabular flints, flints horizontally and diagonally distributed throughout the numerous chalk-pits in the neighbourhood; after having observed their crushed but not disordered condition, and having commonly found flints imbedded in flints, I am totally unable to arrive at anything approaching to a legitimate deduction.

"That the beds of chalk and flint were deposited periodically," says Dr. Mantell, "cannot admit of the slightest doubt. Specimens are not unusual, in which angular fragments of black flint, that could not possibly have been originally formed in their present state, are imbedded in chalk. Sir Henry Englefield was the first who directed the attention of geologists to the subject of the shattered condition of the flints found in certain strata. In a paper read before the Linnæan Society, he notices several beds of shattered flints, which occur in a chalk-pit at Carisbrook, in the Isle of Wight; and, after describing their situation and appearance, proceeds to offer some conjectures upon the probable cause of their destruction. This he supposed might have been occasioned by some sudden shock or convulsion, which in an instant shivered the flints, though their resistance stopped the incipient motion; for the flints, though crushed, are not displaced, which must have been the case, had the beds slid sensibly. Chalcedony is often found occupying the hollows of flints, and on this subject it has been remarked that although in the present compact state of the matter of

flint, it is not easy, though possible, to force a fluid slowly through its pores, yet it is probable that before its consolidation was complete, it was permeable to a fluid whose particles were finer than its own; and that the particles of chalcedony, whilst yet in a fluid state, being finer than those of common flint, did thus pass through the outer crust to the inner station they now occupy; where they also allowed a passage through their own interstices to the still purer siliceous matter, which is often crystallized, in the form of quartz, in the centre of the chalcedony, and is so entirely surrounded by it, that it could have no access to its present place, except through the substance of the chalcedony, and the flint enclosing it." In Professor Buckland's *Bridgewater Treatise* we find the following:—"We may in like manner refer the origin of those large quantities of siliceous matter, which constitute the chert and flint beds of stratified formations, to the waters of hot springs, holding siliceous earth in solution, and depositing it on exposure to reduced degrees of temperature and pressure, as siliceous matter is deposited by the hot waters that issue from the geysers of Iceland." Again Dr. Mantell, "the nodular masses of flint are very irregular in form, and variable in magnitude; some of them scarcely exceeding the size of a bullet, while others are several feet in circumference. Although thickly distributed in horizontal beds and layers, they are never in contact with each other, but every nodule is completely surrounded by chalk. Flints so commonly enclose the remains of sponges, alcyonia, and other zoophytes, that some geologists are of opinion that the nucleus of every nodule was originally an organic body, and Townsend states, 'so far as my observation goes, zoophytes appear universally to have formed the nuclei of nodulated and coated flints.' The nodules of flint frequently exhibit the internal structure of the enclosed zoophyte most beautifully and delicately preserved." A theory offered by Professor Buckland is to this effect: "It does not appear possible that flints could have been formed by infiltration into pre-existing cavities, like the regularly disseminated geodes of the trap rocks. Assuming that the mass which is now separated into beds of chalk and flint, was, previously to its consolidation, a compound pulpy fluid, and that the organic bodies now enveloped in the strata were lodged in the matter of the rock, before the separation of its calcareous from its siliceous ingredients, the bodies thus dispersed throughout the mass would afford nuclei, to which the flint, in separating from the chalk, would, upon the

principle of chemical affinity, have a tendency to attach itself. The chalk and flint proceeded through a contemporaneous process of consolidation; the separation of the siliceous from the calcareous ingredients having been modified by attractions, which drew to certain centres the particles of the siliceous nodules, as they were in the act of separation from the original compound mass. The distances of the siliceous strata must have been regulated by the intervals of precipitation of the matter from which they are derived; each new mass, as it was discharged, forming a bed of pulpy fluid at the bottom of their existing ocean, which, being more recent than the bed produced by the last preceding precipitate, would rest upon it as a foundation similar in substance to itself, but of which the consolidation was sufficiently advanced to prevent the ingredients of the last deposit, from penetrating or disturbing the productions of that which preceded it." Sir. H. Davy found pure flint in the cuticle of many grasses; it is also found in the hollow stems of bamboo; the ashes of wheat straw also are found to contain it.

**FLINTY SLATE.** Flinty slate differs from common slate, in containing a larger proportion of siliceous earth. Slate and flinty slate not only pass into each other, but frequently alternate. When flinty slate ceases to have the slaty structure, it becomes hornstone, or, what the French geologists term petrosilex. If it contains crystals of felspar, it becomes hornstone porphyry.—*Bakewell.*

**FLOATSTONE.** The white and grey porous varieties of rhombohedral quartz. In consequence of their extreme porousness they swim on the surface of water, and have therefrom been named floatstone, or spongiform quartz.

**FLOETZ.** (*flötz*, Germ.) The name given by Werner to certain rocks which were flat, horizontal, and parallel to each other.

**FLO'RA.** (Lat.) As the animals peculiar to any country constitute its *fauna*, so do the trees and plants its *flora*; the botany of a country.

**FLO'RAL.** (*floralis*, Lat.) An epithet for a bud or leaf; pertaining to flowers; belonging to the flower. The calyx is the outer set of the *floral* envelopes.

**FLO'RET.** (*fleurette*, *petite fleur*, Fr.) A floret is a small monopetalous flower, many of which, enclosed in one calyx or perianthium, and placed sessile on a common undivided receptacle, form a species of compound flower.

**FLORIFEROUS.** (*florifer*, Lat.) Bearing flowers; producing flowers.

**FLO'RIFORM.** (from *flos* and *forma*, Lat.)

Having the form, or appearance, of a flower.

**FLO'SCULOUS.** (*flosculus*, Lat.) A little flower; a floret.

**FLU'ATE.** A compound of fluoric acid with a salifiable base.

**FLU'CAN.** A provincial name for a fault or dam; particularly used by the Cornish miners.

**FLU'OR.** } (Lat.) Octahedral fluor.

**FLU'OR SPAR.** } Octaedrisches Fluss-Ha-loide of Mohs. Chaux Fluaté of Haüy. Fluaté of lime; consisting of 67.75 lime and 32.25 fluoric acid. If a cube of fluor spar be split with a knife and a hammer, it will yield only in the direction of the solid angles, and if the division be pursued the result will be an octohedron. There are three varieties of fluor spar; the first, with even fracture and feeble lustre, is called compact fluor; the second, in which the cleavage is distinct, foliated fluor; the third, which occurs incrusting other minerals, earthy fluor. See also *Blue-john* and *Derbyshire spar.*

**FLU'ORIC ACID.** An acid first procured by Gay Lussac, or by Margraff, and called fluorine by Sir H. Davy. It may be obtained by putting a quantity of fluor-spar in powder into a leaden retort, pouring over it an equal quantity of sulphuric acid, and then applying a very gentle heat. From its exceedingly destructive properties it has been called *phlogore*, from *φλόρω*, Gr., by M. Ampere. It destroys the skin, almost immediately, if applied to it, producing very painful wounds. The most singular property which it possesses is that of corroding glass and siliceous bodies, especially when hot, and the thickest glass vessel can only withstand its action for a short time.

Fluorine enters into the composition of some minerals which form constituent portions of great masses of rocks. Fluoric acid is found in mica and hornblende, two minerals of very great importance, as component parts of many rocks. Fifteen analyses of mica, from various parts of the world, by Klaproth, Vauquelin, Rose, and Bendant, afford as a mean, 1.09 per cent. of fluoric acid; and Bousdorf's analysis of hornblende, gives 1.5 per cent. of the same substance. Calculation affords us 0.36 of fluoric acid in gneiss with mica, 0.54 in mica slate, 0.75 per cent. in hornblende rock and greenstone, 0.18 in granite with mica, 0.5 of the same substance in sienite, 0.65 in granite composed of quartz, felspar, mica, and hornblende, and 0.5 per cent. in porphyritic greenstone. Fluor spar is, however, the mineral in which the greatest relative amount of fluorine is detected.—*De la Beche.*

**FLU'STRA.** A genus of polyparia, class Vermes, order Zoophyta. If we carefully observe the patches of white calcareous matter, called flustræ, that may be seen on every sea-weed or shell on the shore, appearing like delicate lace, we shall discover that these apparently mere specks of earthy substance belong to the animal kingdom. The flustra, when taken fresh and alive out of the water, presents to the naked eye the appearance of fine network, coated over with a glossy varnish. With a glass of moderate powers, it is discovered to be full of pores, disposed with much regularity. If a powerful lens be employed, while the flustra is immersed in sea-water, very different phenomena appear; the surface is seen to be invested with a fleshy, or gelatinous, substance, and every pore to be the opening of a cell or cavity, whence issues a tube with several long feelers or tentacula; these expand, then suddenly close, withdraw into the cells, and again issue forth; and the whole surface of the flustra is studded with these hydra-like forms, sporting about in all the energy and activity of life. For a more full account, see Dr. Mantell's Wonders of Geology, whence the above is taken.

**FLU'TED.** Grooved; channelled; furrowed.

**FLUVIA'TIC.** } *fluvialis, fluviatricus*, Lat.  
**FLU'VIAL.** } *fluviale*, Fr.) Belong-  
**FLU'VIATILE.** } ing to a river; growing, or  
 living, in the fresh water of rivers.

**FLUX.** (*fluxus*, Lat. *flux*, Fr. *mouvement réglé de la mer vers le rivage à certaines heures du jour.*)

1. The flow of the tidal wave: the flux is the rise; the reflux, the ebb of the tide.
2. Any substance added to facilitate the fusion of metals or minerals.

**FÆ'CAL.** See *Fæcal*.

**FÆ'CES.** See *Feces*.

**FOLIA'CEOUS.** (*foliaceus*, Lat.) Leafy; consisting of leaves or lamina.

**FOL'LIAGE.** (*folium*, Lat.) The leaves of plants or trees.

**FOL'LIATED.** (*foliatus*, Lat.)

1. In botany, leaved or having leaves.
2. In conchology, in laminae or leaves, as when the edges of the shelly layers are not compact, but seem to separate from each other. This may easily be seen in the large coarse oyster shell.

**FOLIA'TION.**

1. In botany, veneration or leafing of trees, &c.
2. In mineralogy, the act of beating into thin leaves.

**FOLI'FEROUS.** (from *folium* and *fero*, Lat.) Bearing leaves.

**FOLKSTONE MARL.** A stiff marl, varying in colour from a light grey to a dark blue, more generally known under the

provincial term Galt. The thickness of this bed is in some places in the South of Sussex not less than between two and three hundred feet. It is a member of the cretaceous groupe, lying between the upper and lower green-sand. Where the Folkstone marl is exposed, and forms the surface of the country, the soil is exceedingly tenacious, and ranks amongst the finest and most productive. The Folkstone marl abounds in fossils.

**FOL'LICLE.** (*folliculus*, Lat. *follicule*, Fr. *follicolo*, It.)

1. In botany, a univalvular pericarp, opening on one side longitudinally, and having the seeds loose in it; a membranous seed-vessel of one valve and one cell, bursting lengthwise, and having no apparent suture to which the seeds are attached.
2. In anatomy, a small secreting cavity.

**FONTANE'L.** (*fontanelle*, Fr. *fontanella*, It.) An opening left in the skull at birth, which is subsequently closed by osseous deposit; there are two.

**FORA'MEN.** (Lat.) A hole; an opening; generally by which nerves or blood vessels obtain a passage through bones. In botany, the opening in the ovulum. When the foramen is visible on the seed, as is the case in the bean and pea, it is called the *micropyle*.

**FORA'MINATED.** } (from *foramino*, Lat.)  
**FORA'MINOUS.** } Pierced with small open-  
 ings; full of small holes; porous.

**FORA'MINIFER.** A genus of microscopic shells. Mr. Lonsdale has discovered sixteen species of *foraminifers* in the English chalk, and Mr. Searles Wood has discovered fifty species of *foraminifers* in the lower crag formation of Suffolk.

**FORA'MINIFEROUS.** Belonging to the genus foraminifer. Some recent observations have induced M. Dugardin to refer the animals which construct the Miliola and some other microscopic *foraminiferous* shells to a new class of animals of lower degree than the radiata, and possessing a locomotive power by means of minute tentacular filaments.—*Prof. Buckland*.

**FOR'ICIPATED.** (*forcipatus*, Lat.) Hooked, or furnished with pincers, as the claws of a lobster, crab, &c.

**FOR'ELAND.** A promontory; a jutting of high land into the sea, as the North-Foreland, in the Isle of Thauet, and the South-Foreland, near Dover.

**FOR'KED.** Opening into two or more parts; furcated.

**FORMA'TION.** (*formatio*, Lat. *formation*, Fr. *formazione*, It.) Any assemblage of rocks possessing some character in common, either as regards their age, origin, or composition. When a series of strata of a similar rock are arranged with occasional strata intervening, of rocks of ano-

ther kind, which recur in different parts of the series, they are regarded as having been all formed nearly at the same epoch, and under similar circumstances; and such series are called by geologists *formations*. Thus, the strata of shale, sandstone, and iron-stone, that accompany beds of coal, are called the coal *formation*. Strata of different kinds, in which a gradation is observed into each other, and which contain similar species of organic remains, constitute a *geological formation*. The chalk with flints above, the lower chalk without flints, the chalk-marl, and the green-sand under the chalk, are all regarded as members of the chalk *formation*.—*Bakewell*.

**FORNICATED.** (*fornicatus*, Lat.) Concave within, and convex without; vaulted; arched.

**FORNIX.** (Lat.) In conchology, the excavated part under the *umbo*. It likewise signifies the upper, or convex shell in the *ostea*.

**FOSIL.** } (*fossilis*, from *fodio*, Lat. *foss-*  
**FOSILE.** } *sile*, Fr. *fossile*, It.) Dug out of the earth, as fossil shells, fossil bones, fossil coal, &c. The adjective is frequently spelt *fossile*.

**FOSIL.** A substance dug out of the earth. At the present day, the word fossil is used by geologists to express only the remains of animal, or vegetable, substances found buried in the earth's crust.

**FOSILIFEROUS.** (from *fossilis* and *fero*, Lat.) Producing fossils; containing fossil remains; yielding fossils.

**FOSILIST.** One who collects fossils; who studies the nature and history of fossil remains.

**FOSILIZATION.** The conversion of animal or vegetable substances into fossils.

**FOSILIZED.** Become fossil; converted into a fossil body.

**FRA'GILE.** (*fragilis*, Lat. *fragile*, Fr. *fragile*, It.) Brittle; easily broken; weak.

**FRAGILITY.** (*fragilité*, Fr. *fragilità*, It.) Brittleness; weakness.

**FRA'GMENT.** (*fragmentum*, Lat. *fragment*, Fr. *frammento*, It.) A part broken from the whole; an imperfect piece.

**FRA'GMENTARY.** Composed of fragments. Dr. Johnson says, a word not elegant, nor in use: in elegance or euphony it may or may not be, deficient, but, at the present day, it is in use by geologists.

**FREE-STONE.** Any kind of stone, the texture of which is so free or loose that it may be easily worked.

**FRIABILITY.** (*friabilité*, Fr. *friabilità*, It.) The property of being easily crumbled, broken small, and reduced to powder.

**FRIABLE.** (*friabilis*, Lat. *friable*, Fr.

*friabile*, It.) Easily broken into small pieces; easily crumbled, or reduced to powder.

**FRITH.** An arm of the sea, as the Frith of Tay, the Frith of Forth.

**FROND.** (*frons*, Lat.)

1. In botany, implies peculiar union of the fructification with the leaf and stem, namely, the flowers and fruit are produced from the leaf itself.

2. The herbaceous parts of flowerless plants, resembling leaves, are called fronds; they differ from true leaves in their structure in many respects.

**FRONDIFEROUS.** (*frondifer*, from *frons*, and *fero*, Lat.) Producing fronds.

**FRONT.** (*front*, Fr. *fronte*, It.) In conchology, when the aperture in univalves is turned towards the observer.

**FRONTAL.** (*frontale*, Lat. *frontal*, Fr. *frontale*, It.) Appertaining to the forehead.

**FRUCTIFEROUS.** (*fructifer*, Lat.) Bearing fruit.

**FRUCTIFICATION.** (*fructification*, Fr. *fruttificazione*, It.)

1. The temporary part of a vegetable appropriated to generation, terminating the old vegetable, and beginning the new. It consists of the following parts; namely, the calyx, corolla, stamen, pistillum, pericarpium, semen, and receptaculum.

2. The act of bearing fruit; fertility; fecundation.

**FRUCTUOUS.** (*fructueux*, -euse, Fr. *fruttuoso*, It.) Fruitful.

**FRUGIFEROUS.** (*frugifer*, Lat.) Producing fruit or corn; fruitful.

**FRUGIVOROUS.** (*frugivorus*, Lat. *frugivore*, Fr.) Animals which live on fruits and seeds.

**FUCOID.** (from *φύκος* and *είδος*, Gr.) A species of fucus. Fucoids are very abundant in many of the strata, occurring in the transition strata of North America in numerous thin layers. An account of these has been published by Dr. Harlan, of America, and by Mr. R. C. Taylor, in Loudon's Magazine of Natural History. Fucoids are found in great abundance in the grauwaacke slate of the maritime Alps, in the lias, and in the chalk. There is one species, the *Fucoides targionii*, that abounds in the upper green-sand. To a fine species, discovered in the chalk by Dr. Mantell, he has given the name *Fucoides Brongniarti*.

**FUCUS.** (*fucus*, Lat. *φύκος*, Gr. pl. *fuci*.) A genus of the order of Algæ, belonging to the class Cryptogamia. This genus comprehends most of those plants commonly called sea-weed.

**FULGORITE.** (*fulguritus*, Lat.) Anything struck by lightning. Rocks, and the tops of mountains, often bear the

marks of fusion from the action of lighting; and occasionally vitreous tubes, descending many feet into banks of sand, mark the path of the electric fluid. Some years ago, Dr. Fiedler exhibited several of the *fulgorites* in London, which had been dug out of the sandy plains of Silesia and Eastern Prussia.—Mrs. Somerville.

**FULIGINOUS.** (*fuliginosus*, Lat. *fuliginæus*, Fr. *fulliginoso*, It.) Sooty; dark; smoky; dusky; of the colour of soot.

**FULLERS'-EARTH.** A marl of a close texture, soft and unctuous, containing about 25 per cent. of alumina. It derives its name from its being used by fullers to take the grease out of cloth before they apply soap. Any clay having its particles of silica very fine, may be considered as fullers' earth; for it is the alumina alone which acts upon the cloth, on account of its strong affinity for greasy substances.

**FULVOUS.** (*fulvus*, Lat.) Of a light brown, with much yellow.

**FUNGUS.** (Lat. pl. *fungi*.) One of the orders of the class Cryptogamia, according to the artificial system of Linnæus. A mushroom; an excrescence from trees or plants not naturally belonging to them; any morbid sponge-like excrescence.

**FUNNEL-SHAPED.** In botany, applied to a monopetalous corolla, having a conical border placed upon a tube.

**FURCATED.** (*furca*, Lat.) Forked; branched.

**FURCULA.** (Lat.) A fork. A peculiar formation of bone in birds, of a fork-like shape. The *furcula*, commonly known as the merry-thought-bone, is seldom wanting in birds. It is in form like a V, common to both shoulders, and joined by its point to the most prominent part of the crista of the sternum, while the other extremities are connected to the humeral end of the clavicles, and the point of the scapulæ, where these two bones are articulated with each other, and

with the os humeri. The *furcula* serves to keep the wings at a proper distance in flying, and is strong and expanded in birds which fly with great force and rapidity. In the ostrich and cassowary, it is imperfect, the lateral branches not uniting together.

The ornithorhynchus and ichthyosaurus both possess a peculiar form of sternum, resembling the *furcula* of birds. The echidna is the only known land quadruped that has a similar *furcula* and clavicles. A cartilaginous rudiment of a *furcula* occurs also in the dasypus.

**FURFURACEOUS.** (*furfuraceus*, from *furfur*, Lat.) Branny; scaly.

**FUSCITE.** An opaque mineral of a greyish or greenish-black colour, found in Norway, in masses of granular quartz.

**FUSCOUS.** (*fuscus*, Lat.) Brown; tawny; dusky.

**FUSIBILITY.** (*fusibilité*, Fr. *qualità di ciò che è fusibile*, It.) The quality of being rendered fluid by a heat attainable by artificial means, and of again becoming solid on cooling.

**FUSIBLE.** (*fusus*, from *fundo*, Lat. *fusibile*, Fr. *fusibile*, It.) Capable of being melted by the application of heat, and of again becoming solid when cooled.

**FUSION.** (*fusio*, Lat. *fusion*, Fr. *fusionne*, It.)

1. The action of melting by heat.

2. The state of being melted by heat. Applied to minerals and metals.

**FUSIFORM.** Spindle-shaped, swelling in the centre with the ends tapering; intermediate between the conical and the oval.

**FUSUS.** A subfusiform univalve, ventricose in its middle or lower part, with a canalculated base, and no varicose sutures; an elongated spire, a smooth columella, and the lip not slit. The genus comprises many species. The genus *fusus* comprises all shells with a salient and straight canal, which are destitute of varices. Fusi are found at depths varying to eleven fathoms, in mud, sandy mud, and sand.

**FUSUS CONTRARIUS.** A species of *fusus* found in the crag of Suffolk, a sinister shell.

## G

**GABBRO.** A synonymous name with Diallage.

**GADOLINITE.** A mineral thus named after Gadolin, who first ascertained its composition. Its colour is greenish-black; that of its powder greenish-grey. Occurs massive; in granular and prismatic concretions. Fracture conchoidal and glassy. According to Berzelius its constituent parts are yttria 45.93, silica 24.16, protoxide of cerium 16.90, protoxide of iron

11.34. It was first discovered at Ytterby, in Sweden, by Capt. Arhenius, in white felspar; it is found also in Ceylon, in granite.

**GÄHNITE.** Thus named from Gahn; another name for automalite.

**GALACTITE.** (*γαλακτίτης*, Gr.) Milkstone.

**GALÆA.** (Lat.) A genus of echini, found fossil only. They are distinguished by an oval base, from which

the shell rises in a vaulted, helmet-like, form.

**GALEO'LA.** A genus of echinites possessing the same characters as the galea, but differing in size. This circumstance induced Klein to divide them into two genera, but Leske deeming a mere difference of size as insufficient to affect the genus, included them both under the genus *echinocorys*.—*Parkinson*.

**GA'LEATED.** (*galeatus*, Lat.) Helmet-shaped; covered as with a helmet. In botany, plants bearing flowers of a helmet shape, as the monk's-hood.

**GALE'NA.** (*galena*, Lat.) A shining metallic ore composed of sulphur and lead; sulphuret of lead; lead-glance. Its colour is bluish-grey, resembling lead. Occurs regularly crystallized, frequently in cubes and cubo-octahedrons. Before the blow-pipe it decrepitates and melts, emitting a sulphurous smell. It is found in every lead-mine. There are two varieties, common galena and compact galena.

**GALLINA'CEÆ.** Gallinæ of Linnæus. The fourth order of the second class, Aves. So called from their affinity with the domestic cock.

**GALLINA'CEOUS.** (*gallinaceus*, Lat.) Belonging to the order Gallinacæ.

**GALT.** } A provincial name for a stiff marl,  
**GAULT.** } varying in colour from a light grey to a dark blue. The upper and lower beds of the green-sand are in many places separated by the galt; it has been also called Folkstone Marl. The galt abounds in fossil remains, remarkable for their beauty, the pearly covering of the shells being in many instances preserved. The gault is a member of the cretaceous group, passing, in its lower parts, into calcareous marl. The fossils hitherto found in the galt belong to forty-three species, among which are several species of ammonites and hamites; nautili and belemnites; nuculæ and inocerami; caryophillea, &c. The galt rarely exceeds 100 feet in thickness; although in some parts of Sussex it is not less than 250. It is a soil that must rank, says Mr. Young, among the finest in this or any other country, being pure clay and calcareous earth.

**GAMOP'ETALOUS.** Another term for monopetalous. Having the petals united by their edges; a corolla, the petals of which are all united by their edges.

**GAMOSE'PALOUS.** In botany, a term used for a calyx when the sepals of which it is composed are all united.

**GA'NOID.** Belonging to the order Ganoïdian.

**GANOÏDIANS.** (from *γάνος*, Gr. splendour, from the brightness of their enamel.) The second order of fishes according to

the arrangement of M. Agassiz. The families of this order are characterized by angular scales, composed of horny or bony plates, covered with a thick plate of enamel. The bony pike and sturgeons are of this order. It contains more than sixty genera, of which fifty are extinct.—*Prof. Buckland*.

**GANOÏDIAN.** Belonging to the order Ganoïdia. The ganoïdian order of fishes with the placoïdean prevailed, exclusively, in all formations till the termination of the oolitic series, when they ceased suddenly and were replaced by genera of new orders, the Ctenoïdean and Cycloïdean, then for the first time introduced.—*Id.*

**GAP.** In conchology, an opening, in multivalves and bivalves, when the valves are shut, as in the pholades, myæ, &c.

**GA'RNET.** (*granat*, sorte de pierre précieuse, d'un rouge foncé, comme le gros vin, Fr. *granato*, It. *pietra preziosa*.) There are eleven species of garnet, all of them crystals. The precious garnet is found in dodecahedrons, in mica-slate, amongst the oldest, or primary, rocks, in many parts of the world. It is of a beautiful red colour, sometimes with shades of yellow or blue. Those from the kingdom of Pegu are most esteemed, and it is supposed that this was the carbuncle of the ancients. It is harder than quartz, and consists of nearly equal parts of silice, alumine, and oxide of iron, with traces of manganese. Common garnets are more opaque, of a duller colour, and less hard than the precious garnet, though harder than quartz. They are abundant in similar localities in all countries, sometimes constituting nearly the whole mass of a rock.

**GAS.** The name given to all permanently elastic, or aëriform, fluids, except the atmosphere. The term was first used by Van Helmont, who appears to have intended to denote by it every thing which is driven off from bodies in the state of vapour by heat.

**GA'SEOUS.** (from *gas*.) In the form of gas.

**GASTE'ROPOD.** Belonging to the order Gasteropoda.

**GASTERO'PODA.** (from *γαστήρ*, the belly, and *πούς*, the foot, Gr.) The third class of Mollusca; they have the head free, they crawl upon the belly, or upon a fleshy disk, situated under the belly, which serves them as feet. They are univalvular or multivalvular, but in no case bivalvular. The back is furnished with a mantle which is more or less extended, takes various forms, and in the greater number of genera, produces a shell. The tentacula are very small, situated above the mouth, and do not sur-

round it, varying in number from two to six; sometimes they are wanting altogether. The eyes are very small, and sometimes wanting. Several are entirely naked; others have merely a concealed shell, but most of them are furnished with one that is large enough to receive and shelter them. Most of the aquatic gasteropoda, with a spiral shell, have an operculum, a part sometimes horny, sometimes calcareous, attached to the posterior part of the foot, which closes the shell when its occupant is withdrawn into it and folded up. The limax or slug is an example of the class. Cuvier divides this class of Mollusca into nine orders, namely, 1. the Pulmonea; 2. the Nudibranchiata; 3. the Inferobranchiata; 4. the Tectibranchiata; 5. the Heteropoda; 6. the Pectinibranchiata; 7. the Tubulibranchiata; 8. the Scutibranchiata; 9. the Cyclobranchiata.

**GA'STRIC.** (from γαστήρ, Gr. *gastrique*, Fr. *gastrico*, It.) Belonging to the stomach or belly.

**GAULT.** See *Galt*.

**GA'VIAL.** A subdivision of the genus crocodile, characterized by the narrow, elongated, almost cylindrical jaws, which form an extremely lengthened muzzle.—*Dr. Mantell*.

The living species of the crocodile family are twelve in number, namely, one *gavial*, eight crocodiles, and three alligators. Teeth of the fossil gavial have been found in the Tilgate strata, and one of these is figured in *Dr. Mantell's Geology of the South-east of England*, who observes, "it appears that the strata of Tilgate Forest contain the remains of at least two, if not four, species of crocodiles: that one of these (that with slender curved teeth) resembles the gavial of Caen, and probably was about twenty-five feet in length.

**GE'HLINITE.** A mineral allied to Vesuvian, and named after Gehlin. Colours, various shades of green and brown. Authors are not yet agreed as to its constituents, &c.

**GE'LATINE.** } (*gelée*, Fr. *gelatina*, It.) A  
**GE'LATIN.** } concrete animal substance; the principle of jelly. If a piece of the fresh skin of an animal, after every impurity is carefully separated, be put into a quantity of cold water, and boiled for some time, part of it will be dissolved. Let the decoction be slowly evaporated till it is reduced to a small quantity, and then put aside to cool. When cold, it will have assumed a solid form, and precisely resemble that tremulous substance known as jelly. This is, what is called by chemists, *gelatin*. If the evaporation be carried farther, the substance becomes

hard, semitransparent, breaks with a glassy fracture, and is, in short, that substance known under the name of glue.

*Gelatine* therefore is the same with *glue*, only that it is free from those impurities with which glue is so often contaminated. Gelatine is colourless and transparent; when thrown into water it soon swells, and assumes a gelatinous appearance, and gradually dissolves away. By evaporating the water it may again be obtained unaltered in the form of jelly. Cold water dissolves it slowly, but water at a temperature of 90° rapidly. Gelatin is insoluble in alcohol.

**GELATINOUS.** (*gelatineux*, -euse, Fr. *qui ressemble à de la gelée*.) Of the nature of gelatine; containing gelatine; jelly-like; viscous.

**GELATINATE.** To assume the appearance of jelly.

**GELATINATION.** The process of being converted into a jelly-like substance.

**GEM.** (*gemma*, Lat.)

1. In mineralogy, any precious stone. Gems may be divided into natural and artificial; the latter are made of what is termed paste, coloured with different metallic oxides.

2. In botany, the bud, a small conoid body, covered with scales, formed during summer on the branches of trees, containing the rudiments of a future plant, or part of a plant: some plants produce flowers and leaves, others leaves only, and some flowers only.

**GEMELLI'PAROUS.** (from *gemelli* and *pario*, Lat.) Producing twins.

**GE'MINATED.** In conchology, marked with a double elevated striæ connecting the wreaths.

**GE'MINOUS.** (*geminus*, Lat.) Double; in pairs.

**GE'MMULE.** A little bud.

**GE'NERA.** The plural of genus.

**GE'NERIC.** } (*générique*, Fr. *generico*, It.)

**GE'NERICAL.** } That which comprehends the genus, or distinguishes from another genus; but does not distinguish the species.

**GE'NERICALLY.** With regard to the genus, though not to the species.

**GENI'CLULATE.** } (*geniculatus*, Lat.) Knot-

**GENI'CLULATED.** } ted; jointed; applied to culms bent like the knee; also to peduncles bent at the joints.

**GENUS.** (Lat.)

1. That which is predicated of many things, as the material or common part of their essence.

2. A subdivision of any class or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common characters.

**GE'ODE.** (γῶδες, from γῆα, Gr.) A

roundish piece of mineral matter, sometimes only an incrustation, generally more or less hollow, usually lined with crystals, or in some cases loose earthy matter. The geodes found in the green-sand near Sidmouth, says Mr. Bakewell, in his valuable Introduction to Botany, are composed of opaque chert on the outside, and contain within, mammillated concretions of beautiful chalcedony, and occasionally perfect minute rock-crystals.

**GEO'GNOSEY.** (from  $\gamma\eta$  and  $\gamma\nu\omega\sigma\iota\varsigma$ , Gr.) That branch of natural history which treats of the structure of the earth. Werner and his disciples, as well as some of the French geologists, have substituted geognosy for geology, the former derived from  $\gamma\eta$  and  $\gamma\nu\omega\sigma\iota\varsigma$ , the latter from  $\gamma\eta$  and  $\lambda\acute{o}\gamma\omicron\varsigma$ : Mr. Bakewell has justly observed, for this change no sufficient reason can be assigned, and it is contrary to established analogies of language. Nothing can be more unmeaning than the apologies that have been offered for substituting  $\gamma\nu\omega\sigma\iota\varsigma$ , knowledge, for  $\lambda\acute{o}\gamma\omicron\varsigma$ , reason. By the same rule we ought to change meteorology, physiology, &c. into meteorognosy, physiognosy, &c.—*Bakewell, Introduction to Geology.*

**GEOLOGICAL.** Pertaining to the science of geology.

**GEOLOGIST.** One versed in that branch of natural history which treats of the structure of the earth.

**GEOLOGY.** (from  $\gamma\eta$  and  $\lambda\acute{o}\gamma\omicron\varsigma$ , Gr.) Geology may be defined to be that branch of natural history which investigates the successive changes that have taken place in the organic and inorganic kingdoms of nature. It is a science founded in exact observation and careful induction; it may be termed the physical history of our globe; it investigates the structure of the planet on which we live, and explains the character and causes of the various changes in the organic and inorganic kingdoms of nature. It has been emphatically termed the sister science of astronomy, ranking, undoubtedly, in the scale of sciences, next to astronomy, from the sublimity of the objects of which it treats.

Geology is as intimately related to almost all the physical sciences, as is history to the moral. As the historian should, if possible, be at once profoundly acquainted with ethics, politics, jurisprudence, the military art, theology; in short, with all those branches of knowledge, whereby any insight into human affairs, or into the moral and intellectual nature of man can be obtained; so is it desirable that the geologist should be well versed in chemistry, mineralogy,

zoology, botany, comparative anatomy; in short, in every branch of science relating to organic and inorganic nature. "It was long," says Prof. Lyell, "ere the distinct nature and legitimate objects of geology were fully recognised, and it was at first confounded with many other branches of inquiry, just as the limits of history, poetry and mythology, were ill defined in the infancy of civilization."

Werner appears to have regarded geology as little other than a subordinate department of mineralogy, and Desmarest included it under the head of physical geography. Dr. Hutton, in his treatise, published in 1795, first endeavoured to draw a positive line of demarcation between geology and cosmogony, declaring that geology was in no ways concerned with questions as to the origin of things; and, in fact, geology differs as widely from cosmogony, as hypothesis concerning the mode of man's first creation differs from history. Philosophers for some ages past neglected the examination of the earth, contenting themselves with vain speculations respecting its formation; and to Strabo, who flourished under Augustus, and died under Tiberius, about the year 25, and to the old philosophers, who studied the local phenomena of their countries, would the title of geologists with more propriety be given than to Burnet and Buffon, whose systems of cosmogony have more the air of a system of romance, than of a serious generalization of facts. In tracing the history of geology from the close of the seventeenth to the end of the eighteenth century, we find the science retarded by the wild and visionary speculations of a host of writers; to enter on these would, however, far exceed the limits of a work of this kind, and those desirous of so doing, I would refer to Mr. Lyell's admirable work, Principles of Geology.

Hutton, following the example of Newton in astronomy, endeavoured to give fixed principles to geology; but, at that time, too little progress had been made in the science, to enable him to realize so noble a project. A brighter period has now dawned, and the following out the only true method, namely, that of keeping within the boundary of inductive philosophy, has led to the most important results.

One of the greatest difficulties with which geology has had to contend, is the false notion entertained by many well-meaning but weak persons, that geology was opposed to Scripture revelation, and that geological researches might prove injurious to religion. Unfortunately, prejudice and ignorance have too fre-

quently called in the aid of religious feeling to thwart and oppose the progress of scientific knowledge; and it is too much to be feared that did the same power now exist, the geologists of the present day might suffer the same persecutions that Gallileo Gallilei did, and that the works of Lyell, Buckland, De la Beche, Conybeare, Murchison, Phillips, Sedgwick, Mantell, and a host of others, would swell the catalogue of the forbidden list.

Why, it may be asked, should persons whose religious opinions are founded on the basis of immutable truth fear the elicitation of truth? or what has religion to fear from the minutest, the most searching, investigation? Let it ever be borne in mind that, on the one hand, truth can never be opposed to truth, and, on the other, that error is only to be effectually confounded by searching deep and tracing it to its source.

Nothing can be more unfounded than the objection which has been taken against the study of natural philosophy, and, indeed, against all science, that it fosters in its cultivators an undue and overweening self-conceit, leads them to doubt the immortality of the soul, and to scoff at revealed religion. Its natural effect on every well regulated mind is, and must be, directly the reverse. Minds which have long been accustomed to date the origin of the universe, as well as that of the human race, from an era of about six thousand years back, receive reluctantly any information, which, if true, demands some new modification of their present ideas of cosmogony, and, as in this respect, geology has shared the fate of other infant sciences, in being for a while considered hostile to revealed religion; so, like them, when fully understood, it will be found a potent and consistent auxiliary to it, exalting our conviction of the power, wisdom, and goodness of the Creator.

"It may fairly be asked," says Chalmers, "of those persons who consider physical science a fit subject for revelation, what point they can imagine short of a communication of omniscience, at which such a revelation might have stopped, without imperfection or omission, less in degree, but similar in kind, to that which they impute to the existing narrative of Moses. A revelation of so much only of astronomy as was known to Copernicus, would have seemed imperfect after the discoveries of Newton; and a revelation of the science of Newton would have appeared defective to Laplace. And unless human nature had been constituted otherwise than it is, the above supposed com-

munication of omniscience would have been imparted to creatures, utterly incapable of receiving it, under any past or present moral or physical condition of the human race. Does Moses even say, that when God created the heavens and the earth he did more, at the time alluded to, than transform them out of previously existing materials? Or does he ever say that there was not an interval of many ages between the first act of creation, described in the first book of Genesis, and said to have been performed 'in the beginning,' and those more detailed operations, the account of which commences at the second verse, and which are described as having been performed in so many days?

"Let no one, therefore, be checked in his enquiries into the history of the globe by anything but the good rules of philosophical induction, which are essential to the right use of the intellectual strength which God has conferred upon man, to be exercised on the mighty works of nature; and least of all let him be deterred from the pursuit of truth by the vain and impious dread that he may go too far, and penetrate too deeply into those mysteries, which, among their other uses have this one, namely, that they continually excite to activity the soul of man; and, the more they are studied, lead to deeper delight, and more awful contemplation of their glorious and beneficent Author."

Geology, aided not only by the higher branches of physics, but by recent discoveries in mineralogy and chemistry, in botany, zoology, and comparative anatomy, is enabled to extract from the archives of the interior of the earth, intelligible records of former conditions of our planets, and to decipher documents, which were a sealed book to our predecessors. Thus enlarged in its views, and provided with fit means for pursuing them, geology extends its researches into regions more vast and remote, than come within the scope of any other physical science, except astronomy. — *Davy. Buckland. Herschell. Chalmers. Lyell. Phillips. Mantell. Bakewell.*

GEOSAURUS. A fossil saurian of the oolite and lias formations.

GERM. (*germe*, Fr. *germe*, It. *germen*, Lat.)

1. In botany, the swollen base of the pistil, forming the rudiment of the fruit and seed.

2. The embryo; origin. So long as the offspring has no independent existence, but participates in that of its parent, it is called a germ. The separation of the germ is called generation.

GERMINANT. (*germinans*, Lat.) Sprouting; beginning to grow.

**GERMINATE.** (*germino*, Lat. *germer*, Fr. *germinare*, It.) To sprout; to bud; to shoot forth.

**GERMINATION.** (*germination*, Fr. *germinazione*, It. *germinatio*, Lat.) The act of sprouting or shooting forth.

**GEYSER.** The name given to certain boiling springs or fountains in Iceland. The water of these geysers holds a considerable proportion of silex in solution. The following account of the geysers of Iceland is extracted from Mr. Lyell's Principles of Geology. "These intermittent hot springs occur in a district situated in the south-western division of Iceland, where nearly one hundred of them are said to break out within a circle of two miles. They rise through a thick current of lava which may, perhaps, have flowed from Mount Hecla, the summit of that volcano being seen from the spot at a distance of more than thirty miles. Few of the geysers play longer than five or six minutes at a time, and the intervals between their eruptions are, for the most part, very irregular. The great geyser rises out of a spacious basin at the summit of a circular mound composed of siliceous incrustations deposited from the spray of its waters. The diameter of this basin is fifty-six feet in one direction by forty-six in another. In the centre is a pipe seventy-eight feet in perpendicular depth, and from eight to ten feet in diameter, but gradually widening as it rises into the basin. The circular basin is sometimes empty, but is usually filled with beautifully transparent water in a state of ebullition. During the rise of the boiling water in the pipe, especially when the ebullition is most violent, and when the water is thrown up in jets, subterranean noises are heard, like the distant firing of cannon, and the earth is slightly shaken. The sound then increases, and the motion becomes more violent, till at length a column of water is thrown up, with loud explosions, to the height of one or two hundred feet. After playing for a time like an artificial fountain, and giving off clouds of vapour, the pipe or tube is emptied, and a column of steam rushing up with amazing force and a thundering noise, terminates the eruption. If stones are thrown into the crater, they are instantly ejected, and such is the explosive force, that very hard rocks are sometimes shattered by it into small pieces.

**GIBBOUS.** (*gibbus*, Lat. *gibbeaux*, Fr. *gibboso*, It.) Bossed; convex; bunched. In botany, applied to fleshy leaves having one or both sides convex, arising from the great abundance of pulp.

**GIBBSITE.** A mineral of a dirty white

colour, found in America, and named after Mr. Gibbs.

**GILL.** The lung, or respiratory organ of the fish. The gills, or branchiæ, lie in openings on each side of the head; their form is semicircular; they have a vast number of fibrillæ standing out on each side of them like a fringe, and very much resemble the vane of a feather. There are, in most fishes, four gills on each side, resting on an equal number of arched portions of cartilage or bone, connected with the os hyoides. In some cartilaginous fishes there are five gills on each side; in the lamprey there are seven. The larger Crustacea have their branchiæ situated on the under side of their body, not only in order to obtain protection from the carapace, which is folded over them, but also for the sake of being attached to the haunches of the feet, jaws, and thoracic feet, and thus participating in the movements of those organs. They may be seen in the lobster and in the crab, by raising the lower edge of the carapace.

In the greater number of mollusca these important organs, although external with respect to the viscera, are within the shell, and are generally situated near its outer margin. They are composed of parallel filaments, arranged like the teeth of a fine comb; and an opening exists in the mouth for admitting the water which is to act upon them. These filaments appear, in many instances, to have the power of producing currents of water in their vicinity by the action of minute cilia, similar to those belonging to the tentacula of many polypi, where the same phenomenon is observable. In the Acephala, or bivalve mollusca, the gills are spread out, in the form of laminae, round the margin of the shell, as is exemplified in the oyster when it is commonly known by the name of *beard*. The aerated water is admitted through a fissure in the mouth, and when it has performed its office in respiration, is usually expelled by a separate opening.

All the sepia have their gills enclosed in two lateral cavities, which communicate with a funnel-shaped opening in the middle of the neck, alternately receiving and expelling the water by the muscular action of its sides. The forms assumed by the respiratory organs in this class are almost infinitely diversified. In fishes the gills form large organs, and the continuance of their action is more essential to life than it appears to be in any of the inferior classes. When their surfaces are minutely examined, they are found to be covered with innumerable minute processes, crowded together like the pile of

velvet; and on these are distributed myriads of blood-vessels, spread like a delicate net work, over every part of their surface. A large flap, termed the operculum, extends over the whole organ, defending it from injury, and leaving below a wide fissure for the escape of the water which has performed its office in respiration. For this purpose the water is taken in by the mouth, and forced by the muscles of the throat through the apertures which lead to the branchial cavities; in this action the branchial arteries are brought forward and separated to a certain distance from each other, and the rush of water through them unfolds, and separates, each of the thousand minute filaments of the branchiæ, so that they all receive the full action of that fluid as it passes by them. When a fish is taken out of the water, the animal vainly reiterates its utmost efforts to raise the branchiæ, and relieve the sense of suffocation it experiences in consequence of the general collapse of the filaments of those organs, which adhere together in a mass, and can no longer receive the vivifying influence of oxygen. "It has been generally stated," says Dr. Roget, "by physiologists, even of the highest authority, that the principal reason why fishes cannot maintain life, when surrounded by air instead of water, is that the branchiæ become dry, and lose the power of acting when thus deprived of their natural moisture. The rectification of this error is due to Flourens, who pointed out the true cause."

**GI'NGLYMOID.** (from *γινγλυμός* and *εἶδος*, Gr.) Resembling a hinge; pertaining to that species of hinge-like joint which admits of flexion and extension.

**GI'NGLYMUS.** (*γινγλυμός*, Gr.) Articulation admitting flexion and extension.

**GI'RASOLE.** (from *gyro*, to turn, and *sol*, the sun, Lat.) The name given to a variety of opal. The siliceous girasol of Brongniart, and quartz resinite girasol of Haiüy. The *girasole* is of a milk white colour, but it possesses a remarkable property of reflecting a red colour when turned towards the sun, or any bright light. From this peculiar property it obtains its name. Girasole is sometimes strongly translucent, and the finest specimens resemble translucent jelly.

**GLA'BROUS.** (*glaber*, Lat.) Smooth; the opposite to hairy; downy.

**GLA'CIAL.** (*glacialis*, Lat. *glacial*, Fr.) Icy; frozen.

**GLA'CIER.** (*glacier*, Fr. *Amas de montagnes de glace, qui se trouvent en quelques endroits de la Suisse de la Savoie et du Dauphiné, au sommet des montagnes.*) Great accumulations or extensive fields

of ice, common in mountainous countries.

**GLA'CIS.** (*glacis*, F.) A sloping bank.

**GLANCE.** (*glantz*, Germ.)

1. A name given to some minerals which possess a metallic, or pseudo-metallic lustre.

2. An order of minerals, containing eight genera. — 1. Copper glance; 2. Silver-glance; 3. Lead-glance; 4. Tellurium-glance; 5. Molybdena-glance; 6. Bismuth-glance; 7. Antimony-glance; 8. Melane-glance.

**GLANCE-COAL.** (*glanzkohle*, Germ.) A variety of coal, known also as anthracite. This is the *glanzkohle* of Werner; the glance-coal of Jameson, the native mineral carbon of Kirwan, and the blind-coal of some authors. There are several varieties of the glance-coal, namely, *conchoidal glance-coal*, or that having a conchoidal fracture and splendid lustre; *slaty glance-coal*, or that with a slaty structure; *columnar glance-coal*, and *fibrous glance-coal*. This combustible, at first view, strongly resembles coal, from which, however, it materially differs. Its colour is black, or rather grayish and iron-black, sometimes tinged with blue or brown. It, perhaps, never possesses the pure deep black of coal. Glance-coal, like the diamond, appears to be essentially composed of pure carbon, but in a very different state of aggregation. The glance-coal of Kilkenny contains about 97 per cent. of carbon; that of Rhode Island about 94 or 95. It occurs in beds in the coal formation, in the secondary class of rocks; it is occasionally found among rocks of the primary and transition series. It is sometimes nearly allied to graphite. It may be distinguished from coal by the difficulty with which it burns, by its greater specific gravity, and by its composition: it differs from graphite in being less heavy; its trace on paper is dull and blackish, whereas that of graphite is a shining metallic gray; and graphite is unctuous to the feel, whereas glance-coal is not.

**GLAND.** (*glande*, Fr. *glandula*, It.)

1. Bodies employed to form or alter the different liquids in the animal body. There are two distinct sets of glands, the conglobate, and the conglomerate. Great variety is observable both in the form and structure of different glands, and in the mode in which their blood-vessels are distributed. In some glands, the minute arteries suddenly divide into a great number of smaller branches, like the fibres of a camel-hair pencil; this is called the pencillated structure. Sometimes, the minute branches, instead of proceeding parallel to each other, after

- their division, separate like rays from a centre, presenting a stellated arrangement. In the greater number of instances, the smaller arteries take a tortuous course, and are sometimes coiled into spirals. It is only by means of microscopic aid that these minute structures can be rendered visible.
2. In botany, a small transparent tumour or vesicle, discharging a fluid, either oily or watery, and situated on various parts of plants, as the stalk, calyx, leaves, &c. These glands are composed of closely compacted cells, which perform the functions of secretion, or the conversion of the nutritious juices into particular products required for various purposes in the economy of the plant. The perfume of the flowers and leaves of plants arises from secretions from glands.
- GLANDIFEROUS.** (from *glandifer*, Lat.) Bearing acorns, or fruit resembling acorns.
- GLANDIFORM.** Of the form or shape of a gland.
- GLANDULAR.** } (*glanduleux*, Fr. *glandulo-*  
**GLANDULOUS.** } *so*, It. *glandulosus*, Lat.)
1. Pertaining to glands; containing glands; full of glands.
2. In botany, applied to the margins of leaves having glands.
- GLAUBERITE.** An hydrous sulphate of soda and lime. A mineral of a white or yellow colour; crystallized in oblique four-sided prisms; consisting of 51 parts sulphate of soda, and 49 parts sulphate of lime. It is less hard than carbonate of lime, but scratches sulphate of lime. It is found in New Castile, in Spain, disseminated in muriate of soda.
- GLAUCOUS.** (*glaucus*, Lat. azure, *γλαυκός*, Gr.)
1. Of a sea-green colour; grey or blue; azure.
2. In botany, applied to the leaves or stems of plants, when covered with a fine mealiness of a sea-green colour.
- GLENOID.** (from *γλήνη* and *εἶδος*, Gr.) A part having a shallow cavity.
- GLIMMER.** (Germ.) The name given by Werner to mica.
- GLOBOSE.** (*globosus*, Lat.) Round; spherical.
- GLOBOSITY.** (*globesità*, It.) Roundness; sphericity; sphericalness.
- GLOBOUS.** Spherical; round.
- GLOBULAR.** Round; spherical.
- GLOBULE.** (*globule*, Fr. *globetto*, It.) A small particle of matter having a round or spherical form.
- GLOBULOUS.** (*globuleux*, Fr. *globuloso*, It.) Round; spherical.
- GLOMERATE.** } (*glomeratus*, Lat.) Ga-  
**GLOMERATED.** } thered into a mass of a  
globular form.
- GLOMERIS.** (from *glomerio*, Lat. to gather into a round heap.) A myriapod, resembling a wood-louse, which, like the armadillo, when alarmed, rolls itself up into a spherical ball.
- GLOMEROUS.** (*glomerosus*, Lat.) The same as glomerate.
- GLOTTIS.** (from *γλῶττα*, Gr.) The upper opening of the larynx, at the root of the tongue.
- GLUCINA.** (from *γλυκός*, Gr. sweet.) An earth obtainable from the emerald, beryl, and euclase, of all which it forms a constituent part. Sir H. Davy discovered that glucina consisted of three parts glucinum and one part oxygen. Glucina is soluble in the liquid fixed alkalies, in which respect it agrees with alumina. It is insoluble in ammonia, but soluble in carbonate of ammonia. It combines with all the acids, and forms with them sweetish salts, from which circumstance it obtained its name. It was first discovered by Vauquelin in 1798.
- GLUCINUM.** The metal which is the base of the earth glucina; it has not yet been obtained in a separate state.
- GLUMA'CEOUS.** Having glumes.
- GLUME.** (*gluma*, Lat.) The husk of corn; the chaff; the outer husk of corn and grasses; the calyx of corn and grasses. In the grasses, and plants resembling them, the floral envelopes are not called calyx and corolla, but bractææ. The two outer bractææ are termed *glumes*.
- GLUTINOUS.** (*glutineux*, Fr. *glutinoso*, It. *glutinosus*, Lat.) Viscid; tenacious; gluey.
- GLUTINOUSNESS.** Viscosity; tenacity; viscosity.
- GLYCEMERIS.** } A transverse shell, gaping  
**GLYCI'MERIS.** } at both extremities; hinge  
callous, without tooth.
- GNAILED.** Having hard knots.
- GNEISS.** The name given by the German mineralogists to a schistose or slaty granite, abounding in mica. It is a member of the metamorphic rocks. By some geologists, gneiss has been called secondary granite. Granite frequently may be observed passing by scarcely perceptible gradations into gneiss: when granite contains but little felspar, and the proportion of mica is increased, the mica being arranged in layers, it becomes schistose, and we find a true gneiss. Again, when the mica becomes very abundant, gneiss passes into mica-slate. Gneiss occurs in Ireland and Scotland; but it is rarely found in England or Wales. It is most abundant in Sweden. Gneiss is composed of the same ingredients with granite, namely, felspar, quartz, and mica, its texture being equally

crystalline. According to the Huttonian theory, the materials composing gneiss were originally deposited from water; but from the influence of subterranean heat, became altered so as to assume a new texture. The structure of gneiss is always more or less distinctly slaty, when viewed in the mass; although individual layers may possess a granular structure. When this mineral is broken perpendicularly to the direction of its strata, its fracture has commonly a striped aspect. This rock, though slaty in its structure, is rarely perfectly fissile. Gneiss, like granite, never contains any fossil remains; when it occurs with granite, it usually lies immediately over the granite; or, if the strata be highly inclined, it appears rather to rest against the granite than to be incumbent upon it. Gneiss is more or less distinctly stratified, and the strata are often inclined to the horizon at a very great angle; indeed, they are sometimes nearly, or quite, vertical. Mountains composed of gneiss are seldom so steep as those of granite, and their summits, instead of presenting those needle-like points, or aiguilles, which characterize granitic mountains, are usually rounded. Few of the primary rocks are so metalliferous as gneiss. Its ores occur both in beds and veins: more frequently in the latter.

**GLANDULOUS GNEISS.** A variety of gneiss, (in which the mica is sometimes arranged in undulated layers,) presenting numerous small masses of felspar or quartz, of a globular or elliptical form, interspersed like glands through the mass. From this circumstance it has obtained its name.

**GOLD.** (Sax.) A metal, when pure, of a rich yellow colour: specific gravity 19.3. It does not readily combine with oxygen; hence it does not rust when exposed to the air, and it may be melted and re-melted frequently with scarcely any diminution of its quantity. It is said to have been kept in a state of fusion for nearly eight months without undergoing any perceptible change. In ductility and malleability it surpasses all other metals, and it may be beaten into leaves so exceedingly thin, that one grain of gold shall cover fifty-six square inches, such leaves having the thickness only of one 282,000th part of an inch. Its tenacity is inferior to that of iron, copper, platinum, and silver. Gold is soluble in nitro-muriatic acid, and in a solution of chlorine. The gold coins of this country contain one-twelfth part of copper alloy: jewellers' gold is a mixture of gold and copper in the proportions of three-fourths of pure gold and one-fourth of copper.

**GOLT.** See *Gault*.

**GONI'ATITES.** A sub-genus of ammonites, in which the last whorl covers the spire. Seven species have been found in the carboniferous system, and seventeen in the primary strata.

**GONIO'METER.** (from *γωνία*, an angle, and *μέτρον*, a measure, Gr.) An instrument invented by M. Carangeau, for the accurate measurement of crystals. Dr. Wollaston also invented a *goniometer*.

**GONYLE'PTES.** A genus of the second order of Pseudarachnidans, the posterior legs exhibiting a raptorious character.

**GORGO'NIA.** A genus of Ceratophyta, of the family Corticati, class Polypi. These animals have a horny skeleton, are carnivorous, feeding upon living animalcules. The polypi of several species have been observed, and they are found to possess eight denticulated arms, a stomach, &c.

**GRA'LLÆ.** An order of aquatic birds. Waders; frequenting marshes and streams; having long naked legs; long neck; cylindrical bills. In this order are included the crane, stork, heron, bittern, &c. &c.

**GRA'MINA.** (*gramen*, Lat.) The fourth order in Linnæus's division; the grasses.

**GRAMI'NEOUS.** (*gramineus*, Lat.) Grassy; resembling grass. Gramineous plants are such as have a long narrow leaf, and no foot-stalk.

**GRAMINI'VOUS.** (from *gramen*, grass, and *vorō*, to devour, Lat.) Subsisting wholly on grass or vegetable food. Animals which subsist wholly on vegetable food are called graminivorous, while those which live on flesh alone are called carnivorous; those feeding on both are called omnivorous; while those feeding solely on fishes are denominated piscivorous.

**GRAMMATITE.** (The name given by Brongniart to Tremolin.) A mineral, a variety of hornblende, confined almost entirely to primary rocks. Colours white and blue. Disposed in fibrous, radiated, and granular concretions.

**GRANATINE.** A name given by Mr. Kirwan to a granular aggregate containing three ingredients, but those differing from the ingredients of granite. A compound embracing two ingredients only, he termed a *granitell*; when three ingredients are present, but not the three forming granite, he called it a *granatine*; when more than three ingredients form the compound, he termed it a *granilite*.

**GRAN'ATITE.** } The Prismatoidischer gra-  
**GRE'NATITE.** } nat of Mohs, Granatit of Werner, Staurotide of Haüy. A reddish-brown mineral, occurring in primary rocks in the Shetland Isles, and in many parts of Scotland, and in America. Ac-

cording to Vauquelin, it consists of alumina 45, silica 33, oxide of iron 13, oxide of manganese 4, and lime 4. Its form and infusibility distinguish it from the garnet.

**GRANIFEROUS.** (from *granum* and *fero*, Lat.) Pods which bear seeds like grains.

**GRANILITE.** An aggregate containing more than three constituent parts; thus named by Mr. Kirwan.

**GRANITE.** (*granito*, It. *granit*, ou *granite*, Fr. *Pierre fort dure, qui est composée d'un assemblage d'autres pierres de différentes couleurs.*) An aggregate of felspar, quartz, and mica, whatever may be the size or figure of the several ingredients, or their relative proportions, is denominated granite. There are many varieties of granite; as porphyritic granite, in which large crystals of felspar occur; sienitic granite, in which hornblende supplies the place of mica; chloritic, or talcy granite, composed of quartz, felspar, and talc or chlorite, instead of mica; feldspathic granite, &c. &c. Granite is a compound plutonic or igneous rock, unstratified and crystalline, of a granular structure, whence its name. From its great relative depth, granite is rarely met with but in mountainous situations, where it appears to have been forced through the more superficial covering. "It was at one time supposed that granite was peculiar to the lowest portions of the rocks composing the crust of the earth, and that, in fact, it constituted the fundamental rock upon which all others had been formed, and was not discovered higher in the series. This opinion has given way before facts, for we find granitic rocks in situations where they must have been ejected subsequently to the period during which the cretaceous group was deposited, as also in other places, into which they must have been thrust at intermediate periods down to the oldest rocks inclusive. Granite is said to contain forty-eight per cent. of oxygen. Granite being an igneous rock, no organic fossil remains could be expected to be found therein, nor have any ever been discovered; nevertheless granite is occasionally found overlying strata containing fossil organic remains, as in Norway; a mass of granite has been discovered superincumbent on secondary limestone, which contains orthocerata, &c. From these circumstances there can no longer exist a doubt but that granite has been formed at different periods, and is of various ages. A comparatively modern granite may be observed in the Alps penetrating secondary strata, such secondary strata containing fossils, such as

belemnites, referrible to the age of the English lias. Felspar is by far the largest constituent of granite, and in some kinds it is found in large whitish crystals of irregular forms, occasionally of one or two inches in length. Granite of this kind, however beautiful it may be to the eye, is not well adapted for buildings, the felspar being subject to decomposition from the continued action of the atmosphere. Waterloo-bridge is unfortunately built of this perishable kind of granite. It may be considered as a general law, that wherever granite rises to any height above the surface of the earth, the strata of other surrounding rocks rise towards it. The highest point at which granite has been discovered in any part of the world is Mont Blanc, 15,683 feet above the level of the ocean. Saussure, who has published an account of his ascent of Mont Blanc, infers from his observations that the vertical beds of granite were originally horizontal and have been upheaved by some violent convulsions of nature, and he states that what now forms the summit of the mountain must at some former period have been more than two leagues below the surface.

**GRANITEL.** } A name given by Kirwan to  
**GRANITELL.** } a binary aggregate composed of any two of the following ingredients: felspar; mica, shorl, quartz, garnet, steatites, hornblende, jade.

**GRANITIC.** Composed of grains or crystals united without a cement, as in granites and some sandstones.

**GRANITICAL.** Consisting of granite; composed of granite.

**GRANITIC AGGREGATE.** A granular compound, consisting of two, three, or four simple minerals, among which only one of the essential ingredients of granite is present. Among the granitic aggregates, which contain only one of the essential ingredients of granite, may be enumerated combinations of quartz and hornblende, — quartz and actinolite, — felspar and schorl, — mica and hornblende, — quartz, hornblende, and garnet, — quartz, hornblende, and epidote, &c. &c.

**GRANITIFICATION.** The act of being formed into granite.

**GRANITIFORM.** Resembling granite in structure or shape.

**GRANITINE.** An aggregate of three mineral constituents, one or more differing from those which compose granite. For example, an aggregate of quartz, felspar, and shorl is a granitine, as is one of quartz, mica, and shorl; or quartz, hornblende and garnet; and many others.

**GRANITOID.** (from *granite* and *είδος*, Gr.) Resembling granite.

**GRANIVOROUS.** (from *granum* and *voro*,

Lat.) Eating grain; subsisting on grain.

GRA'NULAR. } Bodies containing, or com-  
GRA'NULARY. } posed of, small grains.

GRA'NULAR LIMESTONE. A subspecies of carbonate of lime, the result of a confused or irregular crystallization. Structure foliated and granular. The grains are of various sizes, from coarse to very fine, sometimes, indeed, so fine that the mass appears almost compact. When these grains are white and of a moderate size, this mineral strongly resembles white sugar in solid masses. Its fracture is foliated, and when the structure is very finely granular, the fracture often becomes a little splintery. It is more or less translucent, but in the dark-coloured varieties, at the edges only. Its colour is most commonly white or gray, often snow-white, and sometimes grayish black. Some varieties are flexible when sawn into thin slabs. Granular limestone is sometimes a pure carbonate of lime. It occurs in very large masses, and is almost exclusively found in primary rocks; sometimes it occurs among secondary, but then its relative age is easily determined by the shells it contains, or the accompanying minerals. In the Pyrennees vertical beds of *granular limestone* alternate with granite, and trap, or the limestone is sometimes intermixed with those rocks.

There are few countries in which *granular limestone* is not found. Italy and Greece furnished the ancients with valuable quarries. Both granular and compact limestone furnish numerous varieties of marbles, but those which belong to the former exhibit a more uniform colour, are generally susceptible of a higher polish, and are consequently most esteemed for statuary and some other purposes.—*Cleveland.*

GRA'NULATE. (*granuler*, Fr.) To be formed into small grains.

GRA'NULATED. Having a structure resembling grains; formed into grains; beaded; having small roundish elevations, placed in rows.

GRA'NULATION. (*granulation*, Fr.)

1. The operation by which metals are reduced into small grains.

2. The act of forming into bodies resembling aggregates of grains.

GRA'NULE. (diminutive of grain.) A small grain.

GRA'NULOUS. Composed of grains; full of small grains.

GRA'PHIC GRA'NITE. A variety of granite, composed of felspar and quartz, so arranged as to produce an imperfect laminar structure. When a section of graphic granite is made at right angles to the alternations of the constituent minerals, bro-

ken lines, resembling Hebrew characters, present themselves; hence its derivation.

GRA'PHITE. Another name for black-lead, or plumbago; carburet of iron. Graphite is of a dark steel-gray, or nearly iron-black. It leaves on paper a well defined, shining trace, which has very nearly the colour of the mass, and consists of minute grains. It is perfectly opaque, easily scraped by a knife, and soils the fingers. It is a conductor of electricity, and when rubbed on sealing-wax till a metallic trace appears, communicates no electricity to the wax. Specific gravity from 1.98 to 2.26. Constituent parts, carbon 92.0, iron 8.0.—*Cleveland.*

GRA'PTOLITE. A fossil zoophyte, found in the Silurian shales.

GRA'VEL. Fragments of stones and flints; small pebbles.

GRAVITATION. (*gravitation*, Fr. *gravitazione*, It.) The difference between gravity and the centrifugal force induced by the velocity of rotation or revolution: the force which causes substances to fall to the surface of the earth, and which retains the celestial bodies in their orbits; its intensity increases as the squares of the distance decrease.

GRA'VITY. (*gravité*, Fr. *gravità*, It.) The reciprocal attraction of matter on matter. The force of gravity is every where perpendicular to the surface, and in direct proportion to the quantity of matter.

GRA'YWACKE. } (from *grauwacke*, Germ.  
GRAU'WACKE. } a compound of *grau*,  
GRAUWACKE'. } grey, and *wacke*, a  
GRE'YWACKE. } provincial term used by  
miners.)

The name given to a group of rocks, being the lowest members of the secondary strata. Mr. Lyell comprises in this group the Ludlow, Wenlock and Dudley, Horderly and May Hill rocks, the Bulth and Llandeilo flags, and the Longmynd rocks. The French have changed the name *grauwacke* for *traumate*, a word as little euphonic as the one repudiated. Mr. Bakewell observes, "Graywacke, in its most common form, may be described as a coarse slate containing particles or fragments of other rocks or minerals, varying in size from two or more inches to the smallest grain." When the imbedded particles become extremely minute, graywacke passes into common slate. When the particles and fragments are numerous, and the slate in which they are cemented can scarcely be perceived, graywacke becomes coarse sandstone, or gritstone. When the fragments are larger and angular, graywacke might be described as a breccia with a paste of slate. When the fragments are rounded it might not improperly be called an ancient conglomerate. The old red

sandstone is a graywacke, coloured red by the accidental admixture of oxide of iron; it possesses all the mineral characters, and occupies the geological position of, graywacke. The rock, though composed of substances of various colours, usually exhibits some shade of gray or brown; it is sometimes of considerable hardness, and susceptible of a high polish. Graywacke is often distinctly stratified, but the strata are not usually parallel to those of the subjacent rocks. The common and slaty varieties often alternate with each other, and both are traversed by veins of quartz. This rock is remarkably metalliferous; and its ores occur both in beds and veins. Most of the mines of the Hartz are contained in graywacke.

Graywacke abounds in Germany and in Scotland; indeed, nearly all the mountains of Scotland north of the Frith of Forth are chiefly composed of it. In the neighbourhood of Mont Blanc, and in other parts of the Alps, it occurs at a great elevation, forming large masses in vertical beds.

**GRAYWACKE SLATE.** A variety of graywacke, in which the grains are so minute as to be scarcely perceptible by the naked eye.

**GREEN-EARTH.** The Grün Erde of Werner; the Talc Zographique of Haüy; the Chlorite Baldogée of Brongniart. A variety of talc, occurring in vesicular cavities in amygdaloid. Its colour is a pleasant green, more or less deep, sometimes bluish or grayish-green, and passing to olive and blackish-green. Its fracture is dull, and fine-grained earthy, or slightly conchoidal. It is somewhat unctuous to the touch, and adheres to the tongue. Easily reducible to powder. Specific gravity 2·63.—*Kirwan*.

According to Vauquelin it consists of siliceous 52·0, magnesia 6·0, oxide of iron 23·4, alumina 7·0, potash 7·4, water 4·0. It is met with in the mountainous districts of England and Scotland. It is the mountain-green of artists; and, when ground with oil, is employed as a paint.

**GREEN-SAND.** A member of the chalk formation, called also Shanklin sand. The beds of sand, sandstone, and limestone, which form the lowermost strata of the chalk formation, have obtained the name of green-sand, from the circumstance of their containing a considerable quantity of chlorite, or green earth, scattered throughout their substance. In describing the group of deposits to which the name of green-sand, or Shanklin-sand, is appropriated, geologists state that they admit of a triple division; the first, or uppermost, consists of sand, with irregular

concretions of limestone and chert, sometimes disposed in courses oblique to the general direction of the strata. The second consists chiefly of sand, but in some places is so mixed with clay, or with oxide of iron, as to retain water. The third, and lowest group, abounds much more in stone; the concretionary beds being closer together and more nearly continuous. The total thickness of the green-sand, where it is fully developed, is more than 400 feet. The animal remains of the green-sand are exclusively marine. The French have denominated this formation glauconie crayeuse, and craie chloritée. It is very common to divide the green-sand into the upper green-sand and the lower green-sand, the two being separated by the gault.

**GREENSTONE.** The Grünstein of Werner; Roche Amphibolique of Haüy; the diabase of the French geologists. A granular rock composed of hornblende and felspar, in the state of grains, or sometimes of small crystals. Greenstone contains a larger quantity of felspar than basalt, and the grains both of hornblende and felspar are less amalgamated. It is a variety of trap rock. The hornblende usually predominates, and frequently gives to this aggregate a greenish hue, from which circumstance it obtains its name. Greenstone occurs in beds of considerable magnitude, and sometimes forms whole mountains. It often appears in conical hills, or presents high, mural precipices, whose fronts are frequently composed of numerous columns of various sizes, resembling basalt. Sometimes it forms only the summits of mountains. Small veins of actinolite, epidote, felspar, prehnite, quartz, &c., &c., frequently are found traversing greenstone.

**GREGARIOUS.** (*gregarius*, Lat.) Living in flocks or herds; animals whose habits lead them to assemble in numbers.

**GREENATITE.** Prismatic garnet. See *Granatite*.

**GREYSTONE.** A rock of greyish or greenish colour, composed of felspar and augite, the former being more than 75 per cent. of the whole.

**GREYWACKE.** For a full description of this, see *Graywacke*.

**GREY-WEATHERS.** The name given to large boulders of siliceous sandstone. There is a singular assemblage of these erratic blocks in a field on the borders of Wiltshire, not far from Marlborough. The immense blocks forming, as is supposed, the druidical temple at Stonehenge, are composed of this siliceous sandstone. "Boulders of druid sandstone," observes Dr. Mantell, "also occur in the shingle bed, and calcareous deposit, at Brighton,

and may be observed lying on the sea-shore in considerable numbers, after a recent fall of the cliff. Upon comparing the sandstone of Stonehenge with that of Sussex, no perceptible difference can be detected.

**GRISÉOUS.** (from *griser*, Fr.) A mixture of black and white.

**GRIT.** The provincial term for a coarse siliceous sandstone. Some of the strata of this description have been worked for mill-stones, from which circumstance they have been called mill-stone grit. The mill-stone grit is an important deposit in the north of England, from the Coquet to the Tyne, and on the hills between the dales of Durham and York, from the Tyne to the Ribble.

**GROSSULÆRE.** The asparagus-green variety of dodecahedral garnet. It is found in Siberia. Its constituents are, silica 40·50, alumina 20·10, lime 33·80, oxide of iron 5·00, oxide of managanese 0·50.

**GRYPHÆA.** (from *gryps*, Lat. a griffin.) A fossil inequivalved bivalve; the lower valve concave, terminated by a beak, and curving upwards and inwards; the upper valve much smaller, like an operculum; the hinge toothless, the pit oblong and arched: one impression in each valve. Fossil shells of this genus are found in considerable numbers in different parts of England. From the curved beak of the shell, Linnæus placed it among the anomixæ; but Lamarck placed it under a distinct genus. He notices nine different species. Parkinson observes, "on viewing the different specimens of ostracites and gryphites, I cannot help doubting as to the propriety of the formation of a distinct genus for this shell. I find specimens in which the beak and the body of the valve possess various degrees of curvature, from the complete curve of the gryphites to the slight turn of the edible oyster. The recent gryphæa is found at a shallow depth, in estuaries, on gravel and sand.

**GRYPHÆTE.** (*gryphites*, Lat.) Belonging to the genus gryphæa. This deeply-incurved bivalve is so abundant in some of the beds of lias in France, as to have occasioned them to be called Calcaire à gryphites. These shells are known in this country by the provincial term of "miller's thumbs."

**GYMNOSPERMIA.** (from γύμνος, *nudus*, naked, and σπέρμα, *semen*, seed.) The first order in the fourteenth class, Didynamia, in Linnæus's artificial system; having four naked seeds in the bottom of the calyx, with the exception of one genus, Phryma, which is monospermous.

**GYMNOSPERMOUS.** Having naked seeds

in the bottom of the calyx; belonging to the order Gymnospermia.

**GYNA'NDRIA.** (from γυνή, a woman, and ανήρ, Gr. a man.) The name of the 20th class in Linnæus's sexual system, consisting of plants with hermaphrodite flowers, having the stamens growing upon the style, or having the stamina united with, or growing out of the pistil, and either proceeding from the germen or the style. The orders of this class are taken from the number of the pistils, but botanists are not agreed as to the admission of some of them into the class.

**GYNA'NDRIAN.** Belonging to the class Gynandria.

**GYNA'DROUS.** A term applied to a particular class of plants, in which the stamens and pistils are united. The orders of this class depend on the number of the anthers.

**GYPSEOUS.** (*gypseux*, Fr.) Resembling gypsum; containing gypsum; of the nature of gypsum.

**GYPSUM.** (γύψος, Gr. *gypsum*, Lat. *gypse*, Fr. *gesso*, It.) The chaux sulfatée of Brongniart and Haüy. Sulphate of lime; it is composed of sulphuric acid 46·0, lime 33·0, water 21. It possesses double refraction. There is one variety known by the name of anhydrite, or anhydrous gypsum, which contains no water. Sulphate of lime is an abundant mineral salt, presenting itself under various forms, crystallized or otherwise. From gypsum is obtained plaster of Paris, the gypsum being burnt in a kiln, and the water thereby driven off. The varieties of gypsum are numerous; the crystallized transparent varieties are known as selenite; the fibrous and earthy as gypsum; and the granular and massive as alabaster. The salt mines of this country afford examples of nearly all the varieties. The white powder obtained by exposing gypsum to a strong heat has obtained the name of plaster of Paris, from the extreme abundance of this mineral in the neighbourhood of that capital. Its inferior hardness, together with its chemical characters, will serve to distinguish it from the carbonate, fluatè, and phosphate of lime. "The gypsum formation consists of alternating beds of gypsum and argillaceous and calcareous marl, which are regularly arranged, and preserve the same order of succession wherever they have been examined. The gypsum forms three distinct masses. The lowest consists of thin strata of gypsum containing crystals of selenite, which alternate with strata of solid calcareous marl, and with argillaceous shale. The middle is like the lowest mass, except that the strata of gypsum are thicker,

and the beds of marl are not so numerous; it is chiefly in this mass that fossil fish are found. The uppermost mass is the most remarkable and important of all; it is in some parts more than seventy feet thick; there are but few beds of marl in it; the lower strata of gypsum in this mass have a columnar structure. In this upper mass of gypsum the skeletons and scattered bones of birds and unknown quadrupeds are discovered. Remains of turtles and crocodiles have been also found in the same strata." For a further and more interesting detail, see Bakewell's Introduction to Geology.

**GY'RODUS.** A fossil fish of the family of

Pycnodonts, or thick-toothed fishes, found in the oolite of Durrheim, in Baden.

**GYRO'GONITE.** (from *γύρος*, *curvus*, and *γένος*, genus.) Petrified seed-vessels of the *Chara hispida*. These bodies are found in fresh-water deposits, and were, not very long since, supposed to be microscopic shells, indeed they are thus described by Parkinson, who concludes his notice of them by stating, "Lamarck observes, that it has the form of a very small seed of some species of lucern; and hesitating at determining it to be really a multilocular shell, only assumes it as such for the present."

## H

**HA'BITAT.** Habitation; place of abode.

**HA'BITUDE.** (*habitudo*, Lat. *habitude*, Fr. *abitudine*, It.) Customary manner or mode of life.

**HADE.** A term used by miners; to dip.

**HA'DING.** The dip from the perpendicular line of descent; the dipping of a vein.

**HE'MATITE.** (*ἡματίτης*, Gr. *hematites lapis*, Lat.) Blood-stone, an iron ore; it occurs in masses of various shapes, both globular and stalactitic.

**HALIO'TIS.** (from *ἅλα*, *mare*, and *ὠτός*, *auris*, Gr.) The sea-ear. A shell, both fossil and recent, obtaining its name from the excessive amplitude of its aperture, and the flatness and smallness of its spire, whence it has been likened to an ear. The shells of this genus are said, by Mr. Parkinson, to be among the rarest fossils. The recent shells are littoral, and found adhering to rocks; they are very beautiful, and are remarkable for the pearly iridescence of the inner surface, and for the shell being perforated along the side of the columella by a series of holes; they are amongst the most highly ornamented of all the gasteropoda. The sea-ears protect their open side by fixing themselves to the rocks, and preserve a communication with the atmosphere, or water, without elevating their shells, by means of a line of apertures, under the thickest margin, near the apex: these apertures begin, when the animal is young, near the spire, and as it grows it stops up one and opens another, as its occasions require. "I have," says the Rev. W. Kirby, "a very large specimen, in which there are traces of eighteen apertures, and all but six are stopped up." The soft parts of the inhabitant of this shell are eaten in some places, and are esteemed as being delicious.

**HA'LOIDE.** (from *ἅλς*, salt, and *εἶδος*, Gr. form or appearance.) An order of earthy and metalliferous minerals; tasteless; specific gravity from 2.2 to 3.3.

**HALTE'RES.** (*ἅλτηρες*, Gr. *halteres*, Lat.) The poisers, so named from their supposed use in balancing the body, or adjusting with exactness the centre of gravity when the insect is flying. In those insects which compose the order *Diptera*, we meet with two organs, consisting of cylindrical filaments, terminated in a clubbed extremity; one arising from each side of the thorax, in the situation in which the second pair of wings originate in those insects that have four wings; these are called *halteres*. Whatever may be their real utility, they may still be regarded as rudiments of a second pair of wings.

**HA'MITE.** (from *hamus*, Lat. a hook.) A genus of fossil multilocular hook-formed shells. Parkinson states that the hamite has no evident siphunculus, but this is a mistake; the siphunculus of the hamite, like that of the ammonite, is placed on the back, or outer margin of the shell, and in some species this marginal siphunculus has a keel-shaped pipe raised over it. The external shell is fortified by transverse folds or ribs, which serve to strengthen both the outer and the air chambers. The hamite is sometimes found of large size, more especially that species known as *Hamites grandis*; some of them are of the diameter of a man's wrist. Nine species are stated to have been discovered in the gault or Speeton clay immediately below the chalk in Yorkshire. Dr. Mantell gives the following as found in Sussex:—In the chalk one species, *Hamites armatus*. In the chalk mark five species, *H. armatus*, *H. plicatilis*, *H. alternatus*, *H. ellipticus*, *H. attenuatus*. In the gault six

species, *H. maximus*, *H. attenuatus*, *H. intermedius*, *H. tenuis*, *H. rotundus*, *H. compressus*.

**HA'MOUS.** (*hamus*, Lat.) Hooked.

**HAR'MOTOME.** (from ἀρμός, a joint, and τέμνω, to divide.) The Kreuzstein of Werner; Cross-stone of Jameson; Pierre cruciforme of Brochant; Stauroilite of Kirwan. For a description of *harmotome*, see *Cross-stone*.

**HA'RPA.** A genus of shells placed by Cuvier in the family Buccinoida, order Pectinibranchiata, class Gasteropoda. A beautiful genus of shells, distinguishable from all others by the regular longitudinal ribs that mark the external surface, in some degree resembling a stringed instrument, from which the name is derived. The genus is both fossil and recent; the shells are marine, and are inhabitants of warm climates; they are easily recognized by the projecting transverse ribs on the whorls; the last of which forms a lip on the margin.

**HA'RPAK.** A genus of fossil shells described by Parkinson. They are of an oblong, and somewhat of a triangular, form. The hinge is formed by two long projecting teeth, transversely crenulated on both sides, and diverging in the form of the letter V on the flat valve.

**HA'STATE.** (*hastatus*, Lat.) Spear-shaped.

**HA'TCHETINE.** A variety of bitumen, known also as mineral adipocere, found in the iron ore of Merthyr Tydfil in Glamorganshire. It is insoluble in water, but soluble in alcohol and ether. It fuses at 160°. It is of the hardness of soft tallow.

**HAUSMA'NNITE.** } Pyramidal manganese-

**HAUSSMA'NNITE.** } ore. The Manganese oxyd hydraté of Haüy. It occurs in porphyry, in veins, in America and Germany. It is of a brownish-black colour. It consists, according to Turner, of 98·10 of red oxide of manganese, silica 0·34, oxygen 0·21, baryta, 0·11, water 0·43.

**HAUYNE.** Dodecahedral Zeolite, or Lapis Lazuli.

**HEART-SHAPED.** A triangular figure, having its base emarginate, lateral angles rounded, and lateral margin slightly swollen.

**HEA'VY SPAR.** Sulphate of barytes, baroselenite, or prismatic heavy spar. The Baryte sulphatée of Haüy; the Schwer spath of Werner; and Prismatischer halbaryte of Mohs. There are several varieties of this genus, namely, the compact heavy spar, having a splintery and uneven fracture; the fibrous heavy spar; the straight and curved lamellar heavy spar; the radiated heavy spar; the fetid heavy

spar, giving out, on friction a hepatic odour, whence it is also called hepatic; the earthy heavy spar; the prismatic heavy spar.

Heavy spar consists of baryta 66 parts and sulphuric acid 34 parts. It frequently contains a trace of silex, alumine, oxide of iron, and sometimes of sulphate of strontian. It occurs in veins, both massive and crystallized, in many parts of England, Ireland, Scotland, and Germany, being found in primary, transition, and secondary rocks. It is of different colours. It strongly decrepitates when heated, and fuses into a white enamel, which in the course of some hours falls into powder. One of the most striking characters of this mineral is its great specific gravity, which varies from 4·29 to 4·50. It is from this circumstance it has obtained its name. It is harder than crystallized carbonate of lime, but may be scratched by fluate of lime. Heavy spar may be confounded with sulphate of strontian, but its specific gravity is greater. After fusion, the enamel produced from heavy spar, if applied to the tongue, produces a taste similar to that of rotten eggs, this does not occur in the enamel of sulphate of strontian. Heavy spar is seldom found in large masses. It is sometimes employed as a flux in metallurgic operations, and is said to be a good base for water colours.

**HE'LICAL.** (*hélice*, Fr. ἑλιξ, Gr.) Spiral; winding.

**HE'LIOTROPE.** (*héliotrope*, Fr. *eliotropia*, It. *heliotropium*, Lat. ἡλιοτρόπιον, Gr. from ἥλιος and τρέπω.)

1. A plant, the turnsole.
2. A variety of rhombohedral quartz, of a deep green colour, with disseminated spots of yellow and red jasper. It is more or less translucent. Fracture imperfectly conchoidal. Specific gravity about 2·63. The finest specimens are brought from Siberia and Bucharia. Like agate, it is employed in forming ornamental articles.

**HE'LIX.** (ἑλιξ, Gr.)

1. The outer bar, or margin, of the external ear.
2. The snail. A globular or orbicular shell; spire short, convex or conoidal, last whorl ventricose; opening entire, being wider than long; no operculum. The *helix aspera*, or common snail, is a well-known illustration. Parkinson observes of the fossil helix, "Shells of this genus are rarely found in a state of petrification. The circumstances of conservation in which they are found are, generally, such as are explicable on the supposition of their having become involved in the gradually accreting tufaceous mat-

ter, which is deposited by certain streams and rivers; or in the stalactitic concretions forming in the cavities of limestone rocks, of comparatively modern formation.' It is observed that the terrestrial univalves are never armed with spines, tubercles, or other elevations, but exhibit generally a levigated shell.

**HELVINE.** Tetrahedral garnet.

**HEMATITE.** (*ἡματίτης*, Gr.) Iron ore. There are two kinds of hematite, the red hematite, or rhombohedral iron-ore, and the brown hematite, or prismatic iron-ore. Also written Hæmatite.

**HEMATITIC.** Composed of hematite; containing hematite; resembling hematite.

**HEMIPTERA.** (from *ἡμισυ* and *πτερον*, Gr. So called, because their wing-covers at the base are of a substance resembling horn or leather, and at the tip are membranous.) An order of insects, comprising two families, Geocorisæ and Hydrocorisæ. These insects have four wings, either stretched straight out, or resting across each other; the superior are coriaceous at their base, with a membranous apex. The mouth of hemipterous insects is adapted for extracting fluids by suction only. They are carnivorous, or, more properly, animal-suckers. The cockroach, locust, grasshopper, bug, lantern-fly, &c., belong to this order.

**HEMIPTERAL.** } Belonging to the order  
**HEMIPTEROUS.** } Hemiptera; insects which have one-half of their wings coriaceous, and the other half membranous.

**HEMISPHERE.** (*hémisphère*, Fr. *emisfero*, It. *hemisphærium*, Lat. *ἡμισφαίριον*, Gr.) The half of a globe when it is supposed to be cut through its centre, in the plane of one of its greatest circles; one-half of the globe, or sphere, when divided into two by a plane passing through its centre. The equator divides the sphere into two equal parts, called the northern and southern hemispheres. The horizon also divides the sphere into two parts, the upper and the lower hemispheres.

**HEMISPHERIC.** } Half round; contain-  
**HEMISPHERICAL.** } ing half a globe.  
**HEMISPHERICK.** }

**HENDECAGON.** (from *ἑνδεκα* and *γωνία*, Gr.) A figure of eleven faces or angles.

**HEPATIC.** } (*hepaticus*, Lat. *hépatique*,  
**HEPATICAL.** } Fr. *epatico*, It.) Belong-  
ing to the liver; pertaining to the liver.

**HEPATIC CINNABAR.** A dark-coloured, steel-grey variety of the mercure sulphuret of Haüy, or cinnabar.

**HEPATIC PYRITES.** Hepatic sulphuret of iron. A variety of prismatic iron-pyrites, of a yellow colour, which, on exposure to the atmosphere, acquires a brown tarnish. This embraces those varieties of sulphuret of iron, which are susceptible of a pecu-

liar decomposition, by which the sulphur is more or less disengaged. During this process the pyrites is converted, wholly or in part, into a compact oxide of iron of a liver-brown colour, from which circumstance it obtains its name. In consequence of this decomposition, the mass does not lose its original form, but its hardness and specific gravity are somewhat diminished, and its lustre disappears. The decomposition begins at the surface, and gradually passes into the centre.

**HEPATITE.** A mineral; a variety of heavy spar, or sulphate of barytes. This variety is distinguished by its emitting a fetid smell when rubbed, resembling that of sulphuretted hydrogen, arising from its containing a portion of sulphur.

**HEPATULE.** A name given by Kirwan to certain combinations called by others hydrosulphurets.

**HEPTACA'PSULAR.** (from *ἑπτά*, Gr. and *capsula*, Lat.) Having seven cells.

**HEPTAGON.** (*heptagone et eptagone*, Fr. *ettagono*, It. *ἑπτά* and *γωνία*, Gr.) A figure having seven sides and as many angles.

**HEPTAGONAL.** Having seven sides and as many angles.

**HERBACEOUS.** (*herbaceus*, Lat.) Plants that perish annually down to the roots, having succulent stems, or stalks. Of herbaceous plants, some are annual, these perish, stem and root, every year; some are biennial, the roots subsisting two years; others are perennial, being perpetuated for many years by their roots, a new stem springing up every year.

**HERBARIUM.** (*herbarius*, Lat.) A collection of dried plants; a place set apart for growing herbs in.

**HERBIVOROUS.** (from *herba* and *voro*, Lat. to devour.) Subsisting on vegetables.

**HERMAPHRODITE.** (from *Ἑρμῆς*, Mercury, and *Ἀφροδίτη*, Venus, *hērmaprodite*, Fr. *ermaphrodito*, It. A fabulous name, compounded of those of Mercury and Venus, Hermes and Aphrodité.)

1. Having both the male and female parts of generation.

2. In botany, plants are so called which contain both stamens and ovarium, in distinction to monœcious and diœcious plants.

**HERPETOLOGIST.** One skilled in the natural history of insects.

**HERPETOLOGY.** (*ἑρπετός* and *λόγος*, Gr.) That branch of natural history which treats of reptiles, their habits, &c.

**HERSCHELITE.** A mineral of a white colour, found by Herschel in olivine, and named after its discoverer.

**HETEROCLITICAL.** In conchology, reversed; a term applied to shells whose spires

turn in a contrary direction to the usual way ; sinistral. In shells, the axis of revolution is termed the *columella*, and the turns of the spiral are denominated *whorls*. In consequence of the situation of the heart and great blood-vessels relatively to the shell, the left side of the mantle is more active than the right side, so that the lateral turns are made in the contrary direction. Sometimes, in consequence of the heart being placed on the right side the turns of the spiral are made to the left : this left-handed convolution seldom occurs among the shells of land or fresh-water mollusca.

**HETERÓSTROPHE.** (*ἑτερόστροφα*, Gr. ex ἕτερος et στροφή.) A term applied to reversed shells, or shells whose spires turn in a contrary direction to the usual way ; sinistral shells. Synonymous with Heterocrital.

**HEULANDITE.** Hemi-prismatic zeolite or foliated zeolite. The Stilbite of Haüy. A mineral, thus named after Heuland. It occurs in drusy cavities, in secondary trap rocks, in the Hartz mountains, in Ireland, and in Scotland. It is of different colours, white, grey, brown, and red. Its constituent parts are silica 59, alumina 16·87, potash 8, (or, according to others, lime 9,) water 16·5.

**HEXAGON.** (*ἑξάγωνο*, Fr. *esagono*, It.) *ἑξάγωνος*, Gr. from ἕξ, six, and *γωνία*, angle.) A figure of six sides or angles ; the most capacious of all the figures that can be added to each other without any interstice. The cells of the honeycomb are hexagons.

**HEXAGONAL.** Six-sided.

**HEXAGYN.** (from ἕξ, six, and *γυνή*, Gr. a woman.) A plant having six pistils.

**HEXAGYNIAN.** Having six pistils.

**HEXAHEDRAL.** Having six sides equal to one another ; cubal.

**HEXAHEDRON.** (from ἕξ and *ἔδρα*, Gr. *ἑξαἕδρε*, Fr. *esaedra*, It.) A cube ; a solid body having six equal faces.

**HEXANDER.** (from ἕξ, six, and *άνηρ*, Gr. a man.) As plants which have six pistils are denominated hexagyns, so those with six stamens are termed hexanders.

**HEXANDRIAN.** Having six stamens ; belonging to the sixth class in Linnæus's sexual method.

**HEXANGULAR.** (from ἕξ and *angulus*.) Having six angles.

**HEXAPED.** } (*ἑξοπόδης*, from ἕξ and *ποῦς*,  
**HEXAPOD.** } Gr.) An animal with six feet.

**HEXAPE' TALOUS.** (from ἕξ, six, and *πέταλον*, Gr. a leaf.) A plant having six petals ; a corolla consisting of six petals.

**HEXAPHY' LLOUS.** (from ἕξ and *φύλλον*, Gr.) Six-leaved.

**HI' LUM.** (*hilum*, Lat.) In botany, the

small mark on seeds showing the spot where they were joined to the fruit.

**HINGE.** In conchology, the point by which bivalve shells are united : it is formed by the teeth of the one valve inserting themselves between those of the other, or by the teeth of one valve fitting into the cavities or sockets of the opposite valve.

It is on the peculiar construction of the *hinge* that the generic character of bivalve shells is mainly founded, in connection with the general form of the shell.

Some *hinges* have no visible teeth, and are termed *inarticulate* ; *hinges* with few teeth are termed *articulate* ; those having many teeth are called *multiarticulate*.

**HIPPOROTAMUS.** (*ἵπποπόταμος*, Gr. *hipporotame*, Fr. *hippotamo*, It.) The hippopotamus, or river-horse, belongs to the order Pachydermata, or thick-skinned animals, class Mammalia. This genus of quadrupeds has four fore-teeth in the upper jaw, disposed in pairs at a distance from each other ; and four prominent fore-teeth in the under jaw, the intermediate ones being longest. There are two tusks in each jaw, those of the under being long, and obliquely truncated ; in both they stand solitary, and are recurved. The feet are hoofed on the edges. The head is of an enormous size, and the mouth vastly wide. The ears are small and pointed. The eyes and nostrils are small. The body is naked. The tail is about a foot long, taper, compressed, and naked. The legs are short and thick ; the belly reaching to the ground. One species only is known, the hippopotamus amphibius, confined to the rivers of Africa.

Fossil bones and teeth of the hippopotamus are abundantly found in England, France, Germany, and Italy ; several extinct species have been determined by Cuvier. The head of a hippopotamus was found in Lancashire, under the peat ; bones and teeth are found in large quantities in the Val d'Arno, in Italy, and in alluvial deposits in the neighbourhood of Rome.

**HI' PPOPIUS.** (from *ἵππος*, a horse, and *πούς*, a foot.) A subtransverse, equivalve, inequilateral shell ; lunule closed with crenulated edges ; the hinge formed of two long compressed entering teeth in one valve and three in the other ; the crescent closed. Parkinson states that he does not know of any fossil shells of this genus having been found, but Sowerby mentions fossil species.

**HI' PPOTHE' RIUM.** (from *ἵππος*, and *θηρίον*, Gr.) An extinct animal, allied to the horse, belonging to the miocene period.

**HIPPURITE.** A fossil bivalve, having an under shell of great depth, and of a conical form, with a flat lid, or operculum. This genus is believed to be wholly extinct. The operculum is sometimes convex, but generally it is concave. The particular economy of the inhabitant of this shell is not known. Lamarck has placed the hippurite among his chambered cephalopoda. Specimens of the upper chamber of hippurites have lately been found in the chalk, near Lewes. Dr. Mantell has named a species there discovered *Hippurites Mortoni*, after Dr. Morton, Secretary to the Academy of Natural Sciences of Philadelphia.

**HIRSU'TE.** (*hirsutus*, Lat.) Hairy; rough; shaggy; beset with strong hairs.

**HIRSU'TENESS.** Hairiness; shagginess.

**HISI'NGERITE.** A mineral of a dark colour, occurring massive, found in the cavities of calcareous spar.

**HI'SPED.** } (*hispidus*, Lat.) Hairy; beset  
**HI'SPID.** } with strong bristles.

**HOG-TOOTH SPAR.** A dodecahedral variety of calcareous spar. The *Matastatique* of Haüy.

**HOLOPTY'CHUS.** A genus of fossil sauroid fishes, discovered in the coal formation.

**HOLOPTY'CHUS HIBBERTI.** A species of *holoptychus* named after Dr. Hibbert, and found by him in the limestone of Burdie House.

**HOLOTHU'RIA.** A zoophyte belonging to the order *Pedicellata*, class *Echinodermata*. The *holothuria* is covered with a thick coriaceous skin, which, by means of longitudinal and circular bands of muscular fibres, the animal can shorten or lengthen at pleasure. The body is oblong, and open at each end; numerous tentacula surround the mouth. There are many species.

**HOL'MITE.** A mineral, a variety of carbonate of lime, named after Mr. Holme, who analysed it. Its constituents are lime, carbonic acid, oxide of iron, silica, alumina, and water.

**HOMOGENE'ITY.** (*homogénéité*, Fr. *omogeneità*, It.) Of the same nature; having the same nature throughout.

**HOMOGE'NEAL.** } (*ὁμογενής*, Gr. *homo-*  
**HOMOGE'NEOUS.** } *gene*, Fr. *omogeneo*,  
It.) Similitude of kind; sameness of nature.

**HOMO'LOGOUS.** (*homologue*, Fr. *omologo*, It. *ὁμόλογος*, Gr.) Having the same manner or proportions.

**HONE.** (*hæn*, Sax.) Whetstone slate. A variety of talcy slate, containing particles of quartz: when these particles are exceedingly minute, and the slate possesses a certain degree of hardness with a uniform consistence, it yields hones of the best quality. Kirwan gave to this mine-

ral the name *novaculite*, from *novacula*, the Latin for a razor.

**HO'NEY-STONE.** Pyramidal mellite. The *Honigstein* of Werner; Mellite of Haüy and Brongniart; and Mellilite of Kirwan. It is pyramidal, its primitive form being a pyramid of  $118^{\circ} 4'$  and  $93^{\circ} 22'$ . It was first discovered in Thuringia, between the layers of wood-coal. It is of a honey-yellow colour, sometimes a little tinged with brown. Transparency considerable. When heated it whitens, and in the open air burns without being sensibly charred. It yields neither flame, smoke, nor odour. It is composed of alumina, water, and an acid to which Klaproth gave the name of mellitic acid: the latter constitutes 46 per cent. of the whole. It differs from amber in its weak electricity, double refraction, and chemical character.

**HORIZO'NTAL.** (*horizontal*, Fr. *orizzontale*, It.) Parallel to the horizon; flat.

**HORIZONTAL'ITY.** Flatness; the state of being horizontal.

**HORIZO'NTALLY.** In a direction parallel to the horizon.

**HO'RNBLLENDE.** The amphibole of Haüy. A mineral of a black or dark green colour, often intermixed; heavier than either quartz or felspar, but less hard, its specific gravity being between 3.15 to 3.38. It enters largely into the composition, and forms a constituent part of several of the trap rocks, and appears to connect the primary with the volcanic. When breathed on, it yields a peculiar bitter smell. Before the blow-pipe it melts easily into a black or grayish-black, glass. There are many varieties of hornblende, known as carinthine, tremolite, actynolite, calamite, amianthus, &c. &c. The constituents of hornblende are, silica 45.60, magnesia 18.50, lime 14, alumina 1.18, protoxide of iron 7.50, fluoric acid 1.50. Its colours are produced by the oxides of chrome and iron. Massive hornblende is generally coarsely granular and lamellar; when intermixed with felspar in large lamellar grains, it forms sienite. This very common mineral may, generally, be easily recognized. Though sometimes in regular and distinct crystals, it is more commonly the result of a confused crystallization, and appears in masses composed of laminae, acicular crystals, or fibres variously aggregated. Though inferior to schorl in hardness, hornblende usually will scratch glass, and, though with difficulty, will yield sparks with steel. Its laminated structure, its inferior hardness, and its inability of becoming electric by heat, distinguish it from schorl. It is less hard and more easily fusible than augite. It differs from epidote in hard-

ness, and the results of fusion. Its powder is not soft to the touch like that of asbestos.—*Cleaveland*.

**HORNBLLENDE SCHIST.** One of the metamorphic rocks, composed principally of hornblende, with an uncertain proportion of felspar, and sometimes grains of quartz: its colour is usually black. Dr. M'Culloch observes, "hornblende schist may at first have been mere clay, for clay or shale is found changed by trap into Lydian stone, a substance differing from hornblende schist almost solely in its compactness and in the uniformity of its texture. Argillaceous schist, when in contact with granite, is sometimes converted into hornblende schist, the schist becoming first siliceous, and, at the contact, hornblende schist."

**HORNBL'NDIC.** Containing hornblende; resembling hornblende. A mass of chistolitic and hornblendic slates forms the base of the clay-slate system of Cumberland.

**HORNSTONE.** A siliceous mineral; a subspecies of quartz. It has usually a dull and splintery fracture, but sometimes it is conchoidal. It differs from felspar in being infusible without the addition of an alkali. It occurs massive, and in extraneous external shapes; lustre dull or glimmering, opaque or translucent on the edges; sometimes the whole mass, if thin, has the strong translucency of certain horns. According to Kirwan, its constituents are, silica 72, alumina 22, carbonate of lime 6. Its colours are numerous, and commonly dull. Its infusibility by the blow-pipe distinguishes it from petrosilex and jade. Its translucency serves to render it distinct from jasper. It is generally more dull than flint, and emits sparks more feebly with steel. It is deficient in lustre in comparison with quartz.

Professor Cleaveland observes, "so much ambiguity of meaning is attached to the word *hornstone*, that it would be favourable to the interests of mineralogy if this term could be banished from its nomenclature. It has by some been confounded with hornblende: by others it has been applied to two minerals entirely distinct. This confusion and obscurity in the use of the word *hornstone*, appear to have arisen in part from accidental circumstances. It is asserted by Kirwan, on the authority of Henckel, that this word was originally employed by miners to designate a certain stone, which they found difficult to be cut through in consequence of its tenacity. But a certain degree of translucency is also a character of horn. Hence, as mineralogists did not observe both these

properties to unite in the same mineral, they subsequently applied the term *hornstone*, to two distinct minerals, one of which possessed tenacity only, while the other was translucent, but not remarkably tenacious. Hence the application of the term *hornstone* to the mineral now called *hornblende*."

**HORNSTONE PORPHYRY.** The Hornstein porphir of Werner. A variety of porphyry of a red, brown, purple, or blackish colour. Fracture splintery and conchoidal. Emits sparks when struck with steel. Is susceptible of a fine polish.

**HORTUS SICCUS.** (Lat.) A collection of dried plants.

**HUMBOLDITE.** A rare mineral, thus named after Humboldt.

**HUMERAL.** (from *humerus*, Lat.) Belonging to the shoulder.

**HUMERUS.** (Lat.) The shoulder.

**HUMID.** (*humidus*, Lat. *humide*, Fr. *umido*, It.) Moist; wet; damp; watery.

**HUMIDITY.** (*humidité*, Fr. *umidita*, It.) Moisture; dampness.

**HUMITE.** A reddish-brown mineral, found at Somma, thus named after Sir A. Hume.

**HUMMOCK.** A mound of land.

**HYACINTH.** (*ὕακινθος*, Gr. *hyacinthus*, Lat. *hyacinthe*, Fr.) The Hyacinth of Werner; Zircon hyacinthe of Brongniart. A mineral; a variety of pyramidal zircon, of a hyacinth-red colour. It is crystallized, and when in distinct crystals its ordinary form is a four-sided prism, terminated by four rhombic planes. Each plane angle at the summit is 73° 44'. It is found in beds of streams and rivers along with rubies, sapphires, &c., but sometimes it occurs in the primary rocks. It consists of, zirconia 70, silica 25, oxide of iron 0.5. It is considered a gem, but is little used as such. Before the blow-pipe it loses its colour, but retains its transparency. With borax it melts into a transparent glass.

**HYACINTHINE.** A mineral of a brown or greenish colour, usually crystallized in rectangular eight-sided prisms. Fracture imperfectly conchoidal. Transparent. Causes double refraction.

**HYACINTHINE.** Of the colour of hyacinth; resembling hyacinth; containing hyacinth.

**HYALÆA.** (So named from its semi-transparent shell.) A genus of Pteropods, or animals furnished with organs only for swimming and sailing. The *Hyalæa* has the appearance of a bivalve with soldered valves, the upper one being the largest; this difference of size of the seeming valves causes an aperture through which the animal sends forth two large yellow and violet wings, or sails, rounded

and divided at their summit into three lobes. When its wings, or sails, are unfolded, it moves with great velocity on the surface of the sea. The Pteropods, both from the beautiful colouring of their filmy wings, and from their number and symmetry, are better entitled to the appellation of the butterflies of the ocean, than the escalop shells, which have sometimes been so called.—*Rev. W. Kirby.*

**HY'ALINE.** (from *hyalus*, Lat. *ιάλος*, Gr.) Transparent.

**HY'ALITE.** (*ιάλος*, Gr.) A yellowish or greyish variety of uncleavable quartz or opal. It exhibits the usual appearance of a concretion, and differs but little from calcedony, except in possessing a vitreous lustre, and sometimes a loose texture. It is found in secondary trap rocks; it occurs in grains, filaments, and rhomboidal masses. It is infusible before the blow-pipe. It is nearly all silica, its component parts being silica 92·00, water 6·33.

**HYBER'NACLE.** (*hibernacula*, Lat.)

1. The winter dwelling or residence of animals.

2. That part of the plant which defends the embryo from injuries arising from frost.

**HYBE'RNAL.** (*hibernus*, Lat.) Belonging to the winter.

**HY'BERNATE.** To pass the winter in places protected from the cold, as some animals burrow in the earth, others in the trunks of trees, &c. &c.

**HYBERNA'TION.**

1. The passing of the winter season in a situation protected from cold.

2. In many animals a general suspension of the actions of life, extending even to the vital functions of respiration and circulation, takes place during the winter months, constituting what is termed *hibernation*.

**HY'BRID.** (*ύβρις*, Gr. *hybrida*, Lat. *hybride*, Fr.) Mongrel; a term applied both to plants and animals, when of a cross-breed.

**HY'BODONT.** (from *ύβδος*, and *dens*, Lat.) A sub-family of sharks, according to the arrangement of M. Agassiz. They seem to have begun with the coal formation, to have continued throughout the oolitic deposition, and to have ceased at the beginning of the chalk formation. The teeth of this sub-family possess characters intermediate between the blunt crushing teeth of cestracionts, and the sharp cutting teeth of squaloids.

**HY'BODUS.** A genus of fishes that prevailed throughout the oolitic period. It is well remarked by Prof. Buckland, "not a single genus of all that are found in

the oolitic series exist at the present time."

**HYDA'TID.** (*ύδαρις*, Gr. *hydatide*, Fr.)

An order of internal worms. In hydatids there has not been discovered any vascular system. Hydatids, so frequently found in the liver and other parts of the body in mammalia, have been considered by some as animals, consisting merely of a stomach; by others, as a matrix, or womb, from something like young hydatids being frequently found adhering to their inner side. Hydatids immersed in warm water, immediately after being obtained from a living animal, are observed to have a contractile power, but they have no external opening; they are pellucid spherical bodies, of different sizes and kinds. Each consists of two coats, the inner of which is extremely delicate. They do not possess any visible blood-vessels, though the sac containing them has abundance of vessels, nerves, &c. derived from those of the organ with which it is connected. Hydatids ought not to be confounded with watery vesicles, connected occasionally with the kidney, &c. which are not enclosed in cysts, have no small hydatids adhering to their inner surface, and want contractility. There are many genera.

**HY'DRATE.** (from *ύδωρ*, Gr.) A chemical compound in definite proportions of a solid body with water, still retaining a solid form. It must, however, be borne in mind that when water in combination with other bodies contributes (as in crystallized bodies) to their regular form and transparency, it is then termed water of crystallization. The hydrates are numerous, as hydrate of alumine, baryta, cobalt, copper, lime, magnesia, potassa, soda, &c. &c.

**HY'DRATED.** Mixed with water, but retaining its solid form.

**HYDRAU'LIC.** (*ύδραυλις*, Gr. *hydrauli-*

**HYDRAU'LICAL.** } *cus*, Lat. *hydraulique*,

**HYDRAU'LICK.** } Fr. *idraulico*, It.) Relating to the conveyance of water through pipes. The siphuncle of the nautilus, ammonite, belemnite, &c. forms a very beautiful and complete hydraulic apparatus.

**HY'DRAULICS.** The science of the motion of fluids, and the construction of all kinds of instruments and machines relating thereto.

**HY'DROGEN.** (from *ύδωρ* and *γεννώω*, Gr.)

One of the fifty-five simple, or elementary bodies. Inflammable air, proved by Cavendish to be the basis of water, from which circumstance it has obtained its name. It can be obtained only from water. Hydrogen is colourless, and has commonly a slight odour of garlic; it is

not absorbable by water; it is devoid of taste, and is destructive of life when respired for any time. It is the lightest body known, 100 cubic inches weighing only 2.25 grains, or being nearly thirteen times lighter than atmospheric air. It is combustible, and, when pure, burns with a yellowish-white flame. Hydrogen enters into the composition of all waters, and is evolved in a compound state from volcanos, from certain fissures in the earth, and in districts where coal is found. Two volumes of hydrogen unite with one of oxygen in the production of water. As far as the superficies of our planet is concerned, water so predominates, that, at first sight, hydrogen might be considered as constituting a substance of more relative abundance than it really does. The quantity of hydrogen locked up in coal is considerable. According to Dr. Thomson, cannel coal contains 21 per cent. of it, although in the Newcastle caking coal the proportion is but a trifle more than 4 per cent. Hydrogen may be considered as the most important substance of its class next to oxygen, which enters into the composition of the earth's crust.

**HYDRO'GENATED.** Combined with hydrogen.

**HYDRO'GRAPHER.** (from ὑδωρ and γράφω, Gr. *hydrographe*, Fr. *idrografo*, It.) One who draws maps of the sea-coast, rocks, islands, shoals, &c.

**HYDROGRA'PHIC.** } Relating to a description of the sea-coast, rocks, islands, &c. &c.

**HYDRO'GRAPHY.** (from ὑδωρ and γράφω, Gr. *idrografia*, It. *hydrographie*, Fr.) Description of the watery part of the globe; the art of measuring and describing the sea, rivers, canals, lakes, &c. With regard to the sea, it gives an account of its tides, counter-tides, soundings, bays, gulfs, creeks, &c. as also of the rocks, shelves, sands, shallows, promontories, harbours; the distance and bearing of one point from another; with every thing that is remarkable either at sea or on the coast.

**HYDRO'METER.** (from ὑδωρ and μέτρον, Gr. *hydromètre*, Fr. *idrometro*, It.) An instrument for measuring the extent or depth, gravity, density, and velocity of liquids.

**HY'DROPHANE.** (from ὑδωρ and φαίνω, Gr.) A variety of opal which is opaque and white when dry, but by immersion in water becomes transparent.

**HY'DROPHYTE.** (from ὑδωρ and φυτόν, Gr.) A plant which lives and grows in water. Mr. Lyell observes, "the number of hydrophytes is very considerable, and their stations more varied than could have been anticipated; for while some

plants are covered and uncovered daily by the tide, others live in abysses of the ocean, at the extraordinary depth of one thousand feet: and although in such situations there must reign darkness more profound than night, at least to our organs, many of these vegetables are highly coloured."—*Principles of Geology.*

**HYDROSTA'TIC.** } (from ὑδωρ and στα-  
**HYDROSTA'TICK.** } τικός, Gr.) Relat-  
**HYDROSTA'TICAL.** } ing to that branch of  
science termed hydrostatics.

**HY'DROSTATICS.** (from ὑδωρ and στατικός, Gr. *hydrostatique*, Fr. *idrostatica*, It.) The science which treats of the nature, gravity, pressure, and equilibrium of fluids, and of the weighing of solids in them.

**HY'DRURET.** A compound of hydrogen with a metal.

**HYGRO'METER.** (from ὑγρός and μέτρον, Gr. *hygromètre*, Fr. *igrometro*, It.) An instrument for measuring the degree of moisture of the atmosphere. There are various kinds of hygrometers; for whatever either swells by moisture, or shrinks by dryness, is capable of being formed into an hygrometer.

**HYGROME'TRICAL.** Relating to hygrometry.

**HYGRO'METRY.** The art of measuring the degree of moisture in the atmosphere.

**HYLÆOSAU'RUS.** A fossil lizard discovered in the wealden formation of Tilgate forest by Dr. Mantell, and fully described by him in his *Geology of the South-East of England*. The *Hylæosaurus*, or Lizard of the Weald, was discovered in 1832. Its probable length was about twenty-five feet. It is characterised by a series of long, flat, and pointed bones, which appear to have formed a large dermal fringe, resembling the bones on the back of the modern iguana. In this reptile the osteology of the lizard seems blended with that of the crocodile. Dr. Mantell observes, "the most extraordinary parts are many enormous, angular spinous bones, which lie in the direction of the vertebral column, and evidently extended originally, like a serrated fringe, along the back of the animal."

**HYMENO'PTERA.** (from ὑμενόπτερος, Gr. *alas membranaceas habens*: membranewinged.) Cuvier makes Hymenoptera the ninth order of the class Insecta. They have four membranous wings, and the tail of the female is usually armed with a sting. Though the insects of this order are included in the mandibulate section, for their mouth is furnished with mandibles and maxillæ, yet they do not generally use them to masticate their food, but for purposes usually connected with their sequence of instincts, as the

bees in building their cells; the wasps in scraping particles of wood from posts and rails for a similar purpose, and likewise to seize their prey; but the great instrument by which they collect their food is their tongue; this the bees particularly have the power of inflating, and can wipe with it both convex and concave surfaces; and with it they *lick*, but not *suck*, the honey from the blossoms, for Reaumur has proved that this organ acts as a tongue and not as a pump. Some of the Hymenoptera prefer a vegetable diet.

**HYMENO'PTEROUS.** Belonging to the order Hymenoptera; having four membranous wings.

**HY'PERSTHENE.** } (from *ὑπὲρ* and *σθένος*,  
**HY'PERSTENE.** } Gr.) Prismatical Schiller-spar. Labrador Schiller-spar. A mineral of a greenish-black colour, but on the cleavage of a copper-red. Occurs in granular and lamellar concretions, and massive. It is found in Labrador, in the Isle of Skye, in Banffshire, and in the Shetland Isles. It is composed of silica, magnesia, alumina, lime, and oxide of iron, the last of which is said to form one-fourth of the whole.

**HYPERSTHÉ'NIC.** Containing hypersthene; resembling hypersthene.

**HYOCRATE'RIFORM.** Salver-shaped: a term applied to a monopetalous corolla,

the limb of which being placed on a tube, spreads out horizontally.

**HYPOGA'STRIC.** (from *ὑπό* and *γαστήρ*, - Gr.) Belonging to that region of the abdomen which is called the hypogastrium.

**HYPOGA'STRIUM.** The lower anterior region of the abdomen, from a little below the umbilicus to the pubes.

**HY'POGENE.** (from *ὑπό* and *γίνομαι*, Gr.) A term applied to rocks, expressing that they have assumed their form, or structure, at a depth from the surface.

Mr. Lyell, who proposes to give this term to certain rocks, observes, "It will appear that the popular nomenclature of geology, in reference to the so called 'primary' rocks, is not only imperfect, but in a great degree founded on a false theory; inasmuch as some granites and granitic schists are of origin posterior to many secondary rocks. In other words, some primary formations can already be shown to be newer than many secondary groups, a manifest contradiction in terms." To obviate this difficulty, Mr. Lyell prefers the term hypogene, as one not of chronological import, but implying the theory that such rocks are netherformed, and have not assumed their form and structure at the surface.—*Principles of Geology.*

**HY'STRIX.** (*ὑστρίξ*, Gr.) The porcupine.

## I J

**JA'DE.** The Nephrit of Werner; Nephrite of Jameson; called also nephritic stone, nephrite, and axe-stone. It was formerly much celebrated for its supposed medicinal properties in nephritic affections, or diseases of the kidneys. It is found in Hungary and Siberia, America, Egypt, and China. The inhabitants of New Zealand form it into axes, and other cutting instruments, from which circumstance it has obtained the name of axe-stone. Its surface is smooth; fracture splintery. It has a greasy feel. Colour dark leek-green. In hardness, jade is, at least, equal to quartz; it possesses a peculiar tenacity which renders it difficult either to break, cut, or polish. Brochant states its fresh fracture to present a paler green than that of its surface. Before the blow-pipe it fuses easily, and with a slight ebullition, into a bead of white semi-transparent glass. Its analysis is very variously given by different authors; its constituents are according to some, silica, carbonate of magnesia, iron, alumina, carbonate of lime; others add

chrome, oxide of manganese, soda, and potassa. In consequence of its tenacity it has been wrought into chains and other delicate works.

**JA'GGED.** Irregularly cut or notched, and with the appearance of having been knawed; denticulated; uneven; toothed like a saw.

**JAMB.** A term used by miners for a thick bed of stone which prevents their pursuing a vein.

**JA'MESONITE.** A mineral, thus named after Prof. Jameson by Haidinger; axotomous antimony-glance. It was first discovered in Cornwall, in clay-slate, and it has been since found in Germany and Siberia. Its colour is steel-grey. It consists of lead, antimony, sulphur, and iron.

**JA'NTHINA.** (from *ianthum*, Lat. a violet.) The violet snail. A purple-coloured univalve shell, nearly resembling a snail in its form: it is recent, and commonly found in the Mediterranean. The inhabitants of this shell is said, when irritated, to discharge a purple secretion.

**JA'NTHINA FRAGILIS.** A species of jan-

thina. Mr. Lyell remarks "the *janthina fragilis* has wandered into almost every sea, both tropical and temperate. This common oceanic shell derives its buoyancy from an admirably contrived float, which has enabled it not only to disperse itself so universally, but to become an active agent in disseminating other species, which attach themselves, or their ova, to its shell.—*Principles of Geology*.

According to the account given by Bosc, the *janthina* exhibits many remarkable peculiarities. When the sea is calm, these animals may be seen collected often in large bands, swimming over the surface by means of a floating apparatus consisting of aerial vesicles produced by their foot. During this action their head is very prominent, and the foot is so extended that the float or line of vesicles forms an angle with the middle of the shell. When the sea is rough, the animal absorbs the air from its vesicles, changes the direction of its foot, contracts its body, and lets itself sink. It does the same when in danger from any enemy, and like the cuttle-fish, has the power of emitting a coloured fluid, which, by darkening the surrounding water, serves to conceal it from view. If the floating apparatus be injured or destroyed, there exists a reproductive power in the foot, by which it can be restored.

**J'ARGON.** The zircon jargon of Brongniart. A mineral, a variety of zircon.

**J'ASPER.** (*Jaspe*, Fr.  *Pierre dure et opaque, de la nature de l'agate; jaspide*, It.) A sub-species, a variety of rhombohedral quartz. It is an ingredient in the composition of many mountains. It occurs usually in large amorphous masses, and sometimes also crystallized in six-sided prisms. Fracture conchoidal. It is said to compose the substance of entire ranges of the Asiatic mountains. When quartz is combined with a considerable proportion of iron and alumine, it loses its translucency and becomes jasper. There are many varieties of jasper, distinguished principally by their different colours, and the arrangement of their colours. Mr. Bakewell states, "there can be little doubt that jasper has been, in many instances, formed by subterranean heat, acting with great intensity on beds of argillaceous shale, containing iron."

**JASPI'DEAN.** } Resembling jasper; contain-  
**JASPI'DIOUS.** } ing jasper.

**ICE'BERG.** (from *ice* and *berg*, Germ.) A large mass of ice, met with in cold regions, floating upon the sea, sometimes of enormous magnitude and great height. Icebergs have been seen of the great height of 300 feet, and as it has been ascertained that for every foot above the surface of

the sea-water there are eight feet below, the whole thickness must be immense. In a geological point of view, icebergs are to be viewed as very important and powerful agents, inasmuch as they are the means of transporting to great distances, animals, plants, and rocks.

**ICHTHYODORULITE.** The fossil dorsal spine of certain fishes, armed with tooth-like hooks, or prickles. These were long supposed, says Prof. Buckland, to be jaws, and true teeth; more recently they have been ascertained to be dorsal spines of fishes, and, from their supposed defensive office, have been named *ichthyodorulites*, from the Greek words *ιχθυος*, a fish, *δόνον*, a spear, and *λίθος*, a stone.

**ICHTHYOLITE.** (from *ιχθυος*, and *λίθος*, Gr. *ichthyolite*, Fr.) Fossil fish; a petrified fish. Fossil fishes occur in all the English formations, from the old red sandstone to the tertiary deposits inclusive.

**ICHTHYOLO'GICAL.** Relating to ichthyology, or that branch of zoology which treats of the structure, habits, &c. of fishes.

**ICHTHYO'LOGIST.** One who pursues the study of ichthyology.

**ICHTHYO'LOGY.** (from *ιχθυος*, a fish, and *λόγος*, Gr. discourse; *ichthyologie*, Fr. *ictologia*, It.) That branch of zoology which treats of the structure, classification, habits, and history of fishes.

**ICHTHYO'PHAGOUS.** (from *ιχθυος*, a fish, and *φάγω*, Gr. to eat; *ichthyophage*, Fr.  *celui qui ne se ciba d'altro fuorchè di pesci*, It.) Feeding on fish.

**ICHTHYO'PHAGY.** The practice of feeding on fish.

**ICHTHYOSAURUS.** (from *ιχθυος*, a fish, and *σαῦρος*, Gr. a lizard) A fish-like lizard; an immense fossil marine-saurian or reptile, having an intermediate organization between that of a lizard and a fish. The name appears to have been given to it by Mr. König. The genus comprises many species; some of these attain a magnitude not inferior to that of young whales. The head of the *ichthyosaurus* resembled that of a dolphin, its teeth were conical, sharp, and striated, and exceedingly numerous, in some cases amounting to nearly two hundred, not enclosed in separate sockets, but as in the crocodile, ranged in one continuous groove, or furrow, of the maxillary bone; as also in the crocodile, abundant provision was made for replacing the old teeth, as they were lost, by a supply of new ones. The eye was of enormous magnitude, the orbit in some instances measuring fourteen inches in its longer diameter, and Professor Buckland states, "We have evidence that it possessed both micro-

scopic and telescopic properties." The beak was that of the porpoise; the teeth, as before mentioned, those of the crocodile; the vertebræ nearly resembled those of the shark, being hour-glass shaped; the vertebral column was composed of more than one hundred pieces; the ribs were slender, and the majority of them bifurcated, or forked, at the top; the bones of the sternum were strong and largely developed, and combined nearly in the same manner as in the ornithorynchus or platypus. The ichthyosaurus had four paddles, the form of its extremities deviating from the saurians and approaching the mammalians, being converted from feet into fins; these fins, or paddles, were composed of numerous bones enclosed in one fold of integument; the fore-paddle was composed of nearly one hundred bones, and like the mammalians it possessed a humerus, or shoulder bone, a radius and ulna, or the bones of the fore arm, and phalanges; the bones of the phalanges were polygonal and exceedingly numerous, as before stated. The hind-paddles were very much smaller, containing only from thirty to forty bones. The general conformation of the ichthyosaurus must have greatly resembled that of the porpoise or grampus. Its teeth would have sufficiently proved it to have been carnivorous, but the subsequent discovery of its faecal remains, now called coprolites, and the finding within the intestinal canal the half-digested remains of fishes and reptiles, render this point quite certain; like the crocodile, it must have gorged its prey entire; its stomach was exceedingly capacious, forming a sort of pouch, or sac, and extending through nearly the whole body. The fossil remains of the ichthyosaurus have been discovered in the lias formation, and it appears to have become extinct at the termination of the secondary series of geological formations. It is however the opinion of Mr. Bakewell that the ichthyosaurus, or some species of a similar genus, is still existing in the present seas, and with his remarks the description of the fish-like lizard will be concluded. "About sixteen years since, a large animal was seen for several summers in the Atlantic, near the coast of the United States, and was called the great sea-serpent. I am informed by Professor Silliman, that many persons who attested the existence of the sea serpent from their own observations, were so highly respectable, both for intelligence and veracity, that their evidence could not be disputed. I remember one of the most particular descriptions of the sea-serpent was given by an American cap-

tain, who saw the animal raise a large portion of its body from the water: he represented it as of great length, and about the bulk of a large water cask; it had paddles somewhat like a turtle, and enormous jaws like the crocodile. This description certainly approaches to, or may be said to correspond with, the ichthyosaurus, of which animal the captain had probably never heard."—*Bakewell's Introduction to Geology.*

**ICHTHYOPHTHALMITE.** (from *ἰχθῦς*, and *ὀφθαλμῶς*, Gr.) Fish-eye stone; apophyllite; pyramidal zeolite; the fischaugenstein of Werner; mesotype epointée of Haüy. It is of a white colour, and semi-transparent, or translucent. Occurs both crystallized, and massive. The primitive form of its crystals is a four-sided prism, with rectangular bases. It is easily divisible by percussion into laminæ, whose broader surfaces are splendid and somewhat pearly. It scarcely scratches glass, and does not yield sparks when struck with steel. Specific gravity 2.46. Before the blow-pipe it exfoliates, froths, and eventually melts into an opaque bead. It is composed of silica 50, lime 23, potash 4, water 18, with a trace of fluoric acid. It is found in secondary trap-rocks in the Hebrides and other parts of Scotland, in Sweden, and Iceland.

**ICIOUS.** The terminations of adjectives in *icious* and *aceus* express a resemblance to a material; those in *eus* indicate the material itself: thus, membranaceous, resembling skin; membranous, skin itself; coriaceous, leathery; latericious, resembling bricks.

**ICOSAHE'DRAL.** (from *icosahedron*.) Having twenty equal sides or faces.

**ICOSAHE'DRON.** (*εἰκοσάεδρον*, Gr. *icosaedre*, Fr. *isosaedro*, It.) A regular solid, consisting of twenty triangular pyramids, whose vertices meet in the centre of a sphere supposed to circumscribe it; and therefore have their height and bases equal: wherefore the solidity of one of these pyramids multiplied by twenty, the number of bases, gives the solid contents of the icosahedron.

**ICOSA'NDRIAN.** (from *εἰκοσι* and *ἀνήρ*, Gr.) The twelfth class in Linnæus' sexual method, consisting of plants with hermaphrodite flowers, furnished with twenty or more stamens, inserted into the calyx. The first order of this class consists of trees bearing for the most part stone fruits, surrounded by a pulp, as the plum, peach, cherry, &c.; in the second order we find the apple, pear, &c.; in the third order, the genus *rosæ*. In this class the stamens grow out of the sides of the calyx, as in the strawberry, and it is im-

portant to observe, that such a mode of insertion indicates the wholesomeness of the fruit; we are not aware that there is a single exception to this rule, so that a traveller, who might meet with an unknown fruit, need not scruple to eat it if he find the stamens thus inserted. This character of the insertion of the stamens into the calyx holds good in other classes, as well as in the class Icosandria; thus, in the genus Ribes, including the gooseberry and currant, which belong to the class Pentandria, the stamens grow out of the calyx, and these fruits are well known to be wholesome, while many of the berries of the same class, whose stamens have not a like insertion, are often very deleterious.

**ICOSA'NDRIAN.** Belonging to the class Icosandria; having twenty or more stamens, inserted into the calyx.

**I'DOCRASE.** (from *ἰδῶ* and *κρᾶσις*, Gr.) A mineral found in lava, and formerly mistaken for the hyacinth; it is the Vesuvian of Werner.

**JEFFERSONITE.** A mineral found in New Jersey; colour olive-green passing into brown. It is named after Mr. Jefferson.

**JET.** (from *Gaga*, a river of Asia; *jayet*, Fr.) The Jayet of Häüy; Lignite Jayet of Brongniart; Pech Kohle of Werner. A mineral substance, found in detached kidney-formed masses in many countries. It is of a firm and very even structure, harder than asphaltum, and susceptible of a good polish. It becomes electrical by rubbing, attracting light bodies, like amber. In many respects it resembles cannel-coal, its colour is full-black, and it does not soil the fingers. It is, however, easily distinguished from cannel-coal, in being specifically lighter than water, which cannel-coal is not, and in possessing electrical properties which cannel-coal does not. Some persons have supposed that jet is a true amber, differing only in the mere circumstance of colour. During combustion it emits a bituminous smell. It is never found in strata or continued masses, but always in separate and unconnected heaps.

It is formed into various trinkets, and is particularly used for making mourning ornaments, such as ear-rings, brooches, bracelets, buttons, &c.

**JEWS-STONE.** An extraneous fossil, being the elevated spine of a very large egg-shaped sea-urchin, or echinus.

**IGNEOUS.** (*igneus*, Lat. *igné*, Fr. *igneo*, It.) Fiery; containing fire; produced by the action of fire. In this last sense it is commonly used by geologists when speaking of igneous rocks, or igneous productions.

**IGNE'SCENT.** (*ignescens*, Lat.) Giving out sparks of fire when struck.

**IGNI'FLUOUS.** (*ignifluus*, Lat.) Flowing with fire.

**IGNI'VOMOUS.** (*ignivomus*, Lat.) That vomits fire. Volcanoes are ignivomous mountains.

**IGUA'NA.** A species of lizard, a native of many parts of America and the West Indies, is rarely met with any where north or south of the tropics. It is from three to five feet long, from the end of the snout to the tip of the tail. It inhabits rocky and woody places, and feeds on insects and vegetables. Cuvier states that the iguana subsists upon fruit, grain, and leaves: Bosc, that it lives principally upon insects. It nestles in hollow rocks and trees. The female lays its eggs, which have a thin skin like those of the turtle, and are about the size of those of a pigeon, in the sand. Though not amphibious, they are said to be able to remain under water an hour. When they swim, they do not use their feet, but place them close to their body, and guide themselves with their tails. Captain Belcher found, in the island of Isabella, swarms of iguanas, that appeared omnivorous. This statement proves both Cuvier and Bosc to be correct. The teeth of the iguana are not fitted for comminuting its food, and it is said to swallow it whole.

**IGUA'NODON.** An extinct fossil colossal lizard, discovered in the strata of Tilgate Forest by that indefatigable historian of the chalk and Wealden formation, Dr. Mantell, to whose profound and scientific researches the world is indebted for a knowledge of this genus, and whose splendid museum has lately, to the disgrace of the county of Sussex, been removed from Brighton to the British Museum. The following description of this huge animal is almost entirely taken from Dr. Mantell's *Geology of the South-East of England*. He observes, "the discovery of the teeth and other remains of a nondescript herbivorous reptile in the strata of Tilgate Forest, a reptile pronounced by Cuvier to be 'encore plus extraordinaire que tous ceux dont nous avons connoissance,' is one of the most gratifying results of my labours." The remains of one of these immense animals have lately been found in the Kentish Rag, near Maidstone. The Kentish rag is a grey arenaceous limestone, belonging to the Shanklin sands. From the great resemblance in the dentature, as well as in many other extraordinary characteristics, of this immense reptile to that of the iguana, Dr. Mantell determined on naming it the *Iguanodon*, signifying an animal having teeth like the iguana. In the perfect teeth, and in those which have

been but little worn, the crown is somewhat of a prismatic form; widest, and most depressed, in front; convex posteriorly, and rather flattened at the sides. As soon as the tooth emerges from the gum it gradually enlarges, and its edges approach each other and terminate in a point, making the upper part of the crown angular; the edges forming the side of this angle are deeply serrated, or dented; and the teeth exhibit two kinds of provisions to maintain sharp edges along the cutting surface: the first the serrated edge already described; the second, a provision of compensation for the gradual destruction of this edge, by substituting a plate of thin enamel, to maintain a cutting power in the anterior portion of the tooth, until its entire substance was consumed. These teeth were sometimes two inches and a half in length. While the crown of the tooth was diminishing above, an absorption of the fang was proceeding below, caused by the pressure of a new tooth rising to replace the old one, until by continual consumption, both above and below, the middle portion of the older tooth was reduced to a hollow stump, which fell from the jaw to make room for its more efficient successor. The size attained by the iguanodon appears to have been enormous, the average length from the snout to the tip of the tail being estimated by Dr. Mantell at seventy feet, while, he considers, some may have been one hundred feet in length. This last calculation Prof. Buckland deems improbable, but he gives a length of seventy feet to the iguanodon. A thigh-bone in the possession of Dr. Mantell is three feet eight inches long, and thirty-five inches round, at its largest extremity. The length of the hind foot is supposed to have been six feet and a-half; the circumference of the body, fourteen feet and a-half. A most remarkable appendage possessed by the iguanodon was a horn of bone, placed upon the nose, equal in size, and resembling in form, the lesser horn of the rhinoceros; here was a further analogy between the extinct fossil iguanodon and the recent iguana. The base of this nasal horn was of an irregular oval form, and slightly concave. It possessed an osseous structure, and appears to have had no internal cavity. It is evident that it was not attached to the skull by a bony union, as are the horns of the mammalia.

**IMBEDDED.** Inclosed by surrounding matter.

**IMBRICATED.** (*imbricatus*, Lat.) Laid one over the other at the edges, like the tiles of a house. In botany, applied to leaves, when lying one over the other like tiles upon a house; applied also to the

leaves of the calyx when lying one over the other.

**IMMALLEABLE.** Incapable of being extended by hammering or beating.

**IMPALPABLE.** (*impalpable*, Fr. *impalpabile*, It.) That cannot be felt; not perceptible to the touch; not gritty.

**IMPE'NNOUS.** Wanting wings.

**IMPE'RFORATE.** } (from *in* and *perforatus*,  
**IMPE'RFORATED.** } Lat.) Not perforate; having no opening; not pierced.

**IMPERMEABI'LITY.** The state of being impermeable.

**IMPE'RMEABLE.** Not admitting the passage of fluids through its pores or interstices.

**IMPE'RVIOUS.** Impenetrable; unpassable.

**IMPETUS.** (*impetus*, Lat.) Force; violence; the force with which one body dashes against another.

**IMPING'E.** (*impingo*, Lat.) To fall against; to strike against.

**IMPLU'MED.** } (*implumis*, Lat.) Without  
**IMPLU'MOUS.** } feathers; without hair; callow.

**IMPOROSITY.** Absence of interstices; closeness of texture to the exclusion of pores.

**IMPO'ROUS.** Devoid of pores, of interstices.

**INCANDE'SCENCE.** (from *incandescere*, Lat.) White heat.

**INCANDE'SCENT.** White-hot; white from intense heat, far exceeding red-hot.

**INCARNADINE.** (*incarnadin*, Fr. *incarnativo*, It.) Bright carnation colour; of a flesh colour.

**INCAVATED.** (*incavatus*, Lat.) Hollowed; scooped out; made hollow.

**INCAVA'TION.** A hollow place.

**INCINERATE.** To burn to ashes.

**INCINERA'TION.** The act of burning to ashes.

**INCISOR.** (from *incisores*, Lat.) A fore or cutting tooth.

**INCOHE'RENCE.** } Want of cohesion; want  
**INCOHE'RENCY.** } of adherence.

**INCOHE'RENT.** Wanting cohesion; unconnected; loose.

**INCOMBU'STIBLE.** (*incombustible*, Fr.) That will not burn; that is not consumed by the action of fire.

**INCOMBU'STIBLENESS.** The property of resisting the action of fire.

**INCONDE'NSABLE.** That cannot be forced into a smaller compass.

**INCONGRUOUS.** (*incongruus*, Lat. *incongruo*, Fr. *incongruo*, It.) Unsuitable; not fitting.

**INCORPORATE.** (*incorporo*, Lat. *incorporer*, Fr. *incorporare*, It.) To mingle different substances so as to reduce them to one mass.

**INCRA'SSATE.** (*incrasso*, Lat.) To thicken.

**INCRA'SSATE.** (*incrassatum*, Lat.) Much

- swollen at one portion of its length ; rounded and somewhat swollen.
- INCRASSA'TION.** The act of thickening ; the state of growing thick.
- I'NCREMENT.** (*incrementum*, Lat.) Increase ; matter added.
- INCRE'SCENT.** (*increscens*, Lat.) Increasing ; growing larger.
- INCRUSTA'TION.** (*incrustatio*, Lat. *incrustation*, Fr. *incrostatura*, It.) An adherent covering ; something superinduced ; a coating of siliceous matter.
- INCUBA'TION.** (*incubatio*, Lat. *incubation*, Fr.) The act of sitting upon eggs for the purpose of hatching them.
- INCURVATE.** (*incurvo*, Lat.) To bend ; to make crooked.
- INCURVA'TION.** A state of bending or crookedness.
- INDECI'DUOUS.** (from *in* and *deciduous*, Lat.) Not falling off ; not shed, as the leaves of trees, but evergreen.
- INDECOMPO'SABLE.** That cannot be decomposed, or resolved, into its primary elements or constituent parts.
- I'NDIANITE.** A whitish or grey mineral, brought from the Carnatic, found in masses, of a foliated structure, and having a shining lustre.
- I'NDICOLITE.** (from *indigo*, and *λίθος*, Gr.) An indigo-coloured mineral found in Sweden. It occurs crystallized, and is considered a variety of shorl.
- INDI'GENOUS.** (*indigena*, Lat. *indigène*, Fr.) Native to a country ; originally born, or produced, in a particular country. The term is more usually applied to plants than animals ; thus plants, the natural produce of any particular country, are said to be indigenous to that country.
- INDUC'TION.** (*inductio*, Lat. *induction*, Fr. *induzione*, It.) A consequence drawn from several propositions or principles first laid down ; reasoning from particulars to generals, as when from several particular propositions we infer one general. The process by which a new principle is collected from an assemblage of facts, has been termed *induction*.
- INDUC'TIVE PHILOSOPHY.** A science which ascends from particular facts to general principles, and then descends again from these general principles to particular applications and exemplifications.
- INDUC'TIVE REASONING.** That kind of philosophic reasoning which ascends from particular facts to general principles, and then descends again from these general principles to particular applications and exemplifications.
- I'NDURATED.** (*induratus*, from *induro*, Lat.) Hardened.
- INDURA'TION.** (*induratio*, Lat.) The state of growing hard ; the act of hardening.
- INDU'SIA.** (*indusia*, Lat.) The case or covering of certain larvæ ; generally used plurally, *indusiæ*.
- INDU'SIAL.** Composed of indusiæ ; containing indusiæ. Mr. Lyell states, "there is another remarkable form of fresh-water limestone in Auvergne, called *indusial*, from the cases, or indusiæ, of the larvæ of Phrygiana, great heaps of which have been encrusted, as they lay, by hard travertin, and formed into a rock."
- INDU'SIAL LIMESTONE.** A fresh-water limestone to which the name *indusial* has been given, from its containing the indusiæ, or cases, of the larvæ of Phrygiana. —*Lyell*.
- INEQUILA'TERAL.** } Having unequal sides ;
- INEQUILA'TERAL.** } in conchology, when the anterior and posterior sides make different angles with the hinge.
- INEQUIVALE.** } Where one valve is
- INEQUIVA'LVULAR.** } more convex than the other, or dissimilar in any respect, as in the common oyster.
- INERMOUS.** (*inermus*, Lat.) Unarmed ; devoid of spines, or thorns.
- INFILTRATE.** (*infiltrer*, Fr.) To enter by percolation ; to enter a body through its pores or interstices.
- INFILTRA'TION.** The diffusion of fluids through the interstices or pores.
- INFINITE'SIMAL.** (adj.) Infinitely divided.
- INFINITE'SIMAL.** (subst.) An infinitely small quantity.
- INFLAMMABI'LITY.** The property of igniting ; the quality of taking fire.
- INFLA'MMABLE.** (*inflammable*, Fr. *che può infiammarsi*, It.) Combustible ; that may easily be set on fire ; capable of burning.
- INFLAMMA'TION.** (*inflammatio*, Lat. *inflammation*, Fr. *inflammagione*, It.) The act of setting on flame.
- INFLA'TED.** (*inflatus*, Lat.) Blown or puffed up ; swollen ; distended with air.
- INFLA'TION.** (*inflatio*, Lat.) A puffing up ; distention with wind.
- INFLE'CTED.** Bent ; bowed ; turned ; bent inwards.
- INFLE'CTION.** (*inflectio*, Lat.) The act of bending or turning ; the state of being curved.
- INFLE'XED.** (*inflexus*, Lat.) Curved inwards ; bent towards each other.
- INFLORE'SCENCE.** (*inflorescentia*, Lat.) A word used to express the particular manner in which flowers are placed upon a plant ; this by older writers was denominated the *modus florendi*, or manner of flowering. Botanists distinguish many kinds of inflorescence, under the names whorl, cluster or raceme, spike, corymb, fascicle, tuft, umbel, cyme, panicle, bunch, &c.

**I'NFLUX.** (*influxus*, Lat.) The act of flowing into any thing or place.

**INFO'RMIOUS.** (*informis*, Lat. *informe*, Fr. *informe*, It.) Without shape; of no regular figure; mis-shapen; ill-fashioned.

**INFRA'NGIBLE.** (*infrangibilis*, Lat.) That cannot be broken.

**INFUNDIBU'LIFORM.** (from *infundibulum* and *forma*, Lat.) Funnel-shaped: in botany, applied to a monopetalous corolla, having a conical border placed upon a tube.

**INFUSA'TION.** (*infusatio*, Lat.) The act of darkening, or making blackish.

**INFU'SIBLE.** That cannot be melted by the application of heat.

**INFUSO'RIA.** } Beings so ex-

**INFUSORY ANIMA'LCULES.** } tremely minute as to be invisible to the naked eye, and which have only been discovered since the invention of the microscope. The infusoria have been divided into two orders, the Rotifera and Homogenea. The order of Rotifera comprises many genera, Brachionus, Furcularia, Tubicolaria, and Vaginicola: the Homogenea comprises Ureolaria, Trichoda, Leucophra, Kerona, Himantopes, &c., &c. The most extraordinary genus of all is the Proteus. It is not possible to assign to them any determinate form; their figure changes momentarily; sometimes rounded, sometimes divided. The bodies of the infusoria are, for the most part, gelatinous.

When we place a drop of any decayed infusion of animal or vegetable matter under a powerful microscope, and throw a light through that drop, and through the microscope to the eye, we discover in the drop of water various forms of living beings, some of a rounded, some of a lengthened form, and some exhibiting ramifications shooting in all directions, but all apparently of a soft, transparent, gelatinous, and almost homogeneous texture. These beings constitute the lowest form of animals with which we are at present acquainted, and they were at first considered astomatous, that is, without any mouth, and agastric, or possessing no stomach, and were called infusoria, a denomination explanatory merely of their habit, but not of their structure. Upon further examination, it was discovered that there existed animalculæ of a higher denomination; these exist in every stagnant pool of water, in every river, and in the ocean. Upon examining with great care many years since the effects of coloured infusions upon these minute animalculæ, it was found that they devoured great quantities of the coloured matter in which they were placed, and that they conveyed it into internal cavities or stomachs, which are sometimes extremely

numerous in them. Those cavities exist in almost every known genus. Sometimes there are nearly 200 stomachs in a single animalcule. Animalcules are found so exceedingly minute that nearly five hundred millions are contained in a single drop of water, that is, as many as there are individuals of our own race on the face of the earth. In those minute beings which constitute the simplest forms of animals, there are numerous stomachs, the lowest class is therefore called Polygastrica. They are the food of higher classes, particularly of zoophytes. There is no proper skeleton in the entire class of animalcules called Polygastrica. Some of the polygastrica exude on their surface a secretion which agglutinates, and lays hold of, foreign particles floating in the waters which surround them, and thus form for themselves a partial covering. The earthy matter, however, is not their own produce.—*Prof. Grant.*

Prof. Buckland observes, "We are more perplexed in attempting to comprehend the organization of the minutest *infusoria*, than that of a whale; and one of the last conclusions at which we arrive, is a conviction that the greatest and most important operations of nature are conducted by the agency of atoms too minute to be either perceptible by the human eye, or comprehensible by the human understanding."

Ehrenberg has ascertained that the *infusoria*, which have heretofore been considered as scarcely organized, have an internal structure resembling that of the higher animals. He has discovered in them muscles, intestines, teeth, different kinds of glands, eyes, nerves, and male and female organs of reproduction. He finds that some are born alive, others produced by eggs, and some multiplied by spontaneous divisions of their bodies into two or more distinct animals. Their powers of reproduction are so great, that from one individual a million were produced in ten days; on the eleventh day four millions, and on the twelfth sixteen millions. Ehrenberg has described and figured more than 500 species of animalcules; he has found them in fog, in rain, and in snow.

**I'NGUINAL.** (from *inguen*, Lat.) Pertaining to the groin.

**INHUMA'TION.** (*inhumatio*, Lat. *inhumation*, Fr.) A burying; interment.

**INHU'ME.** (*inhumo*, Lat. *inhumer*, Fr.) To bury; to cover over with earth.

**INK-BAG.** A bladder-shaped sac found in some species of cephalopods, containing a black and viscid fluid resembling ink, by ejecting which, in case of danger from enemies, they are enabled to render the

surrounding water opaque, and thus to conceal themselves. Examples of this contrivance may be seen in the *Sepia vulgaris* and *Loligo* of our seas. To Miss Mary Anning we owe the discovery of numerous fossil ink-bags, found in the lias of Lyme Regis, still distended, as when they formed parts of the living animals. The contents of the ink-bags of cephalopods is used in drawing, the sort preferred is from an oriental species of sepia; some of that extracted from a fossil ink-bag found in the lias was used by Sir Francis Chantrey, on the request of Prof. Buckland, and was by a celebrated painter, who was ignorant of the particulars, pronounced to be sepia of excellent quality. This extreme indestructibility of sepia arises from its being chiefly composed of carbon.

**INOCERA'MUS.** A genus of fossil bivalvular shells of the chalk series, with an oblique beak. Dr. Mantell, in his geology of the South East of England, states, "The shells of the genus *inoceramus* are very remarkable, and ten species occur in the chalk of the South of England. These shells are more or less gibbous, and are commonly marked with transverse concentric ridges, and striæ; their constituent substance is invariably composed of crystallized carbonate of lime, of a radiated or fibrous structure. The hinge is a longitudinal furrow, transversely crenulated, extending on one side of the beaks only. One species, the *Inoceramus Cuvieri*, attains a large size; a length of three feet, by two in width.

**INORGA'NIC.** } Devoid of the organs of  
**INORGA'NICAL.** } vitality.

**INO'RGANISED.** Void of organic structure.

**INO'SCULATE.** (from *in* and *osculator*, Lat.) To unite by apposition.

**INOSCU'ATION.** Union by junction of the extremities; the union, or junction, of the mouths of vessels, as arteries with veins.

**INSECT.** (*insecta*, Lat. *insecte*, Fr. *insetto*, It.) The third class of articulated animals provided with articulated legs; they possess a dorsal vessel analogous to the vestige of a heart, but are wholly destitute of any branch for the circulation. Insects breathe atmospheric air by means of tracheæ, which are most freely ramified through all parts of the body; they possess compound eyes. All insects, which possess wings, metamorphose, or pass through certain changes, before they arrive at their perfect form. In their first state, after leaving the egg, they form larvæ, or caterpillars. The bodies of insects are divided into head, corslet, pectus, abdomen, and members. The head is joined to the body, in some, by ball and socket; in others, by plain surfaces;

in others, after the manner of a hinge. In some, the connection is entirely ligamentous, the different motions corresponding with the nature of the joint. The corslet, or thorax, is situated between the pectus and head. The first pair of feet are joined to this, and it contains the muscles for moving those and the head. To the upper and lateral part of the pectus, the wings, when present, are fixed, and the four posterior feet to its under part. To the upper part a horny process is frequently fixed, termed scutellum, or escutcheon. The pectus contains the muscles which move the wings and four pair of the feet.—*Fyfe*.

Cuvier divided insects into twelve orders:—1. Myriapoda, or insects having more than six feet, to twenty-four and upwards; the insects of this order are apterous, that is, destitute of wings. The myriapoda are also called centipedes. 2. Thysanoura; this order possesses six legs and no wings, and is characterized by the abdomen being furnished with lateral moveable parts, resembling false feet, or appendages fitted for leaping. This order has also been called aptera. 3. Parasita, having six legs, no wings, and ocelli; the mouth consists of a sort of snout containing a retractile sucker. 4. Suctoria, having six legs, but not supplied with wings. 5. Coleoptera, having six legs and four wings, with a horny case, under which the wings are folded. 6. Orthoptera, having six legs and four wings, the two superior wings in the form of cases, and mandibles and jaws for mastication, covered at the extremity by a galea. 7. Hemiptera, having four wings, either stretched straight out, or resting across each other: the blatta, gryllus, fulgora, cymen, &c., are examples. 8. Neuroptera, having four reticulated wings, the inferior being usually of equal size with the superior; the libellula, ephemera, &c. are examples. 9. Hymenoptera, having four wings, naked and membranous, and six feet; these generally possess a sting; the vespa, apis, formica, termes, &c., are examples. 10. The Lepidoptera, possessing a soft hairy body, and four expanded wings, membranous, and covered with small coloured scales resembling dust: the papilio, or butterfly, sphinx, and phalæna, are examples. 11. The Rhipiptera, having two membranous wings, folded like a fan, six legs, and two crustaceous moveable bodies. This order was established by Mr. Kirby, under the name of Stresiptera, or twisted wings; two genera are included in it, *Stylops* and *Xenos*. 12. Diptera, having two membranous extended wings and six legs, with generally, two moveable bodies placed

- over the wings, called halteres, the use of which is not clearly understood: the cæstrus, or gad-fly, the musca, or common fly, the culex, or gnat, &c., are examples.
- INSECT'VORA.** (from *insect* and *voro*, Lat.) In Cuvier's arrangement, a family of animals which lead a subterraneous life, and having grinders studded with conical points. They live principally on insects, and many of them, in cold climates, pass the winter season in a state of torpidity. The hedgehog and mole are examples.
- INSECT'VOROUS.** (from *insectivora*.) Animals subsisting wholly, or in part, on insects.
- INSP'ISSATED.** (from *in* and *spissatus*, Lat.) Thickened; made thick by evaporation. A term applicable only to fluids whose consistence has been increased.
- INSPISSA'TION.** The act of making any liquid of a thick consistence.
- INSTAURA'TION.** (*instauratio*, Lat. *instauratur*, Fr. *restauration*, It.) Restoration to its former condition after decay; renewal; reparation.
- INSTAURATOR.** He who restores that which is decayed to its former condition.
- INSTRAT'IED.** Stratified within some other body.
- INSULAR.** (*insularis*, Lat. *insulaire*, Fr. *isolano*, It.) Belonging to an inland.
- INSULATED.** (from *insula*, Lat.) Detached from all surrounding objects; standing by itself; not contiguous.
- INTEGRAL.** (*intégral*, Fr. *integrale*, It. *integer*, Lat.) A portion of a whole, being similar to the whole and not an elementary portion. Thus the smallest portion of carbonate of lime is still carbonate of lime, but if by any means we separate the carbonic acid from the lime, we no longer have in these, separately, integral portions but the elementary parts.
- INTEGUMENT.** (*integumentum*, Lat.) That which covers or envelopes anything; commonly applied to the natural coverings of the body, as the cuticle, corpus mucosum, cutis, &c.
- INTERCO'STAL.** (from *inter* and *costa*, Lat. *intercostal*, Fr.) Anything between the ribs, as the intercostal muscles, intercostal arteries, nerves, or veins.
- INTERJA'CENT.** (*interjacens*, Lat.) Lying between; intervening.
- INTERJE'CTED.** (*interjectus*, Lat.) Thrown between other bodies.
- INTERLA'MINATED.** Placed between laminæ of plates; enclosed by laminæ.
- INTERME'DIATE.** (*intermédiaire*, and *intermediat*, Fr. from *inter* and *medius*, Lat.) Intervening; interposed; between the extremes.
- INTERMO'NTANE.** (from *inter* and *montanus*, Lat.) Placed between mountains; lying among mountains.
- INTERMU'NDANE.** (from *inter* and *mundus*, Lat.) Subsisting between orb and orb; relating or belonging to the space between worlds.
- INTERNO'DAL.** (from *inter* and *nodus*, Lat.) Applied to flower-stalks proceeding from the intermediate space of a branch between two leaves.
- I'NTERNODE.** The space between one knot or joint and another; a term used both in conchology and botany.
- INTERO'SSEAL.** } (from *inter* and *os*, Lat.)
- INTERO'SSEOUS.** } Placed between bones, as interosseous muscles, arteries, veins, &c.
- INTERRU'PTED.** Divided; separated.
- INTERRU'PTEDLY.** In botany, applied to compound leaves when the principal leaflets are divided by intervals of smaller ones; applied also to spikes of flowers, when the larger spikes are divided by a series of smaller ones.
- INTERSTE'LLAR.** (from *inter* and *stella*, Lat.) Placed between the stars; situated amongst the stars; a term used to express those parts of the universe which are without and beyond our solar system.
- INTERSTICE.** (*interstitium*, Lat. *interstice*, Fr. *interstizio*, It.) The space between one thing and another; time between one act and another. Neither of the above definitions of Dr. Johnson's can be considered to elucidate the word interstice in its common and usual signification. A small hollow space between the parts of a body; the space between one part of a body and another. Il se dit des petits intervalles que laissent entre eux plusieurs corpuscules contigus ou voisins.
- INTERSTI'TIAL.** Containing interstices.
- INTERSTRAT'IFIED.** Stratified between bodies of a different character.
- INTERTRO'PICAL.** (from *inter* and *tropical*.) Those parts which are situated between the tropics.
- INTESTINA.** Linnæus divided the class Vermes, or worms, into five orders, the first of which he named *intestina*; these mostly inhabit the bodies of other animals; they are denominated the most simple animals, being perfectly naked, and without limbs of any kind. Cuvier has divided them into cavitaria, or nematoidea, and parenchymata. The cavitaria or nematoidea are worms having cavities or stomachs, or an intestinal canal floating in a distinct abdominal cavity, such canal extending from the mouth to the anus. The parenchymata comprises those species in which the body is filled with a cellular substance, or with a con-

tinuous parenchyma; the only alimentary organ it contains being ramified canals.

**INTESTINAL.** (*intestinal*, Fr. *intestinal*, It.) Belonging to the intestines.

**INTESTINE.** (*intestin*, Fr. *intestino*, It. *intestinus*, Lat.) Internal; inward.

**INTESTINES.** (This word is generally used in the plural.) All that portion of the alimentary canal which extends from the pyloric extremity of the stomach to the anus; comprehending, in man, the duodenum, jejunum, and ilium, or small intestines, and the cœcum, colon, and rectum, or large intestines.

**INTORSION.** } (from *intorqueo*, *intorsum* et  
**INTORTION.** } *intortum*, Lat.) A twisting or turning in any particular direction.

A term used in botany and conchology.

**INTRAFLIA'CEOUS.** Growing on the inside of a leaf.

**INTRANSMUTABLE.** (from *in* and *transmutabile*.) Unchangeable into any other substance; not capable of being transmuted.

**INTUMESCENCE.** (*intumescence*, Fr. *intumesco*, Lat.) A swelling or rising up; an expansion in the form of bubbles; a puffing.

**INULIN.** (from *inula*.) A vegetable product, resembling starch, obtained from the roots of the *Inula Hellenium*, or elecampane, by boiling them in water. It was thus named by Mr. Rose.

**INVERSION.** (*inversio*, Lat. *inversion*, Fr. *inversione*, It.) Change of order or position so that the upper may be lower, or the lower upper; the first last, or the last first. In the order of superposition of the different stratified rocks, some strata may be wanting altogether, but there will not be found an *inversion* of the regular order of superposition.

**INVERTEBRAL.** (from *in* and *vertebral*.) Not possessing any vertebral column, or hard bony tube for the spinal cord, or medulla spinalis; not having a backbone.

**INVERTEBRATE.** } All those animals are  
**INVERTEBRATED.** } *invertebrated* which

are included in the three great divisions, mollusca, or cyclo-gangliata; articulata, or diplo-neura; and radiata, or cyclo-neura. The other great division includes the *vertebrata*, or spini-cerebrata. In the cephalopodes, the *invertebrate* form of the lower divisions is beginning to be lost, and the *vertebrate* form of that division, to which man belongs, to appear. The first of the true *vertebrated* animals, is the class of fishes; from this class upwards, including pisces, amphibia, reptilia, aves, and mammalia, all are *vertebrated*. From the class Pisces downwards, including cephalopoda, pteropoda, gasteropoda, conchiphora, tunicata, of the

division mollusca; crustacea, arachnida, insecta, myriapoda, annelida, cirrhopoda, rotifera, entozoa, of the division articulata; echinoderma, acalepha, polypiphora, poriphora, polygastrica, of the division radiata, all are *invertebrated*. There is one remarkable distinction which separates the vertebrated from the invertebrated animals, namely, that in the former, the muscles have no *external* points of attachment; and in the latter, with a few partial exceptions, no *internal* ones.

**INVERTED.** (from *inverto*, *inversus*, Lat.) Turned upside down; turned inwards; placed in contrary order to that which was before, or which is usual.

**INVERTEDLY.** In contrary or reversed order.

**INVOLUCEL.** A small or partial involucre.

**INVOLUCRE.** } (*involucrum*, Lat. *cui ali-*  
**INVOLUCRUM.** } *quid involvitur*.)

1. Any membranous covering.  
2. In botany, a species of calyx, remote from the flower, and bearing a great resemblance to bractæ: the involucre is composed of many small leaves placed at the foot of the general umbel; in umbelliferous plants, the involucre, accompanying the partial umbels, is called the involucella.

**INVOLUCRET.** A small, imperfect, or partial involucre, an involucel.

**INVOLUTE.** } (from *involvo*, Lat.)

**INVOLUTED.** } 1. In botany, applied to leaves, when the margins are rolled inwards upon each other.

2. In conchology, where the exterior lip is turned inwards, at the margin, as in all the cyprææ.

**INVOLUTION.** (*involutio*, Lat. *involution*, Fr.)

1. The act of inwrapping or involving.

2. The state of being involved or entangled.

3. That which infolds or inwraps anything; that part which inwraps another.

**IODATE.** A compound salt formed by the combination of iodine, oxygen, and a salifiable base; as the iodates of ammonia, soda, &c.

**IODIDE.** A compound of iodine and some metallic substance; as iodide of iron, iodide of lead, &c. Also a compound of iodine with a simple non-metallic substance. When iodine combines with metals in more than one proportion, it forms a protiodide, or a periodide.

**I'ODIN.** } (from *ιοειδής*, ex *ιον* and *είδος*,

**I'ODINE.** } Gr.) This substance, which was discovered by Courtois, a manufacturer of salt-petre, at Paris, in 1812, obtained its name from the colour of its vapour, which is a beautiful violet. Iodine is procured from sea-water and

from marine vegetables. It is of a greyish-black colour and shining metallic lustre.

**YOLITE.** (from *ιον* and *λίθος*, Gr.) A stone, as its name implies, of a violet colour. It is the prismatischer quartz of Mohs, the Iolith of Werner, and the Iolithe of Haüy. It is found massive and disseminated, and crystallized, in Finland, Norway, Greenland, Switzerland, and Spain; in gneiss and granite. It occurs in regular six and twelve-sided prisms. Its fracture is conchoidal and uneven. It is of a deep blue colour when seen along the axis, and of a brownish yellow when seen in a direction perpendicular to the axis of the prism. When we look along the resultant axes, which are inclined  $62^{\circ} 50'$  to one another, we see a system of rings which are pretty distinct when the plate is thin; but when it is thick, and when the plane passing through the axis is in the plane of primitive polarisation, branches of blue and white light are seen to diverge in the form of a cross from the centre of the system of rings. It consists of silica, nearly 50 per cent. alumina, magnesia, oxide of iron, and oxide of manganese.

**IRIDESCEENCE.** (from *iris*, Lat. the rainbow.) The quality of shining with many colours, resembling those of the rainbow.

**IRIDESCENT.** Shining with the colours of the rainbow. Many membranous shells exhibit, on several parts of their internal surface, a glistening, silvery, or iridescent appearance. This appearance is caused by the peculiar thinness, transparency, and regularity of arrangement, of the outer layers of the membrane, which, in conjunction with the particles of carbonate of lime, enter into the formation of that part of the surface of the shell. The surface, which has thus acquired a pearly lustre, was formerly believed to be a peculiar substance, and was termed mother-of-pearl; Sir David Brewster has, however, satisfactorily proved in the Philosophical Transactions, that the iridescent colours exhibited by these surfaces are wholly the effect of the parallel grooves, consequent upon the regularity of arrangement in the successive deposits of shell. This iridescent property may be communicated to shell-lac, sealing-wax, gum Arabic, balsam of Tolu, or fusible metal, by taking an accurate cast or impression of the surface of mother-of-pearl with any one of these substances.—*Dr. Roget.*

**IRIDIUM.** (from *iris*, Lat.) An excessively infusible metal to which this name has been given from some of its salts having varied tints like those of the rainbow, and from the variety of colours ex-

hibited by its solution. It was discovered, by Mr. Tennant, in 1803, who, in examining the black powder left after dissolving platina, found that it contained two distinct metals, which he named iridium and osmium. It is of a pale steel-grey colour. It occurs in grains, in alluvium, in South America.

**IRIS.** (*iris*, Lat. *iris*, Fr. *iride*, It. *iride*, Gr.)

1. The rainbow.

2. The membrane round the pupil of the eye, deriving its name from its various colours. The colour of the iris corresponds in general with that of the hair, being blue or grey where the hair is light, and brown or black where the hair and complexion are of a dark colour. It floats in the aqueous humour, and serves to regulate the quantity of light sent to the bottom of the eye.

3. A genus of plants; order Monogynia, class Triandria; the flag-flower.

**IRON.** One of the most generally diffused of all solid minerals. Of all the metals the oxides of which are neither alkalies nor earths, iron, geologically considered, is the most important. "Calculating the mean," says Mr. De La Beche, "of thirty kinds of rocks, and neglecting iron ores, properly so called, of every kind, iron constitutes, as an oxide, 5.5 of the lowest stratified rocks, amounting to 14.72 per cent. in mica slate with garnets, and 15.31 per cent. in chlorite slate. It forms 12.62 per cent. in hypersthene rock, and about 20 per cent. in basalts. Oxide of iron constitutes about two and three per cent. of the mass of granites and gneiss, and between three and four per cent. of the mass of greenstone and the more common trappean rocks. When we consider the large amount of iron which exists either in the state of an oxide, a carbonate, a carburet, a silicate, or a sulphuret, therefore including all iron ores of importance, we shall probably not err greatly if we estimate iron as constituting about 2 per cent. of the whole mineral crust of our globe. There is scarcely a rock without iron.—*Geological Researches.*

It is to the presence of iron that rocks and stones most frequently owe their colour, earths when pure being white. The specific gravity of all stones or earthy minerals if it much exceed 2.5 may be attributed to the presence of iron.

In its natural state iron is very unlike what we are hourly accustomed to see it. It presents itself every where only as an earthy mass, a dirty impure rust; and even when found in the mine with a metallic lustre, it is still far from possessing those qualities which are necessary to fit

it for the endless uses to which it is applied. Man has only to purify gold, silver, &c. but he has, as it were, to create iron. It does not appear to have been known so early, or wrought so easily, as gold, silver, and copper. For its discovery we must have recourse to the nations of the East. The writings of Moses furnish us with the most ample proof at how early a period it was known in Egypt and Phœnicia. He mentions furnaces for working iron, "and brought you out of the iron furnace;" the ores from which iron was extracted, "a land whose stones are iron;" and he states that swords, knives, axes, and tools for cutting stones, were at that time made of iron, "and if he smite him with an instrument of iron, so that he die, he is a murderer," "and his hand fetcheth a stroke with the axe to cut down the tree," "thou shalt not lift up any iron tool upon them." The knowledge of iron was brought over from Phrygia to Greece by the Dactyli, according to Hesiod, as quoted by Pliny, who settled in Crete during the reign of Minos I. about 1431 years before Christ. It would appear that a knowledge of iron obtained even before the deluge, for in Genesis we read "And Zillah, she also bare Tubal-Cain, an instructor of every artificer in brass and iron."

Iron forms a constituent part of many animal and vegetable substances; it enters into the composition of the blood; and the various shades of hue of some of the most delicate flowers are more or less owing to its presence.

Iron is of a bluish-white colour, and when polished, has a considerable degree of brilliancy. It has a styptic taste, and emits a smell when rubbed. Its specific gravity is 7.77.

Iron is placed the eighth in order, as regards its malleability, possessing this quality in a less degree than gold, silver, copper, tin, platinum, lead, and zinc. In ductility it ranks fourth, being inferior only to gold, silver, and platinum, and it may be drawn out into wire as fine as a human hair. In tenacity it ranks first, an iron wire one-twelfth of an inch in diameter being capable of supporting 995 pounds without breaking. Iron is fusible at a temperature of 1797 Fahr.

Iron is found native, and is generally considered to be of meteoric origin, being alloyed with nickel and other metals; these masses are called meteoric iron, and it certainly appears that they have fallen from the atmosphere. A mass was discovered in Siberia by Prof. Pallas, weighing 1680 lbs. A mass discovered in Bahia, in Brazil, is estimated to weigh 14,000 lbs.

A singular structure is frequently observed in the argillaceous iron ores of coal districts. The substance of the iron ore is formed into conical sheaths, involving one another, and marked by concentric undulations and radiating striæ. Large spheroidal masses of iron ore, weighing at least a ton, are thus found, in connexion with the coal, at Ingleton, in Yorkshire; and in the coal fields of Staffordshire and South Wales, it is a well known form of aggregation.

The quantity of iron manufactured in Great Britain is enormous; in the year 1827 it was calculated at 690,000 tons; nearly one-half of which, or 296,000 tons, was manufactured in Wales, and upwards of 200,000 in Staffordshire. For the manufacturing of this immense quantity, three millions seven hundred and ninety-five thousand tons of coals would be required.

In a supplementary note to Professor Buckland's Bridgewater Treatise, it is stated, "Ehrenberg has ascertained that a soft yellow ochreous substance, called Raseneisen, which is found in large quantities every spring in marshes about Berlin, covering the bottom of ditches, and in the footsteps of animals, is composed of iron secreted by infusorial animalcules of the genus Gaillonella. This iron may be separated from the siliceous shields of these animals, which retain their form after the extraction of the iron."

**IRONSTONE.** A heavy mineral, possessing sometimes a specific gravity of 3.6, and composed chiefly of iron combined with oxygen, carbonic acid, silicic acid, and water, with, in some instances, calcareous earth. When of a superior quality, it will yield upwards of 36 per cent. of iron. Mr. Bakewell observes, "We know nothing, however, certain, respecting the formation of ironstone; but it appears to have been deposited in fresh water, as it occurs in fresh-water strata in the regular coal formation, and in the coal strata of the oolites of Yorkshire, and among the clay and sandstone strata in the wealds of Kent. Few geologists have attempted to explain the formation of ironstone. It may have been a deposition from chalybeate waters, or was, perhaps, the produce of decomposed vegetation, as bog or peat iron is supposed to have been. If ever we arrive at just conclusions respecting the origin of ironstone, it must be by an accurate examination of the strata in which it occurs, and the relation of these strata to each other. In the Missouri there is a mass of iron ore 300 feet in height, and five miles in extent, which yields 75 per cent. of fine malleable iron."

**IRON-GLANCE.** Rhombohedral iron-ore; the Fero ligiste of Haüy; the Roth eisenstein of Werner. A peroxide of iron, of a dark steel-gray colour. There are several varieties; the red varieties are called red iron ore, and the fibrous, hematite.

**IRON PYRITES.** See *Pyrites*.

**IRON SAND.** A variety of octahedral iron-ore, in grains.

**IRRUP'TED.** (from *irrumpto*, Lat.) Broken violently, and with great force.

**IRRUP'TION.** (*irruptio*, Lat. *irruption*, Fr.) A violent breaking in; a bursting in; a violent rushing into.

**ISCHIA'TIC.** (*ischiadicus*, Lat. *ισχιαδικός*, Gr.) Pertaining to the ischium, as the ischiatic notch, &c.

**ISCHIUM.** (*ischium*, Lat. *ισχίον*, Gr.) One of the bones of the pelvis, situated in the lowest part thereof, and being that bone upon which we sit. It forms the under, and largest portion of the acetabulum, or cup which receives the head of the thigh bone.

**ISERIN.** (from *eisen*, Germ.) A mineral of an iron-black colour, from which it derives its name. It consists of 48 per cent. of oxide of titanium, an equal proportion of oxide of iron, and four per cent. of uranium. It occurs in small obtuse angular grains.

**ISOCARDIA.** A heart-shaped shell, with separated involuted and diverging beaks. The hinge formed by two flattened cardinal inserted teeth, and an isolated lateral tooth under the cartilage slope. This genus includes the *Chama* cor. Some authors divide the genus *Chama* into five, of which *Isocardia* is one.

**ISOCHEI'MAL.** (from *ἴσος*, equal, and *χείμα*, winter, Gr.) Of the same winter temperature: lines drawn through places having the same winter temperature are denominated *isochheimal lines*.

**ISO'CHRONAL.** (*isochrone*, Fr. from *ἴσος*, and *χρόνος*, Gr.) Having equal times; uniform in time. The isochronal vibrations of a pendulum are such as are performed in the same space of time; as all the swings or vibrations of the same pendulum are, whether the arches it describes are longer or shorter.

**ISO'CHRONAL LINE.** That in which a heavy body is supposed to descend without any acceleration.

**ISO'CHRONOUS.** The same as isochronal.

**ISOGEO'THERMAL LINES.** (from *ἴσος*, *γῆ*, and *θερμός*, Gr.) Certain lines or divisions in the earth's crust possessing an equal degree of mean annual temperature. This word is not very common, and I have met with it only in Mrs. Somerville's *Connexion of the Physical Sciences*. It is, however, more definite than iso-

thermal, inasmuch as it applies solely to divisions of the land, whereas isothermal applies equally to air, land, and water.

**ISOMO'RPHISM.** (from *ἴσος* and *μορφή*, Gr.) That quality which a substance possesses of replacing some other substance in a compound body, without any alteration of its primitive form.

**ISOMO'RPHOUS.** That has the property of retaining its primitive form when united with other substances in a compound body.

**ISOPERIMÉ'TRICAL.** (from *ἴσος*, *πέρι*, and *μέτρον*, Gr. *isoperimetro*, It.) Such figures as have equal perimeters or circumferences, of which the circle is the greatest.

**ISO'PODA.** (from *ἴσος* and *πόδος*, Gr.) An order of crustaceans, thus named from the formation of their feet, which are fourteen in number. This order embraces the genus *Oniscus*.

**ISO'SCELES.** (*ἰσοσκελής*, Gr. *isocèle*, Fr.) That which hath only two sides equal.

**ISOPYRE.** A mineral of a greyish or black colour. Occurs massive. Found in Cornwall, imbedded in granite.

**ISO'THERAL.** (from *ἴσος* and *θερος*, summer, Gr.) Of the same summer temperature: lines drawn through places having the same summer temperature are denominated *isothermal lines*.

**ISOTHE'RMAL.** (from *ἴσος* and *θερμη*, Gr.) Possessing equal temperature. Lines drawn upon a map through a series of places having the same annual mean temperature are termed *isothermal lines*, or lines of equal temperature. Mr. Lyell observes, "it is now well ascertained that zones of equal warmth, both in the atmosphere and in the waters of the ocean, are neither parallel to the equator nor to each other. It is also discovered that the same mean annual temperature may exist in two places which enjoy very different climates, for the seasons may be nearly equalized or violently contrasted. Thus the lines of equal winter temperature do not coincide with the lines of equal annual heat, or *isothermal lines*. If lines be drawn round the globe through all those places which have the same winter temperature, they are found to deviate from the terrestrial parallels much farther than the lines of equal mean annual heat. The lines, for instance, of equal winter in Europe, are often curved so as to reach parallels of latitude 9° or 10° distant from each other, whereas the *isothermal lines* only differ from 4° to 5°."—*Principles of Geology*.

**ISOTHE'RMAL ZONES.** As the isothermal lines are as numerous as the places, and as diversified as numerous, geographers

have grouped them into bands or zones. Humboldt has divided the northern hemisphere into six isothermal zones or bands.

**ISTIURUS.** A genus of that family of saurians called iguanida, and thus named by Cuvier. The distinguishing character of the genus *Istiurus* is an elevated and trenchant crest, extending along a portion of the tail, and supported by spinous apophyses of the vertebræ.

**ITUS.** The termination of adjectives in *itus* shows merely the existence of something in general, as, for example, *auritus*, furnished with ears.

**JUGULAR.** (from *jugulum*, Lat. *jugulaire*, Fr. *giugulare*, It.) Pertaining to the throat; belonging to the neck.

**JULUS.** } (*ἰουλος*, Gr.)

1. In botany, a catkin; a species of inflorescence consisting of chaffy scales arranged along a stalk; they are worm-like tufts, which at the beginning of the year grow out, and hang pendular down from the hazle, walnut, filberd, &c.

2. In zoology, a genus of insects of the order Aptera. The feet are very numerous, being on each side twice as many as the segments of the body; the antennæ are moniliform; there are two articulated palpi; and the body is of a semicylindrical form. There are many species.

**IVORY.** (*ebur*, Lat. *ivoire*, Fr. *avorio*, It.) A hard, solid, and firm substance, of a white colour, and capable of a very good polish. It is the tusk of the elephant. The ivory from Ceylon is more valuable than any other, from its not becoming yellow in the wearing, as nearly all other ivories does.

**JURA LIMESTONE.** (*calcaire de Jura*, *Jura kalk*.) The name given by some continental geologists to that group of rocks comprised in the oolite. The Jura limestone group is composed of limestones of various qualities, clays, sands, and sandstone, and contains the same fossils as those found in the oolitic group of England. In the range of the Jura and the outer ranges of the Alps, the calcareous formations are of such immense magnitude, and the beds are often so highly indurated and crystalline, that it is only from their relative position and imbedded fossils, that we can trace their analogy to the English strata.

**IUS.** The termination of adjectives in *ius* expresses the uses or aptness of an organ; for example, *raptorius*, adapted to seize prey; *fossorius*, fitted for digging; *nutatorius*, suited to swim, &c.

**JUXTA-POSITION.** (*juxta-position*, Fr. *juxta* and *positio*, Lat.) The state of being placed in nearness or contiguity; apposition.

## K

**KANGAROO.** An animal of the genus *Didelphys*, the *Didelphys gigantea* of Linnæus. It is a native of New Holland. When of full growth it attains the size of a large sheep. The fore-legs are short, the hind legs of considerable length, so that it advances by leaping rather than walking or running.

**KAOLIN.** (The *Porzellan Erde* of Werner; the *Argile Kaolin* of Brongniart; and *Feldspath decomposé* of Haüy.) Porcelain clay. The name of an earth which is used as one of the two ingredients in the manufacture of oriental porcelain. Mr. Bakewell observes, "I believe it is the soft earthy granite from the mountains of Auvergne which supplies the *kaolin* used in the porcelain manufacture at Sevres. Mons. Brongniart shewed me a specimen of their best kaolin: it contained crystals of pinite." M. Bromare says that by analysing some Chinese kaolin, he found it was a compound earth, consisting of clay, to which it owed its tenacity; of calcareous earth; of spark-

ling crystals of mica; and of small quartz crystals. He says that he has found a similar earth upon a stratum of granite, and conjectures that it may be a decomposed granite. The *kaolin* used in most countries for the manufacture of fine porcelain or china, is generally produced from the felspar of decomposing granite, in which the cause of decay is the dissolution and separation of the alkaline ingredients. Cleveland says, "Kaolin is essentially composed of siliceous and aluminous; the proportions are variable, but the siliceous usually predominates. When pure kaolin is employed in the manufacture of porcelain, some ingredient must be added as a flux, as, when pure, it is infusible. There is satisfactory evidence that kaolin has in most cases, if not in all, originated from the decomposition of rocks abounding in felspar, more particularly from graphic granite, which consists almost entirely of quartz and felspar.

**KARPHOLITE.** (from *κάρφος* and *λίθος*,

Gr.) A straw-coloured mineral not long discovered, occurring in thin prismatic concretions, and of a fibrous structure.

**KEEL.** (*Kiel*, Germ. *quille*, Fr.)

1. In conchology, the longitudinal prominence in the Argonautæ.

2. In botany, the term keel is applied to two of the petals in papilionaceous flowers: the keel is composed of two petals, separate or united, and encloses the internal organs of fructification.

3. In entomology, a sharp, longitudinal, gradually rising elevation upon the inferior surface.

**KEE'LED.** Applied to leaves when the back is very prominent longitudinally.

**KERA'TOPHYTE.** A name given to the horny zoophyte.

**KE'RATE.** (from *κέρας*, Gr. a horn; from the minerals placed in this order having a resemblance to horn in their outward aspect.) The name of the third order of earthy and metalliferous minerals. The characters of the genera of this order are as follows: they are not metallic; have a white streak; no single distinct cleavage; hardness = 1.0 — 2.0; specific gravity 5.5 to 6.5.

**KI'LLAS.** A provincial name for a coarse argillaceous schist; a variety of slate. Mr. Bakewell, in mentioning the *killas* of Cornwall, says, "perhaps the best designation of the *killas* rock on this situation is, that of a minutely grained and highly indurated gneiss that had lost its schistose character."

**KI'LLINITE.** (Thus named from its having been discovered at Killiney, in Ireland, by Dr. Taylor.) A mineral of a pale green colour, occurring in veins of granite at Killiney, near Dublin.

**KIMMERIDGE CLAY.** A blue and greyish-yellow slaty clay of the oolite formation; a member of the oolite group, thus called from its being found abundantly at Kimmeridge, in the Isle of Purbeck. It is also found at Sunning, near Oxford. It contains gypsum and bituminous slate. It is a marine deposit. Kimmeridge clay forms the base of the Isle of Portland.

**KING-CRAB.** (an entomostracan, or shelled insect.) The *Limulus polyphemus*, known also as the horse-shoe. It is very com-

mon on the coast of New Jersey. The king-crab is placed by Cuvier amongst the pœcilopods.

**KNOB.** (*knöbel*, *knopf*, Germ.) A hard protuberance. In conchology, any part of a shell bluntly rising above the rest.

**KNOB'BED.** Containing protuberances or knobs; set with knobs.

**KOA'LA.** An extraordinary quadruped inhabiting the continent of Australia. Cuvier places the *koala* in marsupialia, or the fourth order of Mammalia. This animal has a short stout body, short legs, and no tail: it has the five toes, or fingers, of the fore-feet divided into two groups, the thumb and index forming one group, and the three remaining toes or fingers the other. On the hind feet the thumb is altogether wanting. Carrying its young for a long period on its back, this separation of the toes of the fore-feet enables it to take firmer hold of the branches of the trees, on which it passes a portion of its time.

**KOTH.** A name given by the Spaniards to an earthy slimy substance ejected from the volcanoes of South America. It is of a blackish brown colour, an earthy texture, and is but slightly coherent. The natives call it *Moya*.

**KOU'PHOLITE.** (from *κούφος*, light, and *λίθος*, a stone, Gr.) The prehnite kounpholite of Brongniart. A mineral, a variety of prehnite. It occurs in minute, rhomboidal plates, is of a greenish or pale yellow colour, glistening, and slightly pearly. It has been found in the Pyrenees.

**KY'ANITE.** (from *κύανος*, blue colour, Gr. This is frequently written Cyanite.) The Cyanit of Werner; the Disthene of Haiiy, and the Sappare of Kirwan. Kyanite occurs both massive and crystallized, the crystals, often very long, are frequently grouped. Its colour, as its name imports, is blue, varying from an intense to a light sky-blue. It is infusible, except under the compound blow-pipe. It consists of alumina 64, silica 34, with a small quantity of oxide of iron and a trace of lime. It is found in primary rocks in Scotland and in America.

## L

**LABE'LLUM.** (*labellum*, Lat. a little lip.) A term applied, in botany, to one of the three pieces forming the corolla in orchideous plants. The calyx and corolla consist of three pieces each, and one of those forming the latter, differs very much

in size and form from the other two; it is called the *labellum*, and is often spurred.

**LA'BIAL.** (from *labium*, a lip, Lat. *labial*, Fr. *labiale*, It.) Pertaining to the lips.

**LA'BIATE.** } In botany, plants are so called  
**LA'BIATED.** } which have the segments or

divisions of their corollas resembling the form of lips.

**LABIATÆ.** There is a large class of plants called *labiatæ*, which have irregular monopetalous corollas, and these, generally, bilabiate and ringent; the mint, nettle, &c. are examples.

**LABIUM.** (*labium*, Lat.)

1. In entomology, the lower lip of insects is called the *labium*; the upper, the *labrum*. The lower pair of jaws are behind the mandibles, and between them is situated the *labium*, or lower lip, which closes the mouth below, as the labrum does above. The labium of insects consists of two chief parts, each of which may be considered as a separate organ; namely, the chin and the tongue.

2. In conchology, the inner lip of the shell.

**LABRUM.** (*labrum*, Lat.)

1. In entomology, the upper lip of insects. The labrum is situated above, or rather in front of, the mandibles, it is generally of the form of the segment of a circle, or a triangular, or quadrangular, somewhat convex, corneous plate, which is united posteriorly by a membranous hinge with the clypeus.

2. In conchology, the outer lip; that edge of the aperture which is placed at the greatest distance from the axis of the shell.

**LABRADOR FELSPAR.** } So named from  
**LABRADOR STONE.** } having been found on the coast of Labrador, more particularly on the Island of St. Paul.

This mineral was at one time called Labrador Hornblende, but its present name has very properly been substituted for what was incorrect. Labrador felspar has been found massive and disseminated only. Its laminæ are slightly curved; lustre nearly metallic, and pearly on the perfect cleavage faces. It is distinguished by its splendid changeability of colour, reflecting very beautiful colours when the light falls upon it in certain directions. Although principally occurring on the coast of Labrador, yet this mineral has been found in different parts of Europe.

**LABRADORITE.** A name for Labrador felspar.

**LABYRINTH.** (*labyrinthus*, Lat. λαβύρινθος, Gr. *labyrinthè*, Fr. *labyrintho*, It.) The name given to several cavities of the ear, from their flexuous position. The internal parts of the ear compose what is designated, from the intricacy of its winding passages, the *labyrinth*. It consists of a middle portion, termed the vestibule, from which, on its upper and posterior side, proceed three tubes, called from their shape, semicircular canals; to

the lower anterior side of the vestibule there is attached a spiral canal, resembling the shell of snail, and termed the cochlea.

**LACERTA.** (*lacerta*, Lat.) A lizard. In Cuvier's arrangement, *lacerta* constitutes the second genus of *Lacertinida*, or *lacers-tians*.

**LACERTIAN.** Belonging to the family *Lacertinida*; order *Sauria*.

**LACERTINE.** Resembling a lizard.

**LACINIATE.** } (*laciniatus*, Lat. *lacinié*,  
**LACINIATED.** } Fr.) Ragged at the edges; jagged. In botany, applied to leaves cut into numerous irregular portions.

**LACRYMAL.** (from *lachryma*, vel *lacryma*, Lat. *lacrymale*, Fr.) Certain parts about the eye, connected with the secretion and passage of the tears, as the lacrymal glands, the lacrymal ducts, &c. This word is also written *lachrymal*.

**LACTATION.** (from *lac*, milk, Lat.) The act of suckling; the period of suckling.

**LACTEAL.** (from *lac*, Lat.) The lacteals are numerous minute tubes commencing, by open and very minute orifices, from the inner surface of the intestines, and uniting successively into larger vessels, till they form trunks of considerable magnitude. The office of the lacteals is, to take up the chyle and transmit it to the heart. It is only among the vertebrata that lacteals are met with; in invertebrated animals, the absorption of the chyle is performed by veins instead of lacteal vessels. The chyle of the higher orders of animals often contains a multitude of globules, which give to it a milky appearance, from which circumstance the vessels containing it have obtained their name.

**LACTEOUS.** (*lacteus*, Lat.) Milky; of a white colour, resembling milk.

**LACTIFEROUS.** (from *lac*, milk, and *fero*, to bear, Lat.) Conveying milk; yielding a white juice, or milky liquor.

**LACUNÆ.** (*lacuna*, Lat.) Pl. Small excretory ducts.

**LACUNOSE.** } (from *lacunosus*, Lat.) Hav-  
**LACUNOUS.** } ing the surface covered with small furrows, pits, or depressions.

**LACUSTRAL.** } (from *lacus*, Lat.) Per-  
**LACUSTRINE.** } taining to a lake.

**LACUSTRINE DEPOSITS.** Purely lacustrine deposits are almost unknown among any of the stratified rocks of a date earlier than the tertiary period, and it was not until the publication of Cuvier and Brongniart, on the environs of Paris, that the attention of geologists was much directed to the study of those numerous fresh-water deposits from which we may obtain a knowledge of the ancient condition of

the land. "If we drain a lake," says Mr. Lyell, "we frequently find at the bottom a series of deposits, disposed with great regularity one above the other; the uppermost, perhaps, may be a stratum of peat, next below a more compact variety of the same, still lower a bed of laminated marl, alternating with peat, and then other beds of marl, alternating with clay. Now if we sink a second pit through the same continuous *lacustrine deposit*, at some distance from the first, we commonly meet with nearly the same series of beds, yet with slight variations; some, for example, of the layers of sand, clay, or marl may be wanting, one or more of them having thinned out, and given place to others, or sometimes one of the masses, first examined, is observed to increase in thickness to the exclusion of other beds. At length we arrive at a point where the whole assemblage of lacustrine strata terminate, as, for example, when we arrive at the borders of the original lake-basin." Prof. J. Philips observes, "lacustrine deposits of undoubtedly miocene age are scarcely known. On the coasts of Yorkshire and Lancashire, lacustrine deposits occur at many points, and present a considerable variety of circumstances as to level, above or below the sea, sandy, marly, or peaty composition; but are always governed by the general condition, that they occupy small hollows on the surface of the diluvial accumulations.

**LAGA'NUM.** A fossil echinite thus named by Klein, called also pancake.

**LAGO'MYS.** (from *λάγος*, a hare, and *μῦς*, a rat, Gr.) A rat hare. A genus of animals forming a link between the hare and the rat. The *lagomys* is placed by Cuvier in the order *rodentia*. They have been found in Siberia only, and are described by Pallas. There are several species; one has been found fossil in the osseous breccia of Corsica. The *lagomys* has ears of a moderate size; legs nearly alike; clavicles almost perfect; and no tail. The Rev. W. Kirby observes of the *lagomys*, "it ought rather to have been called the *hay-maker*, since man may, or might, have learned that part of the business of the agriculturist, which consists in providing a store of winter provender for his cattle, from this industrious animal. The Tungusians, who inhabit the country beyond the lake of Baikal, call it *Pika*, which has been adopted as its trivial name. These animals make their abode between the rocks, and during the summer employ themselves in making hay for a winter store. About the middle of August these little animals collect with admirable precaution their winter's pro-

vider, which is formed of the choicest grasses and the sweetest herbs, which they bring near their habitations and spread out to dry like hay. In September, they form heaps or stacks of the fodder they have collected under the rocks, or in other places sheltered from the rain or snow. Where many of them have laboured together, their stacks are sometimes as high as a man, and more than eight feet in diameter. A subterranean gallery leads from the burrow, below the mass of hay, so that neither frost nor snow can intercept their communication with it.—*Bridgewater Treatise*.

**LAGOON.** } (*laguna*, It.) A salt-water  
**LAGUNE.** } lake.

**LAKE.** (*lacus*, Lat. *lache*, Germ. *lac* or *laque*, Fr. *lago*, It.) A large collection of inland water. Some of the lakes of America are upwards of 1500 miles in circuit. The filling up of lakes, and the formation of deltas at their mouths, form subjects of great importance to the geological student. In lakes, the diminution of the surface, by the gradual increase of land at the mouths of rivers which flow into them, is remarkable. The mud and débris brought by the Rhone into the lake of Geneva, and deposited near its entrance, has caused an advance of the land to the extent of two miles within 1700 years, the Roman harbour *Portus Valesiæ*, now called Port Vallais, being at this time two miles distant from the lake.

**LAMA'NTIN.** } The manatus of Cuvier. A

**LAMA'NTINE.** } species of herbivorous cetacea, living upon the plants which grow at the bottom of the sea. The *lamantin* appears to have existed during the miocene and pliocene periods. Fossil remains have been discovered in France. The existing species of the *lamantine* are found near the mouths of rivers in the hottest parts of the Atlantic ocean and in the torrid zone, and the discovery of their fossil remains in Europe adds another link to the long chain of evidence of a diminished temperature of the climate of Europe.

**LAMBDOI'DAL.** (from the Greek letter *λμβδα*, and *ειδος*, form.) The name given to one of the sutures of the cranium, from its supposed resemblance in form to the Greek letter  $\Lambda$ .

**LAME'LLA.** (*lamella*, Lat.) A thin plate or scale. This word is generally used in the plural, *lamellæ*.

**LA'MELLATED.** Composed of thin plates, layers, or scales. In conchology, when a shell is divided into thin and distinct plates or layers, overlying each other with the edges produced.

**LAME'LLAR.** Composed of minute plates

or layers placed one over the other ; foliated.

**LAME'LI BRANCHIA'TA.** In De Blainville's conchological arrangement, the third order of Acephalophora, containing ten families of bivalves.

**LAMELLICO'RNES.** In Cuvier's arrangement, the sixth family of pentamerous coleoptera ; they have foliated horns, from which circumstance they obtain their name.

**LAMELLI'FEROUS.** (from *lamella*, a small plate, and *fero*, to bear, Lat.) Having a structure composed of thin layers ; having a foliated structure.

**LAMELLIRO'STRES.** In Cuvier's arrangement, the fourth family of the order of Palmipedes. The lamelliostres have a thick bill, the edges of which are furnished with laminae, from which circumstance they have obtained their name.

**LA'MINA.** (*lamina*, Lat.) A thin plate or scale ; a thin layer of a stratum. This word is generally used in the plural, laminae.

**LA'MINATED.** (*laminé*, Fr.) Disposed in layers, placed one over another.

**LAMINATION.** Arrangement in layers. Lamination prevails amongst all the varieties of gneiss, mica schist, chlorite schist, hornblende schist, &c. It is often observable in primary limestone, and sometimes in quartz rock. All the members of the carboniferous series display lamination, though in unequal degrees. "The coarse sandstones frequently," says Prof. Phillips, "present oblique lamination, which, added to the irregularity of the beds, renders it often embarrassing to say what is the true dip of such rocks.

**LAMINI'FEROUS.** (from *lamina* and *fero*, Lat.) Having a structure consisting of laminae or layers.

**LA'NATE.** } (from *lanatus*, Lat.) Woolly ;  
**LA'NATED.** } covered with a sort of pubescence resembling short woolly hairs.

**LA'NCEOLATE.** Lance-shaped ; narrow and tapering.

1. In conchology, applied to a shell of an oblong shape, and gradually tapering to each end.

2. In entomology, in describing the figure of the superficies, when the base is not so broad as the centre, and the lateral margins slightly, but equally, swollen, gradually tapering towards the apex, where it terminates in a point, and the longitudinal diameter more than three times the length of the transverse.—*Burmeister*.

3. In botany, applied to leaves of a narrow oblong form, gradually tapering towards each end.

**LA'NCIFORM.** (from *lancea* and *forma*, Lat.) Spear-shaped ; lance-shaped.

**LA'NDSLIP.** A portion of land that has

separated from the main body, in consequence of long-continued rains, or the expansive powers of severe frosts, and has fallen to a lower situation. Landslips are not uncommon on our coasts ; one of great extent occurred some years since at the back of the Isle of Wight, and another is announced, though not of such magnitude, at Alum Bay, while I am writing the present account. Landslips must necessarily be often attended by fatal consequences, as in the falls of avalanches. We are informed that when the mountain of Piz fell, in 1772, three villages, with their entire population, were covered ; and that when part of Mount Grenier, in Savoy, fell, in 1248, five parishes were buried, the ruins occupying an extent of nine square miles.

**LA'NGOUSTE.** (Fr. *sorte d'écrevisse de mer*.) The name given by the French to the *Palinurus vulgaris* of Leach ; the cray-fish or thorny lobster.

**LANI'FEROUS.** (from *lana*, wool, and *fero*, to produce, Lat.) Bearing or producing wool.

**LANI'GEROUS.** (from *lana*, wool, and *gero*, to bear, Lat.) Bearing wool.

**LA'NTANE.** (from *λανθάνω*, to conceal, Gr.) A new elementary body, lately discovered, making the fifty-fifth. See *Elementary body*.

**LANU'GINOSE.** } (from *lanuginosus*, Lat.)

**LANU'GINOUS.** } In entomology, when longish curled hair is spread over the surface ; covered with soft hair resembling wool.

**LA'PIDES JUDA'ICI.** A name given to certain fossil spines of echinites, formerly supposed to be petrified olives.

**LAPIDE'SCENCE.** (from *lapidesco*, Lat. to become stone.) Stony concretion ; the process of being converted into stone.

**LAPIDE'SCENT.** Growing or turning into stone.

**LAPIDIFICA'TION.** (*lapidification*, Fr. from *lapis*, a stone, and *fito*, to make or become, Lat.) The conversion into stone of some other substance ; the act of forming stone.

**LAPIDIFY.** (*lapidifier*, Fr.) To convert into stone ; to form stone.

**LAPIDIFIED.** Converted into stone ; formed into stone.

**LAPILLI.** (*lapillus*, Lat.) Volcanic cinders, abounding in minute globular concretions.

**LA'PIS LA'ZULI.** The Lazurstein of Werner ; Azure-stone of Jameson ; Lazulite of Häüy ; Dodecaedrischer Kuphon-spath of Mohs. When lapis lazuli is pure, it is a mineral of a fine azure-blue colour ; it occurs in rhombohedral dodecahedrons, massive, and disseminated. Structure finely granular, almost compact ; fracture

uneven or conchoidal; lustre feeble; a little translucent at its edges. It scratches glass, but gives sparks with steel with difficulty. Specific gravity about 2.30. Its analysis is very differently given by different authors. It contains silica, nearly fifty per cent. carbonate of lime, alumina, potash, soda, oxide of iron, and sulphuric acid. It occurs associated with primary rocks, especially granite. It is accompanied by garnets, quartz, felspar, &c., with some of which it is often intermixed. It is found chiefly in China, Persia, and Russia. It is capable of a high polish, and is much esteemed. Its chief use, however, is to furnish the ultra-marine blue, used by painters, a pigment remarkable for the durability of its colour.

**LA'PIS ÆTITÆS.** Eagle-stone. A mineral which derives its name from the ancient belief that it was found in the nests of the eagle. It is a variety of iron ore, commonly met with in the argillaceous mines of this country. Its supposed virtues are described by Dioscorides, Ætius, and Pliny, who assert that if tied to the arm it will prevent abortion; if fixed to the thigh it will facilitate delivery.

**LA'RYNX.** (λάρυγξ, Gr.) The upper part of the wind-pipe or trachea; that cartilaginous projection in the throat known as the pomum Adami, which strictly is formed by one of the cartilages of the larynx only, namely, the thyroid. The larynx consists of five cartilages, the cricoid, thyroid, two arytenoid, and the epiglottis.

**LA'TERAL.** (*lateralis*, Lat. *lateral*, Fr. *lateral*, It.) Pertaining to the side; extending to one side from the centre.

**LATERITIOUS.** (*lateritius*, Lat.) Of the colour of brick-dust; applied generally to sediment.

**LATIO'STROUS.** (from *latus*, broad, and *rostrum*, a beak, Lat.) Broad beaked.

**LA'TITUDE.** (*latitudo*, Lat. *latitude*, Fr. *latitidine*, It.) The latitude of a place on the earth's surface is its angular distance from the equator, measured on its own terrestrial meridian: it is reckoned in degrees, minutes, and seconds, from 0 up to 90°, and northwards or southwards according to the hemisphere the plane lies in. Thus the observatory at Greenwich is situated in 51° 28' 40" north latitude. Latitude may also be thus defined, the angular distance between the direction of a plumb-line at any place and the plane of the equator.

**LA'TROBITE.** A mineral, thus named after Latrobe, having been found by him on the coast of Labrador. Colour, pale pink; specific gravity 2.8. Occurs massive and crystallized.

**LA'TTICED.** In conchology, shells having longitudinal lines or furrows decussated

by transverse ones, resembling lattice-work.

**LA'RVA.** (*larva*, a mask, Lat.) An insect in its caterpillar state, before it has attained its winged or perfect state. Some insects, as the butterfly, moth of the silkworm, &c., pass through four distinct states, namely, the egg; the *larva*, or caterpillar; the pupa, or chrysalis; and the imago, or perfect insect. The egg, which is deposited by the perfect insect, gives birth to a caterpillar, or *larva*; an animal, which, in outward shape, bears not the slightest resemblance to its parent, or to the form it is itself afterwards to assume. It has, in fact, both the external resemblance, and the mechanical structure, of a worm. The same elongated cylindrical shape, the same annular structure of the denser parts of the integument, the same arrangements of longitudinal and oblique muscles connecting these rings, the same apparatus of short feet, with claws, or bristles, or tufts of hair, for facilitating progression; in short, all the circumstances most characteristic of the vermiform type are equally exemplified in the different tribes of caterpillars, as in the proper annelida. These external investments, which hide the real form of the future animal, have been compared to a mask; so that the insect, while wearing this disguise, has been termed larva, the Latin name for a mask.—*Roget*.

We have in the larvæ of insects a kind of intermediate animal, in some degree expansive.

**LA'VA.** (This word, according to Kirwan, is derived from the Gothic, *lopa* or *lauffen*, to run, and is applied to the melted or liquified matter, discharged from the mouths of volcanoes.) The matter which flows in a fused, or melted, state from a volcano.

Lava, whatever be its chemical composition, puts on very different appearances, according to the circumstances which accompany its consolidation, hence by some authors it has been divided into compact lava, cellular lava, and cavernous lava. The mineral called felspar forms, in general, more than half of the mass of modern lavas. When this is in great excess, lavas are called trachytic; when, on the other hand, augite prevails, they are called basaltic. When lava is observed as near as possible to the point whence it issues, it is found to be, for the most part, a semi-fluid mass of the consistence of honey, but occasionally so liquid as to penetrate the fibre of wood. It soon cools externally, and consequently exhibits a rough uneven surface; but, from its being a bad conductor of heat, the internal mass remains liquid long after that portion which

is exposed to the air has become solid. That of 1822, some days after it had been ejected, raised the thermometer from  $59^{\circ}$  to  $95^{\circ}$ , at a distance of twelve feet; at a distance of three feet the temperature greatly exceeded that of boiling water. The temperature at which lava continues in a state of fluidity is sufficiently great to melt glass and silver; even stones are said to have been fused when thrown into the lava of Etna and Vesuvius. The length of time during which streams of lava retain their heat is quite astonishing: the current of lava which flowed from Etna in 1669 retains a portion of it to the present time. That which was poured from Jorullo, in Mexico, in the year 1759, was found to retain a high temperature half a century afterwards. Sir W. Hamilton lighted small pieces of wood in the fissures of a current of Vesuvian lava four years after it had been ejected. The streams of lava often become solid externally, even while yet in motion, and their sides may be compared to two rocky walls, which are sometimes inclined at an angle of  $45^{\circ}$ . Of the immense bodies of lava thrown out during volcanic eruptions, few persons entertain a just idea. Etna, which rises upwards of 10,000 feet in height, and embraces a circumference of 180 miles, is composed entirely of lavas. "In the structure of this mountain," says Dr. Daubeny, "every thing wears alike the character of vastness." The products of the eruptions of Vesuvius may be said almost to sink into insignificance, when compared with these *coulées*, some of which are four or five miles in breadth, fifteen in length, and from fifty to one hundred feet in thickness. Still the eruptions of Etna are nothing when compared with that of Skaptár Jokul, the following account of which is extracted from Mr. Lyell's Principles of Geology. "On the 11th of June Skaptár Jokul threw out a torrent of lava which flowed down into the river Skaptá, and completely dried it up. The channel of the river was between high rocks, in many places from four hundred to six hundred feet in depth, and near two hundred in breadth. Not only did the lava fill up these great defiles to the brink, but it overflowed the adjacent fields to a considerable extent. The burning flood, on issuing from the confined rocky gorge, was then arrested for some time by a deep lake, which it entirely filled. The current then again proceeded, and reaching some ancient lava full of subterraneous caverns, penetrated and melted down part of it. On the 18th of June, another ejection of liquid lava rushed from the volcano, which flowed down with amazing velocity over the sur-

face of the first stream. After flowing for several days, it was precipitated down a tremendous cataract called Stapafoss, where it filled a profound abyss, which that great waterfall had been hollowing out for ages, and again the fiery current pursued its onward course. On the 3d of August, fresh floods of lava still pouring from the volcano, a new branch was sent off in a different direction. When the fiery lake which filled up the lower portion of the valley of the Skaptá had been augmented with new supplies, the lava flowed up the course of the river to the foot of the hills whence the Skaptá takes its rise. This eruption did not entirely cease till the end of two years, and although the population of Iceland did not exceed fifty thousand, not fewer than twenty villages were overwhelmed, besides those inundated by water, and more than nine thousand human beings perished, together with an immense number of cattle. Of the two branches of liquid lava, which flowed in nearly opposite directions, *the greater was fifty, and the lesser forty miles in length.* The extreme breadth which the Skaptá branch attained in the low countries was from twelve to fifteen miles, that of the other about seven. The ordinary height of both currents was one hundred feet, but in narrow defiles it sometimes amounted to six hundred."

**LA'UMONITE.** Diatomous zeolite. A mineral thus named after its discoverer, Gillet Laumont. It is of a white, or grayish-white colour, sometimes tinged with red. It occurs regularly crystallized, and in distinct granular concretions. Its crystals are four-sided prisms, slightly oblique, sometimes terminated by diedral summits, sometimes truncated on their lateral edges. By exposure to the air, laumonite disintegrates, and is at length reduced to a white powder. If, however, recent specimens be immersed for two or three hours in a strong mucilage of gum, the action of the atmosphere upon them, and their efflorescence, will be prevented. Laumonite consists of silica 52·0, alumina 21·20, lime 10·50, and water about 14. It occurs in secondary trap-rocks in France, Scotland, Iceland, and America.

**LA'ZULI.** See *Lapis lazuli*.

**LA'ZULITE.** A mineral of a light blue colour, supposed by some mineralogists to be a sub-species of lapis lazuli.

**LEAD.** (*lead*, Sax.) Lead is of a bluish-grey colour, with considerable lustre, but soon tarnishes by exposure to the atmosphere. By friction this metal exhales a peculiar, and somewhat disagreeable, odour. Its specific gravity is 11·35, or nearly eleven and a-half times heavier than water. It is soft and easily melted,

being fusible at about 600° Fahrenheit. It is the softest of all the durable metals; it can be scratched by the nail, and is easily cut by a knife. Its elasticity, ductility, and tenacity, are comparatively low; it cannot be drawn into wire thinner than a line in diameter. Lead is very malleable, and can be beaten into thin leaves, but these, from its imperfect tenacity, are easily torn. All the salts of this metal are highly poisonous; they are, however, most shamefully employed by unprincipled persons to correct or conceal the acidity of cider and wines. The presence of lead in these liquors may be detected by the following means. Dissolve 120 grains of sulphuret of lime and 180 grains of super-tartrate of potash in 16 ounces of distilled water, by repeated shaking the mixture; when perfectly dissolved, leave the mixture to settle, and pour off the clear liquid into clean phials, adding about twenty drops of hydrochloric acid to each. A small quantity of this poured into a wine-glass of the suspected wine, will detect the smallest quantity of lead, if any be present, by producing a black precipitate.

Several instances of the occurrence of native lead have been mentioned, though in few of them does the fact appear to be well established. In the island of Madeira, it is found in small masses, in lava, and has undoubtedly been reduced to its present state by volcanic fire. Next to iron, lead may be considered the most abundantly diffused of all the metals; it has been known from the earliest ages. The lead of our mines is in a state of combination with sulphur, forming a sulphuret of lead; this is called galena, or lead-glance. By exposure to a strong heat the sulphur is driven off and pure lead is obtained: the average produce of metal from the Derbyshire ore is about 66 per cent.

**LEGUME.** (*legumen*, Lat. *légume*, Fr. *legume*, It.) A species of fruit; a pod; a seed vessel peculiar to leguminous plants, formed of two oblong valves having no longitudinal partition; the seeds are attached to one of its margins only; the bean, pea, vetch, and all the natural order of leguminosæ, furnish examples.

**LEGUMINO'SÆ.** An order of plants, calyx five-toothed, inferior, the odd segment anterior, or farthest from the axis; corolla papilionaceous, rarely regular; stamens definite or indefinite, perigynous, either distinct, monadelphous, or diadelphous; ovary superior, one-celled, many seeded, style and stigma simple; fruit a legume, or, rarely, a drupe; seeds occasionally with an arillus; embryo, exalbuminous, cotyledons, either remaining under

ground, or appearing above, in germination; leaves compound, stipulate, alternate; leaflets stipulate; inflorescence usually axillary, but various.

One genus of this order, *Detarium*, has a drupe for its fruit, and *Mimosa* has a perfectly regular corolla.

The order Leguminosæ is most important to man both for its beauty and utility. The pea, bean, harico, vetch, liquorice, clover, sainfoin, lucerne, tamarind, indigo, gum arabic, &c. &c., belong to it. Generally, the order is innocent, if not wholesome; but some few genera are poisonous.

**LEGUMINOUS.** Belonging to the order Leguminosæ; bearing pods; having a legume for a pericarp. Linnæus stated that among all the leguminous or papilionaceous tribe, no deleterious plant is to be found; this, however, is not strictly true.

**LEMMING.** The Lapland marmot. The lemming has short ears and a tail, with the toes of its fore-feet peculiarly adapted for digging. Cuvier places the lemming in the order Rodentia, class Mammalia. Bones of the lemming have been found fossil in a breccia at Cette.

**LEMNIAN EARTH.** A mineral found in the island of Lemnos, in the Egean Sea, whence its name. It is also called sphragide, from *σφραγίς*, *sigillum*, a seal. It is of a reddish colour and has a soapy feel.

**LENS.** (*lens*, a lentil, Lat. *lentille*, Fr. *lente*, It.) So named from its resemblance to a seed of the lentil. A transparent substance having its two surfaces so formed that the rays of light, in passing through it, have their direction changed. Of lenses there are various sorts; a *spherical lens*, is a sphere, all the points in its surface being equally distant from the centre. A *double convex lens*, is a solid formed by two convex spherical surfaces, having their surfaces on opposite sides of the lens. When the radii of its two surfaces are equal, it is said to be *equally convex*; when the radii are unequal, it is said to be *unequally convex*. A *plano-convex lens*, is a lens having one of its surfaces convex and the other plane. A *double concave lens*, is a solid, bounded by two concave spherical surfaces, and may be either equally or unequally concave. A *plano-concave lens*, is a lens one of whose surfaces is concave and the other plane. A *meniscus*, is a lens one of whose surfaces is convex and the other concave, and in which the two surfaces meet if continued. A *concavo-convex lens*, is a lens one of whose surfaces is concave and the other convex, and in which the two surfaces will not meet if continued.

Convex lenses possess peculiar advantages for concentrating the sun's rays, and for conveying to an immense distance a condensed and parallel beam of light. The most perfect burning lens ever constructed was executed by Mr. Parker, of Fleet Street, at an expense of 700*l.* It was made of flint-glass, was three feet in diameter, and weighed 212 pounds. By means of this powerful burning lens, platina, gold, silver, copper, tin, quartz, agate, jasper, flint, topaz, garnet, &c., were melted in a few seconds. — *Brewster.*

**LENTICULÆ.** The name given by De Candolle to certain points, which appear as dark spots, on the surface of the bark of plants.

**LENTICULAR.** (*lenticularis*, resembling a lentil, Lat. *lenticulaire*, Fr.) Having the form of a lens.

In entomology, a round body, with its opposite sides convex, meeting in a sharp edge. In conchology, doubly convex shells.

**LENTICULAR ORE.** The name given by Jameson to obtuse octahedral arseniate of copper, a variety of arseniate of copper; called also lenticular arseniate of copper.

**LENTICULINA.** A sublenticular, multilocular, spiral univalve; a genus of microscopic foraminifera. Distinguished from *Nautilus* by having no syphon. Three species have been found fossil in the neighbourhood of Paris.

**LENTICULITE.** A fossil shell of a lenticular form.

**LENTIFORM.** (from *lens* and *forma*, Lat.) Of the form of a lens.

**LENTZINITE.** A mineral found in Germany, and thus named after Lenzius, a German mineralogist. There are two kinds of lenzinite, the opaline and the argillaceous; the former of a milk-white, the latter of a snow-white colour.

**LEPADITES.** The goose-barnacle. An order of Cirripedes, the species of which are distinguished by a tendinous, contractile, and often long tube, fixed by its base to some solid marine substance, supporting a compressed shell, consisting of valves united to each other by membrane; and by having six pairs of tentaculated arms. They are usually found in places exposed to the fluctuations of the waves. — *Rev. W. Kirby.*

**LEPAS.** (*λεπας*, Gr. *lepas*, Lat. *lepas*, Fr.) Linnæus included under the name *lepas* all the cirripedes or multivalves. These animals are known in this country by the name of Barnacles. The *lepas*, or barnacle, constitutes a connecting link between molluscous and articulated animals; the gills are attached to the bases of the cirrhi, or jointed tentacula. In

the Linnæan system, the *lepas* constitutes the second genus of multivalve shells. The animal a triton; shell affixed at the base, and consisting of many unequal erect valves. They are without eyes, or any distinct head; have no powers of locomotion, but are fixed to various bodies. Their body, which has no articulations, is enveloped in a mantle: their mouth is armed with transverse toothed jaws in pairs, and furnished with a feeler. This genus consists of two families, or divisions, very different in their form, the first of which is the *Balanites*, or Acorn-barnacles, having a shelly instead of a tendinous tube, with an operculum or lid, consisting generally of four, but sometimes of six valves, and being of a subconic form. The second family consists of the *Lepadites*, or Goose-barnacles, the species of which are distinguished by a tendinous, contractile, and often long tube or pedicle, which, being of a flexible nature, allows the animal, fixed by its base to some solid marine substance, to writhe about in quest of food. The animals of this genus have only been found in the ocean. In Turton's Linné thirty-two species of *lepas* are described; fifteen of these have been discovered in our seas.

**LEPIDODENDRON.** (from *λεπις* and *δένδρον*, Gr.) An extinct genus of fossil plants, of very frequent occurrence in the coal formation. It is stated by Lindley and Hutton that plants of this genus are, next to the calamites, the most abundant of the fossils in the coal formation of the north of England. Thirty-four species are enumerated by M. Ad. Brongniart. *Lepidodendra* are sometimes found of enormous size, fragments of stems occurring upwards of forty feet in length. Their internal structure has been ascertained to be intermediate between coniferæ and lycopodiaceæ. In some points of their structure they resemble coniferæ, but in other respects, setting aside their great magnitude, they may be compared to lycopodiaceæ. To botanists, this discovery is of very high interest, as it proves that those systematists are right, who contend for the possibility of certain chasms now existing between the gradations of organization, being caused by the extinction of genera, or even of whole orders, the existence of which was necessary to complete the harmony which it is believed originally existed in the structure of all parts of the vegetable kingdom. By means of *Lepidodendron*, a better passage is established from flowering to flowerless plants, than by either equisetum or cycas, or any other known genus. — *Lindley and Hutton.*

Count Sternberg remarks, that we are

unacquainted with any existing species of plant, which, like the lepidodendron, preserves at all ages, and throughout the whole extent of the trunk, the scars formed by the attachment of the petioles, or leaf-stalks, or the markings of the adhesion of the leaves themselves.

**LEPIDOIDS.** A family of extinct fossil fishes, found in the oolitic series: they were remarkable for their large rhomboidal bony scales, which were of great thickness, and covered with enamel. The scales of lepidoids had a remarkable structure in being furnished on their upper margin with a hook-like process, placed like the hook or peg near the upper margin of a roofing tile; this hook fitted into a depression on the lower margin of the scale placed immediately above it. In order to obtain a correct notion of the form and appearance of the scales, the reader is referred to Prof. Buckland's *Bridgewater Treatise*, in which they are very accurately figured.

**LEPIDOLITE.** (from *λεπίς*, a scale, and *λίθος*, a stone, Gr.) The Lepidolith of Werner; Hemiprismatischer Talk-glimmer of Mohs. Lepidolite Mica. A mineral of a peach-blossom, red, and sometimes grey colour, occurring massive and in small concretions. This mineral, at first view, appears to be composed of small grains, sometimes extremely minute; but these grains, among which little pearly scales are often interspersed, are themselves composed of a great number of minute foliæ or spangles, like those of mica, from which circumstance it has obtained its name. Its constituents have been variously stated. According to some authors, it contains silica 50·36, alumina 28·32, potash 9·0, oxide of manganese 1·25, fluoric acid and water 5·40, lithion 5·50. It exhibits two axes of double refraction, from which circumstance it has been called Di-axial mica. From the beauty of its colour it has been cut into snuff-boxes.

**LEPIDOPTERA.** (from *λεπίς*, a scale, and *πτερόν*, a wing, Gr.) Scaly-winged insects. Lepidoptera form the tenth order of insects in Cuvier's arrangement; they have four wings, both sides of which are covered with small, coloured scales, resembling farinaceous dust. This order comprises butterflies, moths, and sphinxes. The scales are attached so slightly to the membrane of the wing as to come off when touched with the fingers, to which they adhere like fine dust. When examined with the microscope, their construction and arrangement appear to be exceedingly beautiful, being marked with parallel and equidistant striæ, often crossed by still finer lines. The former

of these scales are exceedingly diversified, not only in different species, but also in different parts of the same insect. The proboscis of the Lepidoptera is a double tube.

**LEPIDOPTERAL.** } Belonging to the order  
**LEPIDOPTEROUS.** } Lepidoptera; having wings covered with scales. The progress of the metamorphoses of insects is most strikingly displayed in the history of the *Lepidopterous*, or butterfly and moth tribe.

**LEPIDOSTEUS.** } (The *Lepisosteus* of La-  
**LEPIDOSTEUS.** } *cépède*.) A genus of fishes inhabiting the rivers of North America, one of the two living representative genera of Sauroid fishes. Teeth of a fish related to *Lepisosteus*, or *Lepisosteus*, have been found in the Tilgate beds and in those of Stonesfield.

**LEPIDOSTEUS FITTONI.** A species of fossil *Lepisosteus*, thus named after Dr. Fitton. Scales with bifurcating processes, belonging to the *Lepisosteus Fittoni*, are very abundantly found in the Tilgate strata.

**LEPIDOTUS.** An extinct genus of fishes belonging to the oolite series.

**LEUCIN.** } (from *λευκός*, white, Gr.) The  
**LEUCINE.** } name given by M. Braconnot to a white substance obtained from muscular fibre, by treating it with sulphuric acid, and subjecting it to a peculiar process.

**LEUCITE.** (from *λευκός*, Gr.) A mineral of a white colour, found in volcanic rocks. The Leuzit of Werner; Amphigene of Häuy; Vesuvian of Kirwan; Trapezoidal Kuphon-spath of Mohs. Before the blow-pipe it is infusible, a circumstance which serves to distinguish leucite from the garnet and analcime. Its constituents are silex 53·75, alumine 24·62, potash 21·35. It occurs regularly crystallized; in granular concretions, and in roundish grains. It is often embedded in lava and in basalt. All lavas do not contain crystals of leucite. In the lava of Vesuvius they are abundant, but in that of Etna they are rarely found. Some authors have supposed that the crystals of leucite found in lava pre-existed in the mineral fused by volcanic heat, but that in consequence of their infusibility these crystals were not acted on; others maintain that the Leucite has crystallized within the lava.

**LEUCITIC.** Containing leucite; resembling leucite.

**LEUCITRITE.** A mineral found in Leutra, in Saxony, and thus named from that circumstance. Colour, grayish-white, tinged in places with an ochreous brown.

**LI'AS.** A provincial name, now become conventional amongst geologists, for a

kind of limestone, which, with its associated beds, form a particular group of the secondary series. Mr. Bakewell considers that the name *lias* was probably given to this formation by the provincial pronunciation of the word *layers*, as the strata of *lias* limestone are generally very regular and flat, and can easily be raised in slabs from the quarry. "The great bed of dark argillaceous limestone, divided into thin strata, called *lias*, is the best characterized of all the secondary strata, (except chalk) both by its mineral characters and the fossil remains imbedded in it. The *lias* cannot be mistaken for any of the lower strata; it serves as a key to the geology of the secondary formations in England; and the first enquiry which the student should make, when he is in doubt respecting the position of any of the secondary beds, should be, *does it occur above or below the lias?*

When the *lias* beds are fully developed with their associated beds of clay, they form a mass of stratified limestone and clay, several hundred feet in thickness, which rests upon the red marl.—*Bakewell Introd. to Geology.*

The *lias* group is placed below the oolite, and above the variegated sandstone, in this country; in France and Germany, below the oolite and above the Muschelkalk. The Muschelkalk has not been discovered hitherto in England. It is in the *lias* that the petrified ink-bags of *Loligo* have been found. Proofs are not wanting of intervals between the depositions of the component strata of the *lias*. Twenty different kinds of ammonites have been discovered in the *lias*. Gryphites are so abundant in it, that in France it has obtained the name of *Calcaire à Gryphites*; and, indeed, the Gryphite appears peculiar to, and characteristic of, the *lias* formation.

**LI'BER.** In botany, a layer on the inner surface, or that which is contiguous to the wood, or the bark of trees; the innermost layer of the bark. The liber appears to be formed from the cambium.

**LI'GAMENT.** (*ligamentum*, Lat. *ligament*, Fr. *ligamento*, It.) A strong, flexible, tough, compact, membrane, serving to keep together certain parts.

"Nothing," says Dr. Roget, "can be more artificially contrived than the interweaving of the fibres of ligaments; for they are not only disposed, as in a rope, in bundles placed side by side, and apparently parallel, to each other; but, on careful examination, they are found to be tied together by oblique fibres curiously interlaced in a way that no art can imitate. It is only after long maceration in

water, that this complicated and beautiful structure can be unravelled."

In conchology, the membranaceous substance which connects the valves together; the true ligament is always external.

**LIGAME'NTAL.** } Composed of ligament;  
**LIGAME'NTOUS.** } resembling ligament.

**LI'GNEOUS.** (*ligneus*, Lat. *ligneux*, Fr. *ligneo*, It.) Made of wood; resembling wood; containing wood.

**LIGNI'FEROUS.** (from *lignum*, wood, and *fero*, to produce, Lat.) Producing wood; yielding wood.

**LIGNIFICA'TION.** The process of being converted into wood.

**LI'GNIN.** } From an analysis of lignin by  
**LI'GNINE.** } Dr. Prout it is found to consist of equal parts of water and carbon.

Lignin is deposited, during the growth of the plant, with the intention of forming a permanent part of the vegetable structure constituting the basis of the woody fibre, and giving mechanical support and strength to the whole fabric of the plant.

**LIGNIPE'ROUS.** (from *lignum*, wood, and *perdo*, to destroy, Lat.) A term applied to insects which destroy wood.

**LI'GNITE.** (from *lignum*, Lat.) Wood-coal. Lignite is brown or black. Some lignite has the appearance of jet, is of a velvet-black, does not soil the fingers, is very brittle, and burns with a bright flame. Lignite is a much more recent formation than that of common coal. By some, lignite is considered to be an imperfect coal, as wood not yet mineralized, or passed into a state of coal; while others doubt whether lignite ever becomes true coal. Lignite, like coal, is of vegetable origin, but it differs in many respects from common coal. There are several varieties of lignite; these mostly burn with flame, but they neither swell nor cake like coal.

**LIGNI'TIC.** Containing lignite; resembling lignite.

**LI'GULATE.** } (from *ligula*, a strap, Lat.)

**LI'GULATED.** } Strap-shaped. A term applied to the radical florets of compound flowers, when shaped like a strap or ribbon. The projecting parts of the limb of an irregular corolla are called *lips*; when one lip is very long and narrow, compared to the length of the tube, the corolla is called *ligulate*, or strap-shaped.

**LI'GURITE.** (from *liguria*,) A mineral of an apple-green colour, occasionally speckled. It ranks as a gem.

**LI'LALITE.** Another name for the mineral *lepidolite*, which see.

**LILIA'CEOUS.** (*liliaceus*, Lat.) Resembling a lily; lily-like. A corolla having six regular petals is termed a *liliaceous* corolla.

**LI'LY E'NCRINITE.** (The encrinites moniliformis.) So called, because the arms, when folded, resemble the head of the lily. This is one of the most beautiful of the fossil crinnoidea, hitherto found only in the muschelkalk of the new red sandstone group. Mr. Parkinson states that, independently of the number of pieces which may be contained in the vertebral column, and which, from its probable length, may be very numerous, the fossil skeleton of the superior part of the *lily encrinite* consists of at least twenty-six thousand six hundred pieces. The body is supported by a long vertebral column attached to the ground by an enlargement of its base. It is composed of many cylindrical thick joints, articulating firmly with each other, and having a central aperture, like the spinal canal in the vertebra of a quadruped, through which a small alimentary cavity descends from the stomach to the base of the column. From one extremity of the vertebral column to the other, and throughout the hands and fingers, the surface of each bone articulates with that adjacent to it, with the most perfect regularity and nicety of adjustment. "So exact and methodical is this arrangement," says Prof. Buckland, in his *Bridgewater Treatise*, "even to the extremity of its minutest tentacula, that it is just as improbable, that the metals which compose the wheels of a chronometer should for themselves have calculated and arranged the form and number of the teeth of each respective wheel, and that these wheels should have placed themselves in the precise position, fitted to attain the end resulting from the combined action of them all, as for the successive hundreds and thousands of little bones that compose an encrinite, to have arranged themselves, in a position subordinate to the end produced by the combined effect of their united mechanism; each acting its peculiar part in harmonious subordination to the rest, and all conjointly producing a result which no single series of them acting separately, could possibly have effected." The pelvis of the *lily encrinite* resembles in shape a depressed vase, and, by some, it is supposed that its upper part was closed by an integument, in the centre of which was placed the mouth. The encrinite differs from the pentacrinite in having its plates, or vertebrae, rounded, whereas in the pentacrinite they are pentagonal.

**LI'MA.** (*lima*, Lat. a file.) A genus of shells, placed by Cuvier in the family Ostracea, order Acephala testacea; and by Lamarck in the family Pectenides. *Limæ* differ from *pectens* in the greater

length of their shell in a direction perpendicular to the hinge; they have also a wide opening for the passage of a byssus, by which they are attached. The lima is a longitudinal, nearly equivalved, eared bivalve, with the beaks separated by a cavity. Hinge toothless. The hinge-pit, which receives the ligament, partly internal and partly external. The lima is a marine shell, found at depths varying to thirty fathoms, moored by a byssus. Lamarck describes five fossil species of *lima* found in the neighbourhood of Paris, namely, *L. spathulata*, *L. balloides*, *L. obliqua*, *L. dilatata*, *L. fragilis*.

**LI'MAX.** (*limax*, Lat. a snail.) The cochlea terrestris, or snail, so called from its sliminess.

**LIMB.** (from *limbus*, Lat.)

1. An edge or border, as the sun's *limb*, the moon's *limb*, &c.
2. An extremity of the body, as the arm or leg.
3. In botany, the outer spreading portion of a monopetalous corolla.

**LI'MBILITE.** (from Limbourg, in Swabia.) A compact mineral of a honey-yellow colour, supposed to be a decomposed olivine. On exposure to the action of the blow-pipe, it fuses into a compact, shining, black enamel.

**LIME.** The oxide of calcium, one hundred parts consisting of 72 of calcium, its metallic basis, and 28 of oxygen. Lime does not exist in a pure state in nature, it has so strong an affinity for carbonic acid as to absorb it from the atmosphere, when it becomes converted into carbonate of lime, constituting the different kinds of marble, chalk, and limestone, and forming extensive strata, and the largest mountain ranges. Lime is a white or light grey earth, fusible only by the heat of a galvanic battery, or of a gas blow-pipe; it is exceedingly caustic, and if water be sprinkled upon it, great heat is produced, the water unites with the lime, forming a hydrate of lime. Lime is partially soluble in water, and there is a singular circumstance connected with this, namely, that cold water dissolves a larger proportion than hot water.

**LI'MESTONE.** A genus of minerals comprising many species. Mr. Bakewell observes, "however various in external appearance limestone may be, it is, if pure, essentially composed of 57 parts of lime and 43 carbonic acid; but in some rocks the limestone is intermixed with magnesia, alumine, silex, or iron. The specific gravity of limestone varies from 2.50 to 2.80. All limestones may be scraped with a knife. They are infusible; but when impure, by an intermixture with a portion of other earths, they vi-

trify in burning. All limestones effervesce when a drop of strong acid is applied on the surface; and they dissolve entirely in nitric or muriatic acid. The specific gravity, hardness, and effervescence with acids, taken collectively, distinguish limestone from all other minerals."

Limestone is found in the three great classes of rocks, primary, transition, and secondary; but most abundantly in the last. It is also not uncommon in alluvial deposits, and is known by the name of calcareous tufa.

Mr. Macculloch has attempted to revive the theory of some of the earlier geologists, that all limestones have originated in organized substances. He says, "if we examine the quantity of limestone in the primary strata, it will be found to bear a much smaller proportion to the siliceous and argillaceous rocks than in the secondary; and this may have some connexion with the rarity of testaceous animals in the ancient ocean." He further infers, that, in consequence of the operations of animals, the quantity of calcareous earth deposited in the form of mud or stone is always increasing; and that, as the secondary series far exceeds the primary in this respect, so a third series may hereafter arise from the depths of the sea, which may exceed the last in the proportion of its calcareous strata. To this Mr. Lyell observes, if these propositions went no farther than to suggest that every particle of lime that now enters into the crust of the globe may possibly in its turn have been subservient to the purposes of life, by entering into the composition of organized bodies, I should not deem the speculation improbable; but when it is hinted that lime may be an animal product combined by the powers of vitality from some simple elements, I can discover no sufficient grounds for such an hypothesis, and many facts which militate against it.

Primary limestone has always a granular structure; but the size of the grains is variable, and seems, in some degree, to correspond with the relative age of the mineral. Thus the limestone, which occurs in beds in gneiss, and which is supposed to belong to the older formations, has usually a coarse texture, and large granular concretions. But when its beds exist in mica slate, or argillite, its texture becomes more finely grained, and its colour less uniform. Transition limestone has a texture more or less compact; its colours are much variegated; and it often contains petrifications. Secondary limestone has a compact texture, a dull fracture, and usually contains shells, and sometimes other or-

ganic remains. It is always stratified; but the strata are sometimes inclined, sometimes horizontal.

Mr. De La Beche states the quantity of lime in granite composed of two-fifths quartz, two-fifths felspar, and one-fifth mica, to be 0.37; and in greenstone, composed of equal parts of felspar and hornblende, to be 7.29.

LIMNÆ'A. } (from *λίμνᾶς*, Gr.) A genus of LIMNÆ'A. } fresh-water univalves, placed by Cuvier in the order Pulmonea, class Gasteropoda; and by Lamarck in the family Limnæacea. The Limnea is an ovato-conical, or turretted univalve. Like the *bulini*, it has an oblong spire, and the aperture higher than it is wide; but it may be distinguished from the *bulini* by the very oblique fold on the columella. The Limnea has been found fossil in the neighbourhood of Paris. The recent Limnea inhabits our lakes and pools; its shell is of a light amber colour.

LIM'NITE. A fossil limnea.

LIM'OUS. (from *limosus*, Lat. slimy.) Muddy; slimy.

LIM'PID. (*limpidus*, Lat. *limpide*, Fr. *limpido*, It.) Clear; pure; transparent.

LIMP'DITY. (*limpidité*, Fr. *limpidezza*, It.) Clearness; pureness; brightness; transparency.

LIMULUS. The Molucca crab. A genus of crustaceans, or entomostracans, having a distinct carapace, or buckler, with two eyes in front of the shield. The limulus appears to approximate towards the trilobite, and Professor Buckland says, "the history of this genus is important, on account of its relations both to the existing and extinct forms of crustaceans; it has been found fossil in the coal formations of Staffordshire and Derbyshire; and in the jurassic limestone of Aichstadt, near Pappenheim; a small fossil species is found in the iron-stone nodules of Coalbrook Dale. In the genus *Limulus* there are but faint traces of antennæ, and the shield, which covers the anterior portion of the body, is expanded entirely over a series of small crustaceous legs. Of the tail of the recent limulus, savages form a point to their arrows; and when thus armed, they are much dreaded. The eggs of the limulus are eaten by the Chinese.

LINE OF BEARING. See *Line of Dip*.

LINE OF DIP. Strata almost always decline, or dip down to some point of the horizon, and, of course, rise towards the opposite point. A line drawn through these points is called the *line of their dip*. If a book be raised in an inclined position, with the back resting lengthwise upon the table, the leaves may be supposed to represent different strata, then a

line descending from the upper edges to the table, will be the *line of dip*, and their direction lengthwise will be their *line of bearing*.

**LINES OF GROWTH.** In conchology, those concentric lines or markings in a shell, formed by successive layers of shelly matter, which mark its growth. The external layer is always the most recent.

**LI'NEAR.** (*linearis*, Lat.)

1. In entomology, a figure having the lateral margins very close together, and parallel throughout.

2. In conchology, composed of lines; being marked with lines.

3. In botany, a term applied to narrow leaves, when they are of equal breadth throughout, the two edges being straight, and equi-distant from each other.

**LI'NEATE.** (*lineatus*, Lat.) Marked with lines; marked with longitudinal depressions.

**LI'NGUAFORM.** } (from *lingua*, the tongue,  
**LI'NGUIFORM.** } and *forma*, shape, Lat.)  
Tongue-shaped.

**LI'NGUAL.** (*linguale*, Fr. from *lingua*, a tongue, Lat.) Pertaining to the tongue, as the lingual arteries, lingual veins, &c.

**LI'NGULA.** A genus of bivalves, shells composed of two valves, nearly equal, truncated anteriorly; the hinge having no teeth: the beak of the valves pointed, and united to a tendinous tube, serving for a ligament of attachment. This is the only bivalve shell which is pedunculated. The recent lingula inhabits the Indian ocean; it has thin, horny, and greenish valves. Linnæus, who had seen but one valve of this shell, named it *Patella unguis*. Parkinson says it has not been found fossil, but Mr. Sowerby mentions that some have been found fossil in sandy indurated marl, in Durham limestone, and in alluvium of Suffolk.

**LI'NGULATE.** (*lingulatus*, Lat.) Tongue-shaped; an epithet for leaves shaped like a tongue.

**LIP.** (*lippe*, Germ.) In conchology, the outer edge of the aperture of univalves.

**LIP'PED.** Having lips.

**LIQUEFACTION.** (*liquefactio*, a melting, Lat. *liquefaction*, Fr. *liquefactione*, It.) The act of melting; the state of being melted. This word is sometimes used synonymously with fusion, sometimes with deliquescence, and at others with solution.

**LIQUEFI'ABLE.** That is capable of being changed from a solid to a fluid state.

**LI'QUEFY.** (from *liquefio*, Lat. *liquefier*, Fr. *liquefare*, It.) To dissolve; to melt; to convert from a solid to a fluid state.

**LIQUE'SCENCY.** (*liquescentia*, Lat.) Aptness to melt.

**LI'RICONITE.** (from *λειρός*, pale, and *κονία*, sand or dust, Gr.) A name given to arseniate of copper. It is of a blue or green colour, and occurs in copper mines.

**LI'THIA.** A new alkaline substance, discovered by M. Arfwedson, a Swedish chemist, in 1818, in the mineral called Petalite.

**LI'THIUM.** The metallic base of Lithia, discovered by Sir H. Davy.

**LI'THOCARP.** (from *λίθος*, a stone, and *καρπός*, fruit, Gr.) Petrified, or fossil fruit.

**LITHO'DENDRON.** (from *λίθος*, a stone, and *δένδρον*, a tree, Gr.) A name given to coral, from its likeness to petrified wood.

**LITHO'DOMUS.** (from *λίθος*, a stone, and *δέμω*, to build, Gr.) A transverse, elongated, cylindrical, marine equivalve. Affixed at first by byssus to rocks, which it subsequently penetrates, and remains ever after in the cavity. It is a littoral shell, found at depths varying to ten fathoms. A mollusc, which forms holes in stones and solid rocks, which it effects, not mechanically, by boring, but chemically, by dissolving the rock. Generally used plurally, lithodomi.

**LITHO'DOMOUS.** Belonging to the genus *Lithodomus*.

**LITHO'GENOUS.** (from *λίθος*, stone, and *γεννάω*, to produce, Gr.) Belonging to the class of animals which form coral.

**LITHO'DAL.** (from *λίθος*, a stone, and *είδος*, resemblance, Gr.) Resembling stone; of a stony structure.

**LITHOLO'GICAL.** (from *λίθος*, and *λογικός*, Gr.) Relating to the science of stones; in geology, a term used to express the stony character or structure of a mineral mass.

**LITHO'LOGY.** (from *λίθος*, a stone, and *λόγος*, discourse, Gr. *lithologie*, Fr.) That branch of natural history which treats of stones.

**LITHO'LOGIST.** (from *λίθος* and *λογιστικός*, Gr. *lithologue*, Fr.) One skilled in that branch of natural history which treats of stones.

**LITHOMARGE.** Called also stone-marrow; a variety of talc. It has commonly a fine grain, of a white, gray, yellow, red, or brown colour, these colours being sometimes disposed in spots, clouds, veins, or stripes; unctuous or greasy to the touch, and adheres to the tongue. In water it falls to powder, and does not form a paste. Specific gravity 2.4. It is infusible before the blow-pipe. It differs from potters' clay in not forming a paste with water. It occurs massive, disseminated, globular, and in irregular lumps, in gneiss, porphyry, serpentine, &c.

**LITHO'PHAGI.** (from *λίθος* and *φαγῆν*, to

eat, Gr. *lithophage*, Fr.) Molluscs which eat holes in stones and rocks. While the lithodomi penetrate rocks by chemical action, dissolving the stony matter, lithophagi mechanically perforate, or bore into them. They belong to Lamarck's family of *Lithophagida*.

**LITHOPHAGIDÆ.** A family of terebrating bivalves.

**LITHOPHYTE.** (from *λίθος*, a stone, and *φυτόν*, a plant, Gr. *lithophyte*, Fr.)

1. A stony plant; a coral.
2. The animal which secretes coral.

**LITHOXYLE.** (from *λίθος*, stone, and *ξύλον*, wood, Gr.) Silicified wood.

**LITTORAL.** (*littoralis*, Lat.) Pertaining to the shore.

**LITUIITE.** A fossil shell found in the transition limestone together with the Orthoceratite. The *lituite* is a chambered shell, partially coiled up into a spiral form at its smaller extremity, its larger end being continued into a straight tube of considerable length, separated by transverse plates, outwardly concave, and separated by a siphuncle.—*Professor Buckland*.

**LITUOLA.** A multilocular univalve; a genus of microscopic foraminifera, partly spiral, the last turn being straight at the end. They are found both recent and fossil; of the latter, Lamarck describes two species.

**LITUOLITE.** A fossil lituola.

**LIZARD.** (*lézard*, Fr. *lucertola*, It. *lucertus*, Lat.) In Cuvier's arrangement the lizards form the second genus of *Lacertinida*. They are distinguished by the tongue, which is thin, extensible, and terminating in two threads. The extremity of the palate is armed with two rows of teeth, which are generally either recurvated or conical. Lizards have usually a single perforated eye-lid, which, when closed by its orbicular muscle, exhibits merely a horizontal slit. The body is naked, with four feet and a tail; and they possess the property of reproducing the tail should it be lost.

**LOAM.** (*lehm*, Germ.) An earthy mixture, in which sand and clay form large proportions: when the compound contains much calcareous matter it is usually called marl; a mixture of sand and clay. Any soil which does not cohere so strongly as clay, but more strongly than chalk, is designated loam.

**LOAMY.** Containing loam; of the nature of loam.

**LOBATE.** } 1. In entomology, when the  
**LOBATED.** } margin is divided by deep,  
**LOBED.** } undulating, and successive  
incisions.

2. In botany, applied to leaves, when the margins of the segments are rounded;

according to the number of lobes, the leaf is termed bilobate, trilobate, &c.

**LOBE.** (*lobus*, Lat. *lobe*, Fr. *lolo*, It.)

1. A rounded portion of certain bodies, as the lobes of the brain, the lobe of the ear, the lobes of the lungs, liver, &c.

2. In botany, the cotyledon of the seed is also called the lobe.

**LOBULE.** The diminutive of lobe; a little lobe.

**LOCOMOTION.** (from *locus* and *motio*, Lat.)

The power of moving at will from one place to another; of transferring the whole body from one place to another. The power of locomotion constitutes the most general and palpable feature of distinction between animals and vegetables. Excepting a few among the lower orders of the creation, such as molluscs and zoophytes, all animals are gifted with the power of spontaneously changing their situation.

**LOCOMOTIVE.** Having the power of transferring itself from one place to another.

**LOCULICIDAL.** In botany, a particular kind of dehiscence. Some fruits open by the dividing of each carpellum at its midrib, so that the disseminations stick together, and to two halves of contiguous carpella; this is called *loculicidal dehiscence*.

**LODE.** (a mining term.) A word used to signify a regular vein or course, whether metallic or not; but most commonly it signifies a metallic vein. When the substances forming the lodes are reducible to metal, the lodes are said to be alive; otherwise, they are termed dead lodes.

**LOËSS.** (Germ.) An alluvial tertiary deposit, consisting of calcareous loam, occurring in patches between Cologne and Basle. It encloses freshwater and land shells, as well as some few mammiferous remains. Mr. Lyell observes, "the loëss is found reposing on every rock, from the granite near Heidelberg to the gravel of the plains of the Rhine. It overlies almost all the volcanic products, even those which have the most modern aspect; and it has filled up, in part, the crater of the Rodenberg; at the bottom of which a well was sunk in 1833, through seventy feet of loëss. Here, as elsewhere, it is a yellow loam, with calcareous concretions, and has not the character of a local alluvium."

**LOLI'GO.** (*loligo*, Lat.) A genus of the family of *Sepiæ*. In the loligo is found that peculiar provision for defence, the ink-bag, a bladder-shaped sac, containing a black and viscid ink, the ejection of which, by rendering the surrounding water dark and opaque, defends the animal from the attacks of its enemies. In the lias of Lime Regis, ink-bags of the

fossil loligo are preserved, still distended, as when they formed parts of the organization of living bodies, and retaining the same juxtaposition to an internal rudimentary shell resembling a horny pen, which the ink-bag of the existing loligo bears to the pen within the body of that animal.

**LO'MONITE.** Diatomous Geolite. Named after its discoverer, Gillet Laumont. For a description of this mineral, see *Laumontite*.

**LONCHOPTERIS MANTELLI.** A species of fossil fern found in the shales and clays of Tilgate Forest, and thus named after Dr. Mantell. It is characterized, says Dr. Mantell, by the distribution of the nervures of the leaves. This fern probably did not exceed a few feet in height. The *Lonchopteris Mantelli* is very beautifully figured in Dr. Mantell's *Geology of the South-East of England*, and in his *Wonders of Geology*.

**LONDON BASIN.** The deposits of the London basin belong to the eocene period; they are aqueous.

**LONDON CLAY.** This formation consists of a bluish or blackish clay, lying immediately over the plastic clay and sand, and is an upper member of the arenaceous and argillaceous formation that covers the chalk. Its thickness is very considerable, sometimes exceeding 500 feet, but varying from one to five hundred feet. It contains layers of ovate, or flattish masses of argillaceous limestone. These masses, called septaria, are sometimes continued through a thickness of two hundred feet; of these Parker's cement is made. From the London clay three or four hundred species of testacea have been procured, but the only bones of vertebrated animals are those of reptiles and fish. Remains of turtles have been dug out of this deposit at Highgate and Islington, and some bones of a crocodile were discovered by Mr. Parkinson; nautilites also are found in it. The shells of the London clay mostly belong to genera inhabiting our present seas. The London clay belongs to the eocene period.

**LONGICORNES.** (from *longus* and *cornu*, Lat. long-horned.) A family of insects in Cuvier's arrangement, and so named from the length of their antennæ, which are filiform and cetaceous, and usually as long, often longer, than the body of the insect.

**LONGIPENNES.** (from *longus* and *penna*, Lat. long wings.) A family of birds in Cuvier's arrangement, including those birds, which, from the great strength of their wings, are to be met with in all latitudes. They are recognised by the great length of their wings, whence they derive their name, and by their bill, which

in some genera is hooked at the end, in others simply pointed.

**LONGIROSTRES.** (from *longus* and *rostrum*, a beak, or bill, Lat.) A family of birds comprising the waders, or birds with long bills.

**LONGITUDE.** (*longitudo*, Lat. *longitude*, Fr. *longitude*, It.) The distance of any part of the earth to the east or west of any place. The meridian passing through the observatory at Greenwich is assumed by the British as a fixed origin, from whence terrestrial longitudes are measured. And as each point on the surface of the earth passes through 360°, or a complete circle, in twenty-four hours, at the rate of 15° in an hour, time becomes a representative of angular motion. Hence, if the eclipse of a satellite happens at any place at eight o'clock in the evening, and the nautical almanack shows that the same phenomenon will take place at Greenwich at nine, the place of observation will be 15° of west longitude. In the case of stations differing only in *latitude*, the same star comes to the meridian at the same *time*, but at different *altitudes*. In that of stations differing only in *longitude*, it comes to the meridian at the same *altitude*, but at different *times*. Supposing, then, that an observer is in possession of any means by which he can certainly ascertain the time of a known star's transit across his meridian, he knows his *longitude*; or if he knows the difference between its time of transit across his meridian and across that of any other station, he knows the difference of longitudes between those two places.

**LONGITUDINAL.** (*longitudinaire*, Fr. *longitudinale*, It.) Pertaining to longitude or length.

In conchology, the length of the shell from the apex to the base; thus, longitudinal striæ, &c., are those which radiate from the apex to the base.

**LOPHIODON.** (from *λοφίς* and *ὄδον*, Gr.) A fossil genus of animals, now entirely extinct, allied to the tapir, rhinoceros, and hippopotamus, and connected with the Anoplotherium and Palæotherium; so named from certain points, or eminences, on the teeth. Fifteen species have been discovered in the same freshwater formations as contain remains of the palæotherium.

**LOWER CHALK.** The chalk formation or series is generally divided into six distinct members, namely, the lower green-sand; the gault; the upper green-sand; the *chalk without flints*, or the *lower chalk*; the chalk with flints, or the upper chalk, and the Maestricht beds. This arrangement is, however, altered by some writers, inasmuch as a more minute subdivision

of some of the members is concerned, depending on local appearances. Generally speaking, the lower chalk may be distinguished from the upper by the absence of flints, and by the superior hardness of the chalk, which is sometimes used for building-stone. The lower is regularly stratified. In the north of England, Professor Phillips states, "The lower chalk is of a red colour, and flints are found in it. The only mineral found in the lower chalk is sulphuret of iron. The fossil remains are very numerous and all of them marine."

**LOWER GREEN-SAND.** The lowest member of the chalk series; called also Shanklin sand, from Shanklin, in the Isle of Wight, and iron-sand. A considerable mass of green, or ferruginous sands, with layers of chert, local beds of gault, rocks of cherty or chalky limestone, and deposits of ochre and fuller's-earth. In Yorkshire, this member of the series is wholly wanting, but in Lincolnshire it is fully developed. The lower green-sand is a marine deposit. In some situations, the beds of Shanklin, or lower green-sand admit of a triple division; the first, or uppermost, consists of sand, with irregular concretions of limestone and chert, sometimes disposed in courses oblique to the general direction of the strata. The second consists chiefly of sand, but in some places is so mixed with clay, or with oxide of iron, as to retain water; it is remarkable for its great variation in its colour and consistency. The third, and lowest division abounds much more in stone; the concretionary beds being closer together and more continuous. The fossils of the lower green-sand are not so numerous as those of the lower chalk. It contains upwards of thirty genera belonging to different classes; among these may be enumerated ammonites, nautilus, patella, turbo, natica auricula, rostellaria, pileopsis, &c., of the class Mollusca; corbula, cucullea, gervillia, inoceramus, lenia, modiola, mytilus, mya, nucula, orbicula, pecten, pholadomya, pinna, tellina thetis, terebratula, trigonia, venus, &c. of the class Conchifera; dentalium and vermicularia of Annelides; spatangus, of the class Radiaria, &c., &c.

**LO'ZENGED.** In entomology, of a quadrangular shape, with two opposite angles acute, and two obtuse.

**LUBRICITY.** (*lubricité*, Fr.) Smoothness of surface; slipperiness. More particularly applied to shells.

**LUCU'LLITE.** (from *Lucius Lucullus*, a celebrated Roman, who is said greatly to have admired it.) A black variety of transition limestone, a black marble.

**LU'CID.** (from *lucidus*, Lat. *lucide*, Fr.

*lucido*, It.) Bright; shining; clear; pellucid; transparent.

**LUCI'DITY.** (*lucidité*, Fr.) Splendour; brightness; transparency.

**LU'MBAR.** (from *lumbus*, Lat.) Pertaining to the loins, as the lumbar region, the lumbar muscles, &c.

**LUMINI'FEROUS.** (from *lumen*, light, and *fero*, to produce, Lat.) Producing light; yielding light.

**LU'MINOUS.** (*luminosus*, Lat. *lumineux*, Fr. *luminoso*, It.) Shining; bright; emitting light.

**LU'MINOUSNESS.** Brightness; the quality of shining so as to emit light, or to appear to do so, as the luminousness of the sea; the luminousness of phosphoric bodies.

**LU'NATED.** (*lunatus*, Lat.) Crescent-shaped; formed like a half-moon.

**LU'NULATED.** Crescent-shaped; shaped like a half-moon; semilunar.

**LU'NULE.** In conchology, a crescent-like mark or spot, situated near the anterior and posterior slopes in bivalve shells. In different species of Venus they are prominent; they are frequently very useful in assisting to ascertain the species.

**LU'NULET.** In entomology, a half-moon shaped spot in insects, of a different colour from the rest of the body.

**LU'TEOUS.** (*luteus*, Lat.) A brownish yellow, something of a clay colour.

**LU'TOSE.** (*lutosus*, Lat.) Miry; covered with clay.

**LUTRA'RIA.** A genus of bivalves, placed by Lamarck in the family Mactracea. A thin, transverse, inequilateral shell, gaping at the extremities; two oblique and diverging hinge-teeth accompanying a large pit for the cartilage. No lateral teeth, in which feature it differs from Mactra. One species, *Lutraria compressa*, has been found fossil in alluvial deposits, and another, *Lutraria oblata*, in the sandstone of Bognor.

**LYCOPODIA'CEA.** The club-mosses; or club-moss tribe. Plants of an inferior degree of organization to coniferæ, some of which they greatly resemble in their foliage. This tribe, at the present day, contains no species more than three feet high, while many of the fossil species are as large as recent coniferæ, having attained to the size of forest trees. Their mode of reproduction is similar to that of ferns. The affinities of existing *lycopodiaceæ* are intermediate between ferns and coniferæ on the one hand, and ferns and mosses on the other. They are related to ferns in the want of sexual apparatus, and in the abundance of annular ducts contained in their axis; to coniferæ in the aspect of their stems; and to mosses in their general appearance. The

leaves of existing lycopodiaceæ are simple, and arranged in spiral lines around the stem, and impress on its surface scars of rhomboidal, or lanceolate form, marked with prints of the insertions of vessels.—*Buckland. Lindley. Lyell.*

**LYCOPODITES.** Fossil plants of the genus *Lycopodium*.

**LYCOPODIUM.** A genus of plants of the club-moss tribe.

**LYDIAN STONE.** The Lydischer stein of Werner; La pierre de Lydie of Brochant; Basanite of Kirwan; Lydian stone of Jameson. A variety of siliceous slate; a black siliceous flint-slate, called by some black jasper. It differs but little from the common variety of siliceous slate. Colour grayish or bluish-black, sometimes quite black.

**LYMNÆA.** See *Limnæa*.

**LYMPH.** (*lympa*, Lat. water.) A colourless liquid, found in the lymphatics.

**LYMPH OF PLANTS.** During the vegetation of plants, there is a juice continually ascending from their roots. This is called the sap, or *lymph* of plants. From experiments made by Vauquelin, it was ascertained that the lymph of the common elm consisted as follows:—Of 1039 parts, 1027·904 water and volatile matter, 9·240 acetite of potash, 1·060 vegetable matter, 0·796 carbonate of lime.

**LYMPHATICS.** Minute vessels pervading every part of the body, absorbing and conveying the absorbed matter into the thoracic duct, to be afterwards conveyed into the blood. The lymphatics are supplied within with valves, and without with glands.

**LYRATE.** (from *lyra*, a harp, Lat.) Lyre-shaped; a term applied to leaves divided transversely into several segments, the segments gradually increasing in size as they approach the extremity of the leaf.

## M

**MACHAIRODUS.** An extinct animal of the order Mammalia, referrible to the Miocene period, and allied to the bear.

**MACIGNO.** The Italian word for a kind of stone, a siliceous sandstone sometimes containing calcareous grains, &c. Macigna pietra, a very hard stone.

**MACLE.** The Hohl spath of Werner; Hollow spar of Jameson. Macle occurs only in crystals, the form of which is a four-sided prism. But each crystal, when viewed at its extremities, or on a transverse section, is obviously composed of two very different substances; and its general appearance is that of a black prism, passing longitudinally through the axis of another prism, which is whitish. These crystals, often long, are sometimes very minute; in some instances their edges are rounded. The crystals of Macle present a considerable number of natural joints, which lead to an octohedron for their primitive form. Macle scratches glass; its powder is soft and unctuous. It is opaque, or sometimes translucent. Colour white or gray, often shaded with yellow, green, or red. Specific gravity 2·94. It is found, generally, imbedded in black argillaceous slate.—*Cleaveland.*

**MACLUREITE.** Called also Brucite and Chondrodite. A mineral occurring in imbedded grains in small massive pieces, and in longish granular concretions. Colours yellow, straw-colour, orange, red, and brown; translucent; scratches glass; fracture imperfectly conchoidal. Specific

gravity 3·15 to 3·50. It consists of magnesia 54·0, silica 36·60, fluoric acid 4·0, oxide of iron 2·30, potash 2·0, manganese a trace.

**MACROPOMA.** The name given by M. Agassiz to a genus of sauroid fishes, the fossil remains of which have been discovered in the chalk formation. The scales of the *Macropoma* are studded with hollow tubes, through which, it is stated, there flowed a fluid which served to lubricate the surface of the body.

**MACROPOMA MANTELLI.** A species of fossil fishes belonging to the genus *Macropoma*, found in the chalk near Lewes, and named after Dr. Mantell. The length of a specimen figured in Dr. Mantell's *Wonders of Geology* is twenty-four inches.

**MACRODACTYLI.** (from *μακρός*, long, and *δάκτυλος*, finger, Gr.) The name given to a family of birds in Cuvier's arrangement, having very long toes. The coot, rail, &c. are examples.

**MACROSPONDYLUS.** A fossil saurian found in the oolite and lias formations.

**MACROSTOMATA.** (from *μακρός*, long, and *στόμα*, mouth, Gr.) A family of univalves, belonging to the order *Trachellipoda*, comprising the genera *Stomatella*, and *Haliotis*.

**MACROURA.** (from *μακρός*, long, and *οὐρά*, a tail.) A family of crustaceans, including the lobster, prawn, shrimp, &c. They are so named from their having a long tail, which is, at least, as long as the body, and provided at its termination

with appendages which most frequently form a fin on each side. This tail is always composed of seven distinct segments. Fossil genera of the family *Macroura* have been found in the Muschelkalk and in the lias.

**MACROUROUS.** Belonging to the family *Macroura*. Five or six genera of *Macrourous* decapods have been recently observed in the muschel-kalk.

**MACTRA.** (*μάκτρα*, Gr. *maetra*, Lat. a kneading-trough.) Animal a tethys. A genus of equivalve, inequilateral, transverse bivalves, slightly gaping at the extremities; the hinge, or middle tooth, complicated; lateral teeth rather remote, compressed, and inserted. Shells of this genus have only been found to inhabit the ocean, at depths varying from 0 to twelve fathoms, in sands and sandy mud. The French naturalists divide *Maetra* into two genera, *Maetra* and *Lutrarina*. In Turton's Linné twenty-seven species are described; twelve are inhabitants of our seas. The fossil species belong to the tertiary formations. Lamarck describes one species, *Maetra semisulcata*, found in the neighbourhood of Paris; and Parkinson mentions one, found in Essex.

**MACULA.** (*macula*, Lat. *macule*, Fr. *macula*, It.) A spot, generally of a dark colour.

**MACULATED.** Spotted; marked with small spots.

**MADREPORE.** (*madrépore*, Fr. *corps marin pierreux qui ressemble à des rameaux, à une végétation.*) Madreporæ are stony polypi, with concentric laminæ, resembling stars. In a living state, the stony matter is covered with a skin of living gelatinous matter, fringed with little bunches of tentacula; these are the polypi: the skin and the polypi contract on the slightest touch. Madreporæ are sometimes united and sometimes detached; where the laminæ take a serpentine direction they are called *meandrina*, or *brain-stone*.—*Bakewell's Introduction to Geology.*

The term *Madrepore* is generally applied to all those corals which have superficial star-shaped cavities. In the water, madreporæ are invested with a fleshy covering of various colours; when the animal dies this fleshy gelatinous covering becomes decomposed, and the axis appears studded over with lamellated cells, or stars. Madreporæ raise up walls and reefs of coral rocks with astonishing rapidity, in tropical climates.

**MADREPORITE.**

1. Fossil madreporæ.

2. A variety of limestone, found in large rounded fragments, composed of numerous,

small prisms, nearly cylindrical. Opaque; surface dark brown; fracture conchoidal and black. Constituent parts, carbonate of lime 63, siliceous 13, alumine 10, oxide of iron 11.

**MAESTRICHT BEDS.** The name given to the uppermost member of the cretaceous group, from Maestricht, a town of the Netherlands. The Maestricht beds are marine, and composed of a soft yellowish-white limestone, resembling chalk, and containing siliceous masses, ammonites, hamites, hippurites, baculites, &c. The siliceous masses found in these beds are not composed of black flint, but of chert and calcedony. The Maestricht beds repose on the upper chalk with flints. M. Deshayes has been unable to identify any of the shells of the Maestricht beds with those of the tertiary deposits.

**MAGILUS.** A genus of univalve shells belonging to the family *Cricostomata*, according to the arrangement of De Blainville, and to the order *Tubulibranchiata* of Cuvier. The shell is thick, tubular, and irregularly contorted, having a longitudinally carinated tube, at first regularly spiral, and then extending itself in a line more or less straight. The young of the genus *Magilus* has a very thin shell of a crystalline texture, but, when it has attained its full size, and has formed for itself a lodgment in a coral, it fills up the cavity of the shell with a glassy deposit, leaving only a small conical space for its body; it continues to accumulate layers of this material, so as to maintain its body at a level with the top of the coral to which it is attached, until the original shell is quite buried in this vitreous substance.—*Roget. Cuvier. Sowerby.*

**MAGNESIA.** (*magnesie*, Fr.) An earth with a metallic basis called magnesium. Magnesia consists of magnesium 61·4, oxygen, 38·6. Magnesia is rarely found pure in a native state. It enters into the composition of some of the primary rocks, to which it usually imparts a saponaceous feel, producing also a striated texture, and frequently a greenish shade. Magnesia first became known about the beginning of the eighteenth century. Little, however, was known concerning its nature, till Dr. Black published his celebrated experiments on it in 1755. Magnesia may be thus prepared: sulphate of magnesia, a salt, composed of magnesia and sulphuric acid, is to be dissolved in water, and half its weight of potass added. The potass having a stronger affinity for the sulphuric acid than the magnesia has, seizes the sulphuric acid, and the magnesia is precipitated. Magnesia is often present in the chalk; some of the strata

in France are said to contain ten per cent. of magnesia. Magnesia is present in all the inferior stratified rocks, with the exception of quartz rock, (without mica,) and certain eurites, or compact felspars. In the detrital rocks it is also common, particularly when mica forms any considerable portion of them. There are few limestones which do not contain magnesia. It is an essential ingredient of dolomite, carbonate of magnesia constituting more than forty per cent. of that rock. Magnesia is also disseminated through the waters of the ocean, muriate of magnesia forming from .004 to .005 of their mass.

**MAGNESIAN.** Containing magnesia; resembling magnesia.

**MAGNESIAN LIMESTONE.** A marine deposit, belonging to the new red sandstone group. It lies above the red conglomerate and below the variegated sandstone. It is composed of carbonate of lime and carbonate of magnesia. The magnesian limestone of this country is a dolomite of a yellow or yellowish-brown colour; it is distinctly stratified, the strata varying from a few inches to several feet in thickness. This deposit is fossiliferous, and certain shells, *productæ*, appear for the first time in the magnesian limestone. Magnesian limestone forms the most durable building-stone, and it is of this that the two new houses of parliament are to be built. It is to be lamented that Waterloo Bridge was not built of magnesian limestone instead of felspathic granite, a very perishable kind of stone. Magnesian limestone is also called *zechstein*. Where the magnesia is in excess the land is sterile, but when it is not in excess, the soil is fruitful, and, as a subsoil, healthful.

**MAGNESITE.** A mineral of a white or yellowish-white colour. It occurs massive, tuberoso, reniform, and vesicular. Its fracture is conchoidal. Opaque. Specific gravity 2.881. It is infusible, and before the blow-pipe becomes so hard as to scratch glass. It occurs in serpentine.

**MAGNESIUM.** The metallic basis of magnesia, magnesia consisting of magnesium 61.4, oxygen 38.6.

**MAGNETIC IRON ORE.** The Fer oxydulé of Haüy; Magnet eisenstein of Werner. A black ore, possessing a slight metallic lustre. Occurs regularly crystallized; in granular concretions; massive and disseminated. It is magnetic, sometimes sufficiently so to take up a needle. It occurs in beds in primary and transition rocks. This ore is very common in Sweden.

**MAGNETISM.** (*magnétisme*, Fr.) The tendency of the iron towards the magnet, and the power of the magnet to produce

that tendency; the power of attraction. Very delicate experiments have shewn that all bodies are more or less susceptible of magnetism. Many of the gems give signs of it; titanium and nickel always possess the properties of attraction and repulsion. But the magnetic agency is most powerfully developed in iron, and in that particular ore of iron called the loadstone, which consists of the protoxide and peroxide of iron, together with small portions of alumina and silica. A metal is often susceptible of magnetism if it contain only the 130,000th part of its weight of iron, a quantity too small to be detected by any chemical test. One of the most distinguishing tests of magnetism is polarity, or the property a magnet possesses when freely suspended, of spontaneously pointing nearly north and south, and always returning to that position when disturbed. Induction is the power which a magnet possesses of exciting temporary or permanent magnetism in such bodies in its vicinity as are capable of receiving it. By this property the mere approach of a magnet renders iron or steel magnetic, the more powerfully the less the distance. Iron acquires magnetism more rapidly than steel, yet it loses it as quickly on the removal of the magnet, whereas the steel is impressed with a lasting polarity. There can hardly be a doubt but that all the phenomena of magnetism, like those of electricity, may be explained on the hypothesis of one ethereal fluid, which is condensed or redundant in the positive pole, and deficient in the negative.—*Mrs. Somerville.*

**MAIL.** (*maille*, Fr. *maglio*, It.) Armour for the defence of the body.

**MAILED.** Protected by an external coat or covering, of scales or hard substances, which protects the body.

**MA'LACHITE.** (*malachite*, Fr. *malachite*, It.) An oxide of copper combined with carbonic acid. It is of a blue colour, and occurs in mineral veins and in beds of gneiss, mica-slate, limestone, red-sandstone, &c.

**MA'LACOLITE.** A variety of augite of a darkish green colour.

**MALACO'STRACAN.** Certain orders of Crustaceans, distinguished by having sessile eyes, imbedded in the substance of the head.

**MALLEABILITY.** (*malleabilité*, Fr.) The property or capability of being hammered into different forms without breaking.

**MA'LLEABLE.** (*malleable*, Fr. *malleabile*, It.) That may be spread out by hammering. Of all the metals, the most malleable is gold, five grains of which may be hammered out so as to cover a surface of 273 square inches, the thick-

ness of the leaf not exceeding  $\frac{1}{32000}$ th of an inch.

MA'LLEUS. (*malleus*, Lat. a hammer.)

1. One of the bones of the ear, thus named from its supposed resemblance to a hammer.

2. A bivalve shell of the family Malleacea.

MALM ROCK. The name given to a variety of firestone, a member of the chalk series.

MA'LTHA. A variety of bitumen; called also mineral pitch. This substance bears a considerable resemblance to pitch. Colour black or dark brown. Specific gravity from 1.45 to 2.07.

MA'MMA. (*mamma*, Lat.) The breast.

MAMMA'LIA. (from *mamma*, Lat. the breast. A name given to that class of animals which suckle their young by teats or nipples.) The highest class of animals is that which comprehends man, and all animals which, like man, possess a viviparous mode of generation. These animals have a heart consisting of four cavities; they have hot and red blood. Their most essential character is that of their being viviparous, and suckling their young by teats, and they are thence called *Mammalia*. The *mammalia* are placed at the head of the animal kingdom, not only because it is the class to which man himself belongs, but also because it is that which enjoys the most numerous faculties, the most delicate sensations, the most varied powers of motion, and in which all the different qualities seem combined in order to produce a more perfect degree of intelligence—the one most fertile in resources, most susceptible of perfection, and least the slave of instinct. The muscular system and the living movements of *mammalia* are more varied than in any other vertebrated class, for some are organized to plough the deep or to clamber on the rocky coasts; some to burrow in the earth or to bound over the plains; some to gamble on lofty trees or cliffs, or to wing their way through the air, and these different conditions affect more especially the organs of motion. The bones of all the *mammalia* are nearly of the same colour and general appearance as those of man; they are covered with a periosteum, and contain marrow, which in the whale tribe is fluid. The skeleton of *mammalia* is divided into head, trunk, and extremities. Next to man, the ape tribe is found to have the largest skull in proportion to the face, but, even in the ape, it is found to be small when compared with that of man. The facial angle, which in the adult European is about  $85^\circ$ , is in the ourang outang  $67^\circ$ , gradually descending in some of the monkeys as low as  $30^\circ$ , till among the other genera of quadrupeds it does not sometimes exceed  $20^\circ$ . The young

of *mammalia* are nourished for some time after birth by milk, a fluid peculiar to animals of this class, which is produced by the *mammæ* at the time of parturition, and remains as long as it is necessary. *Mammalia* constitutes the first class of *Spini-Cerebrata* or *Vertebrata*, and this class has been divided by some into ten orders.

1. *Bimanum*, or two-handed; the thumbs separate on the superior extremities only.

2. *Quadrumanus*, or four-handed; the thumb, or great toe, capable of being opposed to the other fingers or toes on each of the four extremities. The ape is an example.

3. *Bradypoda*, or slow moving animals, with their bodies generally covered by a hard crust. The armadillo is an example.

4. *Cheiroptera*, or animals having their fingers elongated for the expansion of membranes, which serve as wings. This membrane commences at the side of the neck, extends between the feet and toes, serves to support them in the air, and enables such of them to fly as have their hands sufficiently developed for that purpose. The bat is an example.

5. *Glires*, or *Rodentia*. Gnawing animals, having large incisors in each jaw, separated from the molars by an empty space, by which they divide hard substances. They have no canine teeth; they cannot seize living prey nor tear flesh; they cannot even, with their teeth, cut their food, but they gnaw or file it, hence their name. The squirrel, mouse, hare, &c., are familiar examples.

6. *Feræ*, or *predaceous* and *carnivorous* animals. They have large canine teeth, the molars forming pointed prominences for tearing and cutting the food. The bear, hedge-hog, &c., are examples.

7. *Solidungula*, or *Solipeda*. Animals having a single toe, or hoof, on each foot. These have six incisor teeth in each jaw, and are all of them herbivorous. The horse is an example.

8. *Ruminantia*, or *Pecora*. The term *ruminantia* indicates the peculiar property possessed by these animals of chewing the cud, that is, of masticating their food a second time, by bringing it back to the mouth after having swallowed it. This property depends upon the structure of their stomachs, of which they have four, the three first being so disposed that the food may enter into either of them, the *æso-phagus*, or gullet, terminating at the point of communication. They have two toes on each foot, and no incisors in the upper jaw. The sheep, goat, ox, &c., are familiar examples.

9. *Pachydermata*, or *Belluæ*. Thick-

skinned animals. Animals of unshapely form and thick tough hide. They have more than two toes on each foot, some having three, four, or five; some of them have large tusks, and a proboscis. The elephant, rhinoceros, hippopotamus, &c., are placed in this order.

10. Cetacea. These are mammiferous animals, destitute of hind feet; their trunk terminates in a thick horizontal tail with a cartilaginous fin. They live in the sea, and their external form is that of fishes, the fin of the tail excepted, which in cetacea is *horizontal*, while in fishes it is always *vertical*. Their respiring by lungs, instead of gills; their possessing warm blood; their viviparous production; and their having mammæ with which they suckle their young, all entitle them to be placed in the class to which they belong. The arrangement of mammalia by Cuvier somewhat differs from the above, and is as follows:—1. Bimana; 2. Quadrumana; 3. Carnaria; 4. Marsupialia; 5. Rodentia; 6. Edentata; 7. Pachydermata; 8. Ruminantia; 9. Cetacea.

As regards the fossil remains of mammalia, the only terrestrial mammalia yet discovered in any secondary stratum, are the small marsupial quadrupeds allied to the opossum, which occur in the oolite formation, at Stonesfield, near Oxford. Prof. Buckland observes, in reference to the secondary series, "With respect to the state of animal life, during the deposition of the secondary strata, although the petrified remains of zoophytes, crustacea, testacea, and fishes, show that the seas in which these strata were formed abounded with creatures referrible to the four existing divisions of the animal kingdom; still the condition of the globe seems not yet to have been sufficiently advanced in tranquillity, to admit of general occupation by warm-blooded terrestrial mammalia." The opinion formerly entertained was, that during the whole of the primary and secondary periods, at least, the class of Mammalia had no existence, and only came into being during the tertiary period. But this conclusion, founded upon the mere want of such remains, was easily seen to be insecure, and at length proved to be erroneous by the decision of Cuvier, that certain small jaw-bones, with teeth, found in the oolitic system, belonged to viviparous quadrupeds.

**MAMMA'LIAN.** Belonging to the class Mammalia.

**MAMMA'LOGIST.** (from *mamma*, Lat. and *λόγος*, Gr.) One skilled in the study of mammiferous animals.

**MAMMALI'FEROUS.** (from *mammalia* and *fero*, to produce, Lat.) A term applied

to strata containing mammiferous remains. As the *mammaliferous crag* of Norfolk, &c.

**MA'MMARY.** Pertaining to the mammæ, as the *mammary glands*, the *mammary arteries*, &c.

**MA'MMIFER.** (from *mamma*, a breast, and *fero*, to bear.) All animals having breasts and suckling their young are included amongst the mammifers. To these Linnæus assigned the name Mammalia. Cuvier, however, called them *Mammifera*; but, as has been observed, there appears no good reason for altering the original term.

**MAMMI'FEROUS.** Having breasts wherewith to suckle their young; belonging to the order Mammalia.

**MA'MMILLARY.** Having small rounded prominences, or projections something resembling teats or nipples; studded with rounded projections.

**MA'MMILLATED.** A term, like the one immediately preceding it, applied to certain appearances observed in minerals, which have the appearance of small bubbles, or rounded protuberances. Flint containing calcedony, is generally mammillated.

In conchology, the apex of a shell when rounded like a teat, is termed *mammillated*.

**MA'MMOTH.** (The etymology of this word does not appear quite agreed on; some state it to be from a Russian word, *mamant*; some, that it is of Tartar origin; others, that it is derived from Behemoth, an Arabic word, signifying elephant. *Mammut*, Germ.) The mammoth appears to be quite extinct; from the fossil remains of it which have been discovered, it appears to have had the feet, tusks, trunk, and many other particulars of conformation in common with the elephant; but it differed from the elephant in its grinders. Two species have been distinguished. The bones of the mammoth are found in great abundance in Siberia, and not only the bones, but portions of the flesh and the skin, and even whole animals have been found in icebergs and in frozen gravel. Towards the close of the last century, the entire carcass of a mammoth was exposed, and at length fell to the ground from a cliff of ice and gravel, on the banks of the river Lena. This animal was nine feet high, and about sixteen feet in length; the tusks were nine feet long. The skin was covered with hair, and it had a mane upon the neck.

The mammoth appears to have survived in England when the temperature of our latitudes could not have been very different from what it now is; for remains of this animal have been found in a

lacustrine formation, at North Cliff, in Yorkshire, in which all the land and fresh-water shells can be identified with species now existing in that county. It is supposed, from the prodigious number of bones found in certain places, that the mammoth must have existed in herds of hundreds, or even thousands. According to Pallas, there is scarcely a river, from the Don, or the Tanais, to the extremity of the promontory Tchuskoinosa, in the banks of which the bones of the mammoth are not most abundant. There are two large islands near the mouth of the river Indigerska, which are said to be entirely composed of bones of the mammoth, intermixed with ice and sand.

The grinders of the mammoth are formed of two substances only; an internal bony substance, and a thick covering of enamel. The form of their crown is generally rectangular, the crown being divided by spreading grooves into a certain number of transverse risings, each of which is divided, in the contrary direction, into two large obtuse, and somewhat quadrangular and pyramidal points; the whole crown, when not worn, being beset with large points, arranged in pairs. In consequence of several of these teeth being much worn down, not only to the base of the pyramids, but even so low as only to leave one square surface edged with enamel, it has been concluded that they were used in the trituration of vegetable food. M. Cuvier particularizes three sorts of these grinders; nearly square, with three pairs of points, generally much worn; rectangular, with eight points, less worn; and others with five pairs of points, and a single smaller one, scarcely the least worn. Cuvier considered he had distinguished five different species.

**MANA'TUS.** A genus of herbivorous cetacea, placed by Cuvier in the family Cetacea herbivora. The manatus appears to have inhabited the seas of our latitude during the Miocene and Pliocene periods. The recent species are now found near the coasts and mouths of rivers, in the torrid zone. They have an oblong body, terminated by an elongated oval fin: the grinders have a square crown, marked with two transverse elevations; they are eight in number throughout. Lamantin, a name often given to manatus, is said to be merely a corruption of Manatus.

**MA'NDIBLE.** (*mandibulum*, Lat. a jaw.) In insects, the upper jaws are called mandibles; the under jaws, maxillæ. The mandibles of insects are two strong, corneous, somewhat bent hooks, their inner margin being more or less dentate; they articulate with the cheeks at their broad

basis, move by ginglymus, and are opposed to each other like the blades of scissors.

**MANDI'BULAR.** Pertaining to the jaw.

**MANGANE'SE.** (*manganèse*, Fr. *maganese*, It.) A metal but little known in its pure or metallic state, to which it is reduced with much difficulty, in consequence of its great affinity for oxygen. When pure, it has a grayish-white colour, with some lustre. Its texture is granular; hardness, nearly that of iron. Specific gravity from 7.0 to 8.0. It has little or no malleability. It absorbs oxygen by exposure to the atmosphere; and its melting point is about 160° W.

In its metallic state, manganese is not applied to any use. It is obtainable in small quantities from the black oxide by heating it in an intense furnace, with charcoal and a little oil.

The common ore of manganese is the black, or peroxide, a valuable substance to chemists, as that from which oxygen is most easily obtained. When added in small quantities to glass, it removes the greenish or yellowish tinge which arises from iron or other impurities; but if added in considerable quantity, it communicates to glass or enamel a violet or purple colour. The ores of manganese present much diversity in their external characters. All minerals containing any considerable quantity of this metal, when melted with borax and a little nitre, yield a violet glass. One of the ores of manganese, known by the name of *Black Wadd*, is remarkable for its spontaneous inflammation when mixed with oil; the reason of this does not appear to be understood.

Oxide of manganese occurs principally, though not exclusively, in primary and transition rocks, in nodules or irregular masses, in veins, and in beds.

Of all the metals, the oxides of which are neither alkalies nor earths, iron and manganese are the most important, geologically considered. It is remarkable that manganese is almost, though not quite, as widely disseminated through rocks as is iron, the proportions, however, being much smaller. There is scarcely a rock without iron, and there are very few which do not afford some trace of manganese: except, however, in the places where its ores are worked, the latter exists only in minute quantities. Its calculated amount is greatest in mica slate with garnets, where, as an oxide, it forms 1.23 per cent. of the constituent parts of the rocks.—*De La Beche. Cleaveland. Ure.*

**MANGANE'SIAN.** Containing manganese; resembling manganese; having the properties of manganese.

**MA'RBLE.** (*marbre*, Fr. *marmo*, It. *mar-*

- mor*, Germ. *marmor*, Lat.) Any limestone possessing sufficient hardness to take a polish may be called marble.
- MA'RGARATE.** A compound of margaric acid with potash, soda, or some other base, and so named from its pearly lustre.—*Lyell's Elements.*
- MARGA'RIC ACID.** An oleaginous acid, formed from different animal and vegetable fatty substances.—*Ib.*
- MA'RGARITE.** A mineral, of a grayish-white colour, occurring massive and in thin crystalline laminae, intersecting each other in all directions. It bears some resemblance to silvery mica.
- MA'RGIN.** (*marge*, Fr. *marginé*, It.) The border or edge. In conchology, the whole circumference or outline of the shell in bivalves.
- MA'RGINATE.** } *marginatus*, Lat.  
**MA'RGINATED.** }
1. In conchology, having a prominent margin or border.
  2. In entomology, when the sharp edge is margined, and surrounds the surface with a narrow border.
- MARGINELLA.** An ovato-oblong, smooth, univalve, with a short spire. The lip thickly margined on the outside. The base of the aperture slightly notched; the columella plicated. Marginella differs from *Voluta* in the reflection of its outer lip. Recent marginellæ are found in sand and sandy mud. Several fossil species have been discovered in the calcaire grossier.
- MARI'GENOUS.** (from *mare*, the sea, and *gigno*, to produce, Lat.) Produced by or in the sea.
- MARI'NE.** (*marinus*, Lat. *marin*, Fr. *marino*, It.) Belonging to the sea; relating to the sea.
- MA'RI'NE ALLU'VIUM.** Shingle thrown up by the sea; materials cast upon the land by a wave of the sea, or those which a submarine current has left in its track.
- MARI'NE VEGETA'TION.** The marine vegetation, says Mr. Lyell, is less known; but we learn from Lamouroux, that it is divisible into different systems, apparently as distinct as those on the land, notwithstanding that the uniformity of temperature is so much greater in the ocean. The number of hydrophytes, or plants growing in water, is very considerable, and their stations are found to be infinitely more varied than could have been anticipated; for while some plants are covered and uncovered daily by the tide, others live in abysses of the ocean, at the extraordinary depth of one thousand feet; and although in such situations there must reign darkness more profound than night, at least to our organs, many of these vegetables are highly coloured.—*Principles of Geology.*
- MARL.** (*mergel*, *märgel*, Germ.) A combination of common clay and calcareous earth; a mixture of clay and lime.
- MA'RLY.** Composed of marl; containing marl; resembling marl.
- MA'RMORATE.** } (*marmoratus*, Lat.) When  
**MA'RMORATED.** } the markings or lines are variegated like marble.
- MARMORA'TION.** Incrustation with marble.
- MARSUPIAL.** (from *marsupium*, a pouch, Lat.) Having a pouch; belonging to the order Marsupialia. New Holland is known to contain a most singular assemblage of more than forty species of the *marsupial* family.
- MARSUPIA'LIA.** Animals possessing abdominal pouches. The marsupialia form the fourth order of Mammalia, in Cuvier's arrangement. The economy of marsupialia is in many respects most singular. One most striking peculiarity is the premature production of the fetus, whose state of development at birth is extremely small. Immediately on their birth they pass into a sort of second matrix. Incapable of motion, and scarcely displaying any germs of limbs or external organs, these diminutive beings attach themselves to the mammæ of the mother, where they remain fixed by the mouth, until they have acquired a growth and development, resembling that of other newly-born animals. The skin of the animal is so arranged round the mammæ as to form a pouch in which not only the imperfect fetus, attached to the nipple by its mouth, remains till fully developed, but into which, long after it is able to run about, it leaps when alarmed, or when wishing to conceal itself. The order Marsupialia holds an intermediate place between viviparous and oviparous animals, forming a link, as it were, between Mammalia and Reptiles. The order Marsupialia contains many genera, both herbivorous and carnivorous. The kangaroo and opossum are familiar examples. Another peculiarity in these animals consists in this; that the members of two litters are sometimes sucking at the same time. The New Holland opossums are very voracious, and devour carcasses as well as insects; they enter into the houses, where their voracity is very troublesome. That most common, the *Didelphys Virginiana*, attacks poultry in the night, and sucks their eggs. It is said to produce sixteen young ones in one litter, which, when first born, do not weigh more than one grain each; though blind, and almost shapeless, when placed in the pouch they instinctively find the

nipple, and adhere to it till they attain the size of a mouse, which does not take place till they are fifty days old, at which period they begin to see. The discovery of marsupials, both in the secondary and tertiary formations, shows that, so far from being of more recent introduction than other orders of Mammalia, this order is in reality the first and most ancient condition, under which animals of this class appeared upon our planet.

**MARSUPIE.** (from *marsupium*, a purse, Lat.) The name given by Dr. Mantell, from their resemblance to a purse, to a genus of Crinoidea found in the chalk. A specimen of one species, named by him *Marsupites Milleri*, found near Brighton, is beautifully figured in his *Geology of the South-East of England*, and in his *Wonders of Geology*. The following description of the marsupite I have extracted from the above two works of Dr. Mantell's:—"The marsupite was a molluscous animal, of a sub-ovate form, having the mouth in the centre, and surrounded by arms, or tentacula. The skeleton was composed of crustaceous, hexagonal plates; the arms, which are subdivided into numerous branches, of ossicula, or little bones: the whole was invested with a muscular tissue, or membrane. When floating, the creature could spread out its tentacula like a net, and by closing them, seize its prey, and convey it to its mouth. The fossil remains of this zoophyte, of which one species only is known, have hitherto been found in the upper chalk of Sussex, Wiltshire, and Yorkshire only. The name of '*cluster-stones*,' given to them by the quarrymen of Sussex, conveys an idea of their general appearance. They may, however, so far as their body is concerned, be compared to the fruit of the pine. The body is orbicular, contained in a pelvis composed of sixteen convex, radiated, angular, crustaceous plates."

**MARSUPIUM.** The name given to a dark-coloured membrane situated in the vitreous humour of the eye of birds. The use of the marsupium is not ascertained, but it is present in almost every bird having extensive powers of vision.

**MASCAGNINE.** A native sulphate of ammonia, found, by Mr. Mascagni, near the warm spring of Sasso, in Tuscany, and named after its discoverer. It has also been called *Sassolin*, from the place near which it was found.

**MASSETER.** (from *μασάσαι*, Gr. to chew.) A muscle connected with the under jaw of insects, and which assists in masticating.

**MASTODON.** (from *μαστός*, a breast, and

*δδός*, a tooth, Gr.) For a full description of the Mastodon, see *Mammoth*.

**MASTOID.** (from *μαστός*, the breast, and *είδος*, likeness, Gr.) Shaped like the breast, or like a nipple. Applied to some prominences of bones; to a foramen; to a muscle; and to cells in the ear.

**MATRIX.** (*matrix*, Lat. *matrices*, pl.) The earthy or stony matter in which a fossil is imbedded.

**MAXILLA.** (*maxilla*, Lat.) The jaw. The lower jaws of insects are called maxillæ; they are placed behind the mandibles, and between is situated the labium, or lower lip. The maxillæ are employed principally for holding the substances on which the grinding apparatus of the mandible is exerted.

**MAXILLARY.** Belonging to the maxilla, or attached to it.

**MAW.** (*magen*, Germ.) The craw of fowls; the stomach of brutes.

**MEANDRINA.** Brain-stone; brain-coral. Madreporæ in which the laminæ assume a meandering direction are called meandrinæ. Meandrinæ are large hemispherical corals, having their surface covered with serpentine ridges and depressions, resembling the convolutions of the cerebrum, or brain, from which circumstance they have been called brain-stone. A very fine specimen, four feet in circumference, may be seen in the British Museum, presented by the late Dr. Jarvis, of Margate.

**MEATUS.** (*meatus*, Lat. from *meo*, to flow.) A passage, as that leading to the ear, called the *meatus auditorius*, &c.

**MECHANICAL ORIGIN.** A term used, says Mr. Lyell, to distinguish rocks of sand, pebbles, or fragments, from those of chemical origin; or such rocks as are of a uniform crystalline texture.

**MEDULLA.** (*medulla*, the marrow, Lat)

1. In botany, the pith of plants.
2. The marrow in the cavities of bones.

**MEDULLARY.** (*medullaris*, Lat.)

1. Relating to the brain, or to the marrow. The medullary substance composes the greater part of the brain, spinal marrow, and nerves.

2. In botany, relating to the pith of plants.

**MEDULLIN.** A name given by Dr. John to the porous pith of the sun-flower.

**MEDUSA.** A genus of marine molluscous animals belonging to the class *Acalepha*. The *medusa* approach nearly to the fluid state, appearing like a soft and transparent jelly, which by spontaneous decomposition after death, or by the application of heat, is resolved almost into a limpid watery fluid. The usual form of a medusa is that of a hemisphere, with a

marginal membrane, like the fold of a mantle, extending loosely downwards from the circumference.

*Medusæ* are met with of very various sizes; the larger abound in the seas around our coasts, but immense numbers of the more minute, and often microscopic, species occur in every part of the ocean. In some parts of the Greenland seas the number of *Medusæ* is so great, that in a cubic inch, taken up at random, there are not fewer than 64. In a cubic foot this will amount to 110,592; and in a cubic mile, the number is such, that allowing one person to count a million in a week, it would have required 80,000 persons from the creation of the world, to complete the enumeration.—*Dr. Roget. Dr. Kidd.*

**MEGALONYX.** (from μέγας, great, and οὐνξ, a claw, Gr.) A huge fossil mammalian, of the order Edentata, and thus named from the great size of its ungual, or claw, bones. The remains of the *Megalonyx* were discovered in the floor of a cavern, in the limestone of Virginia, in America.

**MEGALICHTHYS.** (from μέγας, great, and ἰχθύς, a fish, Gr.) The name given to a fossil sauroid fish, first discovered, by Dr. Hibbert, in the limestone near the bottom of the coal formation, near Edinburgh. Specimens of *Megalichthys* have since been obtained by Sir P. Grey Egerton, Mr. Austin, and Mr. Murchison, in the coal formation.

**MEGALOSAURUS.** (from μέγας, great, and σαῦρος, a lizard, Gr.) A genus of fossil amphibious animals, of great size, belonging to the saurian tribe. This genus was established by Professor Buckland. Cuvier concludes, from a comparison of the fossil bones with those of existing lizards, the *megalosaurus* to have been an enormous reptile measuring from forty to fifty, or even seventy, feet in length, and partaking of the structure of the crocodile and monitor. Remains of the *megalosaurus* have been found in the Oolite and in the Wealden. This huge creature appears to have been carnivorous, from the form of its teeth, and its head terminated in a straight and narrow snout.

**MEGAPHYTON.** (from μέγας, great, and φυτόν, a plant.) An extinct genus of plants belonging to the order Conifera. In the genus *Megaphyton* the stem is not furrowed, and the leaf scars are very large, resembling the shape of horse-shoes, and arranged on each side of the stem in two vertical rows. It is found in the coal strata.

**MEGATHERIUM.** (from μέγας, great, and θηρίον, a beast, Gr.) An extinct animal, of great size, belonging to the order Edentata. Fossil remains of the *Megatherium*

have been discovered in South America, in the alluvial deposites of the Pampas. The *Megatherium* was about eight feet high, and its body twelve feet long; it united part of the structure of the armadillo with that of the sloth. The relative proportions of the extremities of the *megatherium* differ greatly from those of the sloth, and indeed from those of any known animal. Its teeth prove that it lived on vegetables, and its fore-feet, robust, and armed with sharp claws, show that roots were its chief objects of search. Its hide appears to have been covered with a bony coat of armour of considerable thickness, the use of which was probably defensive, not only against the sharp claws of beasts of prey, but also against the myriads of insects that surrounded it. "Secure within the panoply of his defensive armour," says Professor Buckland, "where was the enemy that would dare encounter this behemoth of the Pampas? a creature whose giant carcass was encased in an impenetrable cuirass, and who, by a single pat of his paw, or lash of his tail, could in an instant have annihilated the cougar or the crocodile."

**MEIONITE.** (from μείων, less, Gr.) The Meionite of Werner. A mineral, thus named from its terminating pyramids being lower than those of similar forms in the other minerals. Meionite much resembles Wernerite in the measures of its angles, but the terminating faces of Wernerite stand on the lateral faces of the primitive form, whereas in the meionite they correspond to the truncated lateral edges of the primitive form. Meionite is a prismatic-pyramidal felspar. It occurs in grains, or small crystals, whose more common form is an eight-sided prism, truncated on its lateral edges, and terminated by four low-sided pyramids. It is of a greyish-white colour; translucent and sometimes transparent. It scratches glass, and before the blow-pipe readily melts into a white spongy glass. It is found at Mount Somma, near Vesuvius.

**MELANIA.** (from μέλας, black, Gr.) A genus of univalve fresh-water shells belonging to the order Pectinibranchiata, class Mollusca. The *melania* is a turreted univalve; the aperture entire, ovate, or oblong, and spread out at the base of the columella, which is smooth. Recent *melaniæ* are found in rivers and estuaries. Fossil *melaniæ* are found in the environs of Paris. Lamarck describes twelve species.

**MELANITE.** (from μέλας, black, Gr.) The Melanit of Werner; Grenat noir of Haüy; Grenat melanit of Brongniart. A velvet-black, opaque, dodecahedral variety

of garnet. It occurs in crystals, which are dodecaëdrons, with truncated edges. Fracture conchoidal. Specific gravity 3·73. Its constituents are silice 35·5, lime 32·5, oxide of iron 25·25, alumine 6·0, oxide of manganese 0·4. It is found at Frascati, near Mount Vesuvius, in Bohemia, and in North America.

**MELANOΨIS.** A genus of oval or oblong, fusiform, univalves, belonging to the family Melaniana, in Lamarck's arrangement. Melanopsides are found both recent and fossil; they are distinguished from Melaniæ by a notch in the aperture. Fossil melanopsides are found in the shale of the Wealden, at Pounceford.

**ME'LAPHYRE.** A variety of black or porphyritic porphyry.

**MELASTOMA.** (from μέλας, black, and στόμα, mouth, Gr.) A name given to a genus of plants, belonging to the order Melastomacea, from the fruit staining the lips of a black colour.

**MELEAGRINA.** A genus of bivalve molluscs, known as the *pearl-oyster*. Meleagrina inhabit the Persian Gulf, the coasts of Ceylon, the sea of New Holland, the Gulf of Mexico, and the coasts of Japan. It attains perfection nowhere but in the equatorial seas, but in the pearl fishery of the island of Ceylon it is the most celebrated and productive. The pearls are situated in the fleshy part of the oyster, near the hinge. For one pearl that is found perfectly round and detached between the membranes of the mantle, hundreds of irregular ones occur attached to the interior of the shell, like so many warts: they are sometimes so numerous, that the animal cannot shut its shell, and so perishes.

**ME'LITA.** (from *mel*, honey, Lat.) Honey-cake. A genus of echinites, belonging to Catocysti.

**ME'LLATE.** The name given to a salt, in which the mellitic acid is combined with any salifiable base.

**ME'LILITE.** (from μέλι, honey, and λίθος, a stone, Gr.) The name given to a rare mineral from its honey colour. It occurs only in very minute crystals, perfectly regular and well-defined, but not larger than a grain of millet-seed. These grains are of a cubic or prismatic form; their surface is often coated with an oxide of iron. They are glistening, semitransparent, and will scratch glass. Before the blow-pipe, melilite fuses into a compact, greenish, transparent glass. It occurs in the fissures and cavities of lava.

**ME'LLITE.** (from *mel*, honey, and λίθος, a stone.) Honey-stone. The Honigstein of Werner; La Pierre de miel of Brochant; Pyramidales Melichron-Hartz of Mohs. This mineral was first observed

in Thuringia, where it occurs associated with brown coal. It is of a honey-yellow colour, whence its name, and is usually crystallized in small octahedrons, whose angles are often truncated. Fracture conchoidal. Lustre shining or splendent. By friction the crystals acquire a weak negative electricity. They are more or less translucent, or even transparent, and exhibit double refraction. Mellite may be distinguished from amber by its weak electricity, and double refraction. It consists of mellitic acid 41·0, alumina 14·10, water 44·8.

**MEMBRANA'CEOUS.** (*membranaceus*, Lat.) Resembling membrane. In botany, a membranaceous leaf has no distinguishable pulp between the two surfaces.

**MEMBRANEUS.** (*membraneux*, Fr. *membranoso*, It. *membraneus*, Lat.) Consisting of membrane. In this and the preceding word may be observed the difference between words ending in *aceus* and *eous*: those ending in *aceous* express a resemblance to a material, those ending in *eous* indicate the material itself.

**MEMBRANE.** (*membrana*, Lat. *membrane*, Fr. *membrana*, It.) The membranes of animals are thin semitransparent bodies, which envelope certain parts of the body, to which they furnish a covering for their support and protection. Membranes are modifications of cellular texture, the surfaces of the plates cohering so as to obliterate all the cellular interstices, and being impervious to fluids. Membranes also line the interior of all the large cavities of the body; these membranes, after lining the sides of their respective cavities, are reflected back upon the organs which are enclosed in those cavities, so as to furnish them with an external covering. Thus the bowels are covered by the peritoneum, the lungs by the pleuræ; nevertheless, in consequence of these membranes being reflected, the lungs and bowels may be said to be external to their investing membranes.

**MEMBRANOUS.** Consisting of membrane; resembling membrane. In botany, applied to leaves of an extremely thin and pliable texture; also to stems of a delicate substance, composed of several thin membranes laid one over the other; opposed to *herbaceous*.

**ME'NACHINE.** (from *Menachan*, a valley in Cornwall.) The name given to a new metal, discovered by Mr. Gregor, to which the name titanium is now more generally applied. The *menachine* of Gregor and the *titanium* of Klapproth are the same substance, and to Gregor is owing the merit of the discovery. See *Titanium*.

**ME'NACHANITE.** (from *Menachan*, in

Cornwall.) An oxide of titanium, or menachine, combined with iron. This substance is found abundantly in the valley of Menachan, in Cornwall, and was thus named by its discoverer, Mr. Gregor. It is of a greyish-black colour, and occurs in small grains resembling gunpowder, of no determinate shape, and mixed with a fine grey sand. Specific gravity 4.4. Before the blow-pipe it neither decrepitates nor melts. According to the analysis of Klaproth it consists of oxide of iron 51.00, oxide of titanium 45.25, silica 3.50, oxide of manganese 0.25.

**MENILITE.** (from *Ménil-montant*, near Paris, where it is found.) The Menilit of Werner; Silex menilite of Brongniart; Quartz résinite subluisant of Haüy. A brown or yellowish-grey tuberoso variety of uncleavable quartz. Menilite occurs in small irregular or roundish masses, often tuberoso, or marked with little ridges on its surface. It is translucent, often only at its edges. Structure rather slaty; fracture conchoidal or splintery. It scratches glass. Specific gravity 2.18. Infusible before the blow-pipe. Constituents, silica 85.5, alumine 1.0, lime 0.5, oxide of iron 0.5, water and carbonaceous matter 11.0.

**MENINGES.** (from *μήνιξ*, Gr. a membrane.) A name given to the membranes which cover the brain.

**MENISCUS.** (from *μηνίσκος*, Gr.) A lens, one of whose surfaces is convex and the other concave, and in which the two surfaces meet if continued. As the convexity exceeds the concavity, a *meniscus* may be regarded as a convex lens.

**MENSTRUUM.** A solvent.

**MEPHITIC.** (*mephitis*, Lat.) Offensive to the smell; noxious; pestilential.

**MEPHITIC ACID.** Another name for carbonic acid.

**MEPHITIC AIR.** Another name for nitrogen gas.

**MERCURY.** (*mercure*, Fr. *mercurio*, It.)

One of the fifty-five simple or elementary bodies. This metal is of the same colour as burnished silver; when pure and fluid, it is still opaque, and nearly silver-white, with a strong lustre. Its specific gravity is 13.56, or thirteen times and a-half heavier than water, its density being next to those of platinum and gold. Mercury fuses at a temperature of 39° or 40° below the zero of Fahrenheit, that is, at a temperature of 71° below the freezing point of water. Mercury, which when exposed to a lower temperature is a solid body, becomes fluid: consequently under common circumstances we always find it fluid, and in this respect it remarkably differs from all the other metals. It has obtained its name from its fluidity and colour. The

boiling point of mercury is somewhere about 680°, at which temperature it is converted into vapour of a highly expansive power; this vapour may be again condensed into the fluid metal, by being received into cold vessels. Geoffroy enclosed a quantity of mercury in an iron globe, strongly secured by iron hoops, and put the whole into a furnace; soon after the globe became red-hot it burst with the violence of a bomb, and all the mercury was dissipated.

Mercury has less affinity for oxygen than most other metals; it may be distilled over five hundred times, without loss of quantity. It combines, however, with oxygen in two proportions, forming a red and a black oxide. By merely heating these in a retort the oxygen may be driven off, and the metal once more obtained in its pure state.

The existence of mercury, even in small quantities, in any of its ores, may be ascertained by mingling the ore with iron filings, and heating this mixture to redness under any cold body, as a plate of polished copper; the mercury is volatilized, and condensed in minute globules on the plate. In consequence of the volatility of mercury, it is usually purified by distillation.

Two of the combinations of mercury with chlorine form most valuable and important medicines; the one called chloride of mercury, or calomel, the other bichloride of mercury, or corrosive sublimate. From the fluid state in which mercury exists, it readily combines with most of the metals, to which, if in sufficient quantity, it imparts a degree of fusibility or softness: these compounds are termed *amalgams*. An amalgam of mercury and tin is employed for silvering the backs of looking-glasses, and an amalgam of four parts of mercury, two of bismuth, one of lead, and one of tin, is used for silvering the inside of glass globes, the amalgam fusing on the globe being placed in hot water. The ready combination of mercury with gold or silver, and the facility with which it may be again separated from them by heat, renders it of great value in the obtaining those metals from their ores and alloys in the operations of mining.

Mercury is also most useful in the construction of barometers and thermometers. It was known in the remotest ages, and seems to have been employed by the ancients in gilding, and in separating gold from other bodies, as in the present day. It possesses neither taste nor smell. Native mercury occurs in small globules, disseminated in other metals. These globules are but feebly united to their

gangue, and may be liberated by striking or heating the substance which embraces them. It is from the sulphuret of mercury that the metal is principally obtained. Sulphuret of mercury occurs in beds, or large irregular masses, and sometimes in veins. The mines which furnish the ore, sulphuret of mercury, are by no means common; Spain, Germany, and Peru possess the most important. In Spain, at Almaden, these mines are in a mountain of argillaceous slate or shale. The most celebrated, however, are at Idria; these are situated partly in gray compact limestone, and partly in shale. The working these mines is exceedingly injurious to the health and life of those employed. Criminals, and those convicted of political offences, are sent hither to eke out a miserable existence. They soon lose their teeth, and are subject to paralysis, convulsions, and premature old age. It is said that the surrounding district is so affected by the noxious vapours, that cattle cannot be reared there, and that fruit and grain do not come to maturity.

**MESENTERY.** (*μεσεντέριον*, Gr. from *μέσος*, middle, and *έντερον*, bowel.) A fatty membrane formed of folds of the peritoneum. This is a fine and delicate membrane which connects the intestines to the spine, and which appears to be interposed in order to allow to the intestines that freedom of motion which is so necessary to the proper performance of their functions.

**MESENTERIC.** Pertaining to the mesentery, as the mesenteric glands, &c.

**MESOTHORAX.** (from *μέσος*, middle, and *θώραξ*, chest.) In entomology, the mesothorax gives origin to the second pair of legs, and also the first pair of wings, or to the elytra, of insects.

**MESOTYPE.** (from *μέσος*, middle, and *τύπος*, form.) Prismatic zeolite; a simple mineral of the zeolite family, occurring in drusy cavities, or in veins in secondary trap rocks. The Prismatic Kuphonspath of Mohs. Mesotype is of a white, red, yellow, or yellowish-brown colour. It occurs regularly crystallized. It consists of silica 54.40, alumina 19.75, soda 15.05, lime 1.60, water 9.80. Specific gravity 2.3.

**METACARPAL.** (from *μετά*, with, and *καρπός*, the wrist.) Belonging to the *metacarpus*; as the *metacarpal* bones, &c.

**METACARPUS.** (from *μετά*, with, and *καρπός*, the wrist.) That part of the superior extremity which connects the wrist with the fingers; what is commonly known as the hand, but not including either the wrist or the fingers.

**METABOLIANS.** (from *μεταβάλλω*, Gr. to change.) That sub-class of insects which

undergo a metamorphosis, and are usually fitted with wings in their final state. The insects of the class *Condylopes* may be divided into two sub-classes, namely, *Ametabolians*, or those that do not undergo any metamorphosis, and have no wings; and *Metabolians*.

**METAL.** (*μέταλλον*, Gr. *metallum*, Lat. *métal*, Fr. *metallo*, It. *metall*, Germ.) Metals, as presented by nature, are sometimes pure, or combined with each other only, and are said to exist in a metallic state. But more frequently they are combined with oxygen, sulphur, &c., by which their peculiar metallic properties are more or less disguised; in this case the metal is said to be mineralized, and the oxygen, or sulphur, is called the mineralizer. All the individuals of the class of metals, with the exception perhaps of iron, are perfectly inert and harmless; even arsenic, lead, copper, and mercury, which in certain states of combination constitute some of the most virulent of known substances, exert no action upon the living system, unless they be in union with some other body; but when so united, how valuable do they become, and what various medicinal effects may they not be made to produce! The metals at present known are forty-three in number. Of these, seven were known in the earliest ages, and, in consequence of a superstitious belief in the influence of the stars over human affairs, were first distinguished by the names and signs of the planets; and as the latter were supposed to hold dominion over time, so were astrologers led to believe that some, more than others, had an influence on certain days of the week; and, moreover, that they could impart to the corresponding metals considerable efficacy upon the particular days which were devoted to them. As regards the ages of metals, tin, molybdena, tungsten, and wolfram, are ranked as the most ancient; uranium and bismuth succeed. Gold and copper are deemed relatively and comparatively as new metals. Iron is of all ages. The specific gravity of metals, if we exclude those recently discovered by Sir H. Davy, is always greater than that of minerals; tellurium, the lightest metal, being above 6.0, while the heaviest earthy body is less than 5.0. Metals are opaque; they possess a peculiar lustre, which has been termed metallic lustre, retaining it even when reduced to powder. They are mostly malleable, or capable of being hammered into various orders and thin leaves; and ductile, or capable of being drawn into wires of greater or less fineness. They are not soluble in water. They all unite with oxygen, and, probably, all with chlorine.

They are fusible, or capable of being rendered fluid by a heat attainable by artificial means; becoming again solid on cooling. They are elastic, hard, heavy, and, generally, sonorous. Some of the metals possess a degree of taste and smell. All the metals are expansible by heat, and their degree of expansibility appears to bear a relation to their fusibility.

**META'LLIC.** } (*metallicus*, Lat. *métal-*  
**META'LLICAL.** } *lique*, Fr. *metallico*, It.)

Partaking of metal; consisting of metal; containing metal; resembling metal.

**META'LLIC BEDS.** Some metallic ores occur in the form of *beds* in primary and transition rocks. Iron ore often forms *beds* of considerable thickness, interposed between rocks of gneiss, slate, and mica slate. The difference of external character is so great between a pure metal and an earth, that it is difficult to conceive, at first, how metallic matter can form beds interstratified with earthy rocks; the discoveries, however, of modern chemistry have shown, that metallic and earthy minerals are closely allied.—*Bakewell*.

**META'LLIC LU'STRE.** One of the most conspicuous properties of metals is a particular brilliancy which they possess, and which has been called the *metallic lustre*. There are other bodies which apparently possess this peculiar lustre, as, for example, mica, but in them it is confined to the surface, and accordingly disappears when they are scratched, whereas it pervades every part of metals.

**META'LLIC ORE.** Metals existing in the state of an oxide, or a salt, or united with a combustible, are called *ores*; and this term is, by analogy, extended to the native metals and alloys.

The earthy, stony, saline, or combustible substance, which contains the *ore*, or is only mingled with it, without being chemically combined, is called the *gangue*, or matrix, of the ore.

Metals and their ores, are sometimes disseminated in other rocks; sometimes they form irregular masses of various sizes, and sometimes they constitute beds; but more frequently they are found in veins, either filling the whole vein, or mixed with various saline and earthy minerals. They appear to be the production of every period, but more frequently exist in primary and transition, than in secondary rocks, or than in alluvial earths.

**META'LLIC O'XIDE.** A metal combined with any proportion of oxygen, is called a *metallic oxide*, provided it do not possess the properties of an acid. Hence the same metal, by uniting with different quantities of oxygen, often furnishes two or more oxides, which differ in colour and in other properties. All metals must be

converted into oxides, before they can combine with acids to form metallic salts.—*Cleveland*.

**META'LLIC SALTS.** Those salts which have a metallic oxide for their base; carbonate of lead is an example.

**METALLIC VEINS.** "Perhaps," says Mr. Bakewell, "the reader may obtain a clearer notion of a *metallic vein*, by first imagining a crack or fissure in the earth, a foot or more in width, and extending east and west on the surface, many hundred yards. Suppose the crack, or fissure, to descend to an unknown depth, not in a perpendicular direction, but sloping a little to the north or south. Now, let us suppose each side of the fissure to become coated with mineral matter, of a different kind from the rocks in which the fissure is made, and then the whole fissure to be filled by successive layers of various metallic and mineral substances; we shall thus have a type of a metallic vein. Its course from east to west is called its *direction*, and the dip from the perpendicular line of descent, is called its *hading*."—*Introduction to Geology*.

While plain countries are utterly destitute of all indications of metallic veins, there are few mountainous countries in which they do not occur in abundance.

"There is a remarkable circumstance," says Prof. Phillips, "in the distribution of metallic veins in the same class of stratified rocks,—a peculiarity depending on local influences; such, that while the slates of Cornwall near the granitic eruptions, yield tin and copper, and the Snowdonian slates, and those of Conistow Water Head yield copper; those of Loweswater, Borrowdale, Patterdale, and Caldbeck fells yield lead, or lead and copper."

**METALLIFEROUS.** (from *metallum*, metal, and *fero*, to produce.) Yielding metal, as metalliferous deposits, metalliferous districts, metalliferous veins, metalliferous dykes, &c.

**METALLIZA'TION.** The act, or process, of forming into a metal.

**METALLO'GRAPHY.** (from *μέταλλον*, a metal, and *γραφή*, a description.) A treatise on metals, or metallic substances.

**META'LLURGY.** (from *μέταλλον*, a metal, and *ἔργον*, a work, Gr. *métallurgie*, Fr.) Some authors comprehend under this term, the whole art of working metals, from the glebe, or ore, to the utensil; in which sense assaying, smelting, refining, parting, smithery, gilding, &c., are only branches of metallurgy. Others restrain *metallurgy* to those operations required to separate metals from their ores.

**METAMO'RPHIC.** (from *μετά*, trans, and *μορφή*, form, Gr.) A term proposed for

such hypogene rocks as are stratified, or altered by stratification; any stratified primary rock may be termed *metamorphic*. By some authors the metamorphic rocks have been divided into two groups; namely, those which present traces of stratification, and, secondly, those which present no appearance of regular arrangement, but occur in amorphous or shapeless masses.

**METAMORPHOSIS.** (*μεταμόρφωσις*, Gr. change into another form, *métamorphose*, Fr. *metamorfosi*, It.) Transformations which insects undergo previously to their arriving at their state of perfection. The progress of *metamorphosis* of insects is most strikingly displayed in the history of the Lepidopterous, or butterfly and moth tribe. The egg, which is deposited by the butterfly, gives birth to a caterpillar; an animal which, in outward shape, bears not the slightest resemblance to its parent, or to the form it is itself afterwards to assume. It has, in fact, both the external appearance, and the mechanical structure, of a worm. But these vermiform insects contain in their interior the rudiments of all the organs of the perfect insect. These organs are, however, concealed from view by a great number of membranous coverings, which successively invest one another, like the coats of an onion, and are thrown off, one after another, as the internal parts are gradually developed. These successive peelings of the skin are but so many steps in preparation for a more important change. A time comes when the whole of the coverings of the body are at once cast off, and the insect assumes the form of a *pupa* or *chrysalis*; being wrapt as in a shroud, presenting no appearance of external members, and retaining but feeble indications of life. In this condition it remains for a certain period: its internal system continuing in secret the farther consolidation of the organs; until the period arrives when it is qualified to emerge into the world, by bursting asunder the fetters which had confined it, and to commence a new career of existence. The worm, which so lately crawled with a slow and tedious pace along the surface of the ground, now ranks among the sportive inhabitants of the air; and expanding its newly acquired wings, launches forward into the element on which its powers can be freely exerted, and which is to waft it to the object of its gratification, and to new scenes of pleasure and delight. *Dr. Roget, Bridgewater Treatise.*

Transformations quite as remarkable occur in several tribes of animals belonging to other classes: such as those of the

frog among reptiles, and of the lernæa among parasitic worms. Whether the higher order of crustaceans undergo a real metamorphosis, has not been satisfactorily proved. They are known to change their shells annually; but it has not been observed that this moult has been attended by any change of form, or by the acquisition of any new locomotive or other organs.

**METATARSAL.** (from *μετὰ* and *ταρσός*, Gr.) Belonging to the metatarsus, as the metatarsal bones, &c.

**METATARSUS.** (from *μετὰ* and *ταρσός*, Gr. *metatarse*, Fr.) That part of the foot which lies between the ankle and the toes, corresponding to the metacarpus of the superior extremities. The bones of the metatarsus in the most complete forms of development are always five in number, in each limb.

**METATHORAX.** (from *μετὰ*, beyond, and *θώραξ*, the chest.) In entomology, the third and last segment of the thorax, resembling the second in being of a more united structure than the first. The second and third segments are closely united together, but the original distinction into two portions is marked by a transverse line. To the second and third segments are attached both wings and legs, whereas the first segment has legs alone. The third segment consists of seven pieces, which are similar to those of the second. The posterior wings are placed at the anterior angles, and often occupy the whole sides of the *metathorax*. A pergamenteous partition at the posterior margin, which descends in a perpendicular direction, bowing in its middle towards the abdomen, separates the *metathorax* from the abdomen.

**METEORIC IRON.** The *Octaedrisches eisen* of Mohs; Fer natif of Haüy. Colour pale steel-grey; occurs ramose, and disseminated in meteoric stones. Native, or meteoric iron, is composed of iron and nickel, the proportion of nickel varying from one to nearly ten per cent. In some specimens a trace of cobalt has been discovered.

Pallas found a mass of native iron 1680 lbs. in weight, in Siberia, which tradition stated to have fallen from the air. Meteoric iron is assuredly unlike any iron of earthly origin, but it has been imitated by fusing iron with nickel.

**METEORIC STONES.** } See *Aerolites*.

**METEORITE.** }

**METEOROLOGY.** (from *μετέωρα*, meteors, and *λόγος*, a description, Gr.) The study of the phenomena of the atmosphere. It was not till the 17th century that any considerable progress was made in investigating the laws of meteorology.

Previously to that period, the want of proper instruments precluded the cultivation of this science; but the discovery of the barometer and thermometer in the 17th, and the invention of accurate hygrometers in the 18th century, supplied the pre-existing defects, and enabled philosophers to enter on meteorological observations with accuracy and facility.

**MICA.** (from *mico*, to glisten.) This mineral appears to be always the result of crystallization, but is rarely found in regular, well-defined crystals. Most commonly it appears in thin, flexible, elastic laminæ, which exhibit a high polish and strong lustre. These laminæ have sometimes an extent of many square inches, and, from this, gradually diminish till they become mere spangles, discoverable, indeed, by their lustre, but whose area is scarcely perceptible by the naked eye. Mica is said to contain forty-four per cent. of oxygen. The laminæ of mica are easily separated, and may be reduced to a thickness not much exceeding the millionth part of an inch. Mica is easily scratched with a knife, and, commonly, even by the finger-nail. Its surface is smooth to the touch; its powder is dull, usually grayish, and feels soft. Its colours are silver-white, gray, green, brown, reddish, and black, or nearly black. Specific gravity from 2.50 to 2.90. When rubbed on sealing-wax, it communicates to the wax negative electricity. Before the blow-pipe, it fuses into a grey or black enamel. Its constituent parts are, according to Klaproth, silice 48.0, alumine 34.20, potash 8.75, oxide of iron 4.5, oxide of manganese 0.5. According to others, it is a compound of silicium, potassium, magnesium, calcium, &c., combined with oxygen. Mica is one of the component parts of granite, gneiss, and mica-slate; it occurs also in syenite, porphyry, and other primary rocks. To quartz and limestone it frequently communicates a slaty texture. It may always be distinguished from talc by the elasticity of its plates, in its want of unctuousity, and by its communicating negative electricity to sealing-wax. There are several varieties, or sub-species; Jameson enumerates ten. Mica has been employed, instead of glass, in the windows of dwelling-houses. In lanterns it is superior to horn, being more transparent, and not so easily injured by the flame. Mica is a doubly refracting substance, with two optic axes; along which, light is refracted in one pencil.

**MICA'CEOUS.** Containing mica; resembling mica.

**MICA'CEOUS IRON ORE.** A variety of oxide of iron. This occurs generally in

amorphous masses, composed of thin six-sided laminæ. Colour iron-black, or steel-grey. Lustre metallic. Opaque. Feel greasy. Hardness 5 to 7. Specific gravity from 4.5 to 5.7. It is said to yield nearly 70 per cent. of iron.

**MICA SCHIST.** } A metamorphic rock, com-  
**MICA SLATE.** } posed of mica and quartz; it passes by insensible gradations into clay-slate, and its texture is slaty. Sometimes the mica and quartz alternate, though commonly they are more or less intimately mingled; the mica usually predominating.

**MICA'CELLE.** The Pinite of Kirwan. See *Pinite*.

**MICA'ROPYLE.** (from *μικρός*, small, and *πύλος*, gate, Gr.) A term for the foramen in the perfect seed; this foramen is often visible, as in the pea and bean.

**MICA'SCOPE.** (from *μικρός*, small, and *σκοπέω*, to behold, Gr. *microscope*, Fr. *microscopio*, It.) A microscope is an optical instrument for examining and magnifying minute objects. Jansen and Drebell are supposed to have separately invented the single microscope, and Fontana and Galileo seem to have been the first who constructed the instrument in its compound form. The single microscope is nothing more than a lens or sphere of any transparent substance, in the focus of which minute objects are placed. The best single microscopes are minute lenses ground and polished on a concave tool; but as the perfect execution of these requires considerable skill, small spheres have often been constructed as a substitute. The most perfect single microscopes ever executed, of solid substances, are those made of the gems, such as garnet, ruby, diamond, &c. Garnet is the best material, as it has no double refraction, and may be procured perfectly pure and homogenous. When a single microscope is used for opaque objects, the lens is placed within a concave silver speculum, which concentrates parallel or converging rays upon the face of the object next the eye.

When a microscope consists of two or more lenses or specula, one of which forms an enlarged image of objects, while the rest magnify that image, it is called a *compound microscope*. The ingenuity of philosophers and of artists has been nearly exhausted in devising the best forms of object-glasses and of eye-glasses for the compound microscope. — *Dr. Brewster*.

**MICROSCOPIC.** That may be seen only by the aid of a microscope.

**MICA'EMITE.** A mineral, thus named from having been found at Miemo, in Tuscany. A green variety of Dolomite, occurring in

crystals, and in masses with a radiated structure.

**MILLEPEDE.** } (*millepeda*, Lat. from *mille*,  
**MILLIPEDE.** } a thousand, and *pes*, a  
foot.) Insects whose body is generally  
cylindrical; segments half membrana-  
ceous and half crustaceous, each half  
bearing a pair of legs; antennæ seven-  
jointed, filiform, often a little thicker  
towards the end. These are called *milli-  
pèdes*. The *millipedes* belong to the  
necrophagous tribe, or those which de-  
vour dead animals, or any other pu-  
rescent substances.—*Rev. W. Kirby.*

**MILLEPORE.** (from *mille*, a thousand, and  
*porus*, a pore.) A genus of lithophytes  
of various forms, having the surface per-  
forated with numerous small pores or  
holes. In *millepores* the cells are more  
minute and closer than in *madrepores*,  
and do not exhibit any star-like radia-  
tions.

**MILLEPORITE.** A fossil millepore.

**MILLIOLA.** } A genus of microscopic mul-  
**MILLIOLA.** } tilocular univalves, not larger  
than a millet seed, with transverse cham-  
bers, involving the axis alternately, and  
in three directions; the opening small  
and circular, or oblong, at the base of the  
last chamber. Several species are found  
to exist on our shores, and many recent  
specimens have been obtained, on fucus,  
near the island of Corsica.

**MILLIOLITE.** } The fossil *Miliola*. So nu-  
**MILLIOLITE.** } merous are these minute  
fossils in the neighbourhood of Paris,  
that some species of them form the prin-  
cipal part of the masses of stone in some  
of the quarries. The remains of such  
minute animals as the *milliola*, have  
added much more to the mass of ma-  
terials forming the earth's crust than the  
bones of the mammoths, whales, and  
hippopotami.

**MILLSTONE.** Called also *Burrstone*. The  
Quartz agathe molaire of Haüy; *Silex  
meulière* of Brongniart. The exterior  
aspect of this mineral is somewhat pecu-  
liar, being full of pores and cavities,  
which give it a corroded and cellular  
appearance. It occurs in amorphous  
masses, above the marine sand and sand-  
stone. Sometimes the mass is compara-  
tively compact, and the cavities small  
and not numerous; but in all specimens  
these cavities or cells are to be found.  
*Millstone* is of a white or greyish colour;  
sometimes with a tinge of blue or yellow;  
when unmixed it is pure *silex*. It con-  
tains no organic remains, and in the  
order of superposition of the formations  
in the neighbourhood of Paris, it consti-  
tutes the ninth horizontal bed, counting  
from the chalk upwards. In is of great  
use for making into millstones, from

which circumstance it has obtained its  
name.

**MILLSTONE GRIT.** The name given to a  
siliceous conglomerate, composed of the  
detritus of primary rocks. It has been  
thus named from some of the strata hav-  
ing been worked for millstones. It con-  
stitutes one of the members of the car-  
boniferous, or mountain limestone group.  
The millstone grit forms a bed of con-  
siderable thickness in some situations,  
amounting to three or four hundred feet;  
in others it is of very limited extent;  
and sometimes it is wholly wanting.

**MINERAL ADIPOCÏRE.** A fatty bitumi-  
nous substance occurring in the argilla-  
ceous iron ore of Merthyr, in Wales. It  
is insoluble in water, and fuses at a tem-  
perature of 160°. When cold it is in-  
odorous, but on being heated gives out a  
bituminous odour.

**MINERAL CAOUTCHOUC.** A variety of bi-  
tumen, intermediate between the harder  
and softer kinds. It sometimes much  
resembles India rubber in its softness  
and elasticity, from whence it derives its  
name, and like that removes the traces of  
the pencil, but, at the same time, it soils  
slightly the paper. Colour brown, red-  
dish-brown, or hyacinth-red. Specific  
gravity from 0.90 to 1.23. It burns with  
a bright flame, emitting during its com-  
bustion, a bituminous odour. It occurs  
near Castleton, in Derbyshire.

**MINERAL CHARCOAL.** A fibrous variety  
of non-bituminous mineral coal.

**MINERAL WATERS.** Waters impregnated  
with mineral substances.

**MINERALIZATION.** The process of con-  
verting into a mineral some body not  
previously such.

**MINERALIZE.** To convert into a mineral.

**MINERALIZER.** That which converts a  
substance into a mineral. Metals are  
combined with oxygen, sulphur, &c. by  
which their peculiar metallic properties  
are more or less disguised; in this case  
the metal is said to be *mineralized*, and  
the oxygen or sulphur is termed the *mi-  
neralizer*.

**MINERALS.** (*minérale*, Lat. *mineral*, Fr.  
*minerale*, It.) Those bodies which are  
*destitute of organization*, and which *na-  
turally* exist within the earth or at its  
surface. The term *fossil* is usually ap-  
propriated to those *organic* substances  
which have become penetrated by earthy  
or metallic particles.

Minerals have been divided into two  
kinds; simple, or homogeneous, and com-  
pound, or heterogeneous. Simple minerals  
appear uniform and homogeneous in all  
their parts. They do, in fact, usually con-  
tain several different elementary systems;  
but these are so intimately combined, and

similarly blended, in every part, as to exhibit a uniformity of appearance.

Compound minerals more or less evidently discover to the eye, that they are composed of two or more simple minerals, which either merely adhere to each other, or, as is sometimes the case, appear imbedded one in the other. Compound minerals are frequently aggregates or rocks.

The description of minerals, and their arrangement in systematic order, must result from an investigation of their properties. These properties consist in certain relations which minerals bear to our senses, or to other objects. Some of them are discoverable by mere inspection, or, at most, require some simple experiment to be made upon the mineral to ascertain its hardness, structure, gravity, &c. while others cannot be observed without a decomposition of the mineral. All these properties are usually called characters. We hence have a twofold division of the properties or characters of minerals into chemical and physical.—*Cleveland.*

**MINERALOGY.** That science, says *Cleveland*, which has for its object a knowledge of the properties and relations of minerals, and enables us to distinguish, arrange, and describe them.

*Jameson* defines mineralogy to be that part of natural history which makes us acquainted with all the properties and relations of minerals. It is divided, according to that professor, into two grand branches, namely, mineralogy properly so called, and geology. Mineralogy treats of the properties and relations of *simple minerals*; while geology considers the various properties and relations of the atmosphere, the waters of the globe, the mountain rocks, or those mineral masses of which the earth is principally composed, and the form, density, heat, electricity, and magnetism of the earth.

The history of the materials of the crust of the globe, their properties as objects of philosophical enquiry, and their application to the useful arts and the embellishments of life, with the characters by which they can be certainly distinguished one from another, form the object of mineralogy, taken in its most extended sense.

There is no branch of science which presents so many points of contact with other departments of physical research, and serves as a connecting link between so many distant points of philosophical speculation as this. Nor, with the exception of chemistry, is there any which has undergone more revolutions, or been exhibited in a greater variety of forms. To the ancients it could scarcely be said

to be known at all, and up to a comparatively recent period, nothing could be more imperfect than its descriptions, or more inartificial or unnatural than its classification. It was only, however, when chemical analysis had acquired a certain degree of precision and universal applicability, that the importance of *mineralogy* as a science began to be recognized, and the connection between a stone and its ingredient constituents brought into distinct notice. The arrangement of simple minerals has always been a subject of controversy with mineralogists; and the discussions to which it has given rise have materially contributed to the advancement of our knowledge of the natural and chemical history of minerals. *Berzelius* contends for the chemical arrangement, according to which the species are grouped in conformity with their chemical composition and characters. *Werner* rejects the pure chemical, and adopts the mixed method, in which the species are arranged and determined according to the conjoined external and chemical characters. The writers of the *Wernerian* school usually divide mineralogy into the five following branches; namely, *oryctognosy*, *chemical mineralogy*, *geognosy*, *geographical mineralogy*, and *economical mineralogy*. Of late years, the arrangement according to external characters alone (named the natural history system) has been advocated by *Mohs*. Among the external characters of a stone, none were, however, found to possess that eminent distinctness which the crystalline form offers; a character in the highest degree geometrical, and affording the strongest evidence of its necessary connection with the intimate constitution of the substance. The full importance of this character was, however, not felt until its connection with the texture or cleavage of a mineral was pointed out, and even then it required numerous and striking instances of the critical discernment of *Haüy*, and other eminent mineralogists in predicting from the measurements of the angles of crystals which had been confounded together, that differences would be found to exist in their chemical composition, all which proved fully justified in their result before the essential value of this character was acknowledged. A simple and elegant invention of *Dr. Wollaston*, the reflecting goniometer, gave a fresh impulse to that view of mineralogy which makes the crystalline form the essential or leading character, by putting it in the power of every one, by the examination of even the smallest portion of a broken crystal, to ascertain

the character on which the identity of a mineral in the system of Haiiy was made to depend. Mineralogy, however, as a branch of natural history, remains still distinct from either optics or crystallography. But whatever progress may have hitherto been made in mineralogical pursuits, every new advance has opened a wider and more interesting prospect. The science is still in its infancy, and in many of its paths can proceed only with a faltering and uncertain step.—*Herschell. Jameson. Cleaveland.*

**MINIUM.** (*minium*, Lat.) A red oxide of lead. Minium is of a bright scarlet; it occurs in a loose state, or in masses, composed of flakes with a crystalline texture. It is found in the lead mines of Westphalia. It is used in glass-making, enamelling, and some other arts.

**MIOCENE.** (from *μείων*, less, and *καινός*, recent, Gr.) The name given by Mr. Lyell to a subdivision of the tertiary strata. He says, the European tertiary strata may be referred to four successive periods, each characterized by containing a very different proportion of fossil shells of *recent* species. These four periods he names, Newer Pliocene, Older Pliocene, Miocene, and Eocene. The *Miocene* period has been found to yield eighteen per cent. of *recent* fossils. This was the result of an examination of 1021 fossil species by M. Deshayes. Many shells belong exclusively to the Miocene period. The Miocene strata are largely developed in Touraine, and in the South of France near Bourdeaux, in the basin of Vienna, and other localities. The miocene strata contain an admixture of the extinct genera of lacustrine mammalia of the Eocene series, with the earliest forms of genera which exist at the present time.

**MITRA.** A genus of shells belonging to the Columellaria in Lamarck's arrangement. It is a subfusiform univalve, with a long pointed turreted apex, a notched base, and no canal. Covered with an epidermis of a light brown colour. The columella is plicated; the inferior plicæ being the smallest. Mitres are found both fossil and recent. The recent are found at depths varying to seventeen fathoms, on reefs, in sands, and in sandy mud. Of the fossil mitres, Lamarck describes thirteen species as having been found in the neighbourhood of Paris.

**MOCHA STONE.** (from *Mocha*, in Arabia.) The quartz agathe arborisé of Haiiy. Called also dendritic agate. A mineral, containing in its interior very beautiful delineations of leafless shrubs, trees, &c., of a brown or dark colour. Mocha stones resemble those agates which are found on the Sussex coast called *dendrachatés*.

**MODIOLA.** (from *modiolus*, Lat. a little measure.) A genus of shells belonging to the family Mytilacea. A transverse inequilateral bivalve. Parkinson states that modiolæ do not attach themselves by a byssus, but this is incorrect. The modiola is a littoral shell, moored to rocks, stones, and shells. One species, *modiola discors*, floats free, enveloped in its own silky byssus. One modiola lives in the ascidiæ, and another floats among the Gulf or Sargasso weed. The fossil species have been found in the neighbourhood of Paris, and some in this country.

**MOLAR** (from *mola*, a mill, Lat. *molaire*, Fr.) A grinder-tooth. The large double teeth are called molar teeth, or grinders; these are, however, subdivided according to their different forms; thus those with two fangs are called bicuspid, or false molar teeth. The posterior molar teeth are differently shaped in carnivorous animals, for they are raised into sharp, and often serrated, edges, having many of the properties of cutting teeth. In insectivorous and frugivorous animals, their surface presents prominent tubercles, either pointed or round, for pounding the food; while in graminivorous quadrupeds they are flat and rough, for the purpose simply of grinding.

**MOLA'SSE.** (from *mollis*, soft, Lat.) The name given to a soft green sandstone found in Switzerland; one of the most recent of the tertiary deposits.—*Lyell.*

In the *Molasse* of Switzerland there are many deposits affording sometimes coal of considerable purity.—*Prof. Buckland.*

Mr. Bakewell observes, "By many geologists it is maintained that the beds of soft sandstone, called *molasse*, belong to the London clay division of the tertiary formations. That some of these beds may be tertiary, I do not deny; but I am fully convinced, that many beds called *molasse*, in Savoy, are covered by the Jura limestone and oolites, having repeatedly seen them in contact, and got specimens from each bed at the line of junction."

**MOLECULE.** (*molécule*, Fr. *petite partie d'un corps*.) A minute particle of a mass or body, differing from atom, inasmuch as it is always a portion of some aggregate. All substances consist of an assemblage of material particles, which are far too small to be visible by any means human ingenuity has yet been able to devise, and which are much beyond the limits of our perceptions. The size of the ultimate particles of matter must be small in the extreme. Organised beings, possessing life and all its functions, have been discovered so small that a million of them

would occupy less space than a grain of sand. The ingredients of granite, and of all other kinds of crystalline rocks, are composed of *molecules* which are invisibly minute, and each of these *molecules* is made up of still smaller and more minute *molecules*, every one of them combined in fixed and definite proportions, and affording, at all the successive stages of their analysis, presumptive proof that they possess determinate geometrical figures.

**MOLLUSCA.** (*mollusca*, a nut with a soft shell, Lat.) According to the arrangement of Cuvier, the second great division of the animal kingdom. This he subdivided into six classes, namely, Cephalopoda, Pteropoda, Gasteropoda, Acephala, Brachiopoda, and Cirrhopoda. A vast multitude of species, possessing in common many remarkable physiological characters, are comprehended in this great division. In all, as their name imports, the body is of soft consistence; and it is enclosed, more or less completely, in a muscular envelope, called the mantle, composed of a layer of contractile fibres, which are interwoven with the soft and elastic integument. Openings are left in this mantle for the admission of the external fluid to the mouth and to the respiratory organs, and also protrusion of the head and the foot, when these organs exist. But a larger proportion of this class are *acephalous*, that is, destitute of a head, and the mantle is then often elongated to form tubes, occasionally of considerable length, for the purpose of conducting water into the interior of the body.

The general form of the body, and the kind of motions it performs, vary more in the molluscous than in the articulated classes of animals, and we observe a corresponding diversity in their active organs of motion. In the molluscous classes there appear much greater variety, diversity, and want of symmetry in the whole muscular system. Many of the lower mollusca are fixed by long peduncles at the bottom of the sea; some, as the limaces, creep on the surface of the dry land; the pteropods swim at the surface of the ocean, where the janthinæ hang suspended by floats; the naked cephalopods bound from the surface, and the pholades are fixed deep in cavities of rocks at the bottom; the oyster is fixed to the rock, while the clam skips to and fro by the flapping of its shells; the pinna is anchored to the bottom by its strong byssus, while the cardium swims along the still surface, suspended by its concave expanded foot. So that although none of these animals have wings to fly through the air, or jointed legs to creep

upon the earth, or spines to oar them through the sea, they possess the means of almost every kind of motion, from the vibratile cilia of the fixed corals to the hands and feet of the finny tribe.

The circulation of the mollusca is always double; that is, their pulmonary circulation describes a separate and distinct circle. Their alimentary canal hardly ever passes straight through their body: nor is the anus terminal, as in most of the articulata. Their digestive cavities are more numerous and capacious, the intestine is more lengthened and convoluted, and all the assistant glandular organs are developed on a higher plan, and more constant throughout the classes. The lowest of the molluscous classes, the tunicated animals, shut up in the interior of a cartilaginous, more or less elastic, and biforate tunic, have no prehensile or masticating organs connected with their mouth. The mouth, in fact, is placed at the bottom of the respiratory sac, and appears to be destitute even of those tentacula, appendices, or lips, which are so much developed, and so various in their forms, in the conchiferous animals.

Many of the mollusca are formed for an existence as completely stationary as the zoophytes attached to a fixed base. This permanent attachment does not, however, take place till they have arrived at a certain period of their growth.

The mollusca are the only instance of a *unipede* structure in creation, but this one foot answers every purpose of a hand or leg; it spins for the bivalves their byssus, is used by others as a trowel, by others as an augur, and by others for other manipulations, and is generally their sole organ of locomotion; from its soft and flexible substance it can adapt itself to the surfaces on which it moves, and by the slime that it copiously secretes lubricates them to facilitate its progress. It is probable that the foot may be also employed by these animals as an organ of touch. In the nervous system of mollusca, the ganglia have a circular arrangement.—Cuvier. Grant. Kirby. Roget.

**MOLLUSCOUS.** Animals belonging to the division mollusca, or soft, invertebral, inarticulate animals; often protected by a shell. The external skeleton of the molluscous animals is consolidated by carbonate of lime, without the phosphate of lime which is common to the other great divisions of the animal kingdom. This earthy matter is secreted from the skin in successive layers, mixed with a glutinous coagulable animal matter, which gives firmness and tenacity to the whole mass, and the skeletons are not exuviable as in the articulated classes.

**MOLYBDATE OF LEAD.** The plumb molybdaté of Haüy ; pyramidaler blaibaryt of Mohs. Yellow lead ore. It is of a yellow colour, varying from lemon yellow to yellowish brown. Occurs crystallized and massive. Its specific gravity from 6.5 to 6.9. Fracture uneven, or imperfectly conchoidal. Slightly translucent, especially at the edges. Before the blow-pipe it decrepitates, and fuses into a dark coloured mass. It consists of oxide of lead 58, molybdic acid 38, oxide of iron 2. It is found at Bleyberg, in Carinthia, and in Mexico, in compact limestone. It is sometimes associated with sulphuret of molybdena.

**MOLYBDE'NA.** A mineral of a lead-grey colour, occurring in thin flexible leaves.

**MOLYBDE'NUM.** (from *μολύβδαινα*, Gr.) This metal was discovered by Hielm in 1782. Molybdenum is externally of a whitish yellow colour, but its fracture is a whitish grey. Its specific gravity about 8.6. It is nearly infusible. It has not been applied to any use. It is obtained from the mineral molybdena in small grains, agglutinated together in brittle masses.

**MO'NAD.** (from *μονάς*, Gr. an atom, *monade*, Fr.) The recent observations of Professor Ehrenberg have brought to light the existence of *monads*, which are not larger than the 24,000th of an inch, and which are so thickly crowded in the fluid as to leave intervals not greater than their own diameter. Hence he has made the computation that each cubic line, which is nearly the bulk of a single drop, contains 500,000,000 of these monads ; a number which equals that of all the human beings on the surface of the globe in one drop of fluid. *Monads*, which are the smallest of all visible animalcules, have been spoken of as constituting "the ultimate term of animality."

**MO'NAS.** A genus of animalcules, the smallest visible.

**MONA'NDRIA.** (from *μόνος*, one, and *άνήρ*, a man, Gr.) The first class of plants in Linnæus's artificial system. The plants of this class have only one stamen ; it is a small class, and contains only two orders.

**MONA'NDRIAN.** Belonging to the class Monandria ; having only one stamen.

**MONI'LIFORM.** (from *monile*, a necklace, and *forma*, form, Lat.) Resembling a necklace.

**MO'NITOR.** (*monitor*, an admonisher, Lat.) A genus of lizards or saurians, species of which are found both fossil and recent ; the recent inhabit the tropics. Cuvier places this genus in the family Lacertinida. The monitors frequent marshes and the banks of rivers in hot climates ;

they have received their name from a common but silly notion that they give warning of the approach of crocodiles and caymans by a whistling noise. One species, the *Lacerta nilotica*, devours the eggs of crocodiles. Fossil remains of the monitor have been discovered in the strata of Tilgate Forest, in Sussex.

**MONO'CEROS.** (from *μόνος*, one, and *κέρας*, a horn, Gr.) A name given to the unicorn.

**MONOCOTYLE'DON.** (from *μόνος*, one, and *κοτυληδών*, a seed lobe, Gr.) A plant which has only one cotyledon or seed-lobe.

**MONOCOTYLE'DONOUS.** Those plants, the seeds of which have either only one cotyledon, or if more, those alternate on the embryo, are called monocotyledonous ; grasses, lilies, aloes, and palms, are examples. Monocotyledonous plants may be at all times recognised, from the circumstance of the veins of their leaves being parallel, while those of dicotyledonous plants are reticulated.

**MONO'ECIA.** (from *μόνος*, one, and *οικία*, a house, Gr.) The twenty-first class of plants in the artificial system of Linnæus. In this class the stamina and pistils are in separate flowers, but growing on the same individual plant. The orders in this class depend upon the circumstances of their male flowers, and are nine or ten in number.

**MONO'ECIOUS.** Plants belonging to the class Monœcia, or such as have male flowers, or flowers with stamens, only, and female flowers, or flowers with an ovary, only, on the same individual plant.

**MO'NODON.** (from *μονόδους*, Gr. having one tooth.) The sea unicorn, or narwhal, distinguished by its long tusk, or tusks, for there are sometimes two, extended in a horizontal direction. Only one species is known, namely, the *Monodon monoceros*. The monodon belongs to the order Cetacea, class Mammalia.

**MONOPE'TALOUS.** (from *μόνος*, one, and *πέταλον*, a petal, Gr.) Flowers are so called which consist of only one leaf or petal ; or when the leaves which compose the corolla are united by their edges ; the convolvulus, honeysuckle, &c. are examples.

**MONOPHY'LLOUS.** (from *μόνος*, sole, and *φύλλον*, a leaf, Gr.) Having one leaf only, or formed of one leaf ; applied to calices consisting of not more than one leaf.

**MONOSE'PALOUS.** (from *μόνος*, sole, and *sepal*, a word without any derivation, but invented by botanists to distinguish the parts of the calyx from those of the corolla.) A term applied to the calyx of a flower, when the sepals which compose it are united by their edges : the pink, convolvulus, henbane, &c. are examples.

**MONOTHA'LAMOUS.** (from *μόνος*, single, and *θάλαμος*, a chamber, Gr.) Shells whose chamber is undivided by partitions; these are termed unilocular, or monothalamous: the argonaut is an example.

**MONOTREME.** The *Monotremes* form Cuvier's third tribe of Edentata, comprising two genera, namely, *Echidna* and *Ornithorhynchus*. They are found only in New Holland. The *Monotremes* seem connected with the birds; one genus, the ornithorhynchus, having a mouth resembling the bill of a duck, and being almost web-footed; it has also been stated to be oviparous. The *Monotremes* have no marsupial pouch. They suckle their young from a mammary orifice.

**MONOTRE'MATOUS.** Belonging to the tribe *Monotremata*.

**MOONSTONE.** A variety of felspar, called also *adularia*, possessing a silvery or pearly opalescence. Moonstone is transparent and translucent. Its colour is white, with sometimes a tinge of yellow, green, or red. When held in certain positions, its surface is iridescent. It occurs massive, and in crystals. It is found in the fissures and cavities of granite, gneiss, &c.

**MORA'INE.** An accumulation of sand, stones, or debris, found upon icebergs, glaciers, &c.

**MOR'DANT.** (from *mordeo*, to bite, Lat. *mordant*, Fr.) A substance, employed in the process of dying, which has an affinity both for the colouring matter and the material to be dyed. It is also termed a basis. Sulphate of iron and acetate of alumina are commonly employed as *mordants*.

**MORO'XITE.** A sub-species of apatite, occurring in crystals, of a brownish or greenish-blue colour. It is found in Norway, in primary rocks.

**MOSASAU'RUS.** } "The Mosasaurus," says

**MOSĒSAU'RUS.** } Prof. Buckland, "has

**MOSOSAU'RUS.** } been long known by the name of the Great Animal of Maestricht, occurring near that city, in the calcareous freestone, which forms the most recent deposit of the cretaceous formation. A nearly perfect head of this animal was discovered in 1780, and is now in the museum at Paris. This celebrated head, during many years, puzzled the most skillful naturalists; some considered it to be that of a whale, others of a crocodile; but its true place, in the animal kingdom, was first suggested by Adrian Camper, and, at length, confirmed by Cuvier. By their investigations, it is proved to have been a gigantic marine reptile, most nearly allied to the monitor. Some vertebræ of the mososaurus have been discovered in the upper chalk near Lewes, in Sussex:

these have the body convex posteriorly, and concave anteriorly. Teeth of the mososaurus have been discovered, by Dr. Morton, in the green-sand of Virginia. Portions of jaws, with teeth of the mososaurus, may be seen in the British Museum. Dr. Mantell observes, "The mososaurus was a reptile, holding an intermediate place between the monitor and iguana, about twenty-five feet long, and furnished with a tail of such construction as must have rendered it a powerful oar, enabling the animal to stem the waves of the ocean, of which Cuvier supposes it to have been an inhabitant."

"From the lias upwards," says Dr. Buckland, "to the commencement of the chalk formation, the ichthyosauri and plesiosauri were the tyrants of the ocean; and just at the point of time when their existence terminated, during the deposition of the chalk, the new genus mososaurus appears to have been introduced, to supply for a while their place and office, being itself destined, in its turn, to give place to the cetacea of the tertiary periods."

**MOU'NTAIN CORK.** The Berg kork of Werner; *Suber montanum* of Kirwan; *Asbeste suberiforme* of Brongniart. A white or grey variety of asbestos, to which the name of mountain cork has been given from its extreme lightness, its specific gravity being from 0.68 to 0.99, consequently so light as to swim in water. Its structure is fibrous; the fibres promiscuous and interwoven. Its constituents are silex 56.2, magnesia 26.1, lime 12.7, iron 3.0, alumine 2.0. It occurs in France and Saxony.

**MOU'NTAIN BLUE.** A species of blue malachite or blue copper. The *Cuivre carbonaté bleu* of Haüy; *Kupfer lazur* of Werner. Carbonate of copper. The characteristic colour of mountain blue is azure-blue, often exceedingly beautiful and splendid. Occurs regularly crystallized in scopiform and stellar concretions, radiated, and also curved lamellar. When rubbed on paper it leaves a light blue streak. Specific gravity from 3.20 to 3.60. It dissolves with effervescence in nitric acid. It is scarcely fusible alone, but with borax, to which it communicates a fine green, it yields a globule of copper. Its constituents are copper 66.0, carbonic acid 18.0, oxygen 8.0, water 2.0.

**MOU'NTAIN LIMESTONE.** A series of marine limestone strata, whose geological position is immediately below the coal measures and above the old red-sandstone. To this formation the French have given the name of *Calcaire de transition*. Mountain limestone is one of the most important calcareous rocks in England and

Wales, both from its extent, the thickness and number of its beds, the quantity and variety of its organic remains, and its richness in metallic ores, particularly of lead. In Derbyshire, where the different beds of limestone have been pierced through by the miners, the average thickness of the three uppermost is about 160 yards; the beds are separated by beds of trap or basalt, resembling ancient lavas. The limestone is generally sufficiently hard to bear a polish, and forms what is denominated marble, of considerable beauty. The mountain limestone formation occupies an immense tract in Northumberland, Durham, and Yorkshire, from which country it runs out in a curve to encircle on the north, and partially on the south, the group of Cumbrian slate mountains. It also appears in great force in Derbyshire, ranges through Flint and Denbigh, to St. Orme's head and Anglesea; shows slightly round the Cleve hills in Shropshire; and presents picturesque cliffs on the Wye, near Monmouth. The prevailing characteristic organic fossils are madrepores and encrinites; of the latter some of the upper beds appear to be almost entirely composed. Mountain limestone is generally almost a pure carbonate of lime, but sometimes it contains a considerable proportion of magnesia.

**MOUNTAIN SOAP.** A mineral, a variety of green earth, of a brown or blackish-brown colour. It is massive, dull, smooth and soapy to the touch, and adheres strongly to the tongue. It writes on paper. Its constituents are siliceous 44·0, alumine 26·2, oxide of iron 8·0, lime 0·5, water 20·10. It occurs in secondary rocks of the trap formation, in the Isle of Skye and in Poland.

**MUCRONATE.** (*mucronatus*, Lat. pointed.)

1. In entomology, when from an obtuse end a fine point suddenly proceeds.
2. In botany, when a small point terminates an entire leaf, as in the vetch, house-leek, &c.
3. In conchology, when a shell terminates in a sharp rigid point.

**MUYA.** The name given by the natives of South America to the mud and slime ejected from volcanos during the eruptions.

**MULTISPIRAL.** (from *multus*, many, and *spira*, a spire, Lat.) In conchology, a term for a shell whose spire consists of many whorls; also to an operculum of many volutions.

**MULTILO'CLAR.** (from *multus*, many, and *loculus*, a chamber or shell, Lat.) A term applied to shells containing partitions, which divide them into several chambers. Orthoceratites, baculites, hamites, scaphites, belemnites, &c., are all

*multilocular* shells; the argonaut, or paper nautilus, is a *unilocular* shell.

**MULTIVALVE.** (from *multus*, many, and *valva*, valves, Lat.) Some of the mollusca have, in addition to the two principal valves, small supplementary pieces of shell; these have been comprised in the order of *multivalves*.

**MURCHISONITE.** A new mineral, thus named in honour of Mr. Murchison. Its constituents are silica 68·10, alumina 16·6, potash 14·8. It occurs near Dawlish.

**MUREX.** (*murex*, Lat. *murex*, Fr.) A genus of shells. Animal a limax: shell univalve, spiral, rough, with membranaceous sutures; aperture oval, ending in an entire straight, or slightly ascending canal. The murex is an inhabitant of the ocean, found at depths varying from five to twenty-five fathoms, on different bottoms. These shells, besides their long channelled beaks, are remarkable for the beauty and variety of their spines. Murices, or rock-shells, were in high esteem from the earliest ages, on account of the dye that some of them yielded; cloths died with it bearing a higher price than others. More than one species yielded a dye; one, according to Bochart, a glaucous or azure colour; the other, a purple. Different species of fossil *murex* are found in the London clay and in Bognor sandstone, and Lamarck describes upwards of seventeen species found in the neighbourhood of Paris.

**MURICATED.** (*muricatus*, Lat. full of sharp points and prickles.) Clothed with sharp rigid points; beset with short erect spines.

**MURICITE.** The fossil murex.

**MUSA'CEA.** A family of tropical monocotyledonous plants, including the banana and plantains.—*Lyell, Principles of Geology*.

**MUSCHEL KALK.** (from *muschel*, shell, and *kalk*, lime or chalk, Germ.) A compact hard limestone, of a greyish colour, found in Germany. It belongs to the red sandstone group. The muschel kalk has not yet been discovered in England, but the upper part of the mountain limestone of the north of England is in some respects similar in mineral properties. In Bavaria and Wurtemberg the muschel kalk is interposed between the red sandstone, on which it rests, and the variegated marls which lie over it, and with which, at the junction, it alternates. The muschel kalk abounds in organic remains; its chief fossils are the lily encrinite, ammonite, and terebratula. Remains of ichthyosauri, plesiosauri, crocodiles, and turtles, are also found in it. The salt mines of Wurtemberg are also in this formation.

**MU'SCLE-BIND.** The name given to a stratum of imperfect ironstone and indurated shell, found in the Derbyshire and Yorkshire coal fields. The shells resemble fresh-water muscles, and they are most abundant.

**MU'SITE.** } A mineral, thus named from  
**MU'SSITE.** } Mussa, in Piedmont, where it occurs. It is a white, or pale green, variety of augite.

**MY'A.** (from *μῦον*, a muscle, Gr.) A genus of bivalves belonging to the family Myaria. Animal an ascidia. Shell transverse, oval, thick, gaping at both ends; ligament internal. Hinge with broad, thick, strong, patulous tooth, seldom more than one, perpendicular to the valve, and giving attachment to the ligaments. The *Mya* is found on beaches, in which it often lies buried, with its tube just projecting. It is found in the sea and in rivers; principally in the silt of estuaries. It belongs to the northern hemisphere. Whether any shells of this genus have been found fossil appears problematical. Lamarck states that he has not met with any; Parkinson mentions that a shell resembling *Mya* is found in the cliffs at Bognor, but that he is not able to speak decidedly with respect to it; and Dr. Mantell places it among the fossils of the Shanklin sand, but with a note of interrogation.

**MY'LIQVATES.** A genus of fossil Rays. They are abundant in the London clay and in the crag.

**MYRIA'METER.** (from *μῦρια*, ten thousand, and *μέτρον*, measure, Gr.) A French measure, the length of ten thousand meters, equivalent to two mean leagues of the old measure. Brongniart has expressed, in strong terms, his impression on the subject of the disturbance of the strata composing the earth's crust, by saying that there is hardly a square *myriameter* which is left in its original position.

**MYRIA'PODA.** } (from *μῦρια*, ten thousand,

**MY'RIAPODS.** } and *ποδός*, *ποδός*, a foot, Gr.) A class of insects, commonly called Centipedes, possessing a number of feet, from six to some hundreds. The Myriapoda, in general, resemble little serpents, or Nereides, their feet being closely approximated to each other throughout the whole extent of the body. Myriapods exhibit the following general characters. Animal undergoing a metamorphosis by

acquiring in its progress from the egg to the adult state several additional segments and legs. Body without wings, divided into numerous pedigerous segments, with no distinction of trunk and abdomen. Head with a pair of antennæ; two compound eyes; a pair of mandibles; under-lip connate with the maxillæ.

This class is divided into two orders, the Chilognathans and the Chilopodans. The *julus terrestris*, belonging to the first of these two orders, has, at its entrance into the world, only eight segments and six feet; but acquires, in the course of its development, fifty segments and about two hundred feet. The anterior legs are directed obliquely forwards, and the rest more or less backwards. The Myriapoda possess in their internal structure an organization closely allied to the larva of insects.

**MYTILA'CEA.** In Cuvier's arrangement, the second family of the order Acephala Testacea. All belonging to this family are bivalves, having a foot which they use in crawling. Mytilacea comprises, in Lamarck's system, *Modiola*, *Mytilus*, and *Pinna*.

**MY'TILUS.** (*mytilus*, Lat.) A genus of the family Mytilacea. The muscle. A rough, longitudinal, bivalve; with equal, convex, and triangular valves; the anterior, and longest side of the shell, allowing passage of the byssus. The *Mytilus* is a littoral shell, moored to rocks, stones, crustaceans, &c. The foot of the *Mytilus edulis*, or common muscle, can be advanced to the distance of two inches from the shell, and applied to any fixed body within that range. By attaching the point to such body, and retracting the foot, this animal drags its shell towards it; and by repeating the operation successively on other points of the fixed object, continues slowly to advance. Some *Mytili* produce pearls.

Lamarck describes two species of fossil *Mytili*, found at Grignon and Longjumeau. Dr. Woodward mentions several shells of this genus found fossil in different parts of England; and Dr. Mantell states that they are found in the Ashburnham beds; in the lower green sand; and in the diluvium of Sussex. Dr. Mantell also states that shells of this genus were found by himself and Mr. Lyell in a bed of shale.

## N

**NA'CRE.** (*nacre*, Fr. *nâchera*, It.) A sort of mother-of-pearl. The fossil ink-bags of belemnites found in the lias are surrounded by *nacre*.

**NA'CREOUS.** Glistening; silvery; iridescent. Having the appearance of mother-of-pearl. Many membranous shells exhibit a nacreous appearance on their internal surface, as the *Haliotis*, or sea-ear; *Anodon*, or fresh-water muscle, &c.

**NA'CRITE.** (from *nacre*.) A mineral so called in consequence of its pearly lustre. The Talcite of Kirwan. Nacrite occurs in reniform masses, composed of extremely minute spangles, or glittering scales. Colour pearly grey, with a tinge of red or green. It fuses easily before the blow-pipe. When rubbed between the fingers it leaves a pearly gloss. Unctuous to the touch. Its constituents are, silex 56·0, alumine 18·25, potash 8·50, lime 3·10, iron 4·20, water 6·0.

**NA'KED.** (*nackt*, Germ.)

1. In botany, applied to flowers having no calices; to stems without leaves; also to leaves when perfectly smooth, and quite destitute of hairs.

2. In zoology, applied to molluscs, when the body is not defended by a calcareous shell.

**NA'NDU.** An ostrich of America; the Rhea Americana.

**NA'PHTHA.** (*νάφθα*, Gr. *naphtha*, Lat. *naphte*, Fr.) A variety of bitumen, thin, volatile, fluid, and inflammable; unctuous to the touch, and constantly emitting a strong odour. Colours yellowish-white and yellowish-grey; transparent. Specific gravity from 0·70 to 0·85. It is highly combustible, igniting even on the approach of a lighted taper. It burns with a white or bluish flame, yields a dense smoke, and yields no residuum. It is insoluble in alcohol. When long exposed to the air, it becomes yellow and then brown; its consistence is increased, and it passes into petroleum. Naphtha consists of carbon 82·2, hydrogen 14·8. Springs of it exist in many countries, particularly in the neighbourhood of volcanoes. The finest varieties of naphtha are found on the shores of the Caspian. The soil is sandy and marly, and the surrounding minerals are calcareous. The naphtha is constantly rising in the state of an odorous inflammable vapour. Naphtha is burnt in lamps instead of oil.

**NA'RWAL.** } (*narhwal*, *narwall*, Germ. the  
**NA'RWHAL.** } sea unicorns.) The Mo-

nodon monoceros of Linnæus. Placed by Cuvier in the family Cetacea ordinaria, order Cetacea. The tusk of this animal is sometimes ten feet long, and spirally furrowed. Portions of the skull of the narwhal have been found in the Lewes levels, in Sussex.

**NA'RES.** (from *naris*, Lat.) The nostrils.

**NA'SAL.** (from *nasus*, a nose, Lat. *nasal*, Fr. *nasale*, It.) Pertaining to the nose.

**NA'SCENT.** (*nascens*, Lat. from *nascor*, to be born.) Beginning to exist; growing.

**NA'TANT.** (from *nato*, Lat. to swim.) Swimming in the water; floating on the surface of the water.

**NA'TATORY.** (from *natator*, Lat. a swimmer.) Enabling to swim. Certain organs possessed by many animals are *natatory* organs. Several of the cephalopods and pteropods, and other molluscs, have *natatory* appendages.

**NA'TICA.** A genus of nearly globose, umbilicated, univalves, belonging to the family Neritacea. Aperture entire and semicircular; columella transverse, without teeth, and callous externally. These shells, though strongly resembling Neritæ, may be distinguished from those of that genus by their being always umbilicated, and the columella never dentated. The recent *Natica* is found in estuaries and tidal rivers, in mud and sandy mud, at depths varying to forty fathoms.

Several species of fossil *Natica* are found in the London clay; Bognor sandstone; Galt; and in the Shanklin sand.

**NA'TROLITE.** The Natrolith of Werner; Natrolithe of Haüy. Considered by some mineralogists to be a variety of prismatic zeolite. Occurs in small, reniform, rounded, or irregular masses, composed of very minute fibres. The fibres are divergent, or even radiate from a centre, and are sometimes extremely minute and close. Colours yellow, yellowish brown, and brown, with striped-colour delineations. Translucent at the edges. Specific gravity 2·16 to 2·20. Before the blow-pipe it fuses readily into a white glass. In nitric acid it is reduced, without any effervescence, into a thick jelly. It derives its name from containing soda. Its constituents are silex 48·20, alumine 24·50, soda 16·10, oxide of iron 1·75, water 9·0. It occurs principally at Roegau, in Suabia, imbedded in amygdaloid.

**NA'TRON.** (*natron*, Fr.) The Soude carbonatée of Haüy; L'alkali mineral natif of Brochant; the Natron of Kirwan. A

carbonate of soda occurring massive and crystallized, the principal supplies coming from lakes in Egypt and Hungary. Native specimens of Natron are always mixed with other salts. In Egypt, the lakes which yield Natron abundantly are called the lakes of Natron. These are six in number, to the westward of the Nile, not far from Terrana, in a valley, surrounded by limestone.

**NATURAL HISTORY.** This extensive science has for its object the enquiry into the being of natural bodies, and their thorough investigation in reference to their various qualities, and the relative functions of their component parts. Understood in this extent, it presents us with a distinct unique entirety, which treats the natural body as complete, but gradually perfected; and at the same time seeks to discover the means whereby it attained its completion and perfection. Natural history, therefore, is no mere description of form,—no description of nature, as it has been, latterly, very incorrectly considered, but a true and pragmatistical history, developed from its own fundamental principles.—*Burmeister.*

Most unjustly has natural history been accused of favouring merely minute and curious enquiries into the small parts of creation, and of neglecting the larger views and contemplations which delight the man of taste and refined feeling. Whoever reads the works of Pallas, Humboldt, White, Sedgwick, or Lyell, will acknowledge the error of this misrepresentation.

**NAVICULARÆ.** (from *navicula*, dim. of *navis*, Lat.) The name given to one of the bones of the wrist, and of the ankle.

**NAUTILA'CEA.** A family of Polythalamous cephalopods, in the arrangement of Lamarck. This family comprises Discorbites, Nautilus, Nummilites, Polystomella, Siderolites, and Verticalis.

**NAUTILITE.** A fossil nautilus.

**NAUTILUS.** A genus of shells belonging to the family Nautilacea. A spiral, polythalamous, discoidal univalve with smooth sides. The turns contiguous, the outer side covering the inner. The chambers separated by transverse septa, which are concave outwards, and perforated by a tube passing through the disk. Three or four recent species are known. "It is a curious fact," says Prof. Buckland, "that although the shells of the nautilus have been familiar to naturalists, from the days of Aristotle, and abound in every collection, the only authentic account of the animals inhabiting them, is that by Rumphius, in his history of Amboyna." Lately Mr. R. Owen has published a most admirable memoir on this subject.

At the present day the nautilus is an inhabitant of tropical seas, but its fossil remains are found in formations of every age. From Mr. Owen's memoir we learn, that the animals by which all fossil nautili were constructed, belong to the existing family of Cephalopodous molluscs, allied to the common cuttle-fish. The organ of locomotion in the nautilus appears to be a foot, resembling that of the snail. This organ is expansive, and surmounts the head. The oral organs are much more complicated and numerous than those of the cuttle-fish, and are furnished with no suckers. Its tentacles are retractile within four processes, each pierced by twelve canals protruding an equal number of these organs, so that, in all, there are forty-eight. In fact, the whole oral apparatus, except the mandibles and the lip, is formed upon a plan different from that of the cuttle-fish, as likewise from that of the carnivorous trachelipod molluscans, and indicate very different modes of entrapping and catching their prey: being deprived of suckers, they seem destitute of any powerful means of prehension and detention. The eye, also, is reduced to the simplest condition that the organ of vision can assume, without departing altogether from the type of the higher classes, so that it appears not far removed from that of the proper molluscs. The nautilus has only a single heart, the branchial one being absent. The nautilus resides in the capacious cavity of its first, or external, chamber; and it is now well ascertained that this animal is not a piratical parasite, occupying the shell of another animal, which it has murdered, but that it lives, and sails in a skiff of its own building. A siphuncle connects the body of the nautilus with the air chambers, passing through an aperture and short projecting tube in each transverse septum, till it terminates in the smallest chamber at the inner extremity of the shell. These internal chambers contain only air, and have no communication with the outer chamber but by one small aperture in each septum through which the siphuncle passes. No water can by any possibility pass into these chambers, between the exterior of the siphuncle and the siphonic apertures of the transverse plates, because the entire circumference of the mantle in which the siphuncle originates, is firmly attached to the shell by a horny girdle, impenetrable by any fluid. The number of chambers varies greatly, according to the age of the animal. Dr. Hook states that he has found in some shells as many as forty. The ascent and descent of the nautilus by means of its siphuncle is very

ingeniously and beautifully explained by Prof. Buckland. The siphuncle, as appears from Mr. Owen's statement, terminates in a large sac surrounding the heart of the animal; if we suppose this sac to contain a pericardial fluid, the place of which is alternately changed from the pericardium to the siphuncle, we shall find in these organs an hydraulic apparatus for varying the specific gravity of the shell; so that it sinks when the pericardial fluid is forced into the siphuncle, and becomes buoyant, when the same fluid returns to the pericardium. The substance of the siphuncle is a thin and strong membrane, surrounded by a coat of muscular fibres, by which it could contract or expand itself, in the process of admitting or ejecting any fluid to or from its interior. When the arms and body are expanded, the fluid remains in the pericardium, and the siphuncle is empty, and collapsed, and surrounded by the portions of air that are permanently confined within each chamber; in this state the specific gravity of the body and shell together is such as to cause the animal to rise, and be sustained floating at the surface. When, on any alarm, the arms and body are contracted, and withdrawn into the shell, the retraction of these parts, causing pressure on the pericardium, forces its fluid contents into the siphuncle; and as the quantity of matter within the shell is thus increased, without any increase of magnitude, the specific gravity of the entire animal is increased, and it begins to sink. Rumphius states that, at the bottom of the sea, the nautilus creeps with his boat above him.

Fossil remains of the nautilus are found in strata from the mountain limestone upwards. In some of these the siphunculus is beautifully preserved. But while, as a genus, the nautilus occurs in formations of every age, from the transition series upwards, yet certain species appear limited to particular geological formations: thus the nautilus multicarinatus is limited to strata of the transition formation; the nautilus bidorsatus, to the muschelkalk; the nautilus obesus, and nautilus lineatus, to the oolite; the nautilus elegans, and nautilus undulatus, to the chalk formation. The eocene, miocene, and pliocene has each its particular nautili.—*Buckland. Kirby. Owen. Parkinson. Sowerby.*

**NAUTILUS SYPHO.** The name given to a very beautiful, camerated, siphuncled fossil shell found in the tertiary strata at Dax, near Bourdeaux. This fossil presents deviations from the usual characters of the nautilus, whereby it approximates to the ammonite.

**NAUTILUS ZIC ZAC.** A fossil, camerated, siphuncled shell, found in the London clay. This and the nautilus sypho appear to form connecting links between the genera Nautilus and Ammonite.

**NEBULA.** (*nebula*, Lat.) A cloud; a cluster of stars. It is to Sir Wm. Herschel that we owe the most complete analysis of the great variety of those objects which are generally classed under the common head of Nebulæ, but which have been separated by him into,—1st, clusters of stars, in which the stars are clearly distinguishable; and these, again, into globular and irregular clusters; 2nd, resolvable nebulæ, or such as excite a suspicion that they consist of stars, and which any increase of the optical power of the telescope may be expected to resolve into distinct stars; 3d, nebulæ, properly so called, in which there is no appearance whatever of stars; which, again, have been subdivided into subordinate classes, according to their brightness and size; 4th, planetary nebulæ; 5th, stellar nebulæ; and, 6th, nebulous stars. Not fewer than 2000 nebulæ, and clusters of stars, were observed by Sir Wm. Herschel, whose places have been computed from his observations, reduced to a common epoch, and arranged into a catalogue, in order of right ascension. In a paper read before the Royal Society, Sir John Herschel gives the places of 2,500 nebulæ and clusters of stars; of these 500 are new. Nebulæ have great variety of forms. The distribution of the nebulæ over the heavens is even more irregular than that of the stars. In some places they are so crowded together as scarcely to allow one to pass through the field of the telescope before another appears, while in other parts, hours elapse without a single nebula appearing.—*Sir J. Herschel. Mrs. Somerville.*

**NEBULAR.** Pertaining to nebulæ.

**NEBULOUS.** Cloudy; hazy.

**NEBULO'SITY.** The state of being cloudy.

**NECROPHAGOUS.** (from νεκρός, dead, and φαγεῖν, to eat, Gr.) Animals which devour dead substances. The unclean animals, with respect to their habits and food, were divided into two classes; namely, *zoophagous* animals, or those which attack and devour living animals; and *necrophagous* animals, or those which devour dead ones, or any other putrescent substances.

**NECROMITE.** (from νεκρός, dead, Gr.) A mineral occurring in small masses in limestone; found near Baltimore. When struck it exhales a fetid odour, resembling that of putrid flesh; from this quality it obtained its name.

**NECTARY.** That part of a flower which

secretes and contains the honey, (an almost universal fluid in flowers) and is either a part of the corolla, or an organ distinct from it, and variously formed, as the monks'-hood, black hellebore, &c.; or it is a tubular elongation of the calyx, or of a petal; or, an assemblage of glands. In monopetalous flowers, the honey is contained in the tube which, probably, secretes it. The secretion of honey is not exclusively confined to the flower; in some of the liliaceous tribe it exudes from the flower-stalk, and in the passion-flower it is secreted by glands situated in the peduncle.

**NEEDLE ORE.** The *Nadelerz* of Werner. Colour steel-grey. Amorphous, or in acicular hexaëdral prisms, which are occasionally invested with a yellowish or greenish crust. Fracture uneven and metallic. Specific gravity 6·8. Constituents, bismuth 43·6, lead 24·50, copper 12·12, sulphur 11·60, nickel 1·58, tellurium 1·32. It occurs in a gold-mine near Schlangenberg, in Siberia.

**NEEDLE STONE.** A variety of zoolite, of a yellowish-white colour, found in Iceland.

**NEMATU'RA.** A genus of shells belonging to the family Turbinacea. Two species are known as recent, and one has been found fossil.

**NE'PHELINE.** (from *νεφέλη*, a cloud, Gr.) The *Sommite* of Jameson; *Nephele* of Werner. A mineral found only in the cavities of lava at Mount Somma, from which circumstance it has been called *Sommite*. Occurs generally in small, regular, six-sided prisms, associated with mica, hornblende, and idocrase. Specific gravity 3·27. Colour greyish-white, or greenish-grey. It is translucent, and sometimes transparent. Before the blow-pipe it fuses, with difficulty, into a transparent glass. Its constituents are silic 46, alumine 49, lime 2, oxide of iron 1.

**NE'PHRITE.** (from *νεφρίτης*, ab *νεφρός*, a kidney, Gr.) A mineral, formerly worn from an absurd notion that diseases of the kidney were relieved by so doing. It is a subspecies of jade, possessing the hardness of quartz, combined with a peculiar tenacity which renders it difficult either to break, cut, or polish. It is unctuous to the touch; fracture splintery and dull; translucent. Colours green, grey, and white. Specific gravity from 2·9 to 3·1. Constituents, silic 53·80, lime 12·75, soda 10·80, potash 8·50, alumine 1·55, oxide of iron 5·0, oxide of manganese 2·0, water 2·30. *Nephrite* is brought from India, China, and Persia; it is found also, in primary rocks, in Germany and Egypt. It is worked into handles for sabres, knives, daggers, &c.

**NEPTU'NIAN.** (from *Neptunus*, the fabled deity of the ocean.) Pertaining to the ocean.

**NEPTU'NIAN THE'ORY.** That theory which attempted to prove that all the formations have been precipitated from water, or from a chaotic fluid.

**NEPTUNISTS.** The supporters of the Neptunian theory; they were opposed by the Vulcanists.

**NERITA'CEA.** A family of Trachelipods, including the genera *Natica*, *Nerita*, *Neritina*, *Navicella*, and *Janthina*.

**NERIT'NA.** A genus of fresh-water univalves, belonging to the family *Neritacea*. Shell thin, semiglobose, obliquely oval, smooth, flattish in front; spire short; aperture semicircular; outer lip thin; columellar lip broad, flat, denticulated. Differs from *Nerita* in the minuteness of the denticulation of the columella.—*Sowerby*.

Dr. Mantell describes a species, found, in the state of casts, in the Tilgate grit, which he has named *Neritina Fittoni*, in honour of Dr. Fitton.

**NERIT'NA.** A genus of marine univalves included in the family *Neritacea*. The *Nerita* is a littoral shell, creeping on rocks and sea-weeds. A semi-globose univalve, depressed beneath, and having no umbilicus; aperture entire and semicircular. The aperture is generally large in comparison with the shell, but it is furnished with an operculum which completely closes it.

Of the fossil species, one, *Nerita Conoidea*, is remarkable, both on account of its form and the magnitude which it sometimes possesses. Parkinson states that he is not acquainted with any shells of this genus among our English fossils; Dr. Mantell mentions one species from the diluvium of Sussex. Lamarck particularizes three species as being found in France.

**NEURO'PTERA.** (from *νεῦρον*, a nerve, and *πτερόν*, a wing, Gr.) Nerve-winged insects. Neuroptera, in Cuvier's arrangement, constitutes the eighth order of Insecta. The Neuroptera have four membranous wings, usually reticulated by numerous nervures, but having no sting, or ovipositor. The Neuroptera are mostly bold, rapacious, and sanguinary; perpetually chasing and devouring other insects. The libellula, or dragon-fly, is a familiar example.

**NEUROPTEROUS.** Belonging to the order of Neuroptera.

**NEW RED SANDSTONE.** A series of brick-red strata lying immediately above the coal measures; sometimes called variegated sandstone, in consequence of the occurrence of spots and stripes of a

greenish-grey colour. It is a conglomerate, its prevailing character being siliceous, but comprising calcareous beds of considerable magnitude and extent. By some, the new red sandstone has been divided into three series; the upper, the middle, and the lower beds. Over a large part of England the new red sandstone rests unconformably upon the carboniferous group, showing that the latter was disturbed, dislocated, and partially removed, before the former was accumulated upon it; there is, however, reason to believe that in other parts of the European area deposits still continued quietly to be thrown down upon undisturbed parts of the carboniferous series, so that no real line of separation can be well established between them. It is almost needless to observe when we contemplate the red sandstone series as a whole, and consider that it is in great measure composed of matter which must have been deposited from water where it was, for the time, mechanically suspended, that great variations should be expected at the same geological levels; here clay or marl being found, there sandstone or conglomerate, while, occasionally, calcareous matter should be dispersed among it, under favourable circumstances, in sufficient abundance to constitute numerous beds of limestone.

A very remarkable discovery was made in 1828 of the foot-marks of some unknown quadruped in strata of new red sandstone, three miles from Lochmaben in Dumfries-shire. They were found forty-five feet under the present surface; the strata are inclined thirty-seven degrees.—*Bakewell. Phillips.*

**NEWER Pliocene PERIOD.** Mr. Lyell refers the European tertiary strata to four successive periods, each characterised by containing a very different proportion of fossil shells of *recent* species. These four periods he termed Newer Pliocene, Older Pliocene, Miocene and Eocene; the etymology of these terms will be fully explained under the several words. The Newer Pliocene period is the latest of the four periods, and immediately precedes the recent era. Nevertheless, the antiquity of some Newer Pliocene strata, as contrasted with our most remote historical eras, must be very great, embracing perhaps *myriads* of years. Out of 226 fossil species brought from the Sicilian beds, M. Deshayes found that no fewer than 216 were of species still living. The newer pliocene formation is developed in Sicily and Tuscany; its character is marine, fresh water, and volcanic.

**NICKEL.** (*nickel*, Germ.) A metal of considerable hardness, nearly equal to

that of iron, of a colour intermediate between silver and platina. When polished, it has a high lustre. Specific gravity 8·93. It is both ductile and malleable, and may be hammered into very thin plates. It is difficult to be purified. In common with iron, it is magnetic, capable of acquiring polarity, and may be formed into permanent magnetic needles; this property is destroyed by an alloy with arsenic. Nickel unites in alloys with gold, copper, tin, and arsenic, which metals it renders brittle. With silver and iron its alloys are ductile.

Nickel was discovered as a distinct metal by Cronstadt, in 1751. Its solution in nitric acid is nearly grass green. Nickel is found in all meteoric stones.

**NIGRINE.** (from *niger*, Lat. black.) A variety of ferruginous oxide of titanium, occurring in grains, or rolled pieces. Colour black, or brownish-black. It consists of titanium 84·0, oxide of iron 14·0, oxide of manganese 2·0.

**NITRATE.** A compound of nitric acid with a salifiable base.

**NITRE.** (*νίτρον*, Gr. *nitrum*, Lat. *nitre*, Fr. *nitro*, It.) Nitrate of potash; saltpetre. The potasse nitratée of Haiiy; natürlicher salpeter, of Werner. Nitre, or nitrate of potash, is found native in all countries, where there are circumstances favourable to its production. It frequently effloresces on the soil; but never exists at a greater depth, than that of a few yards beneath the surface. It occurs, naturally, either in masses, or in thin irregular crystals; it is white, semi-transparent, and brittle; salt and cold in taste. When thrown on hot coals, it burns with a sparkling bright light, and with a crackling noise. It crystallizes in six-sided prisms, terminated by a dihedral summit, and retains no water of crystallization. The crystals are permanent, and soluble in seven parts of water at 60°, and in less than their own weight at 212°. The principal supply of nitre is from India. One of the most remarkable localities of nitre in Europe, is in the Pula, or cavity of Molfetta, in the kingdom of Naples. This cavity, which is about one hundred feet deep, contains several grottos or caverns, in the interior of which is found nitre in crusts, attached to compact limestone. When these crusts are removed, others appear in about a month. The various sources of native nitre not being sufficient to supply the great demand there exists for it, it is manufactured wholesale, in the following manner. Rubbish, consisting of lime, mortar, plaster, and earth, is mixed up in heaps, under sheds, with decaying vegetables and refuse matter, and left to rot; the

masses being occasionally moistened with animal fluids, as urine, blood, &c. The nitrogen, disengaged from the corrupting mass, unites with the oxygen of the atmosphere, and forms nitric acid; this, combining with the potash furnished by the vegetable substances, produces an impure nitre. The salt is collected, and afterwards washed and purified.

**NITROGEN.** (from *νίτρον*, nitre, and *γεννάω*, to produce, Gr.) Called also azote. Nitrogen constitutes about four-fifths, or eighty per cent. of common air; the rest being principally oxygen. In its pure state, nitrogen is remarkable for its negative qualities; that is to say, for the difficulty with which it enters into combination with other matters. Thus, it is neither combustible, nor a supporter of combustion; it is neither acid, nor alkaline; possesses neither taste nor smell; nor does it directly combine with any known substance. Yet when made by peculiar management to unite with oxygen, hydrogen, or carbon, nitrogen forms some of the most energetic compounds we possess; thus, *mixed* with oxygen, it forms atmospheric air; *united* with oxygen, it forms aquafortis, the most corrosive of liquids; *united* with hydrogen, it forms the *volatile alkali*, or ammonia, likewise an energetic compound, but of an opposite nature; while *united* with carbon and hydrogen, it forms *prussic acid*, the most virulent poison in existence.

The existence of *nitrogen* in animal and vegetable life may be considered as secondary, that is, derived from the atmosphere in the first instance. There is also every reason to suppose that it cannot be absent from numerous rocks which contain the organic remains of animals that have been entombed living, or at least with their flesh upon them. We have direct evidence in coal that *nitrogen* forms a portion of what may be considered solid rock. Dr. Thomson found it to constitute 15.96 per cent. of the Newcastle caking coal, and there is good reason for supposing that this is rather an under-estimate of the amount of *nitrogen* contained in some coal, judging from the abundance of ammoniacal products given out during the distillation of coal in gas-works.

The absorption of *nitrogen* during respiration, was one of the results Dr. Priestley had deduced from his experiments; and this fact, though often doubted, appears, on the whole, to be tolerably well ascertained by the inquiries of Davy, Pfaff, and Henderson. With regard to the respiration of cold-blooded animals, it has been satisfactorily established by the researches of Spallanzani,

and more especially by those of Humboldt and Provençal, on fishes, that nitrogen is actually absorbed. A confirmation of this result has been obtained by Macaire and Marcet, who have found that the blood contains a larger proportion of *nitrogen* than the chyle, from which it is formed.

Nitrogen has been recently found, by Dr. Daubeny, to be contained very generally in the waters of mineral springs. The king's bath, at Bath, evolves 96.5 per cent. of nitrogen, 3.5 oxygen, and some carbonic acid. The hot-well at Bristol evolves 92 per cent. nitrogen, and 8 oxygen. The springs at Buxton, Bakewell, and Stony Middleton, Derbyshire, evolve nitrogen only. Those of the Spas, in Germany, yield various proportions, as do the other thermal springs in other parts of the globe.

The easiest mode of procuring nitrogen is to abstract from atmospheric air, by the combustion of phosphorus or hydrogen, the oxygen with which it is associated. Its specific gravity is 0.9722. It forms one of the fifty-five simple, or elementary bodies.—*Prout. De la Beche. Roget. Phillips.*

**NIVEOUS.** (*niveus*, Lat.) Snowy; resembling snow; of a snow-white colour.

**NOAH'CHIAN.** Pertaining to the great deluge related by Moses, from which Noah and his family were saved, and thus called after Noah.

**NODE.** (*nodus*, a knot, Lat. *nodus*, Fr. *nado*, It.) A hard knot or swelling, a bump, or rising.

In astronomy, the nodes of a satellite's orbit are the points in which it intersects the plane of the orbit of a planet. The ascending node is the point through which the body passes in rising above the plane of the ecliptic, and the descending node is the point through which the body passes in sinking below the plane of the ecliptic.

**NOCTIVAGANT.** } (from *nox*, the night, and  
**NOCTIVAGOUS.** } *vagor*, to wander, Lat.)

A name given to such animals as wander, in search of prey, during the night.

**NODOSA'RIA.** A genus of orthocerata, found only fossil. They are polythalamous univalves.

**NO'DOUS.** Knotty; full of knots.

**NO'DULAR.** In the form of a nodule or small lump.

**NO'DULAR IRON ORE.** A variety of argillaceous oxide of iron; occurring in masses, varying from the size of a walnut to that of a man's head. Their form is spherical, oval, or nearly reniform, or sometimes like a parallelepiped with rounded edges and angles. They have a rough surface, and are essentially composed of concentric

layers. These nodules often contain, at the centre, a kernel or nucleus, which is sometimes moveable, and always differing from the exterior in colour, density, and fracture. The texture of the exterior is compact and solid; but the density gradually diminishes to the centre, which has an earthy texture. Specific gravity, about 2.57. Its constituents are oxide of iron 77.0, siliceous 6.0, oxide of manganese 1.0, alumine 0.5, water 13.5. These nodules have also been called *Cétites* and *Eagle-stones*, from an opinion that they were found in eagles' nests, where, it was supposed, they prevented the eggs from becoming rotten.

Nodular iron ore is found disseminated in beds of ferruginous clay in secondary earths, and sometimes in alluvial deposits of clay, loam, or sand. This ore is frequently worked, and yields very good iron. Nothing very satisfactory can be said concerning the manner in which these nodules have been formed.—*Cleveland*.

**NO'DULE.** (from *nodulus*, a little knot, Lat.) A rounded, irregular shaped, mineral mass.

**NO'GROBS.** A fossil resembling a belemnite.

**NO'MENCLATURE.** (*nomenclatura*, Lat. *nomenclature*, Fr. *collection des mots qui sont propres aux différentes parties d'une science ou d'un art*.) The names of things in any art or science, or the whole vocabulary of technical terms which are appropriated to any particular branch of art or science.

The imposition of a name on any subject of contemplation is an epoch in its history of great importance. It not only enables us readily to refer to it in conversation or writing, without circumlocution, but, what is of more consequence, it gives it a recognized existence in our own minds, as a matter for separate and peculiar consideration. How important a good system of nomenclature is, may at once be seen, by considering the immense number of species presented by almost every branch of science of any extent, which absolutely require to be distinguished by names. Thus, the botanist is conversant with from 80,000 to 100,000 species of plants; the entomologist with, perhaps, as many, of insects. And the same as regards chemistry, astronomy, &c.

Nomenclature, then, is, in itself, an important part of science, as it prevents our being lost in a wilderness of particulars, and involved in inextricable confusion. Happily, in those great branches of science, where the objects of classification are more numerous, and the necessity for a clear and convenient nomenclature most pressing, no very great diffi-

culty in its establishment is felt. The facility with which the chemist, the botanist, or the entomologist, refers by name to any individual object in his science, shows what may be effected in this way when characters are themselves distinct.

Nomenclature, in a systematic point of view, is as much, perhaps more, a consequence than a cause of extended knowledge. Any one may give an arbitrary name to a thing, merely to be able to talk of it; but to give a name which shall at once refer it to a place in a system, we must know its properties; and we must have a system, large enough, and regular enough, to receive it in a place which belongs to it and to no other.

There is no science in which the evils resulting from a rage for nomenclature have been felt to such an extent as in mineralogy. The nomenclature of most minerals is at present so encumbered with synonymy, that it has become extremely perplexing to the student. This may be illustrated by the example of Epidote. This mineral, which is called *epidote* by Haiüy, is named *pistazit* by Werner, *thallite* by Leme-therie, *akanticone* by Dandrada, *delphinite* by Saussure, *glassy actinolite* by Werner, *arendalit* by Karsten, *glassiger strahlstein* by Emmerling, *la rayonnante vitreuse* by Brochant, *prismatoidischer augit-spath* by Mohs, &c. &c.

In all subjects where comprehensive heads of classification do not prominently offer themselves, all nomenclature must be a balance of difficulties, and a good, short, unmeaning name, which has once obtained a footing in usage, is preferable to almost any other. When the composition is unknown, those names, which are altogether unmeaning in regard to any property of the thing, are, perhaps, the least objectionable; at all events, they cannot lead to error.

Linnaeus was the first to introduce systematic names into natural history. By the introduction of these scientific, fixed, and universally valid names, Linnaeus has undoubtedly acquired his greatest merit in science, and if every thing else which he has done should be forgotten, this, which is wholly his work, will secure his name from forgetfulness.—*Herschel. Cleveland. Burmeister*.

**NO'RKA.** The name given by Cronstadt to an aggregate of quartz, mica, and garnet. This aggregate is included by Kirwan in the granatines.

**NO'RFOLK CRAG.** An English tertiary formation belonging to the older pliocene. It is observed to rest on the chalk and on the London clay. It consists of irregular beds of ferruginous sand clay, mixed with marine shells. According to an account

of Mr. S. Woodward, if a line be drawn from Cromer, on the northern coast of Norfolk, to Wayburn, about six miles west, and from thence extending in a southerly direction towards Norwich, about 18 miles, it will comprise all the regular beds of Norfolk crag.

**NOVA' CULITE.** (from *novacula*, a razor, Lat.) The Wetz schiefer of Werner; argile schisteuse novaculaire of Haüy. Hone-stone. See *Hone*.

**NU'CLEUS.** (*nucleus*, a kernel, Lat.) A solid centre or point, round which matter is collected.

**NU' CULA.** A genus of marine bivalve shells belonging to the family Arcacea. An inequilateral, equivalved, transverse, sub-trigonal bivalve; covered with an epidermis. The hinge linear, bent at an angle formed by numerous, alternately inserted teeth; muscular impressions, two, simple; beaks approximating, and turned backwards. The recent species of this genus are found in estuaries, and in the ocean, at depths varying to sixty fathoms, in mud and sand.

Of fossil species, one is mentioned by Dr. Mantell, as found in the upper green-sand, and one in the lower green-sand. Mr. Parkinson states that he has found shells of the *Nucula margaritacea*, with their fine comb-like teeth, and their pearly coat, quite perfect, in the Essex bank of shells; and in a perfect state, and of a microscopic size, at Plumsted; also some minute calcedonic specimens, in a perfect state, from the Devonshire whetstone. Several species are described by Lamarck.

**NU'DIBRANCHIATA.** The second order of the class Gasteropoda. The nudibranchiata have no shell whatever; neither are they furnished with any pulmonary cavity, their branchiæ being exposed on some part of their back, from which circumstance they have obtained their name. The triton, doris, &c. are examples.

**NUMMULITE.** (from *nummus*, money, Lat. and *λίθος*, a stone, Gr.) The nummulites compose a fossil extinct genus of multilocular cephalopods, presenting, externally, a lenticular figure, without any apparent opening, and, internally, a spiral cavity, divided by septa into numerous chambers; they do not possess a siphuncle, but their chambers communicate by means of small foramina with each other. They have obtained their name from their supposed resemblance to pieces of money. It is of stone composed of *Nummulites* that the pyramids of Egypt are constructed. The extreme obscurity in which the nature of nummulites has been involved, almost to the present day, has occasioned the adoption of various

vague and absurd notions respecting their origin, and a variety of names have been assigned to them. Thus, they have been named *Helicites*, from their spiral structure; *Phacites*, from their resemblance to a lentil; and *Salicites*, from the supposed resemblance of their sections to the leaf of the willow. Pliny is supposed to refer to them, under the name of *Daphnias*, when he mentions that Zoroaster employed these substances for the cure of epilepsy. They have been also termed *Lentes lapideæ*, *Lapides cumini*, *circulares*, *numismales*, &c.

Scheuchzer was the first who concluded that these bodies ought to be ranked among the mineralized remains of animals which had lived before the flood.

Nummulites vary in size from less than an eighth of an inch, or even microscopic minuteness, to an inch and a half in diameter. Their surface is in some nearly smooth, in others rough and scabrous, with numerous small projecting knobs, or undulating lines. Their colour varies from nearly white to brown and red, and sometimes nearly blue. The number of spiral turns seems to depend on the age and size of the animal: in those of a quarter of an inch in diameter, being three or four, while in those of the largest size the number of whorls is frequently upwards of twenty. Lamarck divides the genus into four species.

Nummulites occupy an important place in the history of fossil shells, on account of the prodigious extent to which they are accumulated in the later members of the secondary, and in many of the tertiary strata. They are often piled on each other nearly in as close contact as the grains in a heap of corn. Entire calcareous hills are composed of fossil nummulites.

**NUMMULITIC.** Containing nummulites; composed of nummulites.

**NU'TANT.** (from *nutans*, nodding, Lat.) A perpendicular part, the apex of which bends over.

**NUTA'TION.** (from *nutatio*, a nodding, Lat. *nutatio*, Fr.) A tremulous or vibratory motion of the earth's axis, by which its inclination to the plane of the ecliptic is continually varying, being, in its annual revolution, twice inclined to the ecliptic, and as often returning to its former position. Both the celestial latitudes and longitudes are altered to a small degree by nutation. In consequence of this real motion in the earth's axis, the pole-star, forming part of the constellation of the Little Bear, which was formerly 12° from the celestial pole, is now within 1° 24' of it, and will continue to approach it till it is within ½°, after which it will retreat from the pole for ages; and 12,934 years

hence, the star  $\alpha$  Lyrae will come within  $5^\circ$  of the celestial pole, and become the polar star of the northern hemisphere.

**NUT-GALL.** An excrescence which grows on some species of oaks. These excrescences are produced by the *Cynip quercus folii*, of Linnæus, a small insect which deposits its egg in the tender shoots of

the quercus infectoria, a species of oak abundant in Asia Minor. When the maggot is hatched, it produces a morbid excrescence of the surrounding parts, and it ultimately eats its way out of the nidus thus formed, and makes its escape. The best galls are imported from Smyrna and Aleppo.—*Brande, Man. of Pharmacy.*

## O

**OBCORDATE.** In botany, an epithet for an inversely heart-shaped leaf, petal, or legume.

**OBLATE.** (*oblatus*, Lat.) Flattened or depressed at the poles; generally applied to spherical bodies, flattened at the poles; of the shape of an orange.

**OBLATE SPHEROID.** A spheroid flattened at the poles is called an *oblate* spheroid: such is the form of the earth and planets. When, on the contrary, a spheroid is drawn out at the poles instead of being flattened, it is called a *prolate* spheroid.

**OBLIQUE.** (*obliquus*, Lat. *oblique*, Fr. *oblico*, It.) Not direct; not perpendicular; not parallel.

In botany, applied to the position of leaves, and implies that one part of the leaf is horizontal and the other vertical.

In conchology, applied to the whorls of spiral univalves, which commonly are in an oblique direction in reference to the axis of the shell. The term is also applied to bivalves when they slant off from the umbones.

**OBLIQUITY.** (from *obliquitas*, Lat. *obliquité*, Fr. *obliquita*, It.) Deviation from parallelism or perpendicularity.

**OBLONG.** (*oblongus*, Lat. *oblong*, Fr.) Having greater length than breadth; longer than broad.

In botany, applied to leaves several times longer than broad. The term is chiefly used to discriminate a leaf whose form does not accurately come under the denominations oval, linear, or round.

**OBLONG O'VATE.** Oblong egg-shaped; between oblong and egg-shaped.

**OBOVATE.** In botany, applied to leaves having the form of an egg, with the broad end forming the base, and the pointed the apex of the leaf.

**OBSIDIAN.** Vitreous lava, a volcanic production, of a dark green colour approaching to black. An analysis of obsidian from Mount Hecla, by Vauquelin, gives the constituents as follows, silica 78.0, alumina 10.0, potash 6.0, lime 1.0, soda

1.6, oxides of iron and manganese 1.0.

Obsidian has been divided into two kinds, the vitreous and pearly; these may be distinguished by their fracture, which is either vitreous or pearly.

Vitreous obsidian bears a strong resemblance to the glass of wine-bottles. Its fracture is conchoidal, showing frequently large cavities. Lustre vitreous. Specific gravity from 2.34 to 2.90. It generally occurs in large amorphous masses, when it appears almost black; it is sometimes found in rounded grains.

Pearlstone, the *Obsidienne perlée* of Brongniart; this variety has a granular structure, and is traversed by fissures in all directions. It is consequently very brittle. Its fracture is uneven or granular, and, as before mentioned, *pearly*. When moistened by the breath it frequently returns an argillaceous odour. It occurs amorphous only.

Before the blow-pipe both varieties intumesce, but the vitreous alone fuses into a globule. Obsidian bears indisputable characters of having once been in a state of fusion.

**OBTUSE.** (*obtusus*, Lat. *obtus*, Fr.) An angle which is more than ninety degrees, or that of a right angle.

**O'VOLUTE.** In botany, applied to leaves, when their margins alternately embrace the straight margin of the opposite leaf.

**OCCIDENTAL.** (*occidentalis*, Lat. *occidentalis*, Fr. *occidentale*, It.) Western, as opposed to oriental.

**OCCIPITAL.** (from *occiput*, the hind part of the head, Lat. *occipital*, Fr.) Pertaining to the back part of the head.

**OCCIPUT.** (*occiput*, Lat. from *ob* and *caput*, *occiput*, Fr.) The back part of the head: the fore part is called *sinciput*.

**O'CEAN.** ( $\omega\kappa\epsilon\alpha\nu\omicron\varsigma$ , Gr. *oceanus*, Lat. *ocean*, Fr. *ocean*, It.) That vast body of water which covers more than three-fifths of the earth's surface. The average depth of the ocean has been very variously estimated. Laplace considered, in order to account for the height of the tides according to the laws of gravitation, the

depth to average ten miles ; others rate it at five miles. The present cannot be considered as having always been the bed of the ocean ; on the contrary, what are now the most elevated portions of the earth's crust were once submerged, and over them the ocean for ages rolled its majestic waves. This is not an invention of modern geologists, Ovid declares the same :—

Vidi factas ex æquore terras ;

Et procul a pelago conchæ jacuere marinæ ;

Et vetus inventa est in montibus anchora summis ;

Quodque fuit campus, vallem decursus aquarum

Fecit ; et eluvie mons est deductus in æquor :

Eque paludosa siccis humus aret arenis ;

Quæque sitim tulerant, stagnata paludibus hument.

*Metamorph.* lib. xv.

- OCEA'NIC.** Pertaining to the ocean ; inhabiting the ocean.
- OCEA'NIC DE'LTÀ.** A delta formed at the mouth of rivers where they enter the ocean, as distinguished from either lacustrine or mediterranean deltas. Mr. Lyell observes, " whenever the volume of fresh water is so great as to counteract and almost neutralize the force of tides and currents, and in all cases where these agents have not sufficient power to remove to a distance the whole of the sediment periodically brought down by rivers, *oceanic deltas* are produced.
- O'CELLATED.** (*ocellatus*, Lat.) In conchology, applied to shells, when marked with little eye-like spots.
- O'CHRE.** (*ᾠχρα*, Gr. *ochra*, Lat. *ocre*, Fr.) Red iron ore ; it yields good malleable iron. Colours red, yellow, and brown. It occurs in dull earthy masses, nearly or quite friable, which soil the fingers. Its constituents are oxide of iron 83·0, silice 5·0, water 12·0.
- O'CHREOUS.** Containing ochre ; resembling ochre.
- OCTAË'DRAL.** } Having eight sides all  
**OCTAHE'DRAL.** } equal.
- OCTAË'DRITE.** Octaëdral oxide of titanium ; the Titane anatase of Brongniart ; Octaëdrit of Werner ; Octaëdrite of Jameson ; the Oisanite of Lameth. A pure oxide of titanium, crystallized in acute, elongated octaëdrons, consisting of two pyramids, whose faces are isosceles triangles, and whose bases are squares. Colours blue, blackish-blue, and brown. Lustre splendid and adamantine. Fracture foliated ; easily broken. It scratches glass. Specific gravity 3·8. Before the blow-pipe it is infusible by itself, but with borax it fuses into a glass. It occurs in veins in Dauphiny, Norway, Spain, and Brazil.
- OCTAË'DRON.** } (*ὀκταῖδρον*, from *ὀκτώ*,  
**OCTAHE'DRON.** } eight, and *ἔδρα*, a side,  
 Gr. *octaëdre*, Fr.) The solid angles of an octaëdron are formed by four equal

and equilateral plane triangles ; consequently it is formed by two equal square pyramids joined together at their bases, the sides whereof are equilateral triangles. The octahedron (unlike some forms which are not susceptible of variation, as the die or cube, a solid invariably bounded by six square surfaces or planes) is susceptible of variation ; it is sometimes flat and low, and, at others, acute and high.

**OCTOË'DRITE.** See *Octaëdrite*.

**OCTOPUS.** (from *ὀκτώ*, eight, and *πούς*, a foot, Gr.) A genus of sepia. The *octopus* was the animal denominated polypus by Aristotle. It has eight arms, all of equal length, and contains in its interior two very small rudimental shells, formed by the inner surface of the mantle. This shell becomes much more distinct in the *loligo*.—*Roget*.

**OCTODENTATE.** (from *octo*, eight, and *dentatus*, toothed, Lat.) Having eight teeth, and no more.

**OCTOFID.** (from *octo*, eight, and *findo*, to cleave, Lat.) Eight-cleft. In botany, an epithet for a calyx divided into eight segments.

**OCTOLO'CLULAR.** (from *octo*, eight, and *loculus*, a cell or pocket, Lat.) Eight-celled.

**OCTONO'CLULAR.** (from *octo*, eight, and *oculus*, an eye, Lat.) Having eight eyes.

**OCTOPETALOUS.** (from *ὀκτώ*, eight, and *πετάλον*, a petal, Gr.) Having eight petals or flower-leaves.

**OCTOSPERMOUS.** (from *ὀκτώ*, eight, and *σπέρμα*, seed, Gr.) Eight-seeded ; having eight seeds.

**O'CLULATE.** (*oculatus*, Lat.) Having eyes.

**O'CLIFORM.** (from *oculus*, an eye, and *forma*, shape, Lat.) Resembling an eye in its form ; eye-shaped.

**ODORIFEROUS.** (from *odor*, scent, and *fero*, to give, Lat. *odoriférant*, Fr. *odorifico*, It.) Yielding scent ; giving out perfume. Generally, but not always, used to denote sweet scent.

**O'DOROUS.** (*odorant*, Fr. *odorifero*, It.) Fragrant ; sweet of scent.

**ŒSO'PHAGUS.** (*œsophage*, Fr.) The gullet, or passage leading from the mouth to the stomach, through which the food passes. In the structure of the œsophagus, we may trace an adaptation to the particular kind of food taken in by the animal. When it is swallowed entire, or but little changed, the œsophagus is a very wide canal, capable of being greatly dilated. Serpents, which swallow animals of greater circumference than themselves, have an œsophagus admitting of great dilatation ; the food in such cases remaining a long time in the canal, before it reaches

the stomach. Grazing animals, who carry their heads close to the ground while feeding, have the œsophagus strengthened by thick muscular coats, whereby the food is propelled towards the stomach, the direction being contrary to that of gravity.

**OGY'GIAN.** (from *Ogyges*, a celebrated monarch, the most ancient of those that reigned in Greece.) His origin, the age in which he lived, and the duration of his reign are so obscure and unknown, that the epithet of *Ogygian* is often applied to every thing of dark antiquity.

**OGY'GIAN DE'LUGE.** The name given to a deluge which happened in the reign of *Ogyges*, which so inundated the territories of Attica, that they remained waste for nearly 200 years. This is supposed to have happened about 1764 years before the Christian æra.

**OGY'GES.** The name given by Guettard to a species of trilobite, from its being found among the most ancient rock formations, containing vestiges of organic life.

**OI'SANITE.** The name given by Lameth to pyramidal titanium or anatase.

**OLD RED SANDSTONE.** The lowest member of the carboniferous group, extensively developed in the counties of Shropshire and Herefordshire, in England; Brecknockshire, in Wales; and Dumfriesshire and Forfarshire, in Scotland. The old red sandstone strata lie between the carboniferous series and the silurian rocks. It consists of many varieties and alternations of silicious sandstones and conglomerates of various colours, red predominating. Mr. Bakewell says, "the old red sandstone, about which so much has been written, and so little understood, is a greywacke, coloured red by the accidental admixture of oxide of iron. It possesses all the mineral characters of greywacke, except the colour, which is a quality that never can be considered of importance, being chiefly derived from local or accidental causes. The old red sandstone also occupies the geological position of greywacke, and greywacke slate, into which it passes merely by a change of colour. Until English geologists shall renounce their prejudices, and place the old red sandstone and mountain limestone in the transition class, as greywacke, and transition limestone, every attempt will be vain to identify this part of the geology of England with that of the continent."

**OLDER PLIOCENE.** Mr. Lyell has subdivided the tertiary epoch into four periods; namely, the newer pliocene, the older pliocene, the miocene, and the eocene. The term pliocene he derived from the two Greek words *πλείων*, more, and

*καινός*, recent. The older pliocene formations lie between the miocene and the newer pliocene. Of fossil shells examined by M. Deshayes, the older pliocene contained from thirty-five to fifty per cent. of recent fossils.

**OLEA'GINOUS.** (*oleaginus*, Lat. *oleagineux*, Fr. *olio*, It.) Oily; unctuous.

**OLE'CRANON.** (*ὀλέκρανον*, Gr. from *ὠλενη*, the ulna, and *κάρηνον*, the head.) A process of one of the bones of the fore arm, the ulna, forming part of the elbow-joint.

**OLFA'CTORY.** (from *olfacio*, to smell, to give a scent to, Lat. *olfactoire*, Fr. *olfattore*, It.) Having the sense of smelling; pertaining to smelling: as the olfactory nerves, &c.

**O'LIVA.** (*oliva*, an olive, Lat.) So named from the oblong and elliptical shape of the shell. A marine subcylindrical univalve; aperture narrow, long, and emarginated opposite to the spire, which is short; the plicæ of the columella are numerous, and resemble striæ; whorls sulciform. Mr. Gray has ascertained that, in the olive, shell is deposited, and most probably secreted, by the upper surface of the foot, which is very large, and not by the mantle, which is small, and does not extend beyond the edge of the mouth. The shells of this genus are very beautiful, and display a great variety of rich markings and splendid colours. Recent olive are found at depths varying to twelve fathoms, in mud, sandy mud, coarse sand, &c. They are also caught by fishing lines. Fossil olive are found in the calcaire grossier, and London clay. Several species have been described.

**OLIVA'CEOUS.** Of an olive colour, a green with an admixture of brown.

**OLI'VENITE.** An ore of copper of an olive-green colour. It consists of oxide of copper 63.0, phosphoric acid 28.6, water 8.4. Occurs with quartz in micaceous clay-slate, in drusy cavities.

**O'LIVINE.** The prismatischer chrysolithe of Mohs; peridot of Haüy; olivin of Werner. A mineral, generally of an olive-green colour, from which circumstance it obtains its name: it is sometimes of an asparagus green, or yellowish green. Occurs in distinct granular concretions, or in rounded masses. Structure foliated. Fracture imperfectly conchoidal. Lustre shining, translucent, and, sometimes, transparent. Its constituents are, silic 50.0, magnesia 37.5, oxide of iron 12.0, lime 0.5. It is found in basalt, and is a constituent of many lavas.

**O'MBRIA.** (from *ὀμβριος*, rain, Gr.) Fossil echini, to which the name of ombria has been given, from a supposition that they fell from heaven in the midst of

heavy rain; they are of a rounded form, and have been compared to turbans.

**OMENTUM.** (*omentum*, Lat.) The caul.

**OMNIVOROUS.** (from *omnis*, all, and *voro*, to devour, Lat.) Animals which eat food of all kinds.

**OMOPLATE.** (from *ὄμος*, the shoulder, and *πλατὺς*, broad, Gr.) The scapula, or shoulder-blade.

**ONCHUS.** A genus of sharks, belonging to the sub-family of Hybodonts, teeth of which have been found in the lias, at Lyme Regis.

**OOLITE.** (from *ὄον*, an egg, and *λίθος*, a stone, Gr. *oolites*, Fr.) A group of strata, whose order of superposition is below the Purbeck and above the lias: called also the Jura limestone. The two lowest members of this group, or those immediately above the lias, are called the great oolite, and the inferior oolite. All the members of the group are marine deposits. The oolite has been thus named from its being composed of spherical granular concretions, supposed to resemble the roe, or eggs, of a fish: it is a mere term of convenience, like those of carboniferous, red-sandstone, &c., for many limestones in other groups are oolitic. The oolite is an accumulation of sands, sandstones, marls, clays, and limestones. A very striking zoological feature of this group is the immense abundance of ammonites and belemnites which must have existed previous to, and during, its deposit; for, notwithstanding the usual chances of destruction to which we may suppose they were exposed, myriads of their shells have been found entombed entire, and not unfrequently the animal must have been in them. One hundred and seventy-three species of ammonites, and sixty-five species of belemnites have been enumerated as discovered in the oolite. There can be little doubt that this group, greatly expanded in thickness, and mixed with sandstones, marls, and slates, possessing a very different aspect from the equivalent rocks in a large portion of Western Europe, extends over various parts of Eastern Europe. At present it seems to be considered that rocks equivalent to the oolitic group have not been detected in North America. The aggregate average thickness of the oolite may be estimated at 1200 feet. In some instances the spherical granular concretions, which are imbedded in many of the strata, attain the size of a pea, and this variety has obtained the name of *pisiform* oolite. Some oolites have been used for building-stone, but they are said not to be durable. Somerset House is built of oolite. The vertebrated animals, whose remains are found in oolite, are

fishes and reptiles of the same genera as those discovered in the lias. Some strata of this group are composed, almost entirely, of madreporites, and these have been called "coral ragg." Other strata abound in the remains of fossil alcyonia and sponges, and with congeries of minute millepores and madrepores. In England, the limestone of the oolite has a yellowish brown, or ochreous colour, by which it may at once be distinguished from the lias; and the fossils partaking of the colour of the limestone, renders it easy to separate them from the fossils of the lias. The oolite has been divided into three formations, the upper, the middle, and the lower. Between the lower and the middle division of oolites, there occurs a bed of dark blue clay, called Oxford, or clunch, clay, the thickness of which has been stated to be 200 feet. Between the middle and upper also, there is found a thick bed of clay, called Kimmeridge clay, of a thickness exceeding, in some parts, 100 feet. The uppermost members of the oolite group are the Portland beds, lying immediately under the Purbeck beds.

Oolite has been also called roe-stone, from a supposition of the older geologists, that the globules contained in it were the petrified roes of fishes. In the lithographic limestone of Solenhofen, belonging to one of the upper members of the oolite, a great variety of organic remains is found; and in the museum of Count Munster, there are not fewer than seven species of flying lizards, six saurians, three tortoises, sixty species of fishes, forty-six species of crustacea, and twenty-six species of insects, taken from that deposit.

The lower division of the oolite in Yorkshire, and in Scotland, contains coal formations. In the district north of the river Humber, the lower oolite assumes a new character: instead of finding beneath the cornbrash the forest marble and great oolitic beds of sandstone, shale and carbonaceous matter are interpolated above the sand which covers the lias. Proceeding northwards, these strata rapidly increase in thickness, and the carbonaceous layers gradually become concentrated into a stratum of coal, which, though never exceeding sixteen inches in thickness, is, from local circumstances, of considerable value.

The oolitic tracts of England present a broad band of dry limestone surface, rising westward to elevations of from 800 to 1,400 feet, with escarpments commanding very extensive prospects over the undulating plains of lias and red marl. The whole tortuous line of oolitic

escarpment from the Humber to the Avon, may be regarded as the wasting effects of water on the subjacent red marls and lias clays.—*Bakewell. De La Beche. Lyell. Cleaveland. Mantell. Phillips.*

**OOLITIC.** Composed of oolite; resembling oolite. The name of a large group of strata commencing with the Portland beds above, and terminating in the inferior oolite below.

**OOLITIFEROUS.** Producing oolite, or roestone.

**OPACITY.** (*opacitas*, darkness, Lat. *opacit *, Fr. *opacit *, It.) Opaqueness; darkness. The quality of opacity is not a *contrary* or *antagonist* quality to that of transparency, but only its extreme lowest degree.

**OPAL.** The quartz *r sinite* of Werner; untheilbarer quartz of Mohs. A subspecies of indivisible quartz. Of this there are many varieties, the principal of which are,—1. The precious opal, a milk-white variety, with a beautiful play of various rich colours. 2. Fire-opal; a transparent variety, brought from Mexico, with a carmine-red and apple-green iridescence of great beauty. 3. Common opal; a variety differing but little from the precious opal in many of its characters, but not presenting that effulgence, or play of colours, by which the precious opal is distinguished. Its colour is white, shaded with grey, green, or yellow, sometimes milk-white. When viewed by transmitted light, the milk-white and greenish varieties often change their colours. 4. Semi-opal; a feebly translucent variety, having a conchoidal fracture; colours white, grey, and brown. Prof. Ehrenberg states that nodules of *semi-opal*, which occur in the Polierschiefer, are composed of siliceous concretions, having dispersed through them numbers of infusorial shields, partially dissolved, together with others that are unaltered. Ehrenberg also thinks that he has found indications of microscopic organic bodies of a spherical form in *semi-opal* from Champigny, and also in *semi-opal* from the dolerite of Steinheim, and in precious opal from the porphyry of Kaschan. 5. Menilite; a variety occurring in small, irregular, roundish masses, often tuberoso, or marked with little edges on the surface. The exterior is often bluish or striped, but the interior has a brown or dark grey appearance. Fracture conchoidal. It is translucent. These varieties consist of siliceous in various proportion, from 86 to 95 per cent., combined with oxide of iron and water. The semi-

opal contains about 3 per cent. of alumina.

**OPALESCENT.** Resembling opal; exhibiting a play of various colours; displaying iridescence.

**OPALIZED.** Converted into a substance resembling opal.

**OPALIZED WOOD.** This has the form and texture of wood; the vegetable matter having gradually given place to a siliceous deposit possessing the characters of semi-opal. Its texture is fibrous; fracture conchoidal, with a moderate lustre. It does not strike fire with steel. Specific gravity between 2.0 and 2.6. Colours white and grey, often shaded with yellow or red, and passing into yellow or brown. Translucent at the edges. It has been found in Hungary, near Schemnitz.—*Cleaveland.*

**OPERCULAR.** Having a lid, or cover, or operculum.

**OPERCULUM.** (*operculum*, Lat. from *operio*, to close or shut.)

1. A lid, by means of which many of the molluscous animals close the aperture of their shells. It is in some animals testaceous; in others, horny or cartilaginous. It is affixed to the animal. The operculum of multivalves is composed of two or four pieces. The operculum is calculated for the protection of the animal when it retires within its dwelling, of which it may be termed the door; it is adapted to the shape of the aperture, which it closes completely. The cartilaginous operculum of the common periwinkle is a familiar example.

2. The flap which covers the gill, or organ of respiration, in fishes.—“A large flap, termed the operculum,” says Dr. Roget, “extends over the whole gill, defending it from injury, and leaving below a wide fissure for the escape of the water, which has performed its office in respiration.”

**OPHIDIA.** (from * φιδ*, a serpent, Gr.)

The third order in the class Reptilia, in Cuvier's arrangement, comprising three families, Anguina, Serpentina, and Nuda. In the structure of the skeleton of the serpents, the first of the true reptiles, we may observe a beautiful illustration of the simple means employed in organic structures to accomplish the most numerous and diversified ends, and of the resources of nature in adapting the forms of bones, in all their essential and common parts, to the various uses the animal is to make of them in the living state. We have here animals destitute of anterior and posterior extremities, destitute of arms and legs, of hands and feet, yet capable of a great variety of those active movements which we see in animals the most gifted with those parts. We see

them as if running on all fours, pursuing their prey, rapidly winding through the turf, and through the low vegetables that cover extensive plains. If the prey, to escape from danger, betake itself to the trees, imagining there to be in safety, we find these serpents winding round the tree, and almost without any apparent motion of any portion of their trunk, gliding, as if they were sticking by suckers to the trunks of the trees they climb, till within reach, and then with a velocity, like an elastic spring let loose, they dart forward and twine round their prey. If their prey should even rise from the ground into the air, we see these serpents, as if they were gifted with wings, spring with velocity from the ground, dart upon the bird and seize it, or if the animal be a quadruped, and plunge for safety into the water, the serpents still pursue them in that element, swimming like fishes. Yet, when we examine the condition of the skeleton, we find it simply to consist of a vertebral column and ribs; and with that simple condition of the solid internal frame-work, we see all those varied movements effected. The spine of serpents is formed of a great number of vertebræ; in the rattle-snake there are about two hundred, and in the coluber natrix above three hundred have been counted. These vertebræ are all united by ball and socket joints, the posterior rounded eminence of each vertebra being received into the anterior surface of the next. Serpents swallow their prey entire; and it is well ascertained that they will swallow animals having ten times the diameter of that of their own neck. The loose connexion of all the bones surrounding the mouth of serpents, enables them to distend their jaws and mouth to receive undivided prey, and thus, so far as food is concerned, to dispense with arms to grasp it, and assist in its sub-division. Neither are their teeth suited for mastication, being conical, slender, sharp, osseous, and recurved.

Venomous serpents, or those with isolated fangs, have their organs of manducation constructed on a very peculiar plan. Their superior maxillary bones are very small, attached to a long pedicle, and are very moveable; in them is fixed a sharp-pointed pervious tooth, through which flows a liquor which, poured into the wound made by the tooth, produces effects according to the species of the reptile secreting it. This tooth, when the animal does not wish to use it, is concealed in a fold of the gum, and behind it are several germs destined to replace it, in the event of its being broken.

All those venomous serpents, whose

mode of production is well ascertained, bring forth living young ones, as their eggs are hatched without being laid.—*Grant. M. Murtrie. Roget.*

**OPHIDIOUS.** Belonging to the order Ophidia.

**OPHIOLITE.** (from ὄφις, a serpent, and λίθος, a stone, Gr.) Another name for the mineral serpentine.

**O'PHITE.** (ὄφιτης, lapis in modum serpentis maculosus, ab ὄφις, a serpent, Gr.) Green porphyry, or serpentine. A greenstone, varying from blackish-green to pistachio-green. It contains greenish-white crystals of felspar, which on the polished surface often shew themselves in parallelograms, and are sometimes cruciform. It occurs massive and disseminated. Lustre glistening and resinous. Fracture conchoidal, and often splintery.

**OPO'SSUM.** A genus of quadrupeds belonging to the order Marsupialia. The opossums are peculiar to America, and are remarkable for having a greater number of teeth than any other animal, amounting in all to fifty. These teeth are thus divided: ten incisors above and eight below, three anterior compressed grinders, and four posterior bristled ones, which with the four canine make the fifty. They approach the quadrumanes, by having the thumb of their hind foot opposed to the fingers, whence they have been called pedimanes: the thumb is not armed with a nail.

The small opossums, in the oolite formation at Stonesfield, are the only land mammalia whose bones have yet been discovered in any strata more ancient than the tertiary.

**O'PPPOSITE.** (*oppositus*, Lat.) In botany, applied to the position of leaves placed exactly opposite each other on the stem; also to branches growing in pairs; and to peduncles placed opposite to a leaf.—*Flora Medica.*

**O'PTICS.** (from ὀπτομαι, to see, Gr.) That branch of science which treats of the properties of light and of vision, as performed by the human eye.

**O'RBED.** Round; circular; formed in a circle.

**ORBI'CUA.** (from *orbis*, an orb, Lat.) A genus of bivalve shells belonging to the family Brachiopoda. The orbicula is a very small inequivalved flat bivalve; the lower valve very thin and adherent to other bodies. It is a marine shell, found at depths varying to sixteen fathoms, attached to stones, shells, sunken wrecks, &c. Orbiculæ have not been found fossil.

**ORBI'CLAR.** (*orbiculaire*, Fr. *orbicolare*, It.) Spherical; circular; roundish and

flat. In botany, leaves are so called when their length and breadth are equal, and their form nearly circular.

**O'RBIT.** (*orbita*, Lat. *orbite*, Fr. *orbite*, It.) The line described by the revolution of a planet; the path of a planet, or of a comet. The mean distance of a planet from the sun is equal to half the major axis of its orbit. A planet moves in its elliptical orbit with a velocity varying every instant, in consequence of two forces, one tending to the centre of the sun, and the other in the direction of a tangent to its orbit, arising from the primitive impulse, given at the time when it was launched into space.

**ORCHIDÆ.** (from ὄρχις, Gr. *orchis*, Lat.) An order of monocotyledonous plants. Perianth superior, sepals three, usually coloured, the odd one uppermost, from the twisting of the ovarium; petals three, usually coloured, of which two are the uppermost, while the third, called the labellum, is usually lobed, and differs in figure, colour, or size, from the other two, and is often spurred; stamens three, united in a central column, the two lateral generally abortive, the central one perfect; anther either persistent or deciduous; pollen either powdery or cohering in granular or waxy masses; ovarium one-celled, with three parietal placentæ; style forming part of the column of the stamens; stigma a viscid space in front of the column; fruit usually a capsule, dehiscing by three valves, sometimes baccate; seeds numerous, testa loose and reticulated, no albumen, embryo a solid undivided fleshy mass; herbaceous plants, either stemless, or forming a kind of tuber above ground; or sometimes with a true stem; leaves simple and entire, sometimes articulated with the stem; inflorescence terminal or radical spikes, racemes or panicles, occasionally solitary.

Natives of all countries, except very cold or very dry. There are thirty-seven British species; and, probably, altogether not fewer than fifteen hundred species.

The flower of the orchidæ is very peculiar; the calyx and corolla consist of three pieces each, and one of those forming the latter, differs very greatly in size and form from the other two; it is called the labellum, or little lip, and is often spurred. In many species, this resembles an insect, and hence they have received the name of bee, fly, spider, &c. &c.

**ORCHIDÆOUS.** Belonging to the order Orchidææ; parasitical plants.

**O'RDER OF SUPERPOSITION.** That arrangement of strata in which they are invariably found. The order of superposition is never inverted. Strata are frequently absent, but the order of superpo-

sition of such as are present is invariably the same.

**ORE.** (*erz*, Germ.) A metallic compound. Metals are found usually combined with other substances: the compounds they thus form are called *Ores*, when the metal exists in them in sufficient quantities to form a considerable portion of the mass.

**ORGA'NIC.** (ὄργανικός, Gr. *organicus*; Lat. *organique*, Fr. *organico*, It.) Consisting of various parts co-operating with each other; consisting of natural instruments of action or operation.

**ORGA'NIC BO'DIES.** Such as possess natural instruments of action; on the action of each, and their co-operation together, depend the growth and perfection of the body.

**ORGA'NIC REMAI'NS.** The relics of what were once living bodies: generally applied to the fossil remains of animals or plants.

**ORISMO'LOGY.** (from ὀρισμός, definition, and λόγος, discourse, Gr.) Called also terminology. In entomology, orismology contains the various technical terms used in explaining the perceptible differences in the body of an insect, and at the same time acquaints us with its exterior visible parts in the several periods of its existence, until its full and perfect development. Mr. Kirby introduced the term orismology.—*Shuckard*.

**ORISMOLO'GICAL.** Relating to orismology.

**ORNITHI'CKNITES.** (from ὄρνις, a bird, and θίγω, to touch, Gr.) The footmarks of birds found in different formations. Some recent discoveries of ornithicknites are very remarkable; the footsteps appear in regular succession, on the continuous track of an animal in the act of running or walking, with the right and left foot always in their relative places. An account of these has been published by Prof. Hitchcock, in the American Journal of Arts and Sciences: they were discovered in the new red sandstone of the valley of Connecticut. The most remarkable were those of a gigantic bird, twice the size of an ostrich, whose foot measured fifteen inches in length, exclusive of the largest claw, which measured two inches. The discovery of these ornithicknites is exceedingly interesting to the palæontologist, as proving the existence of birds at the early epoch of the new red sandstone formation.

**ORNI'THOLITE.** (from ὄρνις, a bird, and λίθος, a stone, Gr.) A fossil bird. Stones of various colours and forms, bearing the figures of birds. Specimens of this kind may be obtained at Matlock, in Derbyshire, and at other places where the water is surcharged with lime.

**ORNITHO'LOGY.** (from ὄρνις, a bird, and λόγος, discourse, Gr.) That department

of natural history which treats of birds; describes their structure, external and internal; and teaches their economy and their uses.

**ORNITHOLOGIST.** One versed in that branch of natural history which treats of the habits, structure and uses of birds.

**ORNITHORHYNCHUS.** (from *ὄρνις*, a bird, and *ὀύγχος*, a beak, Gr.) The platypus of Shaw. The duck-bill; an animal indigenous to New Holland, and found in no other country. In this anomalous animal, we have a quadruped clothed with fur, having a bill like a duck, with four webbed feet, suckling its young, and most probably ovo-viviparous: the male is furnished with spurs. The mouth of the ornithorhynchus has a form of construction between that of quadrupeds and birds, being furnished, like the former, with grinding teeth at the posterior part of both the upper and lower jaws, but they are of a horny substance; the mouth is terminated in front by a horny bill, greatly resembling that of the duck, or the spoon-bill. It has also small cheek-pouches. Membranes unite the toes of the fore and hind-feet; in the fore-feet it extends beyond the nails, in the hind-feet it terminates at the root of the nails. It has also a flattened tail. It inhabits the rivers and marshes.

**ORPIMENT.** (from *auripigmentum*, Lat. *orpiment*, Fr. *orpimento*, It.) The Arsenic sulfuré jaune of Haüy; Arsenic sulfuré orpiment of Brongniart. Yellow sulphuret of arsenic, an ore of arsenic combined with sulphur. Its colour is usually lemon-yellow, which is often shining and beautiful. It occurs in laminated or lamellar masses; in concretions; and sometimes in minute crystals. It is principally volatilized before the blow-pipe, with a white smoke, and with the odour of both sulphur and arsenic, leaving a small earthy residue. According to Thenard it is composed of arsenic 57, sulphur 43. Klaproth states his analysis to be arsenic 52, sulphur 38.

The foliated structure of orpiment, and its arsenical odour, when exposed to heat, distinguish it from native sulphur. It occurs in veins, in various metalliferous formations, in Hungary and Germany, India and America.

**ORTHITE.** (from *ὀρθός*, straight, Gr.) A mineral found in the mine of Finbo, in Sweden, and thus named from its being always found in straight layers.

**ORTHOCE'RATA.** } (from *ὀρθός*, straight,  
**ORTHOCE'RATITE.** } and *κέρας*, a horn,  
Gr.) An extinct genus of polythalamous, or many chambered, cephalopods, which inhabited straight shells. The orthocera-

tite resembles an ammonite unrolled, having its chambers separated by transverse septa, concave externally, and convex internally; the septa being pierced by a siphuncle. There are many varieties; some upwards of two feet in length. Orthoceratites are abundantly found in the transition strata, appearing to have been early called into existence, and at an early period to have been consigned to almost total destruction. Part of the pavement of the palace at Hampton Court, and that of the hall of University College, Oxford, are composed of marble containing remains of orthoceratites. Some species, found in the carboniferous limestone of Clouseburn, in Dumfries-shire, are nearly of the size of a man's thigh.

**ORTHOPTERA.** (from *ὀρθός*, straight, and *πτερόν*, a wing, Gr.) An order of insects, the sixth in Cuvier's arrangement. The coverings of the wings, instead of being of a horny texture, are soft and flexible. The wings themselves, being broader than their coverings, are, when not in use, folded longitudinally like a fan.

**ORYCTOLOGICAL.** (from *ὄρυκτός*, a fossil, and *λόγος*, discourse, Gr.) Pertaining to that part of physics which treats of fossils.

**ORYCTOLOGIST.** One who studies, or is versed in, that part of physics which treats of fossils.

**ORYCTOLOGY.** (from *ὄρυκτός*, a fossil, and *λόγος*, discourse, Gr.) By some persons oryctognosy has been substituted for oryctology, and geognosy for geology; for this there appears no valid reason, and if followed, we ought, by the same rule, to change meteorology into metereognosy, physiology into physiognosy, &c. Oryctology is that branch of mineralogy which has for its object the classification of minerals; or, in other words, it consists in the description of minerals, the determination of their nomenclature, and the systematic arrangement of their different species.—*Cleveland.*

**OSCILLATION.** (*oscillatio*, Lat. *oscillation*, Fr. *oscillazione*, It.) Vibration; the act of swinging to and fro; a movement to and fro, like the swinging of the pendulum of a clock, or waves in water. The tides are oscillations of the sea.

**OSMEROIDES MANTELLII.** The name given by Dr. Mantell to an ichthyolite of the chalk formation discovered in the Lewes chalk-pits. It is closely related to the smelt.

**OSMIUM.** (from *ὄσμη*, odour, Gr.) A metal discovered by Tennant in crude platinum, and deriving its name from the strong odour emitted by some of its compounds.

**O'SSEOUS.** (*osseous*, Lat.) Bony; containing bone; resembling bone.

**O'SSEOUS BRE'CCIA.** A mass of fragments of the bones of animals cemented together by a calcareous gangue, and commonly found in fissures and caves.

**O'SSICLE.** (*ossiculum*, a little bone, Lat.) A small bone: some of the small bones which enter into the formation of the ear are termed the *ossicula auditūs*.

**OSSI'FEROUS.** (from *os*, a bone, and *fero*, to produce, to bear, or contain, Lat.) Yielding bones or fragments of bones; containing bones. Thus we have ossiferous gravel, ossiferous clay, ossiferous strata, ossiferous caves, &c. &c. Large portions of this kingdom are covered by irregular aggregations of gravelly sands and pebbly clays, locally stored with the bones of various land quadrupeds. It is a remarkable fact that the ossiferous caves and fissures are situated almost every where in limestone.

**OSTEOC'O'LLA.** (from *ὀστέον*, a bone, and *κόλλα*, glue, Gr.) Vegetables of the most delicate texture, when immersed in waters containing carbonate of lime, become incrustated, still preserving their form even to their most delicate ramifications. These incrustations somewhat resemble the bone of an animal, and the property has been absurdly attributed to them of facilitating the union of fractured bones.

**OSTEO'LOGY.** (from *ὀστέον*, a bone, and *λόγος*, discourse, Gr. *ostéologie*, Fr. *ostéologie*, It.) A description of the bones; that part of anatomy which treats of the bones.

**OS'TRACITE.** A fossil oyster.

**OSTRE'A.** } The oyster. A rough, adherent,

**OSTRE'A.** } inequivalved bivalve; the hinge without a tooth. One muscular impression in each valve. The oyster is found both fossil and recent. Of this genus one hundred and thirty-seven species have been described in Turton's Linné. Lamarck describes eighteen species as found fossil in the neighbourhood of Paris. The most extraordinary shell of this genus for size, says Mr. Parkinson, is the large fossil oyster, the recent analogue of which, from Virginia, appears to be depicted by Lister. Some attain to the length of twenty inches. An under valve in Mr. Parkinson's possession weighed four pounds, being thirteen inches in length and three in thickness. The recent oyster is found at depths varying to seventeen fathoms, in the ocean and in estuaries. Sometimes attached to rocks and other substances.

**OSUS.** The termination of words in *osus* expresses fulness, or the abundant presence of a quality: examples, pilosus, covered with much hair; setosus, covered

with thick bristles; squamosus, covered with scales.

**OU'TCROP.** A term used by miners, to express the exposure at the surface of a stratum or strata.

**OU'TLIER.** A portion of a stratum detached from the principal mass, and lying detached at some distance from it.

**O'VA ANGU'NA.** A species of fossil *cidaris* or *echinus*.

**O'VAL.** (from *ovum*, an egg, Lat. *ovale*, Fr. *ovale*, It.) A rounded surface, its two right-angular diameters being of an unequal length, so that its longest transverse diameter does not pass through the centre of its longitudinal diameter, but lies nearer to one end.—*Shuckard*.

**OVA'R'IUM.** } (*ovaire*, Fr. *ovaja*, It.) That

**O'VARY.** } part of the body which contains the ova, and in which impregnation is performed. In animals, it is only in the organs termed ovaries, that ova are formed.

In botany, that part of the flower which ripens into the fruit, and contains the seed.

**O'VATE.** (*ovatus*, made like an egg, from *ovum*, Lat.) Of the shape of an egg; egg-shaped.

**O'VIDUCT.** (from *ovum*, an egg, and *ductus*, a passage, Lat.) A canal, or duct, through which the ova pass, after impregnation, from the ovary to the uterus. In the human subject the oviducts are called the Fallopian tubes.

**O'VIFORM.** (from *ovum*, an egg, and *forma*, shape, Lat.) Of the form or shape of an egg.

**O'VIFORM LI'MESTONE.** Oolite, or roestone.

**OVI'PAROUS.** (from *ovum*, an egg, and *pario*, to produce, Lat. *ovipare*, Fr. *oviparo*, It.) All animals which lay eggs, enclosed in a calcareous shell, are called oviparous. Oviparous production is thus characterized: the young animal is not attached to the parieties of the oviduct, but remains separated from it by its external envelope; its aliment being enclosed in a sac, which is attached to its intestinal canal.

**OVO'-VIVIPAROUS.** Some animals, such as the salamander and the viper, never lay their eggs, but these are hatched within the body of the parent; so that although originally contained in eggs, the offspring are brought forth in a living state. Such animals are termed *ovo-viviparous*.

**OVIPO'SITING.** The laying of eggs.

**OVIPO'SITOR.** A name given to the terminal apex of the abdomen of insects.

**O'VULE.** } (dim. of *ovum*, an egg, Lat.)

**O'VULUM.** } In botany, the seed before it is perfected. The small bodies produced on the margins of the *carpella* in the

pistil, are called ovula, or ovules; when perfected they become the seeds of the plant. The ovule is generally attached to the placenta of the ovarium by a very small stalk.

**O'XFORD CLAY.** Called also clunch clay. A bed of dark blue clay, sometimes nearly two hundred feet in thickness, interposed between the lower and the middle oolites. One species of ichthyosaurus, distinct from the species occurring in the lias, has been found in this deposit.

**OXIDA'TION.** That process by which metals, and other substances, are converted into oxides by their combination with oxygen.

**O'XIDE.** A substance combined with oxygen, without being in the state of an acid.

**O'XIDIZED.** Converted into an oxide, by combination with oxygen.

**O'XYGEN.** (from ὀξύς, acid, and γεννάω, to produce, Gr.) So called from its property of forming acids. One of the fifty-five simple or elementary substances, and one of the five which exist as gas. So generally does oxygen enter into combination with metallic and non-metallic

bodies, and in such large proportions, that it has been computed that one-half of the ponderable matter of the globe is composed of oxygen gas. Oxygen constitutes about one-20th per cent. of the volume of the atmosphere; it forms a third part, by measure, of the gases composing pure water; and is locked up to an immense amount in the various rocks, which are little else than a mass of oxidized substances. Plants give out oxygen, animals absorb it. It is to Dr. Priestley we owe the knowledge of the former of these two facts; and he it was who first discovered oxygen, in 1774. Oxygen has neither taste nor smell. It is a trifle heavier than atmospheric air, 100 inches weighing 33·88 grains.

**OXYGENA'TION.** "This word," says Dr. Ure, "is often used for oxidation, and frequently confounded with it: but it differs, in being of more general import, as every union with oxygen, whatever the product may be, is an oxygenation; but oxidation takes place only when an oxide is formed."—*Dict. of Chem.*

**O'YSANITE.** A name given by Lameth to pyramidal titanium, or anatase.

## P

**PACHYDERMATA.** (from παχύς, thick, and δέρμα, skin, Gr.) Thick-skinned animals. The seventh order of the class Mammalia, in Cuvier's arrangement. This order Cuvier divided into two families, namely, Proboscidea, or those pachydermatous animals which have tusks and a proboscis, as the elephant and mastodon; and pachydermata ordinaria, in which are included the hippopotamus, anoplotherium, palæotherium, tapir, &c.

Several genera of the order Pachydermata have become extinct, their fossil remains alone proving that such ever existed. Amongst these are the mastodon, the anoplotherium, the palæotherium, and the lophiodon. Of the existing genera of pachydermata, many species which existed during the older and newer pliocene periods also seem to have become extinct.

The pachydermata appear to be, as it were, only the remnants of a very extensive order, which formerly inhabited the earth, but have now almost entirely disappeared. They feed upon grass, but they do not ruminate. They are, for the most part, huge and unwieldy animals, with thick integuments; solidity and strength appearing to be the objects chiefly regarded in their construction.

**PACHYDERMATOUS.** Thick-skinned; belonging to the order Pachydermata.

**PA'DDLER.** The swimming apparatus of the chelonian reptiles, and of the marine saurians, has obtained the name of paddles.

**PÆCULO'PODA.** (from ποικίλος, and πούς, Gr. various footed.) The second order of the class Crustacea; it comprises two families, Xysophura and Siphonostoma.

**PA'LATAL.** Pertaining to the palate, or roof of the mouth.

**PA'LATE.** (*palatum*, Lat. *palais*, Fr. *palato*, It.) The roof, or upper part of the mouth.

**PALÆO'LOGY.** (from παλαιός, ancient, and λόγος, discourse, Gr.) The study of ancient things. This word is commonly written paleology.

**PALÆONTO'LOGIST.** (from *paleontology*.) One who studies, or is versed in, the history of fossil plants and animals.

**PALÆONTO'LOGY.** (from παλαιός, ancient, ὄντα, beings, and λόγος, discourse, Gr.) The history of fossil plants and animals; that branch of natural history which treats of fossil and extinct animals and plants.

**PALÆOSAU'RUS.** (from παλαιός, ancient, and σαύρος, a lizard, Gr.) A genus of fossil saurians, now extinct, found in the magnesian limestone.

**PALÆOTHE'RIMUM.** (from παλαιός, ancient,

and *θηρίον*, a wild beast, Gr.) An extinct genus of fossil quadrupeds, belonging to the order Pachydermata, having twenty-eight molar teeth, or grinders, six incisors, and two canine teeth in each jaw. It possessed three toes to each foot, and had a short fleshy proboscis. Eleven or twelve species of the genus have been discovered. "The place of the genus Palæotherium," says Prof. Buckland, "is intermediate between the rhinoceros, the horse, and the tapir. Some of the discovered species were as large as a rhinoceros, others were from the size of a horse to that of a hog. These animals probably lived upon the margins of the then existing lakes and rivers.

**PALÆOTHERIAN.** Belonging to the genus Palæotherium, as palæotherian remains, &c.

**P'ALEA.** (*palea*, chaff, Lat.) In botany, a term applied to the two inner bractæ of grasses: the paleæ are membranous or chaffy in texture.

**PALLADIUM.** (from the planet Pallas.) A metal of a greyish or bluish-white colour, discovered by Dr. Wollaston in 1803, in platinum. It is malleable, ductile, and flexible, but does not possess much elasticity. In hardness it surpasses all other metals, with the exception of tungsten, which it equals. Specific gravity 11.5. It is not oxidated by the action of the atmosphere. It is fusible only at a very high temperature.

**P'ALLEAL.** (from *pallium*, a mantle, Lat.) In conchology, the name given to the mark or impression observed in bivalves, formed by the muscular attachment of the mantle.

**P'ALMATE.** } (*palmatus*, Lat.) Webbed,  
**P'ALMATED.** } like the feet of some water-birds; deeply divided into lobes like the fingers on the hand; resembling a hand; palmed or hand-like. Applied to leaves which are divided, half, or more than half-way, down the middle, into several nearly equal segments, having a space between each.

**P'ALMIPEDES.** (from *palmipes*, that hath its feet closed with a film or web, Lat.) The sixth order of birds in Cuvier's arrangement. The goose and duck are familiar examples.

**PALM.** (from *palma*, Lat.) The palms constitute a natural order of monocotyledonous, or endogenous, plants. The flowers are hermaphrodite, or polygamous. Perianth six-parted, persistent. Stamens inserted into the base of the perianth, definite or indefinite. Ovary three-celled, or deeply three-lobed, with an erect ovule. Fruit baccate or drupaceous, with fibrous flesh. Albumen cartilaginous; embryo in a cavity at a

distance from the hilum. Leaves terminal, large, pinnate, or flabelliform, plaited in veneration. Spadix enclosed in a valved spatha. Flowers small.

A palm tree affords an example of the mode of growth in endogenous plants. The stem of this tree is usually perfectly cylindrical, attains a great height, and bears on its summit a tuft of leaves. It is composed of an extremely dense external cylindrical layer of wood; but the texture of the interior becomes gradually softer and more porous as it approaches the centre. It has neither medullary rays, nor central pith, nor true outward bark. The first stage of its growth consists in the appearance of a circle of leaves, which shoot upwards from the neck of the plant, and attain, during the first year, a certain size. The following year another circle of leaves arises; but they grow from the interior of the former circle, which they force outwards as their vegetation advances, and as ligneous matter is deposited within them. As soon as the outer layer has become too hard to yield to the pressure from within, the growth of the inner layers is immediately directed upwards; so that they rise in succession by distinct stages, always proceeding from the interior; a mode of development which has been compared by De Candolle to the drawing out of the sliding tubes of a telescope. The whole stem, whatever height it may attain, never increases in diameter after its outer layer has been consolidated. A circle of leaves annually sprouts from the margin of the new layer of wood; these, when they fall off, leave traces, consisting of a circular impression, round the stem. By the number of these circles the age of the tree may be ascertained. The existing family of palms is supposed to consist of nearly a thousand species, of which the greater number are limited to peculiar regions of the torrid zone. It is not surprising to find the remains of palms in warm latitudes, where plants of this family are now indigenous; beautifully silicified stems of palm trees abound in Antigua, and in India; but their occurrence in the tertiary formations of Europe, associated with the remains of crocodiles and tortoises, and with marine shells, nearly allied to forms now found in seas of a warmer temperature, seems to indicate that the climate of Europe, during the tertiary period, was warmer than at the present time. The palms have pervaded all the series of formations, though in small proportions.

**P'ALPI.** In entomology, the palpi, or feelers, are the auxiliary organs of a masticating mouth. Those upon the max-

illæ are termed the palpi maxillares, or maxillary feelers; those placed laterally upon the labium, are designated the palpi labiales, or labial feelers.

**PALUDINA.** A genus of fresh-water univalves, belonging to the family Peristomata. Several species, *Paludina elongata*, *Paludina fluviolum*, *Paludina carinifera*, &c. have been found in the Wealden formation.

**PANCAKE.** The name given by Klein to the *Echinodiscus laganum*, a species of fossil echinus, belonging to the division *Catocysti*.

**PANDA'NEA.** } (from *pandus*, Lat. crooked.)

**PANDA'NUS.** } The screw-pine, so named from the spiral arrangement of its leaves, is a monocotyledonous tree, growing only in the warmer zones, and principally near the sea. The *pandanea*, like the cocoa-nut palm, is generally the first vegetable colonist of the newly-raised coral islands. Its appearance is that of a gigantic pine-apple plant with arborescent stems. The *pandanus* bears a large, spherical, drupaceous fruit: the seed within each drupe being enclosed within a hard nut. From the *pandanus* growing near to the sea, its fruit frequently drops into the water, and is drifted by the waves and winds to distant shores: thus the elements of vegetation are transported to the emerging coral islands, where it vegetates. A fossil fruit of the *pandanus* was found by Mr. Page in the inferior oolite, and is in the Oxford museum. It is of the size of a large orange, and is covered by a stellated rind, or epicarpium, composed of hexagonal tubercles, forming the summits of cells which occupy the entire surface of the fruit. Fruits of a genus, to which M. Adam Brongniart has given the name of *Pandanocarpum*, occur, together with cocoa-nut fruit, at an early period of the tertiary formations, in the London clay of the Isle of Sheppey.

**PANGLIN.** A species of manis, or scaly lizard; called also the scaly ant-eater. Its armature is composed of separate, horny, moveable scales. It is destitute of teeth, has a very extensile tongue, and lives on ants and termites.

**PANICLE.** (*panicula*, Lat. a bunch or cluster.) A species of inflorescence, in which the flowers are scattered on peduncles, variously subdivided without any order, and more or less close. The oat affords a familiar example. When the middle branches of a panicle are longer than the others, it is termed a *thyrsus*.

**PANNICULUS CARNO'SUS.** (from *panniculus*, a cloth, and *carnosus*, fleshy, Lat.) A peculiar set of sub-cutaneous muscular bands which serve to erect the bris-

les, or armour, of certain animals; as the hedge-hog, porcupine, &c.

**PANOPÆA.** A genus of bivalve shells of the family Solenacea. The *panopæa* is a transverse inequilateral bivalve, gaping at both extremities. The hinge similar in both valves, with an acute cardinal tooth in each, and, on the right valve, a little pit, which receives the tooth of the opposite valve.

This shell appears to be of a mixed genus between *mya* and *solen*. It is found both recent and fossil, but no great deal appears to be known of the recent species.

**PAPER COAL.** A bituminous shale, to which the name has been given from its divisibility into extremely thin leaves. In the brown coal formation, and in the *surturbrand*, are found beds that divide into laminæ, as thin as paper, and are composed entirely of a congeries of many kinds of leaves.

**PAPER NAUTILUS.** Called also the Paper Sailor. See *Argonauta*.

**PAPILIO.** (*papilio*, Lat. a butterfly.) A genus of the family *Diurna*, belonging to the order *Lepidoptera*. The butterfly. The species are numerous. It has been well observed that the chrysalis is the tomb of the caterpillar, and the cradle of the butterfly.

**PAPILIONA'CEOUS.** Resembling a butterfly. In botany, the corolla is called *papilionaceous* when it consists of five petals of particular forms, of which the uppermost is generally the largest, and turned back; the two next resemble each other, but differ from the first; they have their faces turned towards each other, and are called the *alæ*; the two lowermost are generally united by their lower edge, and form a keel-like figure, and are, from that circumstance, called the *carina* or keel; the two last, so united, contain, and protect, the internal organs.

**PAPILLA.** (*papilla*, Lat.) This word is generally used in the plural, *papillæ*. Malpighi first discovered this structure in the foot of the pig, and gave to it its name. The external surface of the skin presents a great number of minute projecting filaments; these are the *papillæ*. "It is probable," says Dr. Roget, "that each of these *papillæ* contains a separate branch of the nerves of touch, so that we may consider these *papillæ* as the principal and immediate organs of touch. The *papillæ* are much more easily perceived on some parts than others, but no where are they more perceptible than on the tongue, where, more especially in a morbid condition of the body, they are frequently much elevated.

**PAPILLOUS.** (from *papilla*, Lat. a pimple.)

Having the surface covered with pimples or dots.

**PAPILLOSE.** In botany, a term applied to stems covered with soft tubercles; also to leaves covered with fleshy dots or points.

**PAPULOUS.** (from *papula*, Lat. a kind of pimple.) Full of pimples; pimply; blistered.

**PAPPUS.** (*pappus*, Lat. thistle-down. *πάππος*, Gr.) The feathery appendage that crowns many seeds which have no pericarpium; a particular form of calyx of which we have a familiar example in the dandelion.

**PARABOLA.** (*parabola*, Lat. *παραβολή*, Gr. *parabole*, Fr. *parabola*, It.) One of the five conic sections: thus, if a cone be cut by a plane parallel to one of its sloping sides, the section will be a parabola.

**PARABOLICK.** (*parabolique*, Fr. *parabolico*, It.) Having the nature or form of a parabola.

**PARALLELOGRAM.** (from *παράλληλος* and *γράμμα*, Gr. *parallelograme*, Fr. *parallelogrammo*, It.) In geometry, a right-lined quadrilateral figure, whose opposite sides are parallel and equal.

**PARALLELOPIPED.** (*parallelipiede*, Fr. *terme de géométrie. Corps solide terminé par six parallélogrammes dont les opposés sont parallèles entre eux.*) A solid figure contained under six parallelograms, the opposites of which are parallel and equal; or it is a prism whose base is a parallelogram: it is always triple to a pyramid of the same base and height.

**PARANTHINE.** A rare mineral, thus named by Haüy, more commonly known as Scapolite, *which see.*

**PARASITA.** (*parasita*, Lat. *παράσιτος*, Gr.) In Cuvier's arrangement, the third order of Insecta; they have six legs and are apterous. Mr. Kirby observes, "the order of parasites, consisting of the most unclean and disgusting animals of the whole class, infest both man, beast, and bird, no less than four species being attached to man, may be divided into two sections, namely, those that live by suction, and those that masticate their food. To the first of these belong the human and the dog-louse, and to the other the various lice that inhabit the birds, of which almost every species has a peculiar one.

**PARASITIC.** } 1. In botany, applied to  
**PARASITICAL.** } plants which fix their roots into other plants, and from them, instead of from the earth, derive their nourishment: the mistletoe is a familiar example.

2. In zoology, a name given to certain insects which live upon the animals they infest.

**PARENCHY'MA.** (*παρίγχυμα*, Gr. *parenchyme*, Fr.)

1. A spongy or porous substance forming the bulk of some of the viscera, as the parenchyma of the liver, &c.

2. In botany, a fine, transparent, membranous tissue, lying immediately beneath the epidermis of plants; it is of a deep green colour, very tender, and succulent. When viewed with a microscope, it seems to be composed of fibres which cross each other in every direction. In its simplest state, it appears like a mass of globules or vesicles, crowded together; these, from pressure, assume a six-sided, or hexagonal figure.

**PARENCHY'MATOUS.** Consisting of parenchyma; spongy; porous.

**PARGASITE.** The name given to a variety of actinolite, from its being found in the Isle of Pargas, in Finland.

**PARI'ETAL.** (from *paries*, a wall, Lat.)

1. The name given to certain bones of the skull, from their serving as walls to the brain.

2. In botany, a term used to express an adhesion of some part to the inner side of an organ; as when the seeds are attached to the placenta, the latter are termed *parietal.*

**PARIS BASIN.** A large area, to which the name of Paris Basin has been given, about 180 miles in length, from north-east to south-west, and about ninety miles wide, from east to west. The country in which the capital of France is situated, is perhaps the most remarkable that has yet been observed, both from the succession of different soils of which it is formed, and from the extraordinary organic remains which it contains. Bones of land animals, of which the genera are entirely unknown, are found in certain parts; other bones remarkable for their vast size, and of which some of similar genera exist only in distant countries, are found scattered in the upper beds. Millions of marine shells, which alternate regularly with fresh-water shells, compose the principal mass. The strata composing the Paris basin rest upon chalk, lying, as it were, in a depression of the chalk. The depth of these strata varies from one to five hundred feet. MM. Brongniart and Cuvier divided the strata into the five following formations, commencing with the undermost. 1. First fresh-water formation; consisting of plastic clay, lignite, and first sandstone. 2. First marine formation; comprising the calcaire grossier. 3. Second fresh-water formation; containing siliceous limestone, gypsum, with bones of animals, and fresh-water marls. 4. Second marine formation; consisting of gypseous marine marls, upper marine sands and sandstones, and

upper marine marls and limestones. 5. Third fresh-water formation; containing siliceous millstone without shells, siliceous millstone with shells, and upper fresh-water marls. Subsequent observations have proved that this division, as well as many of the views entertained by MM. Brongniart and Cuvier, is not in accordance with facts with which they were unacquainted, and much modification of the above arrangement has been the consequence. The siliceous limestone, with fresh-water and terrestrial shells and plants, and the calcaire grossier, or first marine formation, often alternate, and are deemed by M. Constant. Prevost to be contemporaneous formations; and it is not improbable that while the waters in one lake or basin might be marine, those in another might be fresh, and thus two formations containing different organic remains might be deposited contemporaneously.—*Lyell. Bakewell.*

**PARTICLES ELEMENTARY.** The final results of chemical analysis. Elementary particles are those of which integrant particles are composed; thus, while the latter remain invariable in the same body, the former must vary with the progress of chemistry. In bodies really simple, the integrant and elementary particles must be the same.—*Cleaveland.*

**PARTICLES INTEGRANT.** These are the smallest particles into which a body can be reduced without destroying its nature, or, in other words, without decomposing it. Only three forms of integrant particles have hitherto been discovered. They are the three most simple, geometrical solids; namely, a tetraëdron; a triangular prism; and a parallelepiped, including all solids of six sides, parallel two and two.

**PARTITE.** (*partitus*, Lat. from *partior*, to divide.) Divided. In botany, a partite leaf is one separated to the base.

**PATELLA.** (*patella*, Lat. a little deep dish with a broad brim.) That bone of the leg commonly known as the knee-pan.

**PATELLÆ.** In conchology, the limpet shell. Animal a limax. A marine shell, univalve, subconic, shaped like a basin; without a spire. In Turton's Linné two hundred and forty species of patella, or limpets, are described: fourteen of these are inhabitants of our coasts. The patella is found both recent and fossil. Recent patellæ are found at depths varying to thirty fathoms, on rocky coasts, stones, and sea-weeds. Many species have been found fossil in the neighbourhood of Paris. Patellæ have also been obtained from the Shanklin sand, and from the Harwich cliffs. Mr. Parkinson mentions that he possesses a fossil patella of the

species *P. ungarica*, of the size of two inches and a-half in its longest diameter.

**PATELLIFORM.** (from *patella*, a dish, and *forma*, form, Lat.) Of the form of a small dish.

**PATELLITE.** A fossil patella.

**PATULOUS.** (*patulus*, from *pateo*, Lat. to be open.) In botany, spreading, as a patulous calyx. In conchology, gaping; with a spreading aperture.

**PAVONIA.** (from *pavo*, Lat. a peacock.) A coral with a deep and isolated cell, such cell containing a large depressed polypus, very similar to the actinia as regards both its structure and appearance. In Dr. Mantell's Wonders of Geology a species of pavonia, the *P. lactuca*, is beautifully figured. He states that the polypi are of a deep green colour, and that there is a connecting, transparent, fleshy substance, which extends over the extreme edges of the foliated expansion of this elegant coral.

**PEA ORE.** The name given to granular argillaceous oxide of iron, from its occurring in small masses or grains, nearly or quite spherical, and of the size of a pea. It is the pisiform iron-stone of Kirwan.

**PEAR ECRINITE.** The Apiocrinites rotundus, or Bradford ecrinite. A species of crinoidea abounding in the oolitic limestone in the neighbourhood of Bradford, near Bath. When living, their roots were confluent, and formed a thick pavement over the bottom of the sea, from which their stems and branches rose into a thick submarine forest, composed of these splendid zoophytes. This bed of beautiful remains has been buried by a thick stratum of clay. The body of the pear ecrinite was of a pyriform shape, from which circumstance it has been thus named. The pear ecrinite is confined to the middle oolite.

**PEARL.** (*perle*, Germ. *perle*, Fr. *perla*, It.) A spherical concretion consisting of concentric coats of the same substance as that which forms the mother-of-pearl of the shell. It is produced by the extravasation of a lapidifying fluid, secreted in the organs of the animal, the pearl oyster, and filtered by its glands. The animal that produces pearls in the greatest abundance, of the purest nature, and of the highest value, has been formed by Lamarck into a genus named *Meleagrina*; Linné classed it with the muscles. It inhabits the Persian gulf, the coasts of Ceylon, &c. It attains perfection no where but in the equatorial seas. The pearl fishery off the island of Ceylon is the most productive of any; the oyster-beds extending over a space thirty miles long by twenty-four broad. The oysters at the greatest depths yield the largest pearls, which are situated

in the fleshy part, near the hinge. For one pearl that is found perfectly round and detached between the membranes of the mantle, hundreds of irregular ones occur attached to the mother-of-pearl; these are sometimes in such numbers as to prevent the animal from closing its valves, and thereby cause its destruction.

The pearl is supposed by some writers to be the effect of disease; it is a formation forced upon the oyster by some extraneous substance within the shell, which it covers with mother-of-pearl. Sir Everard Home considered that the abortive eggs of the animal were the nuclei upon which the pearls were formed.

To collect the pearl oysters, divers are employed; these men, provided with baskets, descend to the bed at the bottom of the sea, and during their stay there, which does not exceed two minutes, generally a minute and a-half, collect into their baskets every thing they can grasp, when they are rapidly, at a signal given, hauled up to the surface. When the bed is richly stored, a diver will collect 150 oysters at one dip, and a single diver will, in one day, bring up from 1000 to 4000 oysters.—*Rev. W. Kirby. Bridgewater Treatise.*

**PEARL SINTER.** Called also florite. A variety of siliceous sinter of a white or grey colour, found in volcanic tuff.

**PEARLA'CEOUS.** Resembling mother-of-pearl.

**PEARLSTONE.** An igneous or volcanic rock with a mother-of-pearl lustre. The Perlstein of Werner; Obsidienne perlée of Brongniart; Lave vitreuse perlée of Haüy. Pearlstone is a variety of obsidian occurring in globular and concentric lamellar, iridescent, translucent concretion. It scratches glass. Specific gravity from 2.20 to 2.55. When breathed upon, it frequently gives out an argillaceous odour. Its constituents are silica 77.0, alumina 13.0, lime and natron 2.6, potash 1.4, oxides of manganese and iron 2.0, water 4.0.

**PEA STONE.** A variety of limestone, called also pisolite. It occurs in globular or spheroidal concretions of the size of a pea. See *Pisolite*.

**PEAT.** (derived by some from the German word *pfutze*, a pool, or standing water.) An intermediate substance between simple vegetable matter and lignite, the conversion of peat into lignite being gradual, and brought about by the action of water. Peat is composed of the remains of many different plants, but probably a great portion is derived from the Sphagnum palustre, and the process by which these vegetables are thus converted is clearly seen in the sphagnum palustre. As the

lower extremity of the plant dies, the upper sends forth fresh roots, thus furnishing a perpetual supply of decomposing vegetable matter. Dr. Maculloch states, "where the living plant is still in contact with the peat, the roots of the rushes, and ligneous vegetables, are found vacillating between life and death, in a spongy half decomposed mass. Lower down, the pulverized carbonaceous matter is soon mixed with similar fibres, still resisting decomposition. These gradually disappear, and at length a finely-powdered substance alone is found, the process being completed by the total destruction of all the organised bodies. The generation of peat, when not completely under water, is confined to moist situations, where the temperature is low, and where vegetables may decompose without putrifying."

Sir H. Davy states that one hundred parts of dry peat contain from sixty to ninety-nine parts of matter destructible by fire. One-tenth of the whole of the surface of Ireland is stated to be peat. At the bottom of peat-mosses there is occasionally found a cake or pan of oxide of iron; whence this is derived does not appear to be clearly understood. The preservative property of peat is very remarkable; bodies of persons who have perished in peat-bogs have been kept free from putrefaction for many years.

**PE'CTEN.** (*pecten*, Lat. a comb.) A genus of marine bivalves, belonging to the family Ostracea, or, according to Lamarck's arrangement, to the family Pectenides. The pecten is a fossil as well as a recent shell, many species being found in our seas. Pectens are found at depths varying to twenty fathoms, in mud, sandy mud, and sand. It is a regular, eared, longitudinally ribbed, inequivalved bivalve, with contiguous beaks, having a triangular auricle on each side of the umbones. Hinge toothless; pit trigonal. One muscular impression. Fossil pectens are found in the neighbourhood of Paris, and in many parts of England; in the Harwich cliff; in the green-sand of Wiltshire; near Thame in Oxfordshire; in Gloucestershire; and in Sussex. Amongst the fossils of Sussex one species of pecten is found in the chalk; four species in the chalk marl; one species in the gault; and three species in the Shanklin sand.

**PE'CTINATE.** } (from *pecten*, a comb, Lat.)

- PE'CTINATED.** }  
 1. In conchology, resembling a comb; cut into regular, straight, segments like a comb.  
 2. In botany, applied to a pinnatifid leaf, whose segments are extremely narrow, resembling the teeth of a comb.

**PECTINIBRANCHIA'TA.** The sixth order of mollusca, in Cuvier's arrangement.

**PECTU'NCULUS.** A genus of orbicular sub-equilateral marine bivalves, with an arched hinge; numerous teeth, alternately inserted in a single row. Pectunculi are easily recognized by their rounded or lenticular form. Muscular impressions two, and strongly marked. Recent pectunculi are found at depths varying from five to seventeen fathoms in sandy mud and sands. Fossil pectunculi are met with in the London clay and calcaire grossier, and in the Bognor sandstone.

**PE'DATE.** (*pedatus*, Lat. from *pes*, a foot.) In botany, applied to leaves in which a bifid petiole connects several leaflets on the inside only; also to a peculiar kind of ternate leaf, its lateral leaflet being compounded in the fore part: the black hellebore is an example.

**PE'DICLE.** (*pediculus*, Lat. a little foot.) The support of the *Lepas* anatifera, and its corresponding species, by which they are attached to wood, &c.

**PE'DICEL.** In botany, a partial flower-stalk, or a subdivision of the general one, each subdivision being termed a pedicel.

**PEDI'GEROUS.** (from *pes*, a foot, and *gero*, to bear, Lat.) Having legs; thus the body of the myriapod is divided into numerous *pedigerous* segments.

**PEDIPA'LPI.** The second family of Arachnidans. They have very large palpi terminated by a forceps or claw. The principal animals among the pedipalps are the scorpions, possessing powerful organs for seizing their prey, and having a tail terminating in a deadly sting. The other pedipalps are not armed with a sting.

**PE'DUM.** (*pedum*, Lat. a shepherd's crook.) A genus of marine bivalvular shells found attached by a byssus to rocks. It is an eared inequivalved bivalve, gaping at the lower valve, and having its beaks separated: hinge toothless; ligament exterior; inferior notch grooved. This genus does not appear to have been found fossil.

**PE'DUNCLE.** (*pedunculus*, Lat. from *pedo*, a splay foot.)

1. In botany, the stalk that bears the flower and fruit.

2. In conchology, a sort of stem by which the shells of the second division of *lepas* are attached to wood, &c.

**PEDU'NCULATE.** } Attached to objects such  
**PEDU'NCULATED.** } as wood, rocks, &c.,  
by a peduncle; having a peduncle.

**PEGMATITE.** A name given by the French mineralogists to a variety of granite composed of granular quartz and felspar.

**PELA'GIAN.** } (*pelagus*, Lat. the sea.) Be-  
**PELA'GIC.** } longing to the sea. Mr.

Lyell says, "belonging to the deep sea."

**PELA'GIAN FORMATIONS.** Oceanic accumulations; deposits by currents, or from other causes, at the bottom of the sea.

**PE'LIOM.** (from *πελιωμα*, Gr. blueness, or of a lead colour.) A blue coloured mineral resembling iolite, of which it is a variety. It is found in Bavaria.

**PE'LLICLE.** (from *pellicula*, Lat. dim. of *pellis*, a little skin, *pellicule*, Fr. *pellucella*, It.) A film; a thin crust or covering.

In botany, a membranous or mucilaginous covering, closely adhering to the outside of some seeds, so as to conceal their proper surface and colour.

**PELTA'TE.** (from *pelta*, Lat. a target.) In botany, a term applied to leaves which have their footstalk inserted in the middle of the leaf, and not joined to the edge; the nasturtium is a familiar example.

**PE'LVIS.** (*pelvis*, Lat. from *πέλυς*, Gr. a basin.) The lower part of the trunk of vertebrated animals.

**PE'NCIL.** A name given to the belemnite.

**PE'NNATE.** } (*pennatus*, Lat. from *penna*, a  
**PE'NNATED.** } wing.) Winged; feathered.

**PENNA'TULA.** Called, commonly, the sea-pen. A polypus with a calcareous axis or stem, having a double set of branches extending in the same plane from both sides, like the vane of a quill. Pennatulæ are not fixed by any attachment to the ground, but float about in the waters of the ocean, carried hither and thither as the current may direct them.

**PE'NNIFORM.** (from *penna*, a feather, and *form.*) Having the form of a feather or quill. In anatomy, muscles in which the muscular fibres pass obliquely outwards on either side from a tendinous centre, are termed penniform. The rectus femoris affords an illustration of a penniform muscle.

**PENTACA'PSULAR.** (from *πέντε*, Gr. five, and *capsula*, Lat. a cell or capsule.) Having five cavities, capsules, or cells.

**PENTA'CEROS RETICULA'TUS.** A fossil species of *asteria*, or *stella marina*.

**PENTA'CEROS DENTIGINO'SUS.** A fossil species of *asteria* or *stella marina*, found in the chalk and in the London clay.

**PENTA'CRINITE.** (from *πέντε*, five, and *encrinite*.) So called from the pentagonal formation of its vertebral column. The fossil pentacrinus. Pentacrinites abound in the lower strata of the oolite formation, and especially in the lias; but disappear entirely in the uppermost formations. From this circumstance geologists were disposed to limit their existence to certain periods, and to conclude that the pentacrinite furnished the re-

mains of an extinct genus. Subsequent discoveries, however, prove that the pentacrinus does still exist; two species, the *Pentacrinus caput medusæ*, and the *Pentacrinus europæus*, having been lately discovered. Thus, probably, it may be with many genera which, in ignorance, geologists describe to be extinct, merely because they have not met with living or recent specimens.

**PENTA'CRINUS.** This animal consists of an angular flexible column, composed of numerous joints, articulating by means of cartilage, and perforated for the transmission of a siphon, or intestinal canal, and sending forth at intervals, in whorls, several articulated cylindrical branches, curving into a hook at their summit; fixed at its base, and supporting at its free extremity a cup-like body, containing the mouth and larger viscera, consisting of several pieces, terminating above in five or six dichotomizing, articulated, semi-cylindrical arms, fringed with a double series of tentacular jointed digitations, furnished below on each side with a series of minute suckers. These arms, when expanded, resemble a star of five (or six) rays; and when they converge, a pentapetalous or hexapetalous flower. The whole animal, when alive, is supposed to be invested with a gelatinous muscular integument.—*Rev. W. Kirby, Bridg. Treatise.*

Two species of the genus pentacrinus have been lately obtained; one, the *Pentacrinus caput medusæ*, from the bottom of deep seas in the West Indies; the other, *Pentacrinus europæus*, has been found on the coast of Ireland, attached to different kinds of *Sertularia* and *Flustracea*. The calcareous joints which compose the fingers of the pentacrinus europæus, are capable of expansion and contraction in all directions; now spreading outwards, like the petals of an expanded flower, and again rolled inwards towards the mouth in the form of a closed bud. These organs serve to seize, and convey to the mouth, the food of the animal. The number of bones in each animal is computed at thirty thousand. Dr. Buckland says that the number of bones in the Briarean Pentacrinite, a species beautifully described in his admirable *Bridgewater Treatise*, exceeded a hundred and fifty thousand. The number of bones in the fingers and tentacula amount at least to a hundred thousand, and fifty thousand more, which is considerably under the real number, may be added for the ossicula of the side arms. Each bone requiring at least two fasciculi of fibres, one for expansion, the other for contraction, the Briarean *Pentacrinus*

must have had three hundred thousand fasciculi of fibres equivalent to muscles.

**PENTADA'CTYL.** (from *πέντε*, five, and *δάκτυλος*, a finger, Gr.) Having five fingers. Applied also to leaves.

**PE'NTAGON.** (from *πέντε*, five, and *γωνία*, an angle, Gr. *pentagono*, Fr. *pentagono*, It.) A figure having five sides and five angles.

**PENTA'GONAL.** (*pentagone*, Fr. *pentagonale*, It.) Having five angles and five sides; quinquangular.

**PENTAGONA'STER SE'MILUNATUS.** A fossil species of the *stella marina*, found in the chalk pits of Kent.

**PENTAGONA'STER REGULA'RIS.** A fossil asterite, or species of *stella marina*, found in the chalk pits of Kent.

**PE'NTAGYN.** (from *πέντε*, five, and *γυνή*, a woman, Gr.) A plant which has five pistils.

**PENTAHE'DRAL.** Having five equal sides.

**PENTAHE'DRON.** (from *πέντε*, five, and *ἔδρα*, a base, Gr.) A figure of five equal sides.

**PENTA'NDER.** (from *πέντε*, five, and *άνηρ*, a man, Gr.) A plant having five stamens.

**PENTA'NDRIAN.** Five stamens; having five stamens.

**PENTAPHYLLOIDAL.** (from *πέντε*, five, *φύλλον*, a leaf, and *εἶδος*, resemblance, Gr.) Appearing to have five leaves; resembling five leaves. The *Placentæ* are all ornamented with a pentaphylloidal flower.

**PENTE'LA'SMIS.** (from *πέντε*, five, and *ἔλασμα*, a plate, or layer, Gr.) A species of *Anatifa*, or of the *Lepas* of *Linnaeus*.

**PEPERI'NO.** The name given by Italian geologists to a particular form of volcanic tuff, composed of basaltic scoriæ.

**PERA'MELES.** A genus of marsupialia. The following description is from Major Mitchell's *Australia*. "The most remarkable incident of this day's journey was the discovery of an animal, of which I had seen only the head amongst the fossil specimens of Wellington valley. This animal was of the size of a wild young rabbit, and of nearly the same colour, having a broad head, terminating in a long very slender snout, like the narrow neck of a wide bottle; and no tail. The feet, and especially the fore legs, were singularly formed; the latter resembling those of a hog, and the marsupial opening was downwards, and not upwards, as in the kangaroo and others of that class of animals. This animal was discovered by our natives on the ground, but when pursued it took refuge in a hollow tree, from which they took it alive; all of them declaring that they had

- never before seen an animal of that kind. The original has been deposited in the Sydney Museum; but having shown to my friend Mr. Ogilvy a drawing of it, he has noticed the discovery in the Proceedings of the Geological Society for 1838, describing the animal as belonging to a new genus closely allied to *Perameles*, but differing in the form of the fore feet, which have only two middle toes resembling those of a hog, and in the total absence of tail. This genus requires to be verified by an examination of the specimens at Sydney. It may eventually turn out to be a real *Perameles*, and in that case be called *Perameles Ecaudatus*, or, if generally distinct, *Chæropus Ecaudatus*.'
- PERCOLATE.** (from *per*, through, and *colo*, to strain, or filter.) To filter through; to strain through; to run through the pores, as through a filter.
- PERCOLATION.** Filtration; the act of running through the interstices of a stratum, as the percolation of water.
- PERENNIAL.** (*perennis*, Lat. *perenne*, It.) In botany, applied to plants that live many years, bearing flowers and fruit frequently.
- PERFOLIATE.** In botany, applied to leaves when the stem appears to pass through their substance. The common hare's-ear is an example.
- PERIANTH.** (from *περι*, about, and *ἄθος*, a flower, Gr.) The calyx is so called when it is united with the corolla, so as to form only one floral envelope.
- PERICARDIUM.** (from *περι*, round, and *καρδία*, the heart, Gr. *péricarde*, Fr. *pericardio*, It.) The membrane which envelops the heart.
- PERICARP.** (from *περι*, round, and *καρπός*, fruit, Gr. *péricarpe*, Fr.) The ovarium, when ripened into fruit, is called the *pericarp*; this consists of three parts, which in some fruits, as the peach and plum, are easily separable. The outer skin is called *epicarp*; the fleshy part, the *sarcocarp*; the stone, or shell, the *endocarp*. There are ten different kinds of *pericarps*, namely, *drupe*, *pome*, *berry*, *follicle*, *silique*, *silicle*, *legume*, *capsule*, *nut*, and *strobile*.
- PERICLINIUM.** The name given by foreign botanists to a kind of involucre. See *Periphoranthium*.
- PERIDOT.** The name given by Haüy to prismatic chrysolite.
- PERIGÉE.** (from *περι*, round, and *γή*, the earth, Gr. *périgée*, Fr.) A term used to denote that point where the sun is nearest to the earth. The perigee of the lunar orbit is the point where the moon is nearest to the earth.
- PERIGYNOUS.** (from *περι*, about, and *γυνή*, a woman, Gr.) Inserted around the pistil. When the stamens grow out of the corolla, calyx, or perianth, or are not in any way joined to the seed-vessel, they are said to be *perigynous*.
- PERIOSTEUM.** (from *περι*, around, and *ὄστέον*, a bone, Gr. *perioste*, Fr.) The membrane which covers all the bones; that, however, which covers the bones of the skull is called the *pericranium*.
- PERIPHORANTHIUM.** When bracts are collected into a whorl, as in umbelliferous plants, they are said to form an involucre, which, if very small, receives the diminutive name of *involucel*. This kind of organ is very remarkable in compound-flowered plants, appearing as if it constituted a calyx common to many flowers; and hence it used to be called a common calyx. It, however, does not differ from the involucre in any thing more than its bracts being more numerous, more closely packed, and parallel with each other, instead of diverging. Foreign botanists have given the names *Periphoranthium* and *Periclinium* to this kind of involucre.
- PERNA.** A genus established by Bruguères. A flat, irregular, subequivalve, compressed, foliaceous, marine, bivalve. Several parallel cavities across the hinge opposed to each other in the two valves, and lodging as many elastic ligaments: anterior margin with a passage for a byssus. Recent *Pernæ* are found at depths varying to ten fathoms; they are littoral shells; moored by their byssus to mangrove trees and corals. Fossil *Pernæ* have been found on the borders of the Rhine.
- PERSISTENT.** (from *persisto*, Lat. to abide.) In botany, opposed to deciduous. Not withering and falling; remaining.
- PERSONATE.** A term applied to a monopetalous flower of an irregular form, the border of the corolla having an oral appearance with the labia closed.
- PERVIOUS.** (*pervius*, Lat.) Admitting passage; capable of being penetrated.
- PÉTAL.** (*πέταλον*, Gr. *pétale*, Fr.) The name given to each leaf of the corolla, or flower of a plant.
- PÉTALITE.** A mineral, of a reddish, or greyish-white colour, which has only been found in Sweden. It consists of silica 77·0, alumina 17·0, lithia 6·0; or according to others, of silica 76·21, alumina 17·22, lithia 5·76. It occurs in a mine of black iron-ore, associated with *spodumene*, *felspar*, *tourmaline*, *mica*, and *quartz*. Its fracture is foliated; scratches glass; brittle, and translucent at the edges. Specific gravity 2·62.
- PÉTIOLE.** (from *petiolus*, Lat. the stalk of fruits.) In botany, a foot-stalk; the

stalk, or stem, which connects the leaf with the branch.

**PETRI'COLA.** (from *πέτρος*, a stone, Gr. and *colo*, to inhabit, Lat.) A genus of transverse, inequilateral, bivalve, marine shells, belonging to the family Lithophagi. Two muscular impressions; two hinge-teeth on one valve, and a bifid one on the other; anterior side rounded, posterior side more or less slightly gaping; ligament external. Petricolæ are found at depths varying to ten fathoms; they inhabit cavities, of their own working, in rocks and shells. They may be distinguished from saxicava by the regularity of their form, and by the teeth on the hinge, which in saxicava become obsolete when the animal is full grown.

**PETRIFA'CTION.** (*pétrification*, Fr.) A substance converted into stone. Substances, either animal or vegetable, converted into stone by the infiltration, or incrustation, of siliceous matter.

**PETRE'SCENT.** (from *petrescens*, Lat.) Becoming stone; growing into stony matter.

**PETRO'LEUM.** (*petrole*, Fr.) A mineral oil, rather thicker than tar, and of a reddish-brown colour; it has obtained its name from the circumstance of its oozing out of rocks like oil. In the East it is burnt as oil. It is unctuous to the touch, and exhales a strong and unpleasant odour. It is lighter than water, its specific gravity being 0.87. In the island of Zante, petroleum is at the present time obtained from the same spot, and in the same manner, as in the days of Herodotus. The most powerful springs producing petroleum are on the Irawaddi, in the Burman empire. In one locality there are said to be 520 wells, yielding annually 400,000 hogsheads of petroleum. It occurs in most countries where coal is found.

**PETROS'I'LEX.** A fusible variety of hornstone; according to some authors, the same as clinkstone; to others, compact felspar.

**PETUN'TZE.** The felspathic *pétuntzé* of Brongniart. A variety of felspar, used in the manufacture of porcelain. It is called *Petuntze* by the Chinese.

**PET'WORTH MA'RBLE.** Called also Sussex marble, occurs in layers varying from a few inches to a foot and upwards in thickness, separated from each other by seams of clay. The *Petworth* or *Sussex* marble is a limestone of various shades of colour, occurring in the *Weald* clay; it is composed of the remains of fresh-water univalves, shells of the *paludina*, and crusts of the *cypris faba*, united into a compact marble by a gangue of calcareous cement. The more compact varieties

bear a beautiful polish, and are elegantly marked, when cut into slabs, by the sections of the contained shells.

**PHÆNOGA'MOUS.** (from *φαίνω*, to shew, and *γάμος*, marriage, Gr.) The name given to such plants as have the stamens and ovarium distinctly visible.

**PHA'LANK.** Pl. Phalanges. (*φάλαγξ*, Gr. *phalange*, Fr. *falange*, It.) The bones composing the fingers and toes are termed the phalanges.

**PHANEROGA'MIC.** } (from *φανερός*, mani-  
**PHANEROGA'MOUS.** } fest, and *γάμος*, marriage, Gr.)

Plants in which the stamens and ovarium are distinctly visible; plants having the reproductive organs visible. In all the *phanerogamous* plants the whole of the double apparatus required for reproduction is contained in the flower. The term is used in contradistinction to *cryptogamous*.

**PHARMA'COLITE.** The name given by Brochant to arseniate of lime.

**PHASIANE'LLA.** (from *phasianus*, Lat. a pheasant.) A genus of shells belonging to the family Trochoida; or, according to Lamarck's arrangement, Turbinacea. It is a solid ovate or conical univalve; opening longitudinal, ovate, and entire; lip thin; columella smooth, with an attenuated base. Recent phasianellæ are inhabitants of the Indian ocean, they are found on the coasts and in estuaries, at small depths only. These shells are marked with beautiful lines of various colours, and are much esteemed and sought after for their beauty.

Two species of Phasianella have been found fossil at Grignon, *P. turbinoides*, and *P. semistriata*.

**PHI'LLIPSITE.** A mineral, found accompanying Herschelite. It is a species of Harmotome or cross-stone, containing lime and potash instead of baryta.

**PHO'LAS.** (*φωλάς*, from *φωλέω*, Gr. to lie concealed.) A genus of marine bivalves, belonging to the family Includa; or, according to Lamarck's arrangement, the family Pholadaria. A transverse gaping shell, composed of two principal valves, with several small accessory pieces placed on the ligament or at the hinge. A long curved tooth protrudes in each valve from beneath the umbones. Pholades are found at depths varying to nine fathoms; they pierce wood, rocks, indurated clay, &c. They are much sought for in consequence of their delicious flavour. The history of none of the boring bivalves, says Mr. Kirby, is more interesting than that of the Pholads, or stone-borers. These animals are defended by two very fragile shells, strengthened indeed by supplementary pieces, and rough like a file, inhabited by a very soft animal which

appears to be furnished with no organs adapted to boring so hard a substance as a rock. When the young are disclosed from the egg, being cast upon the rock in which their mother resides, they bore a hole in it which they enlarge daily, and which they never leave, unless compelled by force. This hole always communicates with the water, and is the orifice through which the animal exerts its double siphons. One of these siphons is its mouth, and the other its anal orifice. Poli says they use their foot as an augur in excavating their crypts, the shell revolving upon it as upon an axis. Pholades possess a remarkable degree of phosphorescent property.

Fragments of fossils belonging to this genus are found in Essex.

**PHO'LADITE.** A fossil or petrified pholas.

**PHOLIDOPHORUS.** A genus of fishes of the Wealden formation that prevailed during the oolitic period, but believed to be now quite extinct.

**PHO'NOLITE.** (from *φονη*, sound, and *λίθος*, a stone, Gr.) Another name for clinkstone. A felspathic rock, sonorous when struck with a hammer, from which circumstance it derives its name. When the texture of basalt is compact, and its felspar greatly prevails, it passes into phonolite; its colour is generally grey, or greenish-grey. Again, when phonolite has a more earthy texture it passes into claystone.

**PHO'SPHATE.** A salt formed by the union of phosphoric acid with a salifiable base.

**PHO'SPHATE OF LIME.** This is found in the bones of animals, and constitutes their base, as well as in the mineral kingdom. It consists of lime 59.0, phosphoric acid 41.0. It is destitute of taste, insoluble in water, and not affected by exposure to the atmosphere. Exposed to a very high temperature it becomes soft, and is converted into a white semitransparent enamel, or rather porcelain. Human bones, according to Berzelius, contain 51.04 of phosphate of lime, and the enamel of teeth, according to Mr. Pepsy, is composed of 78 per cent. of it. Sulphuric, nitric, muriatic, fluoric, and several vegetable acids are capable of more or less decomposing phosphate of lime. Mineral phosphate of lime contains several species, namely apatite, asparagus stone, &c., which are described under their several names.

**PHOSPHORESCENCE OF THE SEA.** This luminous appearance of sea-water arises from the presence of immense numbers of microscopic medusæ which people every region of the ocean, and, being specifically lighter than the sea-water,

float in incalculable multitudes on its surface.

**PHOSPHORESCENT.** Emitting light in the dark without sensible heat.

**PHO'SPHORITE.** Amorphous phosphate of lime. The *chaux phosphatée terreuse* of Haiüy; phosphorite of Werner; phosphorite of Jameson. A variety of apatite, with commonly an earthy aspect: it occurs in masses whose surface often displays mamillary projections. Fracture dull and earthy. Colour white or grey, often marked with spots or zones of a brownish tinge. Specific gravity from 2.8 to 3.2. Before the blow-pipe it is infusible, but its powder thrown upon live coals emits a yellowish-green phosphorescent light. In Spain it forms whole mountains; it is also met with in Germany. According to Pelletier, it contains lime 59.0, phosphoric acid 34.0, and the remainder consists of the carbonic, fluoric, and muriatic acids, with a trifling portion of silex and oxide of iron.

**PHO'SPHORUS.** (*φωσφόρος*, Gr. *phosphorus*, Lat. *phosphore*, Fr.) One of the fifty-five simple or elementary substances, and belonging to that sub-division termed non-metallic. Phosphorus is principally known as entering into the chemical composition of animals. As a component part of minerals, phosphorus is rare; but there must be some amount of it entombed in fossiliferous rocks. Phosphorus is never found pure in nature, and is only to be obtained from organic matter by elaborate chemical processes. It is yellow, and semi-transparent; resembling wax in softness, but more cohesive and ductile. Specific gravity 1.77. Its affinity for oxygen is so great that it burns spontaneously in the atmosphere. It should always be kept in bottles filled with water, and well corked.

**PHYLLA'DE.** The name given by D'Aubuisson, and the French geologists, to clay-slate.

**PHY'SALITE.** A variety of prismatic topaz, of a greenish-white colour. It occurs in coarse granular concretions, having a low degree of lustre. Edges feebly translucent. It consists of alumina 57.75, silica 34.30, fluoric acid 7.82. It is found at Finbo, in Sweden, and at Altenberg, in Saxony.

**PHY'LLITE.** (from *φύλλον*, a leaf, and *λίθος*, a stone, Gr.) A petrified leaf.

**PHY'SICAL.** (*physique*, Fr. *fisico*, It.) Relating to nature or to natural philosophy; not moral; pertaining to material things.

**PHYSICS.** (from *φύσις*, nature, Gr.) Taken in its most enlarged sense, comprehends the whole study of nature; but in the usual acceptation of the word, that branch of science which treats of the properties

of natural bodies, and it includes natural history and philosophy.

**PHYTIVOROUS.** (from *φυτόν*, Gr. a plant, and *voros*, Lat. to devour.) Feeding on plants.

**PHYTOLITE.** (from *φυτόν*, a plant, and *λίθος*, a stone, Gr.) A petrified or fossilized plant.

**PHYTOLOGIST.** (from *phytology*.) One skilled in the structure, &c. of plants.

**PHYTOLOGY.** (from *φυτόν*, a plant, and *λόγος*, discourse, Gr.) That department of science which treats of the nature, habits, qualities, &c. of plants.

**PHYTOPHAGOUS.** (from *φυτόν*, a plant, and *φαγῆν*, to eat, Gr.) Feeding on plants; devouring plants; feeding upon vegetable substances.

**PHYTOSAURUS.** A fossil saurian discovered in the saliferous formation.

**PHYTOZOA.** (from *φυτόν*, a plant, and *ζῶον*, an animal, Gr.) Plant-like animals. Another, and more modern, as well as appropriate, name for zoophytes.

**PIGMENTUM NIGRUM.** A dark brown, or nearly black substance, which covers the surfaces of the choroid membrane of the eye, and gives to it its colour.

**PILEUS.** The name given to a genus of fossil echini; pileus is another name for conulus.

**PILLAR.** In conchology, the columella, or perpendicular centre, which extends from the base to the apex, in most of the spiral shells.

**PILLAR-LIP.** In conchology, a continuation of the glossy process with which the aperture of shells is lined, expanded on the columella.

**PILOSE.** (*pilosus*, Lat.) In entomology, covered with dispersed, long, and bent hairs.

**PI'MELITE.** A variety of steatite, coloured by chrome or nickel.

**PI'NEAL GLAND.** (from *pineus*, Lat. a pine.) The name given to a gland of the brain from its supposed resemblance to a pine. This gland was at one time supposed to be the seat of the soul.

**PINNA.** (*pinna*, Lat. the fin of a fish.) A genus of marine bivalves belonging to the family Mytalacea. A cuneiform, longitudinal bivalve, with an acute base, the upper part gaping; hinge without a tooth, lateral, and very long; valves coalescent. Recent pinnae are found in the ocean at depths varying to seventeen fathoms; they are moored by a long silky byssus, which has been manufactured into stockings and gloves. Pinnae have been found fossil at Grignon, and in the limestone of Gloucestershire, Wiltshire, and Somersetshire.

**PI'NNITE.** A fossil pinna.

**PI'NNATE.** (*pinnatus*, Lat. winged.) In

botany, applied to compound leaves, composed of many leaflets, placed on each side of the petiole; these are placed in pairs opposite to each other, and, in some cases, an odd leaflet at the termination, or, in others, a tendril: of the former the rose furnishes an example; of the latter, the vetch.

**PINNA'TIFID.** In botany, applied to leaves cut transversely into several deep, oblong, parallel segments, the incisions reaching nearly to the midrib, and dividing the leaf into irregular forms, termed lobes. The groundsel affords a familiar illustration.

**PIPE-CLAY.** The Pfeifenthon of Werner. This is the purest kind of potter's clay, and is called pipe-clay, from its being manufactured into tobacco-pipes. It is of a grey or greyish white colour; is infusible; and on exposure to a strong heat it becomes white. It is abundant in Devonshire and Staffordshire.

**PISCIVOROUS.** (from *piscis*, a fish, and *voros*, to devour, Lat.) Feeding on fishes; devouring fishes; subsisting on fishes.

**PI'SIFORM.** (from *pisum*, a pea, and *forma*, form, Lat.) Of the form of a pea; having a structure resembling peas. Granular iron ore is called pisiform iron ore, from its containing small rounded masses of the size of a pea.

**PI'SIFORM IRON ORE.** } The pea ore of  
**PI'SIFORM IRON STONE.** } Jameson; pisiform iron stone of Kirwan. A variety of argillaceous oxide of iron, occurring in small masses or grains, nearly or quite spherical, and often equal in size to a pea, or even larger. These globules are composed of thin, concentric layers, which decrease in density as they approach the centre. The exterior layers are compact, and present an even, glistening fracture with a resinous lustre, whereas the centre of the grain is almost always friable, and has a dull earthy fracture. They are easily broken, and may be cut by a knife. Specific gravity 3·40. These grains, sometimes solitary, are generally united by a ferruginous cement, either calcareous or argillaceous, which adheres to their surface. This variety is composed of oxide of iron 71·5, water 14·5, silex 7·5, alumine 3·5, oxide of manganese 0·5. It is abundant in France, Switzerland, and Germany; occurring in secondary rocks. It sometimes contains fossil shells, which become penetrated with oxide of iron.—*Cleave-land.*

**PI'SOLITE.** (from *πίσσον*, a pea, and *λίθος*, a stone.) So called from its resembling an agglutination of pease. The pisolithe of Brongniart; the peastone of Jameson.

Pisolite is nearly or quite opaque, and consists of small rounded masses, composed of concentric layers, each concretion having a grain of sand for its nucleus, or centre. These concretions, agglutinated by a calcareous cement, form masses of considerable magnitude, and sometimes continuous beds.

**PISOLITIC.** Composed of pisolite; containing pisolite; resembling pisolite.

**Pi'STACITE.** Another name for epidote. See *Epidote*.

**Pi'STAZITE.** See *Epidote*.

**Pi'STIL.** (from *pistillum*, Lat. *pistil*, Fr.)

In botany, the female organ of the plant; situated in the centre of the flower, and forming the rudiments of the fruit. A perfect pistil is composed of three parts, the ovarium, the style, and the stigma. Each modified leaf which forms the pistil, is called a carpellum: the carpella are so folded that the margins of the leaf are next to the axis, or centre; and from these a species of bud is produced, which is the seed. The form of the pistil must depend on that of the carpella, on their number, and on their arrangement.

**PITCH-STONE.** A vitreous lava, of a blackish-green, or a nearly black colour; a semi-vitreous substance having the lustre and appearance of pitch, and containing a portion of bitumen. Specific gravity from 2.29 to 2.64. Before the blow-pipe it whitens, tumescens, and fuses into a porous, whitish enamel. It consists of silex 73.0, alumine 14.5, soda 1.75, lime 1.0, oxides of iron and manganese 1.1, water 8.50. Pitch-stone occurs in veins and in beds; sometimes forming whole mountains.

**PIT COAL.** The coal usually consumed in our houses, and thus called from its being dug out of pits. See *Coal*.

**PLAC'ENTA.** (*placenta*, Lat. a cake, *placenta*, Fr.)

1. In anatomy, the medium of communication between the mother and the fœtus.

2. In botany, that part of the ovarium to which the seeds are attached.

3. In fossilogy, the name given by Klein to a section of catocysti, from the shells being flat, like a cake. They are all ornamented with a pentaphylloid flower. The mouth is in the middle of the base, and the anal orifice near the margin. Placentæ are divided by Klein into three genera, mellita, laganum, and rotula.

**PLACOI'DIAN.** (from *πλαξ*, a broad plate, and *ειδος*, form, Gr.) One of the orders into which M. Agassiz divides the class of fishes. The placoidians are distinguished by their skin being irregularly covered with plates of enamel. In this order are comprised all the cartilaginous

fishes of Cuvier, the sturgeon only excepted.

**PLACOI'DIAN.** Belonging to the order of Placoidians.

**PLAGIO'STOMA.** (from *πλάγιος*, oblique, and *στόμα*, mouth, Gr.) A genus of sub-equivalve, inequilateral, oblique shells, known only in a fossil state. The plagiostoma is one of the most characteristic shells of the chalk formation. Several species are known, namely, *P. spinosum*, *P. Hoperi*, *P. elongatum*, *P. asper*, &c. The *Plagiostoma spinosum* for the long slender spines attached to its upper valve. The spines arise from costæ, which radiate from the beaks to the margin, but without any regularity: they vary in number from fifteen to twenty, and some of them are two inches and upwards in length. They are very numerous in the chalk pits between Shoreham and Bramber, but there is great difficulty in extricating them from the surrounding chalk without breaking the spines.

**PLANO'RBI.** (from *planus*, flat, and *orbis*, an orb, Lat.) A genus of discoidal, fresh-water univalves, resembling the ammonite, but not chambered. *Planorbis* belongs to the family *Pulmonea* in Cuvier's arrangement, and to *Lymnæa* in Lamarck's and Blainville's. *Planorbis* may be distinguished from helices by the slight increase of the whorls of their shell, by the convolutions being nearly in one plane, and by the aperture being wider than it is high. All the shells of this genus are reversed: they abound in pools and ditches.

From the delicacy of their structure, as well as the slight degree of mineralization they have undergone, planorbis are rarely obtained as fossils in a perfect state. Three species have been found in the neighbourhood of Paris. Two species are mentioned as found in the alluvial deposits of Sussex; and planorbis are also found in the fresh-water strata of the Isle of Wight.

**PLA'SMA.** A grass-green variety of rhombohedral quartz. Fracture conchoidal; lustre feeble and resinous. It occurs in beds associated with common chalcidony. It is brought from Italy and the Levant: it was worn by the Romans, and formed into ornamental articles of dress.

**PLA'STER OF PA'RIS.** A sub-species of gypsum. See *Gypsum*.

**PLA'STER STONE.** Another name for plaster of Paris.

**PLA'STIC CLAY.** (from *πλαστικός*, Gr. fit for the art of fashioning, *plastique*, Fr.) A name given to one of the beds of the eocene period, from its being used in the manufacture of pottery. The plastic clay

and the London clay are deemed by some geologists as one formation, and, although separated by others, the line of separation appears to be quite arbitrary. The plastic clay is in some places of great thickness, amounting to four or five hundred feet; in other parts, where present, it is very thin. It is a marine deposit, oysters and other marine shells being found in it.

**PLA'STRON.** (*plastron*, Fr.) A name given to the sternum of reptiles.

**PLATI'NA.** } (*platina*, Spanish, from *plata*,  
**PLATI'NUM.** } silver.) A metal, constituting one of the fifty-five simple or elementary bodies. Platinum was not known in Europe till Mr. Wood brought some of it from America in 1741. When pure, it is of a white colour, like silver, but not so bright. It has neither taste nor smell. It is exceedingly malleable and ductile; it may be hammered into plates of extreme thinness, and Dr. Wollaston succeeded in drawing out a wire of this metal to the fineness of 1-10,000th of an inch. Platinum is one of the most infusible of metals, not yielding before the utmost heat of the furnace; it is soluble in chlorine and nitro-muriatic acid. It was first obtained from Choco and Santa Fé, in South America; it has since been discovered in the Brazils, Spain, and in the Ural mountains, in Siberia. In the ore of platinum four new metals have been discovered, namely iridium, palladium, osmium, and rhodium.

**PLEROSA'URUS.** A fossil saurian of the lias and oolite.

**PLESIOSAU'RUS.** (from *πλησιον*, near to, and *σαυρα*, a lizard, Gr.) A genus of extinct amphibious animals, nearly allied to the Ichthyosaurus. Cuvier says this inhabitant of the ancient world, is perhaps the most heterogeneous, and appears to merit the name of monster above all others. It united the teeth of a crocodile to the head of a lizard; its neck was of enormous length, exceeding that of its body, and resembling the body of a serpent; it possessed a trunk and tail of the proportions of an ordinary quadruped; to all these were added the paddles of a whale. The teeth were conical, very slender, curved inwards, finely striated on the enamelled surface, and hollow throughout the interior. Five or six species of the plesiosauri are known; they appear to have lived in shallow seas and estuaries, and, in the opinion of some, they swam upon or near the surface, having the neck arched, like the swan, and darting it down at the prey within reach. Prodigious numbers of remains are found in the lias. Vertebræ and teeth are found in the Hastings

beds. Some of the plesiosauri were upwards of twenty feet long.

**PLEUROCY'STI.** The third class of echini.

**PLEUROTOMA'RIA.** A fossil genus of turbinated, spiral, univalve shells belonging to the family Turbinacea. They are found only fossil, and occur in the inferior oolite.

**PLI'CATED.** (from *plico*, Lat. to fold.) Plaited; folded.

**PLI'OCENE.** (from *πλείων*, more, and *καινος*, recent, Gr.) The name given by Mr. Lyell to a division of the supracretaceous group, or tertiary strata. The tertiary series Mr. Lyell divided into four principal groups, namely, the eocene, the miocene, the older pliocene, and the newer pliocene, each characterized by containing a very different proportion of fossil *recent* species. The newer pliocene, the latest of the four, contains from ninety to ninety-five per cent. of *recent* fossils; the older pliocene contains from thirty-five to fifty per cent. of *recent* fossils; the miocene contains eighteen per cent. of *recent* fossils; the eocene contains only three and a half per cent. of *recent* fossils. In the newer pliocene deposits of the valley of Elsa, in Tuscany, six *living* species of testacea were recognized by M. Deshayes. The newer pliocene period is that which immediately preceded the recent era; the older pliocene period is that which intervened between the miocene and the newer pliocene. The newer pliocene formations occur in Sicily and Tuscany; the older pliocene at Nice, Perpignan, Norfolk, Suffolk, and near Sienna. Both the newer pliocene and the older pliocene exhibit marine as well as fresh-water deposits.

**PLUMBA'GO.** (*plumbago*, Lat.) Graphite. Commonly called black-lead. See *Black Lead*.

**PLU'MOSE.** } (*plumosus*, Lat. full of fea-  
**PLU'MOUS.** } thers.) Feathery; downy.

**PLU'MULE.** (from *plumula*, Lat. a little feather.) In botany, that part of the seed which grows into the stem and axis of the future plant. In the bean, horse-chestnut, &c. the plumule is distinctly visible, but in plants generally, it is scarcely perceptible without the aid of a magnifying glass; and in many it does not appear till the seed begins to germinate. The first indication of development, whenever the seed begins to germinate, is the appearance of the plumule, which is a collection of feathery fibres, bursting from the enveloping capsule of the germ, and which proceeds immediately to extend itself vertically upwards.

**PLUTO'NIC.** (from *Pluto*, one of the hea-

then deities.) A name given to certain rocks elaborated in the deep recesses of the earth.

**PLUTONIC ROCKS.** Unstratified crystalline rocks, such as granites, greenstones, and others, of igneous origin formed at great depths from the surface. Plutonic rocks are distinguished from those which are called volcanic, although they are both igneous; plutonic rocks having been elaborated in the deep recesses of the earth, while the volcanic are solidified at or near the surface.

**PNEUMATICS.** (from *πνευματική*, Gr.)

That branch of science which relates to the equilibrium or movements of aerial fluids under all circumstances of pressure, density, and elasticity. The weight of the air, and its pressure on all the bodies on the earth's surface, were quite unknown to the ancients, and only first perceived by Galileo, on the occasion of a sucking-pump refusing to draw water above a certain height. The manner in which the observed law of equilibrium of an elastic fluid, like air, may be considered to originate in the mutual repulsion of its particles, has been investigated by Newton, and the actual statement of the law itself, as announced by Mariotte, "that the density of the air, or the quantity of it contained in the same space, is, *cæteris paribus*, proportional to the pressure it supports," has recently been verified by direct experiment. This law contains the principle of solution of every dynamical question that can occur relative to the equilibrium of elastic fluids, and is therefore to be regarded as *one of the highest axioms* in the science of pneumatics.—*Herschel*.

**POIKILITIC.** (from *ποικίλος*, Gr. various, variegated.) To the new red sandstone group, M. Brongniart has applied the name of Terrain Pœcilien. Mr. Conybeare has proposed to extend the term *Pœcilitic* to the entire group of strata between the coal formation and the lias, comprising the new red conglomerate, the magnesian limestone, the variegated sandstone, the shell limestone, and the variegated marl. Some common appellation, says Dr. Buckland, for all these formations has been long a desideratum in geology; but the word *pœcilitic* is, in sound, so like pisolite, that it may be better to adhere more literally to the Greek root, and apply the common name of *Poikilitic group* to the strata in question.

**POLLEN.** (*pollen*, Lat. fine flour.) In botany, the fecundating powder or dust contained in the anther. In dry and warm weather the anther bursts, and the pollen is thrown out.

**POLYGASTRICA.** (from *πολύς*, many, and *γαστήρ*, a stomach, Gr.) The lowest class of animals, belonging to Cyclo-neura, or Radiata.

When we place, says Professor Grant, a drop of any decayed infusion of animal or vegetable matter under a powerful microscope, and throw a light through that drop, and through the microscope to the eye, we discover in the drop of water various forms of living beings; some of a rounded, some of a lengthened form, and some exhibiting ramifications shooting in all directions, but all apparently of a soft, transparent, gelatinous, and almost homogeneous texture. In these minute animals there are numerous cavities or stomachs, in some of them being two hundred in number. There is every reason to believe that polygastrica exist in every drop of water. They form the food of other classes, more especially the zoophytes. Almost all the known genera of polygastric animalcules possess eyes: they are also found to possess an acute sense of taste; they distinguish, pursue, and seize their prey, and, although so excessively minute that five millions have been calculated as being contained in one drop of water, they avoid infringing on one another while swimming. All their movements appear to be as well directed, regular, methodical, and spontaneous, as those of the higher classes of swimming animals. These movements are effected by means of very minute, hair-like, tapering, transparent, vibratile filaments disposed frequently around the mouth, where they are generally largest and longest. There is no proper skeleton in the whole order polygastrica, nor any secretion of shell on the surface, yet there are parts destined to give support. Some of the polygastric animals exude on their surface a secretion which agglutinates foreign particles floating in the waters which surround them, and thus form for themselves a partial covering. In the majority of polygastric animals there is an alimentary canal, with an oral and an anal orifice, which traverses the body. No teeth for mastication, nor any glandular organs to assist in digestion, have been discovered in them. Notwithstanding their extreme minuteness, they appear to be the most numerous, the most prolific, the most active, and the most voracious of all living beings.—*Lectures on Comp. Anatomy, passim*.

**POLYGON.** (from *πολύς*, many, and *γωνία*, angle, Gr.) A geometrical figure of many angles.

**POLYGONAL.** (*polygone*, Fr.) Having many angles and sides.

**POLYHA'LLITE.** A mineral found at Ischel, in Austria. It occurs in masses of a fibrous texture. Lustre pearly. Specific gravity 2.76.

**POLYHÉ'DRON.** (from *πολύς*, many, and *ἔδρα*, side, Gr.) A solid contained under many planes or sides.

**POLYHÉ'DRAL.** } Having many sides or  
**POLYHÉ'DROUS.** } planes.

**POLYMI'GNITE.** (from *πολύς*, many, and *μίγνυμι*, to mix, Gr.) A newly discovered mineral, which has been thus named in consequence of the variety of its constituent parts. It consists of titanic acid, zirconia, lime, yttria, the oxides of iron, cerium, and manganese, with minute portions of magnesia, potash, silica, and oxide of tin. It is of a black colour; crystallized in small prisms; scratches glass; specific gravity 4.8. Fracture conchoidal. Lustre almost metallic.

**POLYPE.** The name given to each tube, surrounded with its tentacula, of the Polypus; Polypus designating the entire animal mass, composed of an aggregation of Polyypes.

**POLYPA'RIA.** } The fourth class of Radiata  
**POLYPI.** } or Zoophytes; thus named from a supposed resemblance to an Octopus, called Polypus by the ancients, this resemblance arising from the arrangement of the tentacula around the mouth.

These animals are commonly known as *Corals*. From an idea which long prevailed that these animals are allied to marine plants, they obtained the name of Zoophytes. The body is cylindrical or conical, sometimes possessing no viscus but its cavity; at others possessing a stomach, which is visible, and other organs. The greater number of Polyparia are inhabitants of the ocean, and from the ocean's depths they raise those immense reefs that at some future period may form a communication between the inhabitants of the temperate zones. Although Polyypi abound in every part of the ocean, still it is in the warmer regions that they grow in greatest luxuriance. The tentacula of Polyypi are exquisitely sensible, and are frequently seen, either singly or altogether, bending their extremities towards the mouth when any minute floating body comes in contact with them. A question arises, says Dr. Roget, with regard to the constitution of these Zoophytes, similar to that which has been proposed with regard to trees, namely, what limit should be assigned to their individuality? Is the whole mass, which appears to grow from one root, and which consists of multitudes of branches, proceeding from a

common stem, to be considered as one individual animal, or is it an assemblage, or aggregation of smaller individuals; each individual being characterized by having a single mouth, with its accompanying tentacula, and yet the whole being animated by a common principle of life and growth? The greater number of naturalists have adopted this latter view, regarding each portion as provided with a distinct circle of tentacula, as a separate animal, associated with its neighbours in the construction of a common habitation, and contributing its quota to the general nourishment of this animal republic.

**POLYPI'FERA.** } That class of animals com-  
**POLYPI'PHERA.** } monly known by the name of Zoophytes. They are carnivorous, feeding upon living animalcules. These animals precipitate immense quantities of carbonate of lime, especially in tropical seas.

**POLYPI'FEROUS.** Animals which have polyypi; zoophytes.

**POLYÉ'TALOUS.** (from *πολύς*, many, and *πέταλον*, a leaf of the corolla, Gr.) In botany, a term applied to a corolla which has the petals separate.

**POLYSE'PALOUS.** (from *πολύς*, many, and *σέπαλ*, the name given to the parts of which the calyx is composed.) In botany, a term given to a calyx which has its sepals separate from each other.

**POLYPOTHE'CIA.** A genus of spongy zoophytes found in flints. Miss Bennett, in her catalogue of the organic remains of Wiltshire, has described seven species.

**POLY'PTERUS.** A genus of fishes found in the Nile and in the rivers of Senegal. M. Agassiz has described two species. The Polypterus and Lepidosteus are the only known genera of living representatives of the sauroid fishes.

**POLYSPE'RMIOUS.** (from *πολύς*, many, and *σπέρμα*, seed, Gr.) In botany, a term applied to the ovarium and fruit when they contain many seeds.

**POLYTHA'LAMOUS.** (from *πολύς*, many, and *θάλαμος*, a chamber, Gr.) Having many cells or chambers, as *polythalamous* shells; multilocular; camerated.

**PORCELANA'CEOUS.** } Resembling porce-  
**PORCELANE'OUS.** } lain. Shells have been divided into two classes. The first are of a compact texture, have an enamelled surface, and are generally beautifully variegated. The shells of this class have been termed *porcelanaceous*, or *porcelaneous* shells; they contain but a small proportion of soft animal matter.

**PORCE'LLANITE.** A mineral of various colours, from grey to nearly black, occurring in amorphous masses or fragments, which are often rifted. Porcellanite

sometimes resembles a brick which has undergone a slight vitrification. Its fracture is imperfectly conchoidal or uneven, more or less glistening, and often has the aspect of certain porcelains. It is opaque, very brittle, and less hard than quartz. Before the blow-pipe it melts into a black scoria. An analysis of it yielded silice 60·75, alumine 27·25, potash 3·66, magnesia 3·00, oxide of iron 2·50. It is most likely an alteration of some variety of argillaceous slate by pseudo-volcanic fires: it does not constitute a distinct species. It is found in large masses near the pitch-lake in Trinidad, and occurs usually in the vicinity of coal mines.—*Cleveland.*

PORIFERA. } from *porus*, a pore, and  
 PORIPHERA. } *fero*, to bear.) A class of animals belonging to Cyclo-Neura, or Radiata. Poriphera constitute the second lowest class of animals, coming between Polypiphera and Polygas-trica. They form the various species of sponge which are met with in such multitudes on every rocky coast of the ocean, from the shores of Greenland to those of Australia. On the shores of the sea, says Professor Grant, when the tide has retired, rocks and other marine substances may be seen covered with a layer of a soft spongy substance, of various forms, colours, and consistence, sometimes hanging in branches from the cliffs which are covered by the sea, sometimes covering the surface of marine animals. This layer consists of beings which possess an organization extremely simple. Their surface is porous; those pores lead to canals which ramify through all parts of their texture; and those canals anastomosing into larger and larger trunks, lead, again, to orifices on the surface, from which there issue constant streams of water. The poriferous animals present various and remarkable forms in the skeleton; and the simple gelatinous body of the animal is supported by a skeleton composed of different kinds of earth: in one group the earth is silica; in another it is the carbonate of lime; in another it is a horny substance. The skeleton, thus composed, has been called the axis of the animal. The material of which the fleshy portion is composed is of so tender and gelatinous a nature, that the slightest pressure is sufficient to tear it asunder, and allow the fluid parts to escape; and the whole soon melts away into a thin oily liquid.

The surface of a living sponge presents two kinds of orifices; the larger of a rounded shape with raised margins, which form projecting papillæ; the smaller, minute and numerous, constituting the pores

of the sponge. It was long the received opinion that the superficial layer of gelatinous substance possessed a considerable degree of contractile power, nor was it till Prof. Grant clearly demonstrated that the sponge does not possess any such property that the illusion was dissipated. The porifera present a digestive system, which, by its form and simplicity, approaches the nearest to that of plants. The cellular tissue of their body is permeated in all directions by anastomosing and ramifying canals, which begin by minute superficial pores closely distributed over every part, and terminate in larger orifices variously placed according to the form of the entire animal. The pores are provided with a gelatinous network and projecting spicula, to protect them from the larger animalcules and floating particles. The internal canals, like the venous system, leading from capillaries to trunks, are bounded by a more condensed portion of the general cellular substance of the body, and are incessantly traversed by streams of water, passing inwards through the minute pores, and discharged through the larger orifices or vents, but no polypi or cilia have been discovered in those parts, although from analogy we might consider them necessary. From the incessant streams that are conveyed through the bodies of these animals, it appears that all parts of these interior perforations, as well as the general external surface of this cellular structure, serve for the conveyance of nutritious matter into the interior substance of the body. On watching the streams of water which issue from the fecal orifices, there may be seen minute flocculent particles that are incessantly detached and thrown out, which appear as if they were the residue of digestion, or pellicles excreted from the body, and thrown off from the surface of internal canals.

No nervous filaments have been detected in the soft gelatinous bodies of poriphera. Their ciliated gemmules, however, are endowed with remarkable living properties, and powers of spontaneous motion. They have an evident object in their motions; they can accelerate, retard, or cease, at pleasure, the vibrations of their cilia; they can change the direction of their course in the water, perceive each other's vicinity, revolve round each other, distinguish the most suitable place for the fixing of each species, or bound forward suddenly from a state of rest. They appear in this state of freedom to be sensible to light, and to shun it.

Although sponges, or poriferous animals, are permanently attached to rocks, and other solid bodies in the ocean, and

are consequently destined to an existence as completely stationary as that of plants, yet such is not the condition of the earlier, and more transitory stages of their development. On the gemmule the power of locomotion is conferred, until it has found for itself a proper habitation; this chosen, it there fixes itself and there continues for the remaining period of its existence.

**PORO'SITY.** (*porosité*, Fr. *porosita*, It.) The quality of having pores; of being porous.

**PO'ROUS.** (*poreux*, Fr. *poroso*, It.) Having small spiracles, interstices, or passages.

**PO'ROUSNESS.** The quality of being porous.

**PO'RPHYRY.** (from *πορφύρα*, purple, Gr. *porphyrites*, Lat. *porphyre*, Fr. *porfiro*, It. *porphyr*, Germ.) Porphyry has been so called in reference to the purple, or reddish, colour so commonly perceptible in it. Generally, any form of rock in which one or more minerals are scattered through an earthy or compact base. Porphyry has generally a compact texture. Sometimes it is composed of tabular, columnar, or globular distinct concretions; and not unfrequently it is traversed by numerous seams and rents. There are many varieties of porphyry, named according to the base of each, as Petrosiliceous Porphyry, Felspar Porphyry, Clinkstone Porphyry, Argillaceous Porphyry, &c. Geologists have described four formations of porphyry; but it is generally agreed that there is much uncertainty with respect to the situation of these formations. The porphyry which occurs regularly imbedded in granite, or which appears to be formed by a mere change of structure in that rock, may properly be classed with primary rocks; it is not considered to be an extensive formation. Porphyry also occurs in enormous masses; at the head of Glen Ptarmagan, a cliff of porphyry fifteen hundred feet in height, in shape resembling an oblique truncated pyramid, passes through granite. In some instances porphyry is, beyond all question, a volcanic formation. Near Christiana, in Norway, an immense mass of porphyry, from 1600 to 2000 feet in thickness, covers beds of gneiss, limestone, and greywacke. Dykes of porphyry cutting through the subjacent rocks indisputably prove the volcanic character of this immense mass. Porphyry and basalt often cover the primary mountains in the Andes; resembling immense castles lifted into the sky.

**PORPHYRI'TIC.** } Resembling porphyry;  
**PORPHYRA'CEOUS.** } containing porphyry;  
 composed of a compact homogeneous rock, in which distinct crystals or grains

are imbedded: the compact stone is called the base, and sometimes the paste. The base, or paste, is generally felspar.

**PO'RTLAND BEDS.** A marine formation, occurring in the Isle of Portland and in Wiltshire. These beds consist of coarse shelly limestone, fine grained white limestone, and compact limestone, all possessing an oolitic structure; and beds of chert. The Portland beds lie immediately under the Purbeck beds, and above the Kimmeridge clay. They constitute the uppermost members of the oolite group, and abound in ammonites, trigonæ, &c.

**PO'RTLAND LIMESTONE.** } One of the mem-  
**PO'RTLAND STONE.** } bers of the  
 Portland beds; a marine oolitic formation, obtained principally from Portland, whence the name, and used in building. This limestone is soft when quarried, but hardens on exposure to the atmosphere.

**PO'TASH.** An alkali obtained by the incineration of vegetables, or the woody parts of plants that do not grow near the sea. The water in which the ashes are washed is evaporated in iron pots, from which circumstance it was called *potash*. Al; though potash is very widely disseminated in the earth's crust, its amount, collectively considered, is greatly inferior to that of siliceous and alumine. There are few, if any, of the inferior stratified rocks without potash; and, viewing them in the mass, potash may be considered as constituting five or six per cent. of the whole. Potash may be regarded as constituting between six and seven per cent. of granites, greenstones, and rocks of that class.

**POTA'SSIUM.** A metal discovered by Sir H. Davy in 1808. At a temperature of 32° potassium is hard and brittle, with a crystalline texture; at 50° it becomes malleable, with a lustre like that of polished silver; and at 150° it fuses. Potassium is lighter than water, its specific gravity being 0.85: to preserve it unchanged, it should be kept in a phial with pure naphtha. Sir H. Davy obtained potassium by submitting solid hydrate of potash to the action of voltaic electricity; it has, however, subsequently been procured by other means, particularly by those described by Gay Lussac and Thenard.

**PO'TSTONE.** The Lapis ollaris of Pliny; Toftstein of Werner; Talc ollaire of Haüy. A variety of steatite, nearly equal in hardness to common steatite; it is, however, more tenacious, and though it may be turned with the lathe, it breaks with difficulty. It is smooth and unctuous to the touch. It is usually of a greenish-

grey colour, with various shades, and often spotted. Its fracture curved, and, sometimes, almost foliated. Specific gravity from 2·8 to 3·2. It emits an argillaceous odour when breathed on. From its being formed into culinary vessels it has obtained its name. From an analysis by Wiegleb, the potstone of Corno, in Lombardy, where it occurs in great abundance, consists of magnesia 38·0, silica 38·0, alumina 7·0, iron 15 0, carbonate of lime 1·0, fluoric acid 1·0.

**POTTERS' CLAY.** A variety of clay, of a reddish or grey colour, which becomes red when heated. That used in our potteries for making coarse red ware comes chiefly from Devonshire. It is exceedingly infusible, and contains a large proportion of alumine.

**POZZUOLA'NA.** Scorixæ or volcanic ashes, brought from Pozzuoli, a town in the bay of Naples, and named therefrom. Pozzuolana is used, mixed with lime, for making a Roman, or water-setting, cement.

**PRASE.** The Prasem of Werner; Quartz hyalin vert obscur of Haüy; Quartz prase of Brongniart. A leek-green translucent variety of rhombohedral quartz; lustre vitreous; fracture splintery. Specific gravity 2·5. Prase appears to be common quartz, coloured by actynolite or epidote.

**PRASINOUS.** (*prasinus*, Lat.) Of a light green colour, inclining to yellow.

**PRECIPITATE.** A deposit, in a solid form, of a body previously held in solution.

**PRECIPITATE.** (*précipiter*, Fr. *precipitare*, It.) To throw down a substance that had previously been held in solution.

**PRECIPITOUS.** (from *præceps*, Lat. *precipitoso*, It.) Steep; headlong.

**PREDACEOUS.** (from *præda*, Lat. *booty*.) Living upon prey.

**PREHENSILE.** (from *prehendo*, Lat. to lay hold of.) That can lay hold of. The *prehensile* portion of the tails of monkeys is naked beneath.

**PREHNITE.** A mineral thus named after Colonel Prehn, who brought it from the Cape of Good Hope. Prehnite is of a green, grey, or white colour. It occurs crystallized; in granular, scopiform, and stellular fibrous distinct concretions; massive and reniform. Its texture is foliated. Fracture uneven. Internal lustre pearly. It scratches glass, though feebly, and gives sparks with steel. Specific gravity from 2·60 to 2·94. Mr. Bakewell was the first person who discovered prehnite in England; he found it in 1816, in amygdaloidal wacke, in Gloucestershire. It has since been found in the basalt of Staffordshire.

**PRIMARY.** A term applied to rocks or strata, because it was supposed, from the absence of fossil remains, that they were formed before animals and vegetables; as well as that they were the first rocks formed. Mr. Lyell, with his wonted acumen, proposes to substitute the word *hypogene* for *primary*. It would appear, says Mr. Lyell, that the popular nomenclature of geology, in reference to the so called "primary" rocks, is not only imperfect, but in a great degree founded on a false theory; inasmuch as some granites and granitic schists are of origin posterior to many secondary rocks. In other words, some *primary* formations can already be shown to be newer than many *secondary* groups,—a manifest contradiction in terms. See *Hypogene*.

**PRIMARY ROCKS.** These rocks were formerly called primitive, and will, in all probability, hereafter be called hypogene. They are of crystalline structure, and manifestly owe their present state to igneous agency. The primary rocks are those which are older than the most ancient European group, (greywacke,) in which distinct fossils have as yet been discovered. Primary rocks are divisible into two groups, the stratified and the unstratified. The stratified group consists of the rocks called gneiss, mica schist, argillaceous schist, hornblende schist, primary limestone, and some others. The unstratified, or Plutonic, is composed in a great measure of granite, and rocks closely allied to granite.—*Lyell's Principles of Geology*.

**PRIMARY STRATA.** The primary strata are defined above by the old red sandstone; and when that is absent, by the carboniferous limestone; below, they usually rest, but sometimes unconformably, upon granite. They consist, in a great measure, of mechanical aggregates, comparable with sandstones and clays, but yet generally distinguishable by superior hardness, and somewhat of a crystalline structure in mass, or texture in detail, from the secondary rocks. In the secondary rocks there is more variety of arenaceous and calcareous members. In the tertiary strata loose sands, marls, and clays abound, while these scarcely occur at all among the primary rocks.—*Prof. Phillips*.

**PRIMITIVE.** A term applied to certain rocks, from the circumstance of no fossil remains of animals or vegetables, nor any fragments of other rocks, being found in them. The term has given way to what is considered a more appropriate one, namely, primary. With the continued advance of geological knowledge,

the term primary will, in all probability, yield to that proposed by Mr. Lyell, namely, hypogene.

**PRIMORDIAL.** (from *primordium*, Lat. *primordial*, Fr.) Original; existing from the beginning; first in order.

**PRISM.** (*πίσιμα*, Gr. *prisme*, Fr. *prisma*, It.) A solid figure, the ends whereof are parallel, equal, and similar plane figures, and the sides which connect the ends are parallelograms. Prisms take particular names from the figure of their bases or ends, namely, triangular, square, rectangular, pentagonal, hexagonal, &c.

**PROBOSCIDI'ANA.** A family of quadrupeds belonging to the order Pachydermata. The proboscideans have five toes to each foot; they possess no canine teeth, but two tusks, which project from the mouth, and frequently attain to an immense size. The nostrils are continued out into a proboscis, which is exceedingly flexible, possesses great flexibility, and terminates in a finger-like appendage. The proboscis may be considered as the hand of the elephant. One living genus only of this family is known, namely, the elephant; the other genus, the mastodon, is believed to be extinct.

**PROBOSCIS.** (*προβοσκίς*, Gr. from *βόσκω*, to feed, and *πρό*, before, *proboscis*, Lat. *proboscide*, Fr. *proboscide*, It.) A lengthened tube, snout, or trunk belonging to certain animals. The proboscis of the elephant is of great length, serving the purposes of a hand, conveying to the mouth anything it desires to swallow. It is an instrument of most delicate touch, of scent, and breathing, and of prehension as adroit as that of a hand. By the extraordinary flexibility with which it is endowed, it can not only be inflected inwards to carry things to the mouth, but be bent upwards, downwards, or laterally, to lay hold of things above, below, or on either side; and, by the assistance of its finger-like termination, it can grasp anything, even the most minute, as readily as we can with our four fingers and thumb. In insects, when the instrument for suction extends for some length from the mouth, it is called a proboscis; such is the apparatus of the butterfly, the moth, the gnat, the house-fly, and other insects that subsist on fluid aliment.

**PROCUMBENT.** (*procumbens*, Lat.) Lying down; prone. In botany, a term applied to plants, the stems of which lie or fall upon the ground through weakness.

**PRODUCTA.** An extinct genus of equilateral inequivalve, striated bivalves. It is found in the mountain limestone and older secondary rocks only; it is allied to the existing genus *Terebratula*.

**PROLEGS.** The name given to what are

termed the spurious legs of insects. While the number of the true legs is limited to six, the *prolegs* are often very numerous; they consist of fleshy and retractile tubercles. The true legs are generally protracted by horny scales; but the coverings of the *prolegs* are wholly membranous. The office of the *prolegs* appears to be merely to serve as props to support the body while the insect is walking, and to prevent its hinder part from treading on the ground. They are frequently terminated by single or double hooks; and also by a marginal coronet of recurved spines.—*Dr. Roget, Bridg. Treatise.*

**PROTEUS.** (*πρωτεύς*, *proteus*, Lat.) The name given to a genus of the order Batrachia. One species only has been hitherto discovered, namely, the Proteus Anguinus. A subterranean saurian, which never makes its appearance on the earth's surface, but is always concealed at a considerable depth below it, being found in subterraneous lakes and caves two or three hundred feet below the surface of the ground. The following particulars are extracted from Sir H. Davy's *Consolations in Travel*:—"Independently of the natural beauties found in Illyria, and the various sources of amusement which a traveller fond of natural history may find in this region, it has a peculiar object of interest in the extraordinary animals which are found in the bottom of its subterraneous cavities, namely, the Proteus anguinus, a far greater wonder of nature than any of those which the Baron Valvasor detailed to the Royal Society a century and a half ago, as belonging to Carniola.

At first view, you might suppose this animal to be a lizard, but it has the motions of a fish. Its head, and the lower parts of its body, and its tail, bear a strong resemblance to those of the eel; but it has no fins; and its curious bronchial organs are not like the gills of fishes; they form a singular vascular structure, almost like a crest, round the throat, which may be removed without occasioning the death of the animal, who is likewise furnished with lungs. With this double apparatus for supplying air to the blood, it can either live below or above the water. Its fore feet resemble hands, but they have only three claws or fingers, and are too feeble to be of use in grasping or supporting the weight of the animal; the hinder feet have only two claws or toes, and in the larger specimens are found so imperfect as to be almost obliterated. It has small points instead of eyes, as if to preserve the analogy of nature. It is of a fleshy whiteness or

transparency in its natural state, but when exposed to light, its skin gradually becomes darker, and at last gains an olive tint. Its nasal organs appear large; and it is abundantly furnished with teeth, from which it may be concluded that it is an animal of prey; yet in its confined state it has never been known to eat, and it has been kept alive for many years by occasionally changing the water in which it was placed. The proteus was first discovered in Illyria by the late Baron Zöis; but it has been reported that some individuals of the same species have been recognized in the calcareous strata in Sicily."

The proteus has been found of various sizes, from that of the thickness of a quill to that of the thumb, but its form of organs has always been the same. It is a perfect animal of a peculiar species, and it adds one instance more to the number already known, of the wonderful manner in which life is produced and perpetuated in every part of our globe, even in places which seem the least suited to organized existences. And the same Infinite Power and Wisdom which has fitted the camel and the ostrich for the deserts of Africa, the whale for the Polar seas, and the morse and the white bear for the Arctic ice, has given the proteus to the deep and dark subterraneous lakes of Illyrica,—an animal to whom the presence of light is not essential, and who can live indifferently in air and in water, on the surface of the rock, or in the mud. The organization of the spine of the proteus is analogous to that of one of the sauri, the remains of which are found in the older secondary strata. The problem of the reproduction of the proteus, like that of the eel, is not yet solved, but ovaria have been discovered in animals of both species.

This name is also given to a species of infusoria. Of these, the most singular, says Dr. Roget, is the proteus, which cannot, indeed, be said to have any determinate shape; for it seldom remains the same for two minutes together. It looks like a mass of soft jelly, highly irritable and contractile in every part; at one time wholly shrunk into a ball, at another stretched out into a lengthened riband; and again, at another moment, perhaps, we find it doubled upon itself like a leech. If we watch its motions for any time, we see some parts shooting out, as if suddenly inflated, and branching forth into star-like radiations, or assuming various grotesque shapes, while other parts will, in like manner, be as quickly contracted. Thus the whole figure may, in an instant, be completely

changed, by metamorphoses as rapid as they are irregular and capricious.

**PROTHEÏTE.** A mineral species, recently discovered, occurring in the valley of the Zillerthal, in the Tyrol.

**PRO'ROGINE.** The name given to a granite composed of felspar, quartz, and talc or chlorite; the talc supplying the place of mica. Mr. Bakewell observes that this name has been improperly given, whereas talcy or chloritic granite would at once convey a distinct idea of its nature.

**PRU'NOSE.** (from *pruina*, Lat. a frost, or rime.) In entomology, applied to the clothing of insects when covered with a minute dust, scarcely discoverable by the lens.

**PSAMMO'BIA.** A small bivalve found in the cyclas limestone of Burwash.

**PSEU'DO.** (ψεύδος, Gr. false.) A term generally used as a prefix to, and in composition with, other words; it implies a sense of spuriousness, as, for example, a pseudo-tuber is a false tuber; pseudo-galena is false galena; a pseudo-volcano is a coal mine in a state of combustion.

**PSILOME'LLANE.** Another name for uncleanable manganese ore.

**PTERODA'CTYLE.** } (from πτερόν, a wing,  
**PTERODA'CTYLUS.** } and δάκτυλος, a  
finger, Gr.) An extinct genus of winged reptiles, belonging to the family Iguanida. It is found fossil in the Jura limestone formation, in the lias at Lyme Regis, and in the oolitic slate of Stonesfield. "The structure of these animals," says Prof. Buckland, "is so exceedingly anomalous, that the first discovered pterodactyle was considered by one naturalist to be a bird; by another, a species of bat; and by a third, as a flying reptile. The form of its head and length of neck, resembled that of birds, its wings approached to the proportion and form of those of bats, and its body and tail approximated to those of ordinary mammalia. The pterodactylus forms an extinct genus of the order Saurians, in the class of reptiles; adapted by a peculiarity of structure to fly in the air. The pterodactyles are considered by Cuvier to rank among the most extraordinary of all the extinct animals that have come under his consideration. Eight species have been discovered, of sizes varying from that of a snipe to that of a cormorant. They had a short tail, an extremely long neck, and a very large head; their eyes were of enormous size, apparently enabling them to fly by night; the beaks were long, like those of a crocodile, and furnished with sixty sharp-pointed teeth. Their most remarkable character consisted in the excessive elongation of the second toe of the fore-foot, which was more than double the length of the trunk,

and, in all probability, served the purpose of supporting some membrane which enabled the animal to fly. The fingers terminated in long hooks, like the curved claws of the bat. The form and size of the foot, leg, and thigh, show that this extraordinary animal was capable either of standing firmly on the ground, or of perching upon the branches of trees. It is deemed probable that the pterodactyle had the power of swimming.

**PTEROPODS.** } (from *πτερόν*, a wing, and  
**PTEROPODA.** } *πούς*, a foot, Gr.) A class of molluscs possessing organs adapted for either swimming or sailing. The genera belonging to this class have the sac formed by the mantle closed on every side; a structure rendering it necessary that the gills should be placed externally, as regards the sac; and they are found spreading out like a pair of wings on each side of the neck. This position of the gills, causing them to resemble the wings of an insect, suggested to Cuvier the name which he assigned to the class. Four genera only are known, namely, *Clio*, *Cymbulia*, *Pneumodermon*, and *Limacina*. These molluscs abound in the colder regions of the ocean, and the *clio borealis* is considered to form the chief source of food for the whale.

**PTEROPODOUS.** Belonging to the class Pteropoda; wing-footed.

**PUBESCENCE.** (from *pubesco*, Lat. to grow mossy, or hairy.) The downy substance on plants, resembling fine silken short hairs.

**PUBESCENT.** Clothed with fine hairs or down.

**PUDDING-STONE.** A conglomerate composed of rounded stones imbedded in a paste. Pudding-stone is distinguished from breccia by the form of the contained pebbles: in the latter they are sharp angular fragments; in the former they are rounded nodules.

**PULVINITES.** (from *pulvinus*, Lat. a cushion.) A fossil bivalve found in the baculite limestone of Normandy.

**PUMICE.** } (*pumex*, Lat. *pomice*, It.)

**PUMICE STONE.** } A light, spongy, fibrous lava, produced by the action of gases on trachytic and other lavas. The island of Lipari contains a mountain entirely formed of white pumice: when viewed from a distance, the appearance is that of a mountain completely covered with snow. Pumice is supposed to have been produced from a considerable disengagement of gas, while the lava was in a plastic, but not in a fluid state; the escape of the gas producing the porous structure which characterizes pumice stone. Pumice is very light, and swims upon water, its specific gravity being about 9.0. It is fusible before the blow-

pipe, melting into a whitish enamel or glass. Klaproth gives the analysis of a specimen from Lipari as follows: silice 76.5, alumine 17.5, soda and potash 5.0, iron 1.75. Immense quantities of pumice are sometimes ejected from volcanoes.

**PUMICEOUS.** Having the characters of pumice; resembling pumice; containing pumice.

**PUNCTATED.** (from *pungo*, Lat. to prick.) Marked with small dots or punctures; full of small holes.

**PUPA.** (*pupa*, Lat.)

1. In conchology, a genus of cylindrical univalve land shells, belonging to the family Colimacea.

2. In entomology, the chrysalis; one of the states of existence of such insects as undergo metamorphoses. The insect in its *pupa* state of existence appears as if wrapt in a shroud, presenting no appearance of external members, and retaining but feeble indications of life. In this condition it remains for a certain period, until the time arrives when it is qualified to emerge into the world, by bursting asunder the fetters which had confined it, and to commence a new existence.

**PURBECK BEDS.** A fresh-water deposit, consisting of various kinds of limestones and marls. The Purbeck beds constitute the lowest members of the Wealden group, lying below the Hastings sands, and immediately above the Portland beds. The Purbeck limestone abounds in organic remains, and the marble is a congeries of small fresh-water snail-shells (*paludina*), intermixed with the minute crustaceous coverings of a species of cypris.—*Dr. Mantell.*

**PURBECK STRATA.** The lowest deposits of the Wealden group.

**PURPLE COPPER ORE.** The *Cuivre pyriteux hepaticque* of Haüy; the *buntkupfererz* of Werner. A species of sulphuret of copper. This ore occurs in masses, or plates, or disseminated; it is characterized by its lively and variegated colours, from which circumstance it is frequently called variegated pyritous copper. It has a metallic lustre; fracture conchoidal, with small cavities. Specific gravity from 4.95 to 5.46. It effervesces with nitric acid, imparting to it a green tinge. Before the blow-pipe, on charcoal, it melts, yielding a metallic globule. According to Klaproth, its constituents are, copper 58, iron 18, sulphur 19, oxygen 5. It occurs in metallic veins, and in beds, most commonly in primary rocks.

**PURPURA.** (*purpura*, Lat. the shell-fish from which purple cometh.) A genus of marine univalves belonging to the family Purpurifera. The shells of this genus are found at depths varying to twenty-five

fathoms, and the greater number of the species are littoral. The *Purpura* is an ovate univalve, its surface being rather rough with spines or tubercles; aperture notched, and slightly channelled in the lower part; the columella naked, flat, depressed, and terminating in a point at the base. The animal resembles that of a true buccinum. The species are very numerous; the animal secretes a purple liquor, which was formerly used in dyeing. Only one species is described as having been found fossil, namely, the *purpura lapillus*.

**PURPURI'FERA.** A family of Trachelipoda in Lamarck's system, comprising the genera Buccinum, Cassidarea, Cassis, Concholesas, Dolium, Eburna, Harpa, Monoceros, Purpura, Ricinula, Terebra.

**PUTA'MEN.** (*putamen*, Lat. a shell of a nut.) In botany, another name for the endocarp, stone, or shell of certain fruits.

**PYC'NODONTS.** (from *πυκνός*, thick, and *ὄδον*, a tooth, Gr.) Thick-toothed fishes. An extinct family of fishes which prevailed extensively during the middle ages of geological history. "Of this extinct family," says Prof. Buckland, "there are five genera. Their leading character consists in a peculiar armature of all parts of the mouth with a pavement of thick, round, and flat teeth, the remains of which, under the name of bufonites, occur most abundantly throughout the oolite formation.

**PYCNO'DUS TRIGONUS.** A genus of thick-toothed fishes, belonging to the family of Pycnodonts.

**PYCNITE.** A mineral of a yellowish-white colour, found principally at Altenberg, in Saxony.

**PYR'ALLOLIT.** A newly-discovered mineral found in the lime quarries of Finland.

**PY'RAMID.** (*πυραμίς*, Gr. from *πῦρ*, fire, *pyramide*, Fr. *pyramide*, It.) The name given to a certain figure, from its resembling the shape of flame. A solid figure, whose base is a polygon, and whose sides are plain triangles, their several points meeting in one.

**PYR'AMIDAL.** } Having the form of a py-  
**PYR'AMIDICAL.** } ramid.

**PYRAMIDE'LLA.** A genus of marine univalves, belonging to the family Plicacea. It is found on coral reefs, sands, and sandy mud, at depths varying to twelve fathoms. The pyramidella is a turriculated univalve; opening entire and semi-oval; columella projecting, with three transverse folds, and perforated at its end.

**PYRENAITE.** } A greyish-black, dodecahe-  
**PYRENEITE.** } dral, opaque variety of dodecahedral garnet. It consists of silica 43, alumina 16, lime 20, oxide of

iron 16, water 4. It is found in the French Pyrenees, from which circumstance it has obtained its name, in limestone.

**PY'RIFORM.** (from *pyrum*, a pear, and *forma*, form, Lat.) Pear-shaped; of the form of a pear.

**PYRI'TES.** (*πυρίτης*, Gr. *pyrites*, Lat. *pyrite*, Fr.) Sulphuret of iron. The fer-sulfure of Haüy, who has described sixteen modifications of the primitive form of its crystals. The colour of pyrites is usually bronze yellow, passing to pale brass yellow, and sometimes to brown. It possesses the hardness of quartz, striking fire with steel, and emitting an odour of sulphur. Specific gravity from 4.10 to 4.80. Before the blow-pipe it exhales a strong odour of sulphur, and yields a brownish globule. It is composed of sulphur and iron; iron 47.85, sulphur 52.15. It occurs in almost every rock, stratified or unstratified. The shining yellow streaks so common in our coals afford familiar examples of pyrites. It is a well-known property of iron pyrites to decompose rapidly when laid in heaps and moistened with water. There are many varieties of pyrites, namely, capillary, cellular, hepatic, radiated, &c. &c.

Mr. Webster gives the word pyrite, making pyrites the plural, and he adduces an authority in a quotation from Darwin; but it is most unusual to write pyrite, and pyrites is used in the singular.

**PYRI'TOUS.** Containing pyrites.

**PY'ROCHLORE.** The pyrochlor of Werner. Another name for octahedral titanium ore.

**PYRO'GENOUS.** (from *πῦρ*, fire, and *γεννᾶω*, to produce, Gr.) Produced by fire, as rocks of igneous origin.

**PYROLU'SITE.** Another name for the common ore of manganese, as prismatic manganese ore.

**PYRO'METER.** (from *πῦρ*, fire, and *μέτρον*, measure, Gr.) An instrument for measuring intense degrees of heat. The most celebrated pyrometer is that invented by Mr. Wedgwood, the extremity of his scale reaching to 240° Wedgwood, or 32277° Fahrenheit.

**PYRO'METRY.** The dilatation of bodies by heat forms the subject of that branch of science called *pyrometry*. There is no body but is capable of being penetrated by heat, though some with greater, others with less rapidity; and, being so penetrated, all bodies (with a very few exceptions, and those depending on very peculiar circumstances), are dilated by it in bulk, though with a great diversity in the amount of dilatation produced by the same degree of heat.

**PYRO'PE.** (from *πυρρός*, Gr. *pyropus*,

Lat.) A deep blood-red variety of dodecahedral garnet. It consists of silica 40·0, alumina 27·6, oxide of iron 16·0, magnesia 10·0, lime 3·5, chromic acid 2·6, oxide of manganese 0·3. It occurs in small masses or grains. It is generally transparent, with a splendid, vitreous, conchoidal fracture. As a gem it is highly prized.

**PYROPHORUS.** (from *πῦρ*, fire, and *φορός*, bearing, Gr. *pyrophore*, Fr.) A substance which has the property of igniting merely on exposure to the air. It is an artificial production, and may be variously prepared. M. Gay Lussac formed a pyrophorus of one part of lamp-black and two parts of sulphate of potash.

**PYROPHY'SALITE.** A variety of topaz.

**PYROSOMA.** (from *πῦρ*, fire, and *σῶμα*, a body, Gr.) The pyrosomæ unite in great numbers, forming a large hollow cylinder, open at one end and closed at the other, which swims in the ocean by the alternate contraction and dilatation of the individual animals which compose it. A pyrosoma may thus be compared to a great number of stars of botrylli strung together; the whole being moveable.

From the phosphorescent character which they possess they have obtained their name. It is a floating polyp, differing from the coral in being locomotive. Peron observed that when irritated its phosphorescence was augmented.

**PYROXENE.** (from *πῦρ*, fire, and *ξένος*, a stranger, Gr.) The name given by Haüy and Brongniart to augite. See *Augite*.

**PYROXENIC.** Composed of pyroxene or augite; containing augite; resembling augite.

**PYROXENIC PORPHYRY.** Augitic porphyry.

**PYRULA.** (from *pyrum*, a pear, Lat.) A genus of marine univalves, belonging to the family Canalifera. Recent pyrulæ are found at depths varying to nine fathoms, in mud and sand. The pyrula is a somewhat pyriform univalve, swelling in the upper part, with no variciform sutures, caudated, canaliculated, spire short, aperture wide, outer lip thin, and not slit, columella smooth. Six species have been found fossil by Lamarck. Pyrulæ are also found in the London clay, and in the Bognor sandstone.

## Q

**QUADRANGLE.** A square; a surface with four right angles.

**QUADRANGULAR.** (*quadrangularis*, Lat. *quadrangulaire*, Fr.) Four cornered; square; having four right angles.

**QUADRATE.** (*quadratus*, Lat.) Square; having four equal and parallel sides.

**QUADRICA'PSULAR.** In botany, having four capsules to a flower.

**QUADRIDENTATE.** Four-toothed.

**QUADRILOBATE.** (from *quatuor*, four, and *lobus*, a lobe, Lat.) A term applied in botany to a part having four lobes; as a quadrilobate leaf.

**QUADRILOCULAR.** (from *quatuor*, four, and *loculus*, a cell, Lat.) Four-celled; having four cells.

**QUADRIPHY'LLOUS.** (from *quatuor*, four, Lat. and *φύλλον*, a leaf, Gr.) In botany, having four leaves; four-leaved.

**QUADRIPLICATED.** (from *quatuor*, four, and *plica*, a fold, Lat.) A term in conchology; having four plaits or folds.

**QUADRIVALVULAR.** (from *quatuor*, four, and *valva*, a valve, Lat.) A term in botany; having four valves.

**QUADRUMANA.** (from *quatuor*, four, and *manus*, a hand, Lat.) The second order of Mammalia, including the monkeys, lemurs, and onistites. All the animals of

this order have the toes of the hind feet free and opposable to the others, and all the toes are as long and flexible as the fingers. The great character which distinguishes the members of this order is the possessing a moveable thumb on their lower extremities opposed to the fingers.

**QUADRUMANOUS.** Having four hands; four-handed.

**QUADRUPED.** (*quadrupes*, Lat. *quadrupède*, Fr. *quadrupede*. It.) An animal that goes on four legs; that has four legs and feet.

**QUA-QUA-VE'SAL.** (*quaquà*, Lat. on every side, and *versus*, inclined, Lat.) Inclined towards every side; facing all ways.

**QUAQUAVE'SAL DIP.** A term applied to the dip of a bed which is inclined, facing all sides.

**QUARRY.** (*carrière*, Fr. *le lieu d'où l'on tire de la pierre*.) A place whence are obtained stones for building and other purposes

**QUARTZ.** (*quarz*, Germ. *quartz*, Fr. *mot emprunté de l'Allemand*.) Silix in its purest form. Quartz is a hydrate of silicium, or silix with some water of crystallization; it is a compound of a metallic basis, silicium, and oxygen. Quartz is

found in every variety of form, although in its composition it varies but slightly. When crystallized, it usually occurs in six-sided prisms, terminated by pyramidal points; but it also occurs in many derivative forms, its primitive being a rhomboid. It scratches glass, of which it is an essential ingredient; it gives sparks with steel in great abundance. Hardness = 7.0. Specific gravity = 2.5, to 2.7. Its lustre ranges from splendid to glimmering, and is vitreous. Fracture conchoidal. Brittle and easily frangible. It exhibits double refraction, which must be observed by viewing an object through one face of the pyramid and the opposite side of the prism. It is infusible before the blow-pipe, even when the flame is excited by oxygen. Before the compound blow-pipe a fragment of rock crystal fuses instantly into a white glass. Quartz is very generally distributed, and, as far as our knowledge extends at present, appears to be the most abundant mineral in nature. It occurs in every rock, from granite to the newest secondary formation; it is found in every district of the globe. When mixed with alkalies quartz melts easily, and forms glass. It is not acted upon by any acid but the fluoric. Quartz often encloses, or is mixed up with foreign substances, from which circumstance it assumes great varieties of colour. Many of the precious stones consist of simple quartz combined with some colouring matter. Among these we may place the amethyst, cats'-eye, opal, Bristol diamond, Scotch topaz, &c. Quartz exists in veins intersecting mountains, and it sometimes forms large beds, and even entire mountains, which are composed of this mineral in grains united without a cement, called granular quartz. Combined with alumine and iron, quartz loses its translucency and passes into jasper. When rubbed, quartz yields a peculiar odour, and a phosphorescent light. Quartz is a constituent of granite.

QUARTZOSE. } Containing quartz; com-  
QUARTZY. } posed of quartz; resembling quartz; having the properties of quartz.

QUATERNARY. (*quaternarius*, Lat. the number of four; *quaternaire*, Fr.) Consisting of four. In geology, a term applied to the upper tertiary strata, or those which are supposed to be of later formation than any of the strata in the Paris or London basins. The faluns, or marls of Touraine and the Loire, are *quaternary* formations.

QUICKLIME. This may be obtained by exposing chalk, limestone, or any calcareous substance, for a length of time, to full red heat, whereby the carbonic acid and the water which were previously in combination are expelled.

QUICKSILVER. See *Mercury*.

QUINARY. (*quinarius*, Lat. *quinaire*, Fr.) Containing five; applied to things arranged in order by fives.

QUINATE. In botany, applied to compound leaves when composed of five leaflets.

QUINQUANGULAR. (from *quinque*, five, and *angulus*, an angle, Lat.) Having five corners or angles.

QUINQUECAPSULAR. (from *quinque*, five, and *capsula*, a capsule, Lat.) In botany, applied to a flower having five capsules.

QUINQUEDE'NTATE. (from *quinque*, five, and *dens*, a tooth, Lat.) Five-toothed.

QUINQUEFOLIATE. (from *quinque*, five, and *folium*, a leaf, Lat.) Having five leaves.

QUINQUELOBATE. } (from *quinque*, five,  
QUINQUELOBED. } and *lobus*, a lobe,  
Lat.) In botany, applied to parts which are divided to the middle into five distinct parts or lobes.

QUINQUELOCULAR. (from *quinque*, five, and *loculus*, a cell, Lat.) Five celled; having five cells.

QUINQUEVALVULAR. (from *quinque*, five, and *valva*, doors or valves, Lat.) Having five valves.

## R

RACE'ME. (*racemus*, Lat. a bunch of berries.) A term used in botany to express a kind of inflorescence, when all the buds of a newly-formed axis unfold into flowers, each having a stalk; a raceme consists of numerous flowers, rather distant, each on its own proper stalk, and all connected together by one common peduncle.

RADIA'TA. The name given to the fourth great division of the animal kingdom, in

consequence of the radiated form of the body which is so apparent in some of the classes which compose it. This division comprises five classes, namely, Echinoderma, Acalepha, Polypiphera, Poriophera, and Polygastrica. The radiata are amongst the most frequent organic remains in the transition strata, and they present numerous forms of great beauty. Radiata have also been called zoophyta. They form the lowest division of the

animal kingdom, having skeletons as various as the forms of the animals. These skeletons are sometimes external, most frequently internal, often composed of minute pieces symmetrically arranged, or of one solid mass; often of a thin diaphanous horny consistence, or composed of dense siliceous or calcareous spicula, or of masses of carbonate with a little phosphate of lime. The osseous parts in these classes appear to be extra vascular, and to grow by the juxta-position of new portions, and from the simplicity of the general structure and functions of these animals, and from the internal situation of their solid parts, they are not exuviable.

**RA'DIATE.** In botany, a corolla consisting of a disk, in which the corollets are tubular and regular, and of a ray, in which the florets are irregular.

**RA'DIATED.** (*radiatus*, Lat.)

1. Adorned with rays.

2. Belonging to the division Radiata. The radiated animals are among the most frequent organic remains in the transition strata; many of the strata appear almost entirely composed of their mineralized exuvæ; but generally in a fractured condition. Radiated animals comprise all those which were formerly called zoophytes, or animal plants, as the corallines, &c.; which were long mistaken for marine vegetables.

3. In mineralogy, when the fibres are broad and flat, and diverging as from a centre.

**RA'DIATED IRON PYRI'TES.** A variety of sulphuret of iron of a pale bronze yellow, more or less inclining to steel-grey, or to brass-yellow. It occurs regularly crystallized; in radiated, granular, and lamellar concretions. But more frequently its form is globular, botryoidal, reniform, tuberoso, &c. Its surface is often rough, and sometimes presents the solid angles of octahedral crystals. Lustre varies from glistening to glimmering, and is metallic. It is easily frangible. When its form is spherical, the fibres diverge from the centre; when nearly cylindrical, from the axis. Its constituents are iron 46·03, sulphur 53·97. It occurs more particularly in the chalk deposit.

**RADIA'TION.** (*radiation*, Lat. *radiation*, Fr.)

1. Beamy lustre; emission of rays.

2. Divergence from a centre.

**RADIA'TION OF HEAT.** It is a general law, that all hot bodies throw out or radiate heat in all directions, and that other colder bodies placed in their neighbourhood become hot, as if they received the heat so radiated. There are two modes of communicating heat, — by radiation,

and by conduction; and both these have their peculiar, and, to all appearance, very different laws.

**RA'DICATED.** (*radicatus*, Lat.) In conchology, when the shell is fixed by the base, or by a byssus, to some other body.

**RA'DICAL.** (from *radix*, Lat. a root, *radical*, Fr.) Primitive; original. In botany, radical leaves are such as spring from the root: the dandelion is a familiar example.

**RA'DICLE.** (*radicula*, a little root, from *radix*, Lat. *radicule*, Fr.) In botany, that part of the embryo which grows downwards and becomes the root. The primary object of vegetable structures appears to be the establishment of the functions of nutrition; and we find that while the plumule, bursting from its enveloping capsule, proceeds to extend itself vertically upwards, at the same time, slender filaments, or *radicles*, shoot out below to form the roots.

**RA'DII VECTO'RES.** Imaginary lines joining the centre of the sun and the centre of a planet or comet, or the centres of a planet and its satellite.

**RA'DIOLITES.** A genus of irregular inequivalved fossil shells obtained from that part of the Pyrenees which is named Les Corbieres. They are striated externally. The inferior valve is in the form of a reversed cone; the superior valve convex. They have neither hinge nor cartilage. The shell is beautifully figured in Parkinson's Organic Remains.

**RA'DIUS.** (*radius*, Lat. *radius*, Fr.)

1. The semi-diameter of a circle. The mean radius of the earth is intermediate between the distances of the centre of the earth from the pole and from the equator.

2. One of the bones of the fore-arm, or that part of the upper extremity which extends from the elbow to the wrist. The fore-arm contains two bones, the *radius* and the *ulna*; the radius is the smaller of the two.

**RAGG.** } Called also Rowley ragg, or  
**RA'GSTONE.** } Dudley basalt. A fusible siliceous stone, of a dark grey colour, occurring near Dudley.

**RA'MOSE.** } (from *ramus*, a branch, Lat.)

**RA'MOUS.** } Branched, full of branches. Applied also to flowers growing on the branches; to peduncles proceeding from a branch; and also to leaves growing on branches when they differ from those on the stems.

**RANE'LLA.** A genus of marine univalves, belonging to the family Canalifera. Recent ranellæ are found principally in the Indian seas at depths varying to eleven fathoms. Some fossil species have been discovered in the London clay.

**RAPTO'RIOUS.** (from *rapio*, Lat. to snatch.)

1. The name given to animals which dart upon and seize their prey.

2. The name given to certain parts of insects. The legs are called *pedes*; when adapted to the seizing of prey, they are suitably called *pedes raptorii*, not arms. The idea of arms presents a certain organization not found in insects, although the *raptorious* legs of insects may possibly be analogous in their functions.—*Shuckard*.

RA'TIO. (*ratio*, from *reor*, Lat.) The relation which one quantity bears to another.

RA'VIN. } (*ravin*, Fr.) A deep, hollow,  
RA'VINE. } narrow excavation formed by the force of running water. The French use the two words ravin and ravine in different significations. The word *ravin*, a substantive masculine, is used to express a place which has been hollowed out by a stream of running water, as "*passer un ravin profond*." *Ravine* is employed to denote a torrent of water, "*espèce de torrent formé d'eaux qui tombent subitement et impétueusement des montagnes, ou d'autres lieux élevés, après quelque grande pluie*." Sometimes, however, *ravine* is used also to signify the place worn by the torrent.

RAY. (from *raja*, Lat. *raie*, Fr.) A fish of the sea. The rays form a genus of fishes of the order Chondropterygii; they may be known by their flattened body, which is in the form of a disk, from the union of the body with the very broad and fleshy pectorals, which are joined to each other before or to the snout, and which extend behind the two sides of the abdomen as far as the base of the ventrals. The rays have no ribs. The phalanges of the carpus are very numerous, and each is subdivided into several pieces by regular articulations; they are arranged close to one another in one plane, and form an effectual base of support to the integument which covers them. Both the anterior and posterior extremities are supported by arches of bones, forming a sort of belt. In this genus are included the skate, torpedo, and sting-ray. The direction of the eyes is oblique. Rays are sometimes called sea-eagles, because, in their rage and fury, they occasionally raise themselves out of the water, and fall again with such force as to make the sea foam. Mr. Kirby, quoting from Lacedpede, says, an individual of a species of this tribe, called by the sailors the sea-devil, taken at Barbadoes, was so large, as to require seven pairs of oxen to draw it on shore; he very judiciously, however, adds two notes of admiration to this marvellous story. Fossil rays are abundant throughout the tertiary formation;

they occur also in the jurassic limestone; not any have been found in any stratum older than the lias.

RAYS OF FISHES. A name given to the fins of certain fishes. Dr. Roget says, the dorsal fins are supported by a series of slender bones which are joined to the spinous processes of the vertebræ, and are formed from distinct centres of ossification. These *rays*, as they are called, are sometimes destined to grow to so considerable a length, as to require being subdivided into many pieces, in order to lessen the danger of fracture, and also to allow of a greater degree of flexibility. These *rays* assume branched forms from the farther subdivision of their parts.—*Bridg. Treatise*.

RAY. In botany, the florets composing the margin of a compound flower form the *ray*.

REA'GENT. A term used in chemistry for a certain body employed to ascertain the component parts of other bodies, either as regards the quantity or quality of such component parts.

RE'ALGAR. (*realgar*, Fr. arsenic rouge.) The Hemiprismatic Schwefel of Mohs; Rothens-rausch gelb of Werner; Arsenic sulfuré rouge of Haüy. Red sulphuret of arsenic. Arsenic combined with sulphur forms *realgar* and *orpiment*, which are found as natural ores; the *realgar* is of a beautiful and variable red. *Realgar* is a bi-sulphuret of arsenic, consisting of arsenic 69·0, sulphur 31·0. Specific gravity 3·27. It occurs in regular crystals, in compact masses, in concretions, or in crusts, which are sometimes earthy. Before the blow-pipe it melts easily, burns with a blue flame and garlic smell, and soon evaporates. Nitric acid deprives it of its colour. It occurs in veins in primary, transition, secondary, and volcanic rocks; in Sicily, Germany, America, and other parts.

RE'CENT FORMATION. Any formation, whether igneous or aqueous, which can be proved to be of a date posterior to the introduction of man is called *recent*. Recent formations are marine, fresh-water, and volcanic. Of recent marine formations, we may instance the coral formations of the Pacific ocean; the deltas of the Ganges, Po, &c. Of recent fresh-water formations, the deposits in many lakes; Italian travertin, &c. Of recent volcanic formations, the lavas of the different volcanoes, which have been in action since man was introduced. A fine specimen of recent limestone from Gaudaloupe, containing a fossil human skeleton, may be seen in the British Museum.

RE'CENT PERIOD. That period of time commencing with the introduction of man upon this earth.

**RECEPTACLE.** (*receptaculum*, Lat. *receptacle*, Fr. *ricettacolo*, It.) In botany, the basis or point, upon which all the parts of the fructification rest; the receptacle has not always any particular figure to distinguish it, except in compound flowers, when the surface, which is either convex, concave, conical, scaly, cellular, hairy, or naked, forms the distinguishing character of the genus or family. The receptacle is distinguished into *receptaculum proprium*, or receptacle appertaining to one fructification only; and *receptaculum commune*, or common receptacle, connecting several distinct fructifications.

**RECLINED.** In botany, applied to leaves when the point is lower than the base; also to stems when curved towards the ground.

**RECTANGLE.** (*rectangulus*, Lat. *rectangle*, Fr.) Every right-angled parallelogram is called a rectangle, and is said to be contained by any two of the straight lines which contain one of the right angles.

**RECTANGLED.** Having a right angle, or an angle of ninety degrees.

**RECTANGULAR.** (*rectangulaire*, Fr.) Right angled; having one or more angles of ninety degrees.

**RECTILINEAL.** } (from *rectilinearis*, Lat.  
**RECTILINEAR.** } made of straight lines,  
**RECTILINEOUS.** } *rectiligne*, Fr.) Consisting of right lines; right lined; in a straight line.

**RECURVATED.** } (from *re*, back, and *curvo*,  
**RECURVED.** } to bend, Lat.) Bent backwards; turned backwards.

**RED CORAL.** (the *corallium rubrum*.) A branched zoophyte, somewhat resembling in miniature a tree deprived of its leaves and twigs. It seldom exceeds one foot in height, and is attached to the rocks by a broad expansion or base. It consists of a bright red, stony axis, invested with a fleshy, or gelatinous substance of a pale blue colour, which is studded over with stellular polypi.—*Dr. Mantell, Wonders of Geology.*

**RED CHALK.** See *Reddle*.

**RED MARL.** Another name for the new red sandstone.

**REDDLE.** The roethel of Werner; the crayon rouge of Brochant; the argile ocreuse rouge graphique of Haüy. Red chalk; a species of argillaceous iron-stone ore. The best specimens are brought from Germany. It occurs in opaque masses, having a compact texture. In hardness, it differs but little from chalk. It is dry, and rough to the touch, adhering to the tongue, and yielding an argillaceous odour. Specific gravity from 3.10 to 3.90.

**REEF.** (*riff*, Germ.) A range of rocks

lying generally near the surface of the water.

**REFLECT.** (*reflecto*, Lat. *réfléchir*, Fr. *riflettere*, It.) To throw back; to return.

**REFLECTED.** (*réfléchi*, Fr.) Folded backwards; thrown back.

**REFLECTION.** The act of throwing back; the act of bending back; that which is reflected. By the laws of optics, the angle of reflection is equal to that of incidence, whatever the reflecting surface may be, and however obliquely the light may fall upon it.

**REFLEXED.** Recurved; bent backwards.

**REFRACTED.**

1. In conchology, abruptly bent, as if broken.

2. In botany, bent back at an acute angle.

**REFRACTION.** (*réfraction*, Fr. *refrazione*, It.) The incurvation, or change of determination in the body moved, which happens to it whilst it enters or penetrates any medium; in dioptricks, it is the variation of a ray of light from that right line, which it would have passed on in, had not the density of the medium turned it aside. When light passes through a drop of water or a piece of glass, it obviously suffers some change in its direction. These bodies have therefore exercised some action, or produced some change upon the light, during its progress through them. The power which thus bends or changes the direction of a ray of light is called *refraction*, and the amount of this refraction varies with the nature of the body. All the celestial bodies appear to be more elevated than they really are; because the rays of light moving through the atmosphere in straight lines, are continually inflected towards the earth. Light passing obliquely out of a rare into a denser medium, as from vacuum into air, or from air into water, is bent or refracted from its course towards a perpendicular to that point of the denser surface where the light enters it. The denser the medium the more the ray is bent.—*Mrs. Somerville. Brewster. Herschel.*

**REFRACTION DOUBLE.** When a ray of light passes obliquely from one medium to another of a different density, it is refracted, or bent from its original direction. Still, the image of any object, seen through a refracting medium, usually appears single. There are, however, some transparent minerals, which have the remarkable property of causing objects to appear double; that is, they present two images of any object seen through them. In this case it is evident, that the ray must be divided into two portions after entering the refracting medium, and that each portion presents an image of the

object. This is a distinctive character of very considerable value in some minerals, not depending on any accidental circumstances, but on the nature of the mineral. Double refraction is exhibited most strikingly in Iceland spar.

REFRIGERATED. (from *refrigero*, Lat.) Cooled.

REFRIGERATION. (*réfrigération*, Fr.) The act of cooling down; the state of being cooled.

It is the opinion of some geologists that the whole of this planet was formerly in an incandescent state, and that the process of gradual *refrigeration* has been constantly proceeding; that the crust of the earth has cooled down to its present temperature, but that the centre of the earth is still a molten mass. Professor Whewel, speaking of Fourier's arguments on the subject, says, "it results from Fourier's analysis that at a depth of twelve or eighteen miles the earth may be actually incandescent, and yet that the effect of this fervent mass upon the temperature at the surface may be a scarcely perceptible fraction of a degree. The slowness with which any heating or cooling effect would take place through a solid crust is much greater than might be supposed. If the earth below twelve leagues depth were replaced by a globe of a temperature five hundred times greater than that of boiling water, 200,000 years would be required to increase the temperature of the surface one degree."

REGENERATION. (*régénération*, Fr. *rigenerazione*, It. *regeneratio*, Lat.) Reproduction. The property which some animals possess of reproducing parts which have been destroyed.

RELIQUIÆ. (Lat.) Remnants; remains of the dead. To understand rightly, says Prof. Phillips, the daily accumulating stores of organic *reliquiæ*, requires more than a slight knowledge of existing nature,—more even than an acquaintance with the animal and vegetable forms.

RENAL. (*renalis*, Lat. from *ren*, a kidney.) Pertaining to the kidneys.

RENIFORM. (from *ren*, a kidney, and *forma*, form, Lat.) Kidney-shaped.

RENULINA. A genus of flat, sulcated, reniform, many-chambered, microscopic foraminiferous shells, with linear chambers adapted to the curves of the shells; the last being the longest.

REPTILE. (*reptilis*, Lat. *reptile*, Fr. *reptile*, It.) A vertebrated, cold-blooded, animal. The body covered with a shell, or with scales, or entirely naked. Possessing neither hair, mammæ, feathers, nor radiated fins; breathing through the mouth and nose by means of lungs; oviparous, but never hatching its eggs, and amphi-

bious. The oldest formations in which any reptiles have been found are those connected with the magnesian limestone formation.

REPTILIA. Reptiles form the third class of vertebrated animals, and it is subdivided into four orders, namely, Chelonia, or tortoises, Sauria, or lizards, Ophidia, or serpents, and Batrachia, or frogs. Of these four orders, the Chelonians and Batrachians are partly aquatic, partly terrestrial; the Saurians and Ophidians are principally tenants of the land.

REPULSION. (*répulsion*, Fr.) That property possessed by bodies which causes their particles to recede from one another, or to avoid coming in contact. In air and in liquids, the most perfect freedom of motion of the parts among each other subsists, and from this, and other considerations, it has been concluded that the several parts do not touch, but are kept asunder at determinate distances from each other, by the constant action of the two forces of attraction and *repulsion*, which are supposed to balance and counteract each other.—*Herschel*.

RESIN. (*resina*, Lat. *résine*, Fr.) Called also rosin. A yellowish-white coloured substance, which exudes from many trees, more particularly the different species of fir. It is somewhat transparent, is hard and brittle, of a disagreeable taste, and may be collected in considerable quantities. Resin may be distinguished from other substances by the following properties. It is more or less concrete, and possesses a certain degree of transparency. Its taste is sometimes hot and disagreeable, but not unfrequently it is tasteless, or nearly so. Colour generally between pale yellow and brown. Specific gravity from 1.0 to 1.3. It is electric and a non-conductor of electricity. When heated it readily melts; and if the heat be much increased it is volatilized, and burns with a white flame and strong odour, producing a great quantity of smoke. It is insoluble in water, and by this may be distinguished as well as separated from gum. It is soluble in alcohol, ether, and in the volatile oils. The number of resins is very great, as there is scarcely a plant which does not contain some kind of resin.

RESINIFEROUS. (from *resina*, resin, and *fero*, to produce, Lat.) Yielding resin.

RESINOUS. Resembling resin; containing resin; possessing the properties of resin.

RESPIRATION. (*respiratio*, Lat. *respiration*, Fr. *respirazione*, It.) The function of breathing; the act of inhaling air into and exhaling it from the lungs. Respiration consists of two parts, inspiration, which, in a healthy condition, takes place about twenty-six times in a minute, thir-

teen cubic inches of air being the average quantity taken in at each inspiration; and expiration, which alternates with inspiration. It is by respiration that the blood becomes freed of its carbon and, at the same time, obtains fresh supplies of oxygen.

**RE'SPIRATORY.** Serving for the function of breathing; connected with the function of respiration.

**RE'SPINATE.** (*respinatus*, Lat.) In botany, a term applied to leaves, when the under surface is turned upwards.

**RESPLE'NDENT FE'LSPAR.** Another name for Adularia, or moon-stone.

**RE'TE MU'CO'SUM.** (from *rete*, a net, and *mucosum*, mucous, Lat.) A tissue lying immediately under the epidermis, or scarfskin, and the cutis vera, or true skin. The black colour of negroes depends upon a black pigment, situated in this substance.

**RE'TICULAR.** (*reticulaire*, Fr.) Having the form of net-work, as a reticular membrane, reticular tissue, &c.

**RE'TICULATE.** } (*reticulatus*, Lat. from  
**RE'TICULATED.** } *rete*, a net; *reticulé*,  
*reticulée*, Fr.) Made of net-work;  
formed of interstitial vacuities.—*Johnson.*

**RE'TICULE.** (*reticulum*, dimin. of *rete*, Lat. a small net.) A name given to the second stomach of ruminant animals.

**RE'TINA.** (from *rete*, a net, Lat. *réline*, Fr.) The net-like expansion of the optic nerve placed at the back of the eye, and which has been called one of the membranes of that organ. The *retina* is an exceedingly thin and delicate layer of nervous matter, supported by a fine membrane. No nerve but the optic nerve, and no part of that nerve but the *retina*, is capable of giving rise to the sensation of light.

**RE'TINASPHAL'TUM.** The name given by Mr. Hatchett to a sub-species of bitumen. It is an opaque, ochre-yellow, and brittle substance found in Bovey coal and fossil wood. Fracture vitreous, and imperfectly conchoidal. Specific gravity 1.13. According to its analysis by Mr. Hatchett, who deems this substance to be an imperfectly mineralized resin, it consists of resin 55, asphaltum 41, earthy matter 3; = 99.

**RE'TINITE.** Another name for *Retinasphaltum*.

**RE'TORT.** A globular vessel with a long neck, sufficiently bent as to make with the belly of the vessel an angle of sixty degrees. Retorts are used for distillation, and some other chemical processes.

**RE'TRA'CTILE.** Capable of being drawn back; as the organs of certain animals.

**RE'TROFLE'CTED.** (from *retro*, back, and

*flecto*, to bend, Lat.) Bent in different directions, usually in a distorted manner.

**RETROMI'NGENT.** (from *retro*, backwards, and *mingo*, to stale, Lat.) Passing the urine backwards; belonging to the class of retromingents.

**RETROMI'NGENTS.** In zoology, a class of animals, whose characteristic is, that, both male and female, they void their urine backwards.

**RE'UNDATED.** (from *retundo*, Lat. to blunt.) Blunted, or turned at the edge.

**RE'USE.** (*retusus*, Lat. blunted.)

1. In conchology, a shell ending in an obtuse sinus is termed a *retuse* shell; bluntly notched.

2. In botany, leaves are called *retuse*, when ending in a broad shallow notch, or sinus.

**REVE'RSED.** (*reversus*, from *re* and *verto*, to turn, Lat.) Turned upside down; turned side for side.

1. In conchology, a reversed shell is one, the volutions of which are the reverse way of the common corkscrew.

2. In botany, when the upper lip of the corolla is larger and more expanded than the lower.

**REVIVIFICA'TION.** (*revivification*, Fr. from *re* and *vivifico*, Lat.) Renewal of life; restoration to life. A dormant vitality may exist in a system of organs which have been brought into a perfectly dry state; and this is the case not with vegetables only, but with many species of animalcules, and even with some of the more highly developed worms. These may be kept in a dry state for an indefinite length of time, and when moistened with water, shall resume their activity, as if restored to life. The *revivification* of animalcules is a curious phenomenon. The *Rotifer redivivus*, or wheat animalcule, can live only in water, and is commonly found in that which has remained stagnant for some time in the gutters of houses. But it may be deprived of this fluid, and reduced to perfect dryness, so that all the functions of life shall be completely suspended, yet without the destruction of the vital principle; for this atom of dust, after remaining for years in a dry state, may be revived in a few minutes by being again supplied with water. This alternate suspension and restoration of life may be repeated, without apparent injury to the animalcule, for a great number of times.—*Dr. Roget, Bridgewater Treat.*

**REVIV'ISCENCE.** Revivification; renewal of life.

**RE'VOLUTE.** (*revolutus*, Lat. rolled backwards.) In botany, applied to leaves, when the margins are rolled backwards towards the under surface.

**RHACHEOSAURUS.** A fossil saurian of the lias and oolite.

**RHA'TIZIT.** The name given by Werner to prismatic kyanite.

**RHINOCEROS.** (ῥινόκερωσ, Gr. from ῥιν, a nose, and κέρας, a horn: *rhinoceros*, Lat. *rhinoceros*, Fr. *rinocerónte*, It.) A genus of thick-skinned mammalia, included by Cuvier in the family Pachydermata Ordinaría. The rhinoceros is found at the present day, in India, Java, Africa, and Sumatra. It is a large animal, having three toes, but the feet not cloven. The bones of the nose support a solid horn in two species of this genus; but the other species possess two horns. Burchel and Campbell met with more than one new species of rhinoceros in their journey from the Cape of Good Hope into the interior. Campbell's had a straight horn projecting three feet from the forehead, different from any he had before seen, its horn resembling that of the supposed unicorn.—*Rev. W. Kirby.*

Fossil remains of the rhinoceros are found in Siberia and Germany. The entire carcass of a fossil rhinoceros was discovered, in frozen sand, on the banks of the Wilaji, in Siberia. Bones and teeth of the rhinoceros are found in this country in superficial gravel and loam.

**RHÍPIPTERA.** A new order of insects, established by Mr. Kirby under the name of *Strepsiptera* (twisted wings), named Rhipiptera by Latreille, includes only two genera, namely, stylops and xenos. These insects are remarkable for their anomalous form, and the irregularity of their habits. The tegmina are fixed at the base of the anterior legs; they are both long and narrow, and appear to be incapable of protecting the wings. The wings are large, membranous, divided by longitudinal and radiating nervures, and fold longitudinally, after the manner of a fan.

**RHIZOMA.** (ῥίζωμα, a root, Gr.) A species of creeping stem which grows under-ground.

**RHIZOPODES.** The name proposed, by M. Dujardin, to a new class of animals of lower degree than the radiata, possessing a power of locomotion by means of minute tentacular filaments. This new class would comprise the animals which construct the miliola, and some microscopic foraminiferous shells.

**RHOMB.** (ῥόμβος, Gr. *rhombus*, Lat. *rhombe*, Fr. *rombo*, It.) In geometry, an oblique angled parallelogram, or quadrilateral figure, whose sides are equal and parallel, but the angles unequal, two of the opposite sides being obtuse, and two acute.

**RHOMBIC.** Having the figure of a rhomb.

**RHOMBOID.** (from ῥόμβος, a rhomb, and

ἴδιος, form, Gr.) Is a figure which has its opposite sides equal to one another, but all its sides are not equal, nor are its angles right angles.

**RHOMBOIDAL.** Having the form of a rhomboid.

**RHOMBUS.** A rhomb; that which has its sides equal, but its angles are not right angles.

**RHOMB SPAR.** Called also bitter spar, a variety of magnesian carbonate of lime. This variety occurs crystallized, most of its crystals being rhombs, sometimes truncated, and sometimes with rounded edges. Fracture foliated, the foliæ having a shining or splendent lustre, more pearly than that of calcareous spar. Specific gravity from 2.48 to 3.00. It is generally of a greyish colour to pale yellow, or yellowish brown. It appears to pass by imperceptible shades into dolomite.

**RIBBED.**

1. Having bones communicating with and attached to the vertebræ, and serving to protect the organs contained within the chest.

2. In botany, a term applied to leaves when they possess large raised vessels on the under side.

3. In conchology, when shells have ridges, or ribs, either longitudinal or transverse.

**RÍMA.** In conchology, the interstice between the valves, when the hymen is removed.

**RÍNGENT.** (from *ringo*, to grin, Lat.)

In botany, applied to a monopetalous corolla, the border of which is usually divided into two lips, which gape like the mouth of an animal. A corolla with two lips is called bilabiate; when these present an appearance like the mouth of an animal, the *corolla* is called *ringent*.

**ROCK.** (*roc* and *roche*, Fr. *rocca*, It.)

Rocks, and the substances they enclose, lie beneath the superficial accumulations, and constitute the crust of the earth. The term "rocks" is apt to mislead beginners; for under this title geologists rank clay, sand, coal, and chalk, as well as limestone, granite, slate, and basalt, and other hard and solid masses, to which the use of the term is generally restricted.

—*Prof. Phillips.*

The rocks of which the mineral crust of the globe is composed are divided into those of aqueous and igneous origin, from the two agents known to us as capable of their production. Rocks are also divided into primary, transition, secondary and tertiary. These, and many other divisions, such as crystalline, fossiliferous, &c. &c. are described in the various works on geology.

**ROCK BUTTER.** Native alum. It occurs in the cavities or fissures of argillaceous

slate in soft masses; it is of a yellowish-white colour; a little unctuous to the touch; massive, tuberoso, or stalactical. It is mingled with clay and oxide of iron.

**ROCK CRYSTAL.** This, which is only the most perfect variety of quartz, has, when crystallized, received the name of *rock crystal*: the same name has been extended to coloured crystals, when transparent. The finest specimens of *rock crystal* are found in Dauphiné, in the Alps, in Madagascar, &c.; but it abounds in every country, in all parts of the world, in chasms or clefts of the oldest rocks. The primitive form is a rhomboid of  $94^{\circ} 15'$  and  $85^{\circ} 45'$ ; the secondary forms are an equiangular six-sided prism, rather acutely acuminate on both extremities by six planes which are set on the lateral planes, a double six-sided pyramid, an acute simple six-sided pyramid, and acute double three-sided pyramid. Splendent; fracture perfect conchoidal; gives double refraction feebly. Its specific gravity is from 2.5 to 2.8. By friction it exhales a peculiar odour, and some varieties also phosphoresce in the dark. An analysis by Bergman gave silice 93, alumine 6, lime 1.

**ROCK WOOD.** A variety of asbestos of a brown colour; in its general appearance greatly resembling fossil wood.

**ROCK CORK.** The Berg kork of Werner; Suber montanum of Kirwan; Asbeste suberiform of Brongniart. Called also Mountain cork; a white or grey-coloured variety of asbestos. Its specific gravity varies from 0.68 to 0.99; this, and its fibrous structure, have obtained for it the name of cork. Its constituents are silice 56.3, magnesia 26.2, lime 12.4, alumine 2.0, iron 3.1. It occurs in France, Germany, and some other countries. Near Alais, in France, it is met with on the surface of the ground, in long white masses, having a resemblance to human bones.

**ROCK SALT.** Common salt. This is found in vast solid masses or beds, in different formations, extensively in the new red sandstone formation. The saliferous strata of Northwich, form two beds of great thickness, one being 120, the other 110 feet in thickness. The origin of these beds does not appear, to the present time, to be satisfactorily understood or explained.

**RODENTIA.** (from *rodo*, Lat. to gnaw.) The fifth order of Mammalia. Called also Gnawers. The order contains many genera, some of which are familiar to us, namely, the squirrel, the rat, the mouse, the hare, the rabbit, &c. &c. From the characters of their teeth, which are

adapted neither for seizing nor tearing their food, but merely to nibble and gnaw it, they have received their name of *Rodents*, or gnawers. The great majority of this order are gregarious, living in burrows, in common habitations which they excavate or fabricate themselves.

**ROE STONE.** The roogenstein of Werner; oviform limestone of Kirwan. A name given to the oolite, a variety of limestone, from its being composed of small rounded particles, resembling the roe or eggs of a fish. See *Oolite*.

**ROSA'CEÆ.** An order of plants, including the genera *potentilla*, *fragaria*, *rosa*, *rubus*, *spiræa*, *brayera*, *dryas*, &c. &c. The following is a description of this order; calyx with four or five teeth, the odd one posterior or next the axis, with a disk lining the tube, or surrounding the orifice; petals five, equal, perigynous; stamens indefinite in number, inserted into the calyx within the petals; ovaria superior, sometimes solitary, one-celled, either distinct, or, in some genera, cohering into a many-celled pistil, styles lateral, and stigmata simple; fruit either a cynarrhodum, an etærio, or follicular; seeds suspended, embryo pointing to the hilum, hardly any albumen; herbaceous plants or shrubs, leaves alternate, compound, with two stipulæ.

Chiefly found in temperate or cold northerly climates; very few within the tropics; fourteen British genera. The whole order is innocent.—*Prof. Lindley*.

**ROSA'CEOUS.** Belonging to the order Rosaceæ. Applied to polypetalous corollas, consisting of four or more petals, spreading like a rose.

**ROMANZOVITE.** A mineral recently discovered in Finland. It is of a brown, brownish yellow, and blackish-brown colour. It has been named after Count Romanzoff. According to the analysis of M. Julin, it consists of silica 41.22, lime 24.78, alumine 24.08, oxide of iron 7.02, magnesia and oxide of manganese 0.92.

**RO'SIN.** See *Resin*.

**ROSTELLA'RIA.** A genus of marine univalves, found both recent and fossil. A slightly turreted or fusiform univalve, terminating at its base in a lengthened canal, similar to a sharp beak. The lip whole or dentated, and dilated with age; with a groove contiguous to the canal.

The most remarkable fossil shell of this genus is *Rostellaria macroptera*, found in Hampshire, and in France. This large and handsome fossil is remarkable for the size of its right lip, which is formed into a wide, round, and rather thin wing, extending from the canal at the base,

over the body of the shell and a great part of the spire. The most common species is *Rostellaria fissurella*.—*Parkinson*.

Five species are enumerated by Dr. Mantell as occurring in the strata of Sussex, above the Wealden, namely, *R. Sowerbii*, *R. Parkinson*, *R. carinata*, and *R. calcarata*: one species is found with two processes, closely resembling *R. Pes Pelicani*. Recent *Rostellariæ* are found in the Indian seas.

**RO'STRATED.** (*rostratus*, Lat. beaked.)

1. In botany, a term applied to plants when the fruit has a beak-like process.

2. In conchology, applied to shells having a beak-like extension of the shell, in which the canal is situated.

**RO'STRUM.** (Lat.) A beak or bill; the beak or bill of a bird.

**RO'TALITES.** A genus of shells existing only in a fossil state, and found at Grignon. Four species are described by Lamarck, namely, *R. trochidiformis*, *R. lenticulina*, *R. depressa*, and *R. discorbula*. The shells of this genus are convex, conical, spiral, multilocular, univalves, slightly radiated beneath; aperture marginal, trigonal, and inclined downwards.

**RÖTHE TODTE LIEGENDE.** The name given by the Germans to the lower beds of new red sandstone.

**ROTI'FERA.** The first order of the class Infusoria. The researches of Ehrenberg show that a group, formerly believed to belong to the class of the most minute animalcules, possess an organization extremely complex. They were characterized as rotiferous animalcules, because they have circles of vibratile cilia, which appear like revolving wheels when they are in rapid action, and by these hair-like processes they were enabled to swim. They float, attract their prey with these, and thus get their food. They possess an alimentary canal passing through the body. They possess also muscular fasciculi; nervous ganglia; and even a cerebral or supra-æsoophageal ganglion. They possess a vascular system pretty highly developed, so that they are far removed from the polygastrica. Ehrenberg has called them "rotatoria," but the term rotifera is more generally used. They are distinguished by their circles of cilia, sometimes single, sometimes double, which, through the microscope, appear like revolving wheels.

Lamarck is of opinion, from the observations of Du Trochet, that what are taken for two or more wheels, are only one, bent so as to form partial ones; but in some they certainly are distinct organs. The object of the rapid gyration of this wheel

or wheels is to create a vortex in the water, whose centre is the mouth of the animal; a little charybdis bearing with it all the animalcules or molecules that come within its sphere of action.—*Prof. Grant. Rev. W. Kirby.*

**RO'TTEN STONE.** Another name for Tripoli, in Barbary, whence it was formerly brought. Although the name has been applied to all the species of Tripoli, yet, strictly, it ought to be confined to those varieties only which are most light and friable, and have a very fine grain. Rotten stone occurs near Bakewell, in Derbyshire, resting on compact limestone. It is used in polishing metals, stones, and glass, as well as for many other purposes.

**ROTU'ND.** (*rotundus*, Lat.) Round; circular; spherical. Applied to leaves and shells.

**RU'BELITE.** } The Tourmaline rubellite of  
**RU'BELLITE.** } Brongniart; Tourmaline  
apyre of Haüy. Red tourmaline. This mineral is of a red colour, of various shades; in the form of its crystals it resembles schorl, as well as in its power of acquiring opposite electricities by heat. It is translucent, sometimes transparent. Specific gravity 3·07. Its crystals are cylindrical or acicular, and aggregated in groups. Before the blowpipe this mineral becomes white, but does not fuse, a circumstance, considering its composition, not easily explained. Its constituents are silex 42·0, alumine 40·0, soda 10·0, oxides of manganese and iron 7·0. In the British Museum there is a specimen of Rubellite, from the kingdom of Ava, valued at 1000*l.* Some specimens of Rubellite afford from five to six per cent. of boracic acid, and from two to three of lithion.

**RU'BBLE STONE.** The name given by Kirwan to Greywacke.

**RU'BY.** (from *rubeo*, Lat. to be red, *rubis*, Fr. *rubino*, It. *rubin*, Germ.) The Spinell of Werner; Spinelle rubis of Brongniart. A transparent red variety of rhombohedral corundum. The ruby is a variety of the same mineral genus as the sapphire, but differs from it in containing rather more silex, and in being less hard. Rubies are found in alluvial soil in Ceylon, Pegu, and other countries in the East. The ruby ranks next to the diamond in value. When a specimen is fine, and free from flaws, a ruby of large size will sell for from ten to fifteen thousand pounds. It is composed principally of alumine, containing not less than ninety per cent.

**RU'GGED.** (from *ruga*, Lat. a wrinkle.) Rough; uneven. In botany, applied to leaves when the surface rises into little inequalities above the veins.

Ru'GOSE. } (*rugosus*, Lat.)  
Ru'GOUS. }

1. In conchology, applied to shells which are rugged and full of wrinkles.

2. In botany, applied to leaves when the veins are more contracted than the disc, so that the disc rises into little inequalities: the primrose and sage afford examples.

3. In entomology, when longitudinal elevations are placed irregularly on the surface, resembling coarse wrinkles.

Ru'MINANTS. (from *rumino*, to chew over again, Lat. *ruminant*, Fr. *ruminante*, It.)  
Chewing the cud.

RuMINANTIA. } The eighth order of Mam-

Ru'MINANTS. } *malia*, or those animals that chew the cud. These animals possess the singular property of returning the food to the mouth after it has been swallowed, that it may undergo the process of a second mastication. This property depends upon the structure of the four stomachs which these animals possess, the three first being so arranged that the food may pass from the oesophagus into either of them. Cuvier divides this great order into those that have horns, and those that have none.

Ru'NCINATE. (from *runcina*, a saw, Lat.)

In botany, a term applied to leaves whose edges are cut into teeth turning backwards like a scythe.

Rust. (*rost*, Germ.) If iron be exposed to the air, more especially if the atmosphere be moist, its surface is soon tarnished, and it is gradually changed into a brown or yellow powder, well known by the name of *rust*. Rust is an oxide of iron, or of some other metal.

Ru'TILE. Red oxide of titanium. The titane oxyde of Haüy; titane rutil of Brongniart; rutil of Werner; peritomes titan-erz of Mohs. A brown, red, yellow, and sometimes nearly velvet-black ore. Occurs regularly crystallized, massive, disseminated, in angular grains and in flakes. External lustre considerable, and sometimes metallic. Opaque or translucent. Scratches glass. Specific gravity = 4.2 to 4.4. It is infusible before the blow-pipe unless a flux be employed. It is found in Scotland, in the granite of Cairgorm.

RyA'KOLITE. A name lately given to glassy felspar.

## S

SA'CCHAROID. (from *σάκχαρ*, sugar, and *ειδος*, form, Gr.) A term applied to rocks which have a texture resembling that of loaf-sugar.

SA'CRAL. Pertaining to the sacrum.

SA'CRUM. (Lat.) The bone which forms the basis of the vertebral column.

SADDLE-SHAPED STRATA. When strata are bent on each side of a mountain, without being broken at the top, they are called saddle-shaped.—*Bakewell*.

SA'GENITE. Another name for rutile, or red oxide of titanium. See *Rutile*.

SAGITTA. An obsolete name for belemnite.

SAGITTATE. (from *sagittatus*, Lat.) Arrow-shaped.

SA'HLITE. The sahlit of Werner; the malacolite of Brongniart. A variety of augite, discovered in a silver mine at Sahla, in Sweden, from which it takes its name. It is of a green colour of various shades. It occurs in straight, lamellar, and granular concretions, sometimes crystallized, with a shining, vitreous, or pearly lustre; translucent at the edges. It is soft to the touch, scarcely scratches glass, and is easily scratched by a knife. Specific gravity 3.2. Before the blow-pipe it melts, with some ebullition, into a porous glass. It consists of silica 53,

magnesia 19, lime 20, alumina 3, iron and manganese 4.

SA'LAMANDER. (*σαλαμάνδρα*, Gr. *salamandra*, Lat. *salamandre*, Fr. *salamandra*, It. *salamander*, Germ.) A genus of reptiles belonging to the order Batrachia. The salamander possesses the general form of the lizard, and is placed by Linnæus among the lizards; but its characters are those of the Batrachians. Its body is elongated; it has four feet, and a long tail. When arrived at an adult state, its respiration is performed in the same manner as in frogs and tortoises. Aristotle and Pliny state that if the salamander passes through fire, the fire is immediately extinguished, and that it emits a milky saliva, which is depilatory. Bosc says that it emits from its skin a milky fluid when annoyed, and when put into the fire, it sometimes happens that this fluid sufficiently extinguishes it to permit the animal to escape. This secretion of a milky fluid appears to be exceedingly acrid; produces, if applied to the tongue, a very painful sensation; is an excellent depilatory, and destroys small animals. Spallanzani has discovered that the salamander has the power of reproducing lost or mutilated organs,

so that if its legs or tail be cut off, or its eyes plucked out, these organs will, in the course of a few months, be reproduced.

From the strata at Eningen has been extracted a gigantic fossil salamander upwards of three feet in length, the *Homo diluvii testis* of Scheuchzer.

**SALIENT.** (*saliens*, from *salio*, Lat. to leap.) Leaping; moving by leaps.

**SALIENT ANGLE.** A projecting angle. In a zig-zag line the upper are the salient, the lower the re-entering angles.

**SALIFEROUS.** (from *sal*, salt, and *fero*, to bear, or produce, Lat.) Containing salt; yielding salt. Thus, in geology, we have saliferous deposits; saliferous rocks; saliferous strata; saliferous system, &c. &c.

**SALIFEROUS SYSTEM.** This is the new red sandstone system of some authors; the Poikilitic system of Mr. Conybeare. Of above two hundred species of fossils found in the rocks of the saliferous system, not more than fifty have been discovered in England. The saliferous system comprises the new red sandstone and the magnesian limestone formations; in the former of these two formations no organic remains have been discovered in England. In Germany and France there is added to the series of strata which we possess in this country, a member which is called muschel-kalk; this, though extensively developed in Germany, has never been discovered in England. The organic remains of this system, says Prof. Phillips, though few in number, are exceedingly interesting to the naturalist and geologist, from the strong testimony they offer of the successive changes of the living creation, according to the new circumstances of the land and sea. The fossil plants, shells, fishes, and reptiles of the saliferous system, appear to partake both of the character of those in the older carboniferous, and the newer oolitic, deposits. Calamites, resembling those of the coal formation, are mingled with cycadææ, like those of the oolites. Fishes of the genus *palæoniscus* are here found for the last time; while the remains of oviparous quadrupeds, the phytosaurus and protorosaurus, are first discovered. If the saliferous system were arranged only in accordance with its organic remains, the lower half, or magnesian limestone formation, might be ranked with the carboniferous rocks; the upper half, or new red sandstone formation with the oolitic rocks; but regarding it according to its mineral characters, it forms one great series of deposits, which were thrown down at a period when a decided change in the conditions of the

globe was taking place. The manner in which the group rests upon the carboniferous group in England is such as to show that the latter was disturbed, dislocated, and partially removed before the former was accumulated upon it; nevertheless, in other parts of the European area, there is reason for supposing that the new red sandstone was quietly deposited upon the carboniferous series, no real line of separation being established between them. Mr. De La Beche observes, "it is worthy of remark, that, as far as the European area is concerned, rock-salt is very frequently distributed among the higher parts of the new red sandstone series, from which circumstance it has sometimes been named *saliferous*, by way of distinction; a term exceedingly objectionable, as it would imply either that at this geological period salt was more abundantly deposited than at any other, or that it was confined to it." The saliferous system, commencing with the keuper, or variegated marls, lies immediately under the lias, and, terminating in the reg conglomerate, rests upon the carboniferous series. Its depth in some parts has been estimated at eight or nine hundred feet.

**SALIFIABLE.** That may become a salt by combination with some other body.

**SALINE.** (*salin*, Fr.) Containing salt; consisting of salt.

**SALIVA.** (*saliva*, Lat. *salive*, Fr.) A fluid secreted by the salivary glands, which serves to lubricate the tongue and fauces, to facilitate deglutition, and is supposed greatly to assist the function of digestion. Its principal saline constituent appears, from analysis, to be muriate of potash.

**SALIVARY GLANDS.** Organs which secrete the saliva. All animals that masticate their food are provided with salivary glands, which pour the saliva into the mouth as near as possible to the grinding surfaces of the teeth. In animals subsisting on vegetable food, which requires much maceration, the salivary glands are of large size. Fishes and the cetacea, performing no mastication, have no salivary glands.

**SALT.** (*sal*, Lat. *salz*, Germ. *sel*, Fr. *sale*, It.) Formerly called muriate of soda, now known as chloride of sodium. In an impure state, this is one of the most abundant productions of nature. It occurs in two forms, either as a solid mineral, or in solution, in the waters of the ocean, and of lakes and springs in inland districts. The waters of the ocean contain about one-thirtieth of their bulk in solution. The uses of salt are numerous, putting aside its great importance, or absolute necessity, as a matter of food. It

is employed in glass-making, enamelling, glazing, and bleaching. It is a valuable manure; and it is used in the making of bread. On an average, an adult may be considered to consume from five to six ounces of salt a-week. About a million of tons is supposed to be annually consumed.

**SALT MINES.** Although the most frequent position of rock-salt is in strata of the new red sandstone formation, yet it is not exclusively confined to them. The salt mines of Wieliezka and Sicily are in tertiary formations; those of Cardona in cretaceous; some are found in the oolite; while others occur in the coal formation. There are salt-mines in Mexico which furnish annually one million eight hundred thousand bushels. The salt-mine of Wieliezka, already mentioned as existing in the tertiary formation, is very celebrated. It is entered by six shafts of four or five yards in diameter, and from sixty to seventy yards deep. It is worked to a depth of upwards of nine hundred feet. The works in the mine are most surprising; there is a stable, apartments, a chapel, &c., all the furniture of which is made of salt.

**SALT SPRINGS.** The salt-springs generally, but not invariably, rise from strata of the new red sandstone formation. The strongest yield about one-fourth of their weight in salt. Those at Droitwich, in Cheshire, are remarkably abundant, furnishing upwards of sixteen thousand tons of salt annually. The salt is obtained merely by evaporation.

**SALTPETRE.** Nitrate of potash, or nitre. See *Nitre*.

**SAND.** (*sand*, Germ.) Flint or quartz broken fine by the action of water, but not reduced to powder. Very small particles of siliceous matter not cohering together, nor softened by water.

**SANDSTONE.** An aggregate of siliceous grains. Any stone composed of grains of sand agglutinated together. The grains of sandstone are sometimes so fine as scarcely to be distinguished by the unaided eye; at others their magnitude is equal to that of a walnut or an egg, as in the coarse sandstones known as conglomerates, pudding-stones, breccias, &c. The cement which agglutinates the siliceous particles of sandstones may be calcareous, argillaceous, or siliceous: when siliceous the sandstone sometimes resembles quartz. Sandstones are close, porous, and vesicular. They vary in colour, from white to red or brown, but their most common colour is grey or greyish white: sometimes their colour is uniform, at others it is variegated. Sandstone is in general distinctly stratified, and the beds

horizontally arranged; this, however, is not invariably the case, as they are sometimes much inclined, or even vertical.

**SAPONACEOUS.** (from *sapo*, soap, Lat.) Soapy to the touch; resembling soap; having a soapy feel.

**SAPPARE.** A mineral first described by Saussure, who gave it the name of *sappare*. It is the Cyanit of Werner, and the Disthene of Haüy. For its description see *Cyanite*.

**SAPPHIRE.** (from *σάπφειρος*, Gr. *sapphirus*, Lat. *saphir*, Fr. *zaffiro*, It. *saphir*, Germ.) A precious stone, exceeding all others in hardness except the diamond. It consists of nearly pure alumina, with a little oxide of iron, and some silex or lime; but the sapphire contains upwards of ninety-eight per cent. of alumina. Its specific gravity is from 3.70 to 4.30. It possesses double refraction, and varies from opaque to transparent. Its colours are blue, red, green, white, grey, yellow, brown, and black. There are several varieties of the sapphire, as the white, blue, or oriental sapphire, the *oriental* amethyst, the *oriental* topaz, and the *oriental* emerald. The finest sapphires are found in alluvial soil in Ceylon and Pegu. Lately the sapphire has been employed in the formation of small lenses for microscopes. The red sapphire is the most highly esteemed, its value being sometimes equal to that of a diamond of the same size: a single stone has been estimated at the value of one thousand guineas.

**SARCOCARP.** The fleshy part of certain fruits, placed between the epicarp and the endocarp. That part of fleshy fruits which is usually eaten.

**SARCOLITE.** (from *σάρξ*, flesh, and *λίθος*, stone, Gr.) A variety of analcime, found at Mount Somma, and obtaining its name from the flesh colour of its crystals, which are cubo-octahedral.

**SARDONYX.** (*σαρδόνυξ*, Gr. *sardonyx*, Lat. *sardoine*, Fr. *sardonico*, It. *sardonyx*, Germ.) The Quartz agate sardoine of Haüy; Silex sardoine of Brongniart. A variety of calcedony differing from carnelian only in its colour, which is reddish yellow, or nearly orange, with occasionally a tinge of brown.

**SARMENTOSE.** } (*sarmentoux*, *euse*, Fr. *sarmentous*. } *mentosus*, Lat. full of twigs.) In botany, applied to stems that are thrown out from the roots for the purpose of increase, being barren of flowers, and creep along, putting forth roots from various points.

**SASSOLIN.** } So called from its having  
**SASSOLINE.** } been found near the warm spring of Sasso, in Tuscany. Native boracic acid.

**SA'TELLITE.** (*satellite*, Fr. *sattellite*, It.)

A small body revolving about a planet. The moon is a satellite to the earth. The moon is so near the earth, that the reciprocal attraction between each of her particles, and each of the particles in the prominent mass at the terrestrial equator, occasions considerable disturbances in the motions of both bodies; for the action of the moon on the matter at the earth's equator, produces a nutation in the axis of rotation, and the re-action of that matter on the moon, is the cause of a corresponding nutation in the lunar orbit.—*Mrs. Somerville.*

**SA'TIN SPAR.** A fibrous variety of calcareous spar. It is susceptible of a fine polish, and exhibits the lustre of satin, from which circumstance it has obtained its name. Its colours are grey and pale rose-red. Very fine specimens are met with in Cumberland.

**SAU'RIA.** (from *σαῦρος*, a lizard, Gr.) The second order in the class Reptilia. This order, according to Cuvier's arrangement, includes six families, namely, Crocodilida, Lacertinida, Iguanida, Geckotida, Chamæleonida, and Scincoide.

**SAU'RIAN.** A reptile belonging to the order Sauria.

**SAU'RIAN REMAINS.** The oldest strata in which any remains of saurians have been found, are those connected with the magnesian limestone formation. The bones and entire skeletons of reptiles allied to the class Reptilia occur in the lower part of the secondary strata, and are very abundant in the lias. Many of these animals were different from any known existing genera. "The species of fossil saurians are exceedingly numerous, attaining in many instances a magnitude unknown among the living orders of that class, and which seem to have been peculiar to those middle ages of geological chronology that were intermediate between the transition and tertiary formations. During these ages of reptiles, neither the carnivorous nor the lacustrine mammalia of the tertiary periods had begun to appear; but the most formidable occupants both of land and water, were crocodiles, and lizards; of various forms, and often of gigantic stature, fitted to endure the turbulence, and continual convulsions of the unquiet surface of our infant world." Upon the whole, it is in the oolitic period, between the eras of the red sandstones and the greensands, that the gigantic saurians existed in greatest abundance about the shores, in the rivers, and on the land, in these now cold regions of the globe. Some of the saurians were exclusively

marine; others amphibious; others were terrestrial, ranging in marshes and jungles, clothed with a tropical vegetation, or basking on the margins of estuaries, lakes, and rivers. Even the air was tenanted by flying lizards, under the dragon form of pterodactyles.—*Professors Buckland and Phillips.*

**SAUROCE'PHALOUS.** A fossil saurian, found in the oolite, and by M. Agassiz ranked among fishes. Its form was adapted for swimming.

**SAU'ROID.** (from *σαῦρα*, a lizard, and *ἔιδος*, form, Gr.) The name given to a group of fishes found in great abundance in the carboniferous and secondary formations. The *sauroid* fishes, says Prof. Buckland, occupy a higher place in the scale of organization, than the ordinary forms of bony fishes. In the tertiary strata the sauroids almost disappear, and are replaced by less complex forms, and present only two genera among existing fishes.

**SAU'SSUKITE.** A combination of crystallized serpentine with jade or felspar. It is thus named after Saussure, who first described it. It is the jade de Saussure of Brongniart. In its external characters it differs but little from nephrite, but in its composition it by no means resembles it. It was first noticed by Saussure near the lake of Geneva, scattered about in rounded pieces and loose blocks. Its colours are green, greenish grey, or white with a slight tinge of green or blue. Its specific gravity is about 3.35. Before the blow-pipe it fuses. It consists of silex 49.0, alumine 24.0, lime 10.5, soda 5.5, magnesia 3.75, oxide of iron 6.5. By many mineralogists, saussurite is included under nephrite.

**SAXICA'VA.** A genus of bivalves, belonging to the family Lithophagi, or stone-eaters.

**SAXICA'VOUS.** Animals which make holes in the rocks, either by boring them, by means of some auger-like process they possess; or by dissolving the rock, by some acid which it secretes.

**SCA'BROUS.** (from *scabrosus*, Lat. rough; *scabreux*, Fr.)

1. In entomology, applied to the surface of an insect when covered with small and slight elevations.

2. Applied to shells, when rough, rugged, harsh, or like a file.

3. In botany, applied to the stems that are rough, from any little inequalities or tubercles.

**SCA'GLIA.** (Ital.) A mode of chalk, of a red colour. In an interesting paper, by Prof. Sedgwick and R. J. Murchison, Esq. published in the Philosophical Magazine for June 1829, on the relations of the secondary and tertiary strata on the

- southern flanks of the Tyrolese Alps, the tertiary strata are described as forming a vast series of beds resting on *scaglia* or chalk. The *scaglia* occurs in beds nearly vertical; the upper ones contain nodules and layers of flints; their colour is red, and their structure fissile. The *scaglia* contains in some parts ammonites and belemnites.—*Mr. Bakewell, Introd. to Geology.*
- SCALA'RIA.** A genus of marine turreted univalves, with acute longitudinal raised ribs. The aperture nearly circular; the margins uninterrupted, bordered, and reflected. *Scalariæ* are found in sandy mud at depths varying from seven to thirteen fathoms. Lamarck has described five species of this genus as found among the fossils of Grignon and Pernes.
- SCALA'RIFORM.** (from *scalaris*, a ladder, and *forma*, form, Lat.) Mr. Robert Brown has ascertained by examination of a trunk of *Cycadites mycophyllus*, from Portland, the existence of *scalariform* vessels without discs, in the mature trunk.
- SCA'LOPED.** Indented at the edges.
- SCA'NDENT.** (from *scandens*, climbing, Lat.) A term applied to plants which climb upon some support, attaching themselves by fibres or tendrils.
- SCAPE.** (from *scapus*, Lat.) In botany, an herbaceous stalk springing from the root, and bearing the flower and fruit, but not the leaves. The hyacinth, cowslip, and dandelion, are examples.
- SCA'PHITE.** (from *scapha*, a boat.) So named from its supposed resemblance to a boat. The scaphite resembles an ammonite partly unrolled. Scaphites are found in the chalk and in the greensand. They are believed to be altogether extinct; but the Rev. W. Kirby most justly remarks, "who shall say what species lurk in those unapproachable recesses never to be revealed to human eye, but in a fossil state. The *baculites*, *hamites*, *scaphites*, and numerous others, there have space sufficient to live unknown to fame, while they are reckoned by the geologist as expunged from the list of living animals."
- SCA'POLITE.** Pyramidal felspar. The scapolite of Werner; scapolite of Brochant; paranthine of Haüy. A rare mineral, occurring massive and in long prismatic crystals. It consists of silica 43·83, alumina 35·43, lime 18·96. It is of a grey, yellowish, greenish-white, or silver-white colour. Specific gravity from 3·68 to 3·71. Before the blow-pipe it intumesces, and fuses into a shining, white enamel. It is found in beds of magnetic ironstone and iron pyrites, at Arendal, in Norway.
- SCA'PULA.** The shoulder-blade.
- SCA'PULAR.** Pertaining to the shoulder-blade or scapula.
- SCARF-SKIN.** The cuticle or external covering of the body; called also the epidermis.
- SCHAA'LSTEIN.** Shell-stone. The schaal-stone of Jameson; pierre calcaire testacée of Brochant; spath en table of Haüy. Called also tabular spar or table spar. A substance of a grey or pearly-white colour, usually occurring in masses, composed of thin laminae, collected into large prismatic concretions. It is very rare, and has been found chiefly at Dog-natska, in the Bannat.
- SCHEE'LIUM.** Another name for Tungsten.
- SCHI'LLER SPAR.** (from *schillerm*, Germ. to vary colours, to play from one colour to another.) The schiller spath of Mohs. A genus of spars comprising four varieties, namely, common schiller spar; bronzite, or hemiprismatic schiller spar; hypersthene, or prismatoidal schiller spar; and anthophyllite, or prismatic schiller spar. The characters of the genus are, the cleavage monotomous, perfect. Metallic pearly lustre. Hardness = 3·5 to 6·0. Specific gravity = 2·6 to 3·4.
- SCHIST.** (σχιστός, Gr. *schistus*, Lat. *schiste*, Fr.) A term synonymous with slate. A rock, of a fissile character, which may easily be split.
- SCHISTO'SE.** } Slaty; fissile.
- SCHI'STOUS.** }
- SCHISTO'SE MI'CA.** The name given by Kirwan to mica slate.
- SCHNEIDE'RIAN MEMBRANE.** Thus named from Schneider, who first described it. The lining membrane of the nostrils.
- SCHORL.** A dark-coloured, opaque, variety of tourmaline. It occurs crystallized; in prismatic and granular concretions, massive and disseminated. The electric powers of schorl constitute one of its most striking characters. By friction it becomes positively electric; but by exposure to heat, it acquires positive electricity at one end, and negative at the other. Schorl is brittle; it scratches glass; is harder than hornblende, but less hard than quartz. Fracture vitreous and conchoidal. Specific gravity from 3·05 to 3·36. It fuses easily before the blow-pipe, and is converted into a greyish-white or brownish enamel, sometimes nearly compact at others vesicular. Its constituents are, silice 36·75, alumina 34·50, potash 6·0, magnesia 0·25, oxide of iron 21·0. It occurs imbedded in granite, gneiss, &c. in Scotland and in Cornwall.
- SCHO'RLITE.** The Pycnite of Haüy and

Brongniart; the Schorlous beryll of Jameson. A mineral of a straw colour, occurring at Altenburg, in Saxony, in a rock of quartz and mica.

**SCIENCE.** (from *scientia*, knowledge, Lat. *science*, Fr. *sienza*, It.) The knowledge of many, orderly and methodically arranged and digested, so as to become attainable by one. The knowledge of reasons and their conclusions constitutes *abstract*, that of causes and their effects, and of the laws of nature; *natural science*.

**SCITAMINEÆ.** One of Linnæus's natural orders of plants; they are all natives of warm climates: the ginger, plantain, &c. are examples.

**SCITAMINEOUS.** Belonging to the order Scitamineæ. *Scitamineous* plants have been found fossil in the strata of the Isle of Sheppey.

**SCLEROTICA.** } (from *σκληρος*, hard, Gr.)

**SCLEROTIC.** } The outermost coat, tunic, or membrane of the eye. It is exceedingly dense and firm, and does not pass over more than about four-fifths of the ball of the eye, its place in front being supplied by a transparent membrane, the *cornea*, to permit the passage of light.

**SCOPIFORM.** (from *scopa*, a besom, and *forma*, form, Lat.) Of the form of a besom or broom.

**SCORBI'CLATE.** In conchology, pitted; having the surface covered with hollows.

**SCORBI'CLUS.** A depression or cavity.

**SCORIA.** (*σκόρπια*, Gr. *scoria*, Lat.) The dross or scum of metals; the cinders of volcanic eruptions (then used plurally, *scoriæ*); the recementitious matter of metals in a state of fusion.

**SCORIA'CEOUS.** Resembling scoria; containing scoria.

**SCORIFIED.** Reduced to scoria or dross.

**SCORIFORM.** Having the form, shape, or external appearance of scoria.

**SCORIOUS.** Drossy; cindery; excrementitious.

**SCORPION.** (*σκόρπιος*, Gr. *scorpius*, Lat. *scorpion*, Fr. *scorpio*, It. *scorpion*, Germ.)

A genus of arachnidans, belonging to the family Pedipalpi, order Pulmonariæ. The scorpion is remarkable, not only for the powerful organs by the aid of which it is able to seize its prey, but also for its jointed tail, terminating in a deadly sting. The palpi are very large, with a forceps at the extremity resembling a hand; the tail is composed of six joints, the last joint terminating in an arcuated and exceedingly acute point or sting, which allows the exit of a poisonous fluid contained in an internal reservoir. The scorpion is provided, on each side of the thorax, with four pulmonary cavities, into each of which air is admitted by a separate external opening. The eyes are

compound, accompanied by stemmata. A fossil scorpion has been discovered by Count Sternberg in the ancient coal formation at Chomle, near Radnitz.

**SCROBI'CLATED.** (*scrobiculus*, from *scrobs*, a furrow, Lat.) Furrowed; having small ridges and furrows.

**SCRUBSTONE.** A provincial term for a species of calciferous sandstone.

**SCUTUM.** (*scutum*, Lat. a shield or buckler.) A species of Echinite. The name given by Klein to the third section of the class of Cateocysti; the *scutum* of Klein is the *Echinanthus* of Leske.

**SE'CONDARY.** (from *secundus*, Lat. *seconde*, Fr.) Succeeding to the first.

**SE'CONDARY FORMATIONS.** } By secondary

**SE'CONDARY STRATA.** } are meant

**SE'CONDARY ROCKS.** } those strati-

fied rocks older than the tertiary, which contain distinct organic remains, and which sometimes pass into the strata commonly called primary. The principal groups of the secondary formations, beginning with the uppermost and descending, are as follows:—1. The cretaceous group, beginning with the Maestricht beds, and terminating in the lower green sand. 2. The wealden group, commencing with the weald clay, and closing with the Purbeck beds; this group is a freshwater deposit. 3. The oolite, or Jura limestone group, beginning with the Portland beds and ending with the inferior oolite. 4. The new red sandstone group, commencing with the Keaper and ending in the red conglomerate. 5. The carboniferous group, comprising the coal measures, the mountain limestone, and the old red sandstone. 6. The graywacke group.

Some authors, however, subdivide the secondary formations as thus described, separating the transition rocks and coal measures, and making the secondary rocks terminate with those formations that cover the transition rocks and the coal measures. The secondary strata cover a large portion of the habitable globe, and are the immediate subsoil of the most fertile districts in Europe. The secondary strata are composed of extensive beds of sand and sandstone, mixed occasionally with pebbles, and alternating with deposits of clay, and marl, and limestone. Six substances are interstratified in this system: arenaceous, argillaceous, and calcareous rocks form the principal masses, and are associated with beds of chert, iron-stone, and coal. In colour, these rocks are white, brown, grey, green, yellow, or red. It is no small proof of design, says Prof. Buckland, in the arrangement of the materials that compose the surface of our globe, that whereas

the primary and granitic rocks are least calculated to afford a fertile soil, they are for the most part made to constitute the mountain districts of the world, which from their elevation and irregularities, would otherwise be but ill adapted for human habitation; while the lower and more temperate regions are usually composed of derivative, or secondary strata, in which the compound nature of their ingredients qualifies them to be of the greatest utility to mankind, by their subserviency to the purposes of luxuriant vegetation.

It is in the strata belonging to the secondary formations that the bones of enormous reptiles are first discovered; but throughout the whole series no bones of mammiferous land quadrupeds have been discovered, with the single exception of marsupial remains which occur in the oolite, at Stonesfield, near Oxford. The peculiar feature in the population of the whole series of secondary strata, was the prevalence of numerous and gigantic forms of Saurian reptiles. The earth was, probably, at that time too much covered with water, and those portions of the land which had emerged above the surface, were too frequently agitated by earthquakes, inundations, and atmospheric irregularities, to be extensively occupied by any higher orders of quadrupeds than reptiles.

The order of succession of the upper strata of the secondary series may be more accurately ascertained in England than in any other country already examined.

“From the examination,” says Dr. Mantell, “of the organic remains of the secondary formations, we arrive at the following results; that the seas, lakes, and rivers, during the geological epoch termed secondary, were peopled by fishes, mollusca, crustacea, radiaria, polyparia, and other zoophites; all of extinct species, and presenting as a whole, a greater discrepancy with existing forms, than those of the tertiary; the most remarkable feature being the absence of cetacea, and the presence of several genera of extinct marine reptiles. On the land we find no analogy to the tertiary or present æras; throughout the vast accumulation of the spoils of the ancient islands and continents, although the remains of fresh-water turtles, insects, and terrestrial plants abound, no indications are afforded of the existence of mammalia, one instance only excepted, that of the didelphis, discovered at Stonesfield. In vain we search for the bones of man, or the remains of works of art—for the skeletons of the mastodon or the elk—for the palæotheria, or of other mammalia that were

their cotemporaries: the osseous remains of reptiles, terrestrial or fluviatile, alone appear.”

With the cretaceous system ends the long series of deposits which are, by general consent, ranked as strata of the secondary periods of geology. Prof. Phillips says, “turning to the organic remains of the several secondary systems, it is apparent that, within the period of time which elapsed between the deposition of the primary and tertiary strata, two very distinct assemblages of terrestrial plants had flourished, and become extinct. The ancient and abundant flora of the carboniferous era, with its lepidodendræ, sigillariæ, and calamites, had been replaced by new races of zamia and cycadæ, which, in their turn, vanished from the northern zones of the globe before the cretaceous system. The marine zoophyta were changed. One total change had come over the crustacea,—not a single trilobite being known in the strata more recent than coal: the brachopodous conchifera, the gasteropodous and cephalopous mollusca were equally altered. Two large assemblages of fishes had vanished before the deposition of the chalk; and both on the land, and in the sea, gigantic reptile forms had come into being, reproduced themselves to a marvellous extent, and then all perished with the close of the secondary period.”

Long as the above extract has been, it is scarcely possible to refrain from quoting the following splendid passage from the same eloquent author:

“How, then, can they, by whom the magnificent truths of elapsed time and successive creations have been put in clear and strong evidence,—how can they be expected to yield to false notions of philosophy, and narrow views of religion, the secure conviction that, in the formation of the crust of the earth, Almighty Wisdom was glorified, the permitted laws of nature were in beneficent operation, and thousands of beautiful and active things enjoyed their appointed life, long before man was formed of the dust of the ancient earth, and endowed with a divine power of comprehending the wonders of its construction? It is something worse than philosophical prejudice, to close the eyes of reason on the evidence which the earth offers to the eyes of sense; it is a dangerous theological error to put in unequal conflict a few ill-understood words of the Pentateuch, and the thousands of facts which the finger of God has plainly written in the book of nature; folly, past all excuse, to suppose that the moral evidence of an eternity of the future shall be weakened by admitting the physical evi-

dence for an immensity of the past."—*Phillips. Buckland. Mantell. Bakewell.*

**SECTILE.** (from *sectilis*, that may be easily cut, Lat.) A term in mineralogy, applied to minerals, when, being cut with a knife, the separated particles do not fly away, but remain on the mass.

**SECULAR REFRIGERATION.** The periodical cooling and consolidation of the globe from a supposed original state of fluidity from heat.—*Lyell's Principles of Geology.*

**SECURIFORM.** (from *securis*, a hatchet, Lat. and *form.*) Hatchet-shaped: a term applied to shells and to leaves.

**SEDIMENT.** (*sedimentum*, Lat. *sediment*, Fr.) That which subsides, or settles at the bottom.

**SEDIMENTARY ROCKS.** Rocks which have been deposited by water.

**SEED VESSEL.** In botany, the pericarp.

**SELENITE.** (*σεληνίτης*, Gr. *sélénite*, Fr.)

Sulphate of lime, or crystallized gypsum.

A transparent and highly crystallized variety of gypsum. The crystals of selenite are frequently united, or collected into groups of various forms. Selenite consists of lime 33·0, sulphuric acid 44·8, water 21·0. It is found abundantly in the gypsum and salt formations of England, France, Germany, &c., &c. The primitive form of its crystals is a dodecahedron, which may be conceived as two four-sided pyramids, applied base to base, and which, instead of terminating in pointed summits, are truncated near the bases; so that the sides of the pyramids are trapeziums, each terminating in a rhomb. It causes double refraction. Before the blow-pipe it melts into a white enamel. It does not effervesce with muriatic acid, unless it be impure.

**SELENIUM.** (from *σελήνη*, the moon, Gr.)

One of the fifty-five simple or elementary bodies, and a non-conductor of electricity. It was extracted by Berzelius from the pyrites of Fahlun. According to Dr. Prout, it appears to constitute the connecting link between sulphur and the metals.

**SELF-LUMINOUS BODIES.** All visible bodies may be divided into *self-luminous* and *non-luminous*. Self-luminous bodies, such as the stars, flames of all kinds, and bodies which shine by being heated or rubbed, are those which possess in themselves the property of discharging light.—*Dr. Brewster.*

**SEMI.** (*semi*, Lat.) In composition with other words, implies half; as semi-spherical; semi-transparent, &c., &c.

**SEMINAL LEAVES.** The first leaves of a plant.

**SEMI-OPAL.** A variety of opal. The Halbopal of Werner; La demi-opale of

Brochant; Quartz résinite commune of Haiy. The colours of semi-opal are white, grey, green, red, brown, and blue. Fracture imperfectly conchoidal. Specific gravity 2·0 to 2·5. It is infusible before the blow-pipe. It consists of silica 85·0, alumina 3·0, oxide of iron 1·74, carbon 5·0, ammoniacal water 8·0, with a fraction of bituminous oil: or, according to another analysis, of silica 82·7, water 10·0, oxide of iron 3·0, alumina 3·5.

**SENSORIUM.** (*sensorium*, Lat. *sensorium*, Fr.) That particular part of the brain in which sensation produces perception.

**SEPAL.** This word has no derivation, but was invented by botanists to distinguish the several parts of the calyx from those of the corolla.

**SEPIA.**

1. The name given by Linnæus to the cuttle-fish. A genus of cephalopods comprising several subgenera, the two most interesting of which are the Argonauta of Linnæus and the Sepia of Lamarck. For a description of sepia the reader is referred to the article *Cuttle-fish*.

2. The ink of the cuttle-fish. This has been found in a beautiful state of preservation in fossil ink-bags of sepia in the lias at Lyme Regis. The common sepia, used in drawing, is from the ink-bag of an oriental species of cuttle-fish.

**SEPIOSTAIRE.** The name given, by Blainville, to the internal bone of the sepia or cuttle-fish. The absence of a siphuncle renders the *sepiostaire* an organ of more simple structure, and of lower office, than the more compound shell of the belemnite.

**SEPTARIA.** (from *septa*, inclosures, Lat.)

Spheroidal concretions, varying from a few inches to a foot in diameter, and divided into cells or chambers of irregular form; sometimes they are nodules of clay, having the chambers filled with spar; they are usually found in argillaceous strata. Masses of argillaceous limestone, traversed interiorly by cracks passing in different directions, and containing calcareous spar.

**SEPTUM.** (*septum*, Lat.) A partition.

The plates dividing the chambers of multilocular shells are termed septa; a partition separating certain portions of the brain is called the septum; and the cartilaginous partition of the nostrils is called the septum of the nose.

**SEROLIS.** A genus of crustaceans, affording the nearest approach among living animals to the external form of the trilobite. This genus was first established by Dr. Leach. The greatest difference between the serolis and trilobite consists in the former possessing a fully developed

series of crustaceous legs and antennæ, whilst the trilobite does not display any traces of either of these organs. Captain King has lately collected many specimens of *serolis* on the east coast of Patagonia, and in the Straits of Magelhaens he saw the beach covered with them dead.—*Prof. Buckland.*

**SERPENTINE.** A mineral substance deriving its name from its spots and variegated colours, supposed to resemble the skin of the serpent; its colours and their peculiar arrangement, are in great measure, characteristic. It sometimes forms whole rocks. It differs from hornblende in containing a larger portion of magnesia and a smaller quantity of iron. There is, however, an intimate connection between serpentine and hornblende, as the latter is observed, in some situations, to be changed into serpentine by contact with limestone. The grain of serpentine is fine, and its texture compact: it may be cut or scraped with a knife, but it does not yield to the finger-nail. When broken, it possesses some lustre and a slightly unctuous feel. Its surface, which is sometimes glossy, is soft to the touch. Specific gravity from 2·5 to 2·7. Before the blow-pipe it hardens but does not fuse. Its constituents are magnesia 34·5, silice 28·0, alumine 23·0, lime 0·5, water 10·5, oxide of iron 4·5 = 101. There are two varieties, the precious and the common serpentine. When serpentine is found intermixed with patches of crystalline white marble, it constitutes a stone denominated verde-antique. Some crystallized varieties have obtained the name of diallage, or schillar spar. Many of the Alpine districts of Europe contain beds and rocks of serpentine; but Patrin states that there is no serpentine in Northern Asia, neither was any seen in the Andes of South America, by Humboldt. In the United States it is met with abundantly. Brongniart has given to serpentine the name of Ophiolite. In the Apennines, the serpentine rests upon saussurite, the saussurite upon jasper, and the jasper upon limestone. Its degree of hardness, and the peculiar arrangement of its colours form the distinctive characters of serpentine.—*Bakewell. Cleaveland.*

**SERPULA.** A genus of the order Tubicola, class Annulata. The animal a terebella; shell univalve, tubular, generally adhering to other substances; often separated internally by septa at uncertain distances. Serpulæ have only been found to inhabit the ocean. They are generally littoral, attached to rocks, stones, shells, crustaceans, corals, and other marine bodies; sometimes several species are found on one stone or shell. In Turton's Linné

forty-eight species of serpula are described, twenty-seven of which inhabit the seas of our coasts. Serpulæ may commonly be seen upon the shells of lobsters, crabs, oysters, &c., to which they adhere by the lower surface, looking like small worms creeping upon them. Wherever the sea is or has been, they abound either in a recent or fossil state.

**SERRATE.** } (*serratus*, Lat. from *serro*, to  
**SERRATED.** } saw.) Jagged; notched.

1. In botany, applied to leaves, the margins of which resemble a saw, the teeth pointing towards the extremity of the leaf.

2. In entomology, applied to the bodies of insects, the margins having jagged incisions, like the teeth of a saw.

**SERRULATE.** } (from *serrula*, a little saw,  
**SERRULATED.** } Lat.) When the edges of leaves or margins of shells are very finely jagged or notched, they are said to be serrulated, and not serrated.

**SERTULARIA.** A genus of arborescent corals belonging to the family Tubularii.

**SERUM.** (*serum*, Lat., *serum*, Fr.) The thin, watery, transparent part of the blood.

**SÉSAMOÏD.** (from *σεσάμη*, an Indian grain, and *εἶδος*, resemblance, Gr. *sésamoïde*, Fr.) The name of some exceedingly small bones found at the root of the thumb or great-toe.

**SÉSQUI.** (A contraction of *semisque*, Lat. signifying and a half.) A prefix to many words, signifying the quantity and a half more.

**SÉSILE.** (from *sessilis*, seated, Lat.) In botany, applied to flowers when placed directly on the branch or stem; also to leaves when they grow directly from the stem, branch or root, without any foot-stalk: any part of a plant which commonly is borne on a stalk, is said to be sessile when it has none.

**SETACEOUS.** (from *seta*, a bristle, Lat.) Bristle-shaped; bristly.

**SHALE.** (*schale*, Germ.) Slate clay; indurated slaty clay.

**SHANKLIN SAND.** Called also lower green sand. A marine deposit of siliceous sands and sandstone of various shades of green, red, brown, yellow, ferruginous, grey, and white, with subordinate beds of cherts and siliceous limestones, constitute the formation called the Shanklin sand, or lower green sand. It is the lowest member of the cretaceous group, intervening between the gault above and the weald clay below. The beds consist of an aggregation of sand, with comminuted shells and fragments of corals, impregnated with iron,

and containing the remains of myriads of shells, polyparia, &c.

**SHARK.** (from *καρχαρία*, Gr.) The squalus of Linnaeus. A genus of fishes belonging to the family Selachii, order Chondropterygii Branchiis Fixis. The shark is a phosphoric fish. That tribe of sharks, called by the French Reguins, which is thought to be synonymous with the carcharias of the Greeks, and one of which was probably the monster that swallowed Jonah, are stated to exceed thirty feet in length. The genus of sharks may be considered as one of the most universally diffused, and most voracious of modern fishes. Several rows of teeth are lodged in each jaw, but one only of these rows projects, and is in use at the same time; the rest lying flat, but ready to rise in order to replace those that have been broken off, or worn down. The shark is oviparous or ovo-viviparous, according to circumstances. The vertebral column is prolonged into the upper lobe of the tail, and the tail is of great service in enabling the shark to turn its body so as to bring the mouth, which is placed downwards beneath the head, into contact with its prey. Sharks appear to have existed throughout every period of geological history. M. Agassiz has separated the sharks into three sub-families, each containing forms peculiar to certain geological epochs, and which change simultaneously with the other great changes in fossil remains. The first of these sub-families, or the Cestraciants, commences with the transition strata, appearing in every subsequent formation till the commencement of the tertiary. Of the Cestraciants, one representative only now remains, namely, the Cestracion Philippi, or Port Jackson shark. The Cestraciants possessed large polygonal, obtuse, enamelled teeth, covering the interior of the mouth with a kind of tessellated pavement. The second sub-family, or Hybodonts, commenced with the muschel-kalk, is found throughout the whole of the oolitic deposits, and disappears at the commencement of the cretaceous group. The teeth of the Hybodonts were intermediate between the blunt polygonal teeth of the Cestraciants and the sharp-edged cutting teeth of the Squaloids. The third sub-family, termed Squaloids, appeared at the commencement of the chalk deposits, and continues downwards to the present period. In the Squaloids, the teeth are smooth on the outer side, and plicated on the inner; sometimes the edge is serrated.

**SHELL.** (*schale*, Germ.) The hard covering of anything; the covering of a testaceous or crustaceous animal. The crus-

taceous coverings of animals, as of echini, crabs, lobsters, cray-fish, &c., are composed of the same ingredients as bones; but the proportion of carbonate of lime far exceeds that of the phosphate in shells. The following are the proportions contained in the shell of the lobster:—Carbonate of lime 60·0, phosphate of lime 14·0, cartilage 26·0. The shells of marine animals may be divided into two classes, namely, porcellaneous and mother-of-pearl, or membranous shells; the porcellaneous shells have the appearance of porcelain; their surface is enamelled, and their texture often slightly fibrous: the mother-of-pearl, or membranous shells, are covered with a strong epidermis, below which lies the shelly matter in layers. Porcellaneous shells are composed of carbonate of lime, cemented together by a small portion of gelatine; most of the univalve shells, and many of the convoluted beautiful shells of the tropics, belong to this division. Mother-of-pearl, or membranous shells, are composed of alternate layers of carbonate of lime and a thin membranaceous substance, which resembles coagulated albumen in its properties. This membrane still retains the figure of the shell after all the carbonate of lime has been separated by acids. Many membranous, or mother-of-pearl shells, exhibit, on several parts of their internal surface, a glistening, silvery, or iridescent appearance; to this structure the term nacreous has been applied.

This appearance is caused by the peculiar thinness, transparency, and regularity of arrangement of the outer layers of the membrane, which enter into the formation of that part of the surface of the shell. The surface, which has thus acquired a pearly lustre, was formerly believed to be a peculiar substance, and was termed mother-of-pearl, from a supposition that of it pearls were formed. Assuredly, pearls are composed of the same materials, and have the same laminated structure as the membranous shells; but Sir D. Brewster has satisfactorily demonstrated that the iridescent colours exhibited by these surfaces are wholly the effect of the parallel grooves, consequent upon the regularity of arrangement in the successive deposits of shell.

The process employed by nature for the formation and enlargement of the shells of the mollusca was very imperfectly understood prior to the investigations of Reaumur. His experimental enquiries have established these two general facts; first, that the growth of a shell is simply the result of successive additions made to its surface, and, secondly, that the ma-

terials constituting each successive layer are supplied by the organized fleshy substance called the mantle, and not by any vessels belonging to the shell itself. The connexion between the animal and the shell may be regarded as mechanical rather than vital; for whatever portion of vitality it might have possessed when first deposited, all trace of that property soon disappears. It is found that shells may be impregnated with poisonous metallic salts, and yet the animal suffer no inconvenience.

It is upon the exclusive shape of the shell, and not the animal inhabiting it, that the arrangement of conchology is formed. Most shells are very different in their young and adult state, both as regards their form and colour. The Linnæan arrangement of shells consists of three orders, namely, multivalve, bivalve, and univalve.

Shells are found fossil in the most ancient strata of the transition period that contain any traces of organic life, and many of these agree so closely with the existing species, that we infer their functions to have been the same, and that they were inhabited by animals of form and habits similar to those which fabricate the living shells most nearly resembling them. The most prolific source of organic remains has been the accumulation of the shelly coverings of animals which occupied the bottom of the sea during a long series of consecutive generations. A large proportion of the entire substance of many strata is composed of myriads of these shells, reduced to a comminuted state by the long-continued movements of water. Minute examination discloses occasionally prodigious accumulations of microscopic shells, no less surprising by their abundance, than their extreme minuteness; the mode in which they are sometimes crowded together, may be estimated from the fact, that Soldani collected from less than an ounce and a half of stone, found in the hills of Tuscany, ten thousand four hundred and fifty-four microscopic chambered shells. Of several species of these shells, four or five hundred weigh but a single grain; of one species, a thousand individuals would scarcely weigh one grain; and great numbers of them could pass through a paper in which holes have been pricked with a needle of the smallest size.

The phenomenon of shells found in rocks, at a great height above the sea, has been attributed to several causes. By some, it has been ascribed to a plastic virtue in the soil; by some, to fermentation; by some, to the influence of the

celestial bodies; by some, to the casual passage of pilgrims with their scallops; by some, to birds feeding on shell-fish; but by all modern geologists, with one consent, to the life and death of real mollusca at the bottom of the sea, and a subsequent alteration of the relative level of the land and sea.

The specific gravities of many shells have been lately ascertained by Mr. De La Beche. Those of land-shells ranged from 2·82 to 2·87; of fresh-water shells, from 2·79 to 2·82; those of marine shells, from 2·43 to 2·85. He adds, while the specific gravities of the land shells enumerated is generally greatest, the densities of the *floating* marine shells is much the smallest. The greatest observed density was that of a *helix*, the smallest that of an *argonaut*. The specific gravity of all the land shells examined was greater than that of Carrara marble; in general more approaching that of Arragonite. The fresh-water and marine shells, with the exception of the *argonaut*, *nautilus*, *ianthina*, *lithodomus*, *haliotis*, and great radiated crystalline *teredo*, exceeded Carrara marble in density. This marble and the *haliotis* are of equal specific gravities.

The testacea, says Mr. Lyell, are by far the most important class of organic beings which have left their spoils in the subaqueous deposites. There is scarcely any great series of strata that does not contain some marine or fresh-water shells, and these fossils are often found so entire, especially in the tertiary formations, that when disengaged from the gangue, or matrix, they have all the appearance of having been just procured from the sea. Their colour, indeed, is usually gone, but the parts whereon specific characters are founded, remain unimpaired; and though the animals themselves have disappeared, their form and habits can generally be inferred from the shell which covered them.

From the proportions which fossil shells bear to marine shells of existing species, M. Deshayes and Mr. Lyell have proposed a fourfold division of the marine formations of the tertiary series. The total number of known fossil shells, at the time Mr. Lyell wrote his fourth edition of *Principles of Geology*, in the tertiary series was 3,036. Of these 1,238 are found in the eocene; 1,021 in the miocene; and 777 in the older, and newer pliocene divisions. The numerical proportions of recent to extinct species may be thus expressed. In the newer pliocene period 90 to 95 per cent. are of *recent* species; in the older pliocene, 35 to 50; in the miocene period 18; in the eocene period 3½ per cent. only are of recent

species.—*Buckland. De La Beche. Lyell. Thomsom. Brown. Brewster.*

**SHELL MARL.** A deposit of calcareous earth and clay containing shells.

**SH'NGLE.** (*schindel*, Germ.) The loose, water-worn, pebbles on the sea-shore.

**SHIST.** See *Schist*.

**SHOOTING STARS.** Shooting stars and meteors differ from aerolites in several respects. They burst from the clear azure sky, and darting along the heavens are extinguished without leaving any residuum, except a vapour-like smoke, and generally without noise. Their parallax shows them to be very high in the atmosphere, sometimes even beyond its supposed limit, and the direction of their motion is, for the most part diametrically opposite to the motion of the earth in its planet. The astonishing multitudes of shooting stars that have appeared within these few years at stated periods, over the American continent, and other parts of the globe, warrant the conclusion that there is either a nebula, or that there are myriads of bodies revolving in groups around the sun, which only become visible when inflamed by entering our atmosphere.

**SHORL.** See *Schorl*.

**SHORLITE.** See *Schorlite*.

**SIBERITE.** Another name for Rubellite, or red tourmaline.

**SIBERO-CALCITE.** The name given by Kirwan to brown spar; the braun spath of Werner.

**SIDERUM.** The name given by Bergman, who took it for a new metal, to phosphuret of iron.

**S'ENITE.** } (from Siena, a city of Egypt,

**SY'ENITE.** } where this rock occurs in abundance, and whence the Romans obtained it for architectural and other purposes.) Werner gave the name of sienite to aggregates composed of felspar, hornblende, and quartz; or of felspar, hornblende, quartz, and mica. Sienite is the roche feldspathique of Haüy. It often bears the general aspect of a granite. Felspar and hornblende may be deemed its two constant and essential ingredients, but it frequently contains quartz and mica, and occasionally talc and epidote. It is the presence of hornblende, as a constituent part, which distinguishes this rock from certain granites, that accidentally contain hornblende. The structure of sienite is commonly granular; but the grains are sometimes coarse, and sometimes very fine. In some instances the structure of sienite is slaty. Greenstone and sienite are essentially composed of the same ingredients, namely, felspar and hornblende; from granitic greenstone there is a transition to sienite, and

from sienite to true granite. The colour of sienite is usually grey, but this is affected by the ingredients entering into its composition.—*Cleveland.*

**SIENITIC.** Containing sienite; resembling sienite; possessing some of the characters of sienite. Sienitic granite contains hornblende. Sienitic porphyry is fine-grained sienite containing large crystals of felspar.

**SIGARETUS.** A genus of marine univalve shells belonging to the family Macrostromata. It is a depressed, oval, nearly auriform shell, with a short spiral columella: the aperture entire, wide, spread out towards the summit of the right lip, and longer than wide. It is a Tuscan fossil, and exceedingly rare. The living sigaretus is found in sand at depths varying from five to fifteen fathoms.

**SIGILLA'RIA.** (from *sigillum*, Lat.) The name given by M. Ad. Brongniart, to certain large, and, in modern vegetation, unknown forms of plants discovered in the coal formation: the name has been assigned from the peculiar impressions on the stems. The stems are of various sizes from a few inches to upwards of three feet in circumference, and of great length. They are scattered throughout the sandstones and shales that accompany the coal, and may occasionally be seen in the coal itself. These stems are inclined in all directions, and some of them are nearly vertical: they are supposed to have been hollow, like the reed, and with but little substance. M. Ad. Brongniart has enumerated nearly fifty species.

**S'ILEX.** (*silex*, Lat. flint.) An oxide of silicon, constituting the greater part of all the rocks of which the crust of the earth is composed.

**S'ILICA.** The same as silex. One hundred parts of silica contain 48.4 of silicium, and 51.6 of oxygen. It is white; its specific gravity is 2.6; it is fusible.

**SILICICA'LE.** The quartz agathe calcifère of Haüy: silex silicicalce of Brongniart. A substance occurring in amorphous masses, in thin beds, under strata of compact limestone, in Provence. It is of a grey or brown colour, sometimes nearly black. It effervesces with nitric acid; and before the blow-pipe fuses into a white scoria. It is a mixture of flint and carbonate of lime.

**SILICEOUS.** Containing silex; flinty; having the appearance or properties of flint. Thus we have siliceous limestone; siliceous slate; siliceous nodules, &c.

**SILICIFY.** To convert into flint; to petrify.

**SILICIFICA'TION.** Called also petrification. The conversion of any substance into stone by the infiltration of siliceous matter.

**SILICIUM.** } The hitherto undecomposed  
**SILICON.** } base of silica or silic. Of  
 the metallic bases of the alkalis and  
 earths, silicium is the most abundant on  
 the surface of our planet, silica entering  
 so largely into the composition of both  
 chemical and mechanical rocks. Accord-  
 ing to a table of Mr. De La Beche's,  
 gneiss contains 71 per cent. of silica;  
 mica slate 73 per cent.: talcose slate 78;  
 granite 74; basalt 59, &c. &c. In pure  
 quartz rock, silica would be the only in-  
 gredient. Flint, quartz or rock-crystal,  
 &c., are hydrates of silicium, or silic with  
 some water of crystallization.

**SILICULA.** (Lat. a little husk or pod.)  
 In botany, a species of fruit.

**SILICULOUS.** Having small pods or husks.

**SILIQUA.** (Lat.) A pod; a long seed  
 vessel of two valves, separated by a linear  
 receptacle, on whose edges the seeds are  
 ranged alternately.

**SILIQUARIA.** A genus of marine univalves,  
 found both fossil and recent. It is a  
 tubular shell, spiral at its beginning, con-  
 tinued in an irregular form; divided  
 laterally, through its whole length, by a  
 narrow slit, and formed into chambers by  
 entire septa. Recent siliquariæ have been  
 found in sponges; they may be distin-  
 guished from serpulæ by the longitudinal  
 slit. Cuvier places the genus in the order  
 Tubulibranchiata. Fossil siliquariæ occur  
 at Grignon.

**SILIQUESE.** } Bearing pods. A term ap-  
**SILIQUEOUS.** } plied to plants having that  
 sort of pericarp denominated a pod or  
 legume.

**SILLIMANITE.** A dark grey or brown mi-  
 neral, composed of silica 42.6, alumina  
 54.1, oxide of iron 1.9, water 0.5, dis-  
 covered at Saybrook, in Connecticut, and  
 named after Prof. Silliman.

**SILT.** The deposit of running water; mud.

**SILVAN.** The name given by Werner to  
 the metal tellurium.

**SILVER.** (*silber*, Ger.) One of the fifty-five  
 simple or elementary bodies, and included  
 in the subdivision termed metals. When  
 pure, it is nearly white. It is superior to  
 gold in lustre, and inferior to it in malle-  
 ability; it is however so malleable that  
 it may be beaten into leaves not ex-  
 ceeding 100,000th of an inch in thick-  
 ness. It is very ductile, surpassing gold  
 in tenacity, but inferior to iron, copper,  
 and platinum. It may be drawn out into  
 wire of greater fineness than human hair.  
 It is harder than gold, but softer than  
 copper, and may be easily cut by a knife.  
 Its specific gravity is 10.47. Silver fuses  
 at a temperature of about 1,000 degrees  
 Fahr. It is not oxidated by exposure to  
 the atmosphere, but becomes tarnished  
 by sulphureous vapours. It is tasteless,

and free from smell. It is soluble in  
 nitric acid. Silver for domestic purposes,  
 as well as that made into coin, is rendered  
 harder by an alloy of copper. The  
 standard silver of this country consists of  
 eleven ounces two pennyweights of pure  
 silver and eighteen pennyweights of cop-  
 per. Silver has been known from the  
 earliest ages. It is found native and in  
 ores of several kinds. The ores of silver  
 occur in metallic veins, traversing primary  
 rocks. There are many ores which yield  
 silver that are not, strictly speaking, ores  
 of silver. Although the mines of Europe  
 yield considerable quantities of silver,  
 yet it is to Mexico and Peru that we are  
 indebted for the main supplies. The  
 mines of Potosi have paid a royal duty  
 on silver valued at 234,700,000*l.* ster-  
 ling.

**SILURIAN.** The name given by Mr. Mur-  
 chison to an upper subdivision of the  
 sedimentary strata found below the old  
 red sandstone. Mr. Murchison assigned  
 this name to these strata from their being  
 best developed in that portion of England  
 and Wales formerly included in the an-  
 cient British kingdom of the Silures.  
 The Silurian rocks are divided into up-  
 per and lower: the upper Silurian rocks  
 comprise the Ludlow formation and the  
 Wenlock formation; the Ludlow forma-  
 tion consisting of the upper Ludlow rock,  
 the Aymestry limestone, and the lower  
 Ludlow rock; the Wenlock formation  
 consisting of the Wenlock limestone and  
 the Wenlock shale: the lower Silurian  
 rocks are subdivided into the Caradoc  
 formation and the Llandeilo formation;  
 the Caradoc formation consisting of flags,  
 sandstones, grits, and limestones; the  
 Llandeilo formation, of calcareous, dark-  
 coloured flags, with sandstone and schist.  
 The whole of the Silurian rocks attain a  
 thickness in some parts of seven thou-  
 sand five hundred feet. They are all  
 marine deposits. Upwards of five hun-  
 dred and fifty species of organic beings  
 have been discovered in the Silurian  
 rocks. The name Greywacke has been  
 also given to this group.

**SIMIA.** (*simia*, an ape, Lat.) A genus of  
 Quadrumana. The ape. The lower jaw  
 of an ape has been discovered in the  
 miocene strata, in the department of  
 Gers, in France.

**SIMPLE.** (*simplex*, Lat. *simple*, Fr. *sem-  
 plice*, It.)

1. In botany, applied to roots, when  
 undivided; to a leaf, when consisting  
 of only one leaf, and not divided into  
 leaflets, &c. &c.  
 2. In mineralogy, a term applied to ele-  
 mentary, or undecomposed substances:  
 these are fifty-five in number, and are

described under the article "*elementary substances*." The mineralogist and the geologist consider those minerals as *simple* and homogeneous, which present no difference of qualities to our senses throughout the mass, although the chemist may discover that such minerals are composed of two or more elementary substances. The difference between a simple mineral and a simple substance may be illustrated by the case of calcareous spar, or crystallized carbonate of lime. The ultimate elements, calcium, oxygen, and carbon, are *simple substances*; the crystalline compound resulting from the union of these elements, forms a *simple mineral*, called carbonate of lime.—*Bakewell. Buckland.*

**SINI'STRAL.** A term applied to shells, where, in consequence of the heart being placed on the right side, the turns of the spiral are made to the left. These shells are termed *sinistral*, or *reversed*.

**SIN'TER.** (*sinter*, Germ. a mineral substance; scale which flies from the iron while it is under the hammer.) Calcareous sinter is a variety of carbonate of lime, and may be either stalactical, tuberoso, reniform, globular, cylindrical, tubular, branched, or in large, undulated, masses. It is composed, whatever may be its form, of a series of successive layers, concentric, plane, or undulated, and nearly or quite parallel. Quartz sinter, or pearl sinter, is a variety of opal.

**SIN'UATE.** } (*sinuatus*, Lat.) In botany,  
**SIN'UATED.** } applied to leaves when the margins are cut into wide rounded openings, as in the leaf of the oak.

**SIN'UOUS.** (*sinuosus*, Fr. *sinuoso*, It.) Bending in and out; winding; crooked; tortuous.

**SIN'US.** (*sinus*, Lat. a bag, *sinus*, Fr.)

1. In anatomy, a cavity or cell; a narrow passage.
2. In conchology, a groove or cavity.

**SIP'HON.** } (*siphon* and *siphunculus*,  
**SIP'HUNCLE.** } Lat. *siphon*, Fr. *sifone*, It.) An hydraulic apparatus belonging to chambered, or polythalamous, shells, passing through the several chambers, and terminating in a large sac, which surrounds the heart of the animal. The use of the siphunculus appears to be the enabling the animal to rise to the surface, or descend to the bottom, of the water, by increasing its specific gravity.

**SIP'HUNCLED.** Possessing a siphuncle; formed with a siphuncle.

**SKO'RODITE.** (from *σκόροδον*, garlic, Gr.) A mineral of a leek-green or brown colour; an arseniate of iron. Before the blow-pipe it fuses, giving out a smell of

garlick, from which circumstance it has obtained its name.

**SKO'RZA.** The epidote skorza of Brongniart; epidote arenacé of Haiüy. A variety of epidote.

**SLAG.** (*schlacke*, Germ. *slagg*, Dan.) The drop or recrement of metal.

**SLATE.** A kind of clay, of a structure termed schistose, which admits of being split into thin layers of considerable extent. Slate is commonly of a bluish or greenish colour, with a silky lustre. It consists of silex 50·0, alumina 25·0, oxide of iron 11·3, manganese 1·6, potash 4·8, carbon 0·3, water 7·5. It is opaque; may be scratched by the knife; and fuses into a blackish slag.

**SLA'TY.** Resembling slate; containing slate; composed of parallel thin plates which admit of being separated by splitting.

**SLATE SYSTEM.** This group is sub-divided into, 1st, the Plynlimmon rocks, consisting of grauwacke and grauwacke slate, with beds of conglomerates, the thickness of the whole being estimated at several thousand yards. 2nd, The Bala limestone, a dark limestone associated with slate, containing shells and corals. 3rd, The Snowdon rocks, consisting of fine-grained slates, of various shades of colour, and of fine and coarse grauwacke and conglomerate. In the strata of the slate system are found the most ancient organic remains.

**SLI'CKENSIDES.** A provincial name for a variety of galena,

**SLOTH.** The Bradypus of Linnæus, the only existing genus of Tardigrada.

**SMALT.** (*smalto*, It. *schmalte*, Germ.) Powder-blue, a vitreous substance obtained by melting zaffre, silex, and potash together.

**SMARA'GDITE.** The name given by Saussure to diallage.

**SMA'RAGD.** } (from *σμάραγδος*, Gr. *smaragdus*, Lat. *smeraldo*,  
**SMA'RAGDUS.** } *ragdus*, Lat. *smeraldo*, It. *smaragd*, Germ.) The emerald. See *Emerald*.

**SOA'PSTONE.** A name given to steatite, in consequence of its soapy feel. Its description will be found under the word *Steatite*.

**SO'DA.** (*soda*, *sode*, *soude*, Germ.) Mineral fixed alkali, found native in some situations, but generally obtained from the combustion of marine plants, more particularly of the salsola soda. Common salt, so universally employed as a condiment and as an article of food, so absolutely necessary to the preservation of health, is a chloride of sodium, consisting of 52·26 parts of soda, and 45·74 parts of hydrochloric acid. Soda, says Mr. De La Beche, is found in schorl, and

certain hypersthene rocks, in some eurites, in trachytes, pitchstones, basalts, and some diallage rocks. There can be little doubt that a large amount of soda is thus locked up in rocks, particularly if we include the masses of rock-salt discovered in different parts of the world. It is, however, found in greatest abundance diffused through the waters of the ocean.

**SO'DA FE'LSPAR.** Another name for albite, or tetarto-prismatic felspar. See *Albite*.

**SO'DALITE.** (from *soda*, and *λίθος*, Gr. a stone.) A sub-species of lapis lazuli. The name sodalite has been given to this mineral from the large proportion of soda which it contains, being 25 per cent. Its constituents are silice 36·0, alumine 32·0, soda 25·0, muriatic acid 6·7, oxide of iron 0·2. It is found in Greenland and Vesuvius. It occurs massive, and in dodecahedrons with rhombic faces. Colour green, of different shades. Structure foliated; fracture conchoidal. Specific gravity 2·37. It is infusible.

**SO'DIUM.** One of the fifty-five simple or elementary bodies. Sodium is the metallic basis of soda, and, like potassium, was discovered by Sir H. Davy in 1807. It has the appearance of silver, or of lead, and is both ductile and malleable. Its specific gravity is 0·97, consequently it is lighter than water.

**SOIL.** (*sol*, Fr. *soulo*, It.) The name given to that superficial accumulation of various substances which lies upon the surface of the globe, and covers the rocks below; it is also called earth, mould, loam, &c. Its depth is irregular, from a few inches to several feet.

**SOLA'RIUM.** A genus of depressed, conical, nearly discoidal, umbilicated, marine, univalve shells, belonging to the family Turbinacea. Recent solaris are littoral shells, found on rocks and weeds, and belong to tropical seas. One species, *solarium canaliculatum*, has been found in the London clay of Hampshire: Lamarck describes nine species.

**SO'LEN.** A genus of marine bivalves, found on sandy beaches, wherein it burrows vertically, and lies concealed at a depth of about six inches, when the tide leaves the beach dry. The shell is bivalve, oblong, equivalve, inequilateral, open at both ends; hinge with a subulate reflected tooth, often double, and not inserted in the opposite valve. It is included in the family Solenacea.

**SO'LENITE.** A fossil solen. Lamarck describes five species, as found in the neighbourhood of Paris. Fragments of solenites are found in the Essex cliffs.

**SOLFATA'RA.** The name of an extinct volcano near Puzzuoli, which constantly emits aqueous vapour, and sulphureous

and muriatic exhalations. The word *solfataris* is now applied to any volcanic vent emitting sulphureous, muriatic, and acid vapours or gases.

**SO'LID.** A solid is that which has length, breadth, and thickness.

**SOLIDU'NGULOUS.** (from *solidus*, solid, and *ungula*, a hoof, Lat.) Having the hoof whole and undivided.

**SO'LITARY.** (*solitarius*, Lat. *solitaire*, Fr. *solitario*, It.)

1. In botany, applied to peduncles when there is only one on the same plant, or when they stand singly in the same place; to seeds, when there is only one in a pericarp.

2. In conchology, applied to a single tooth.

**SO'MMITE.** The name given by Jameson to the mineral called by Haüy nepheline. For a description of sommite, see *Nepheline*.

**SPAR.** (*spath*, Germ. *spath*, Fr. *terre de minéralogie*, emprunté de l'Allemand. *Quelques uns disent, spar*.) In mineralogy, a name given to those earths which easily break into rhomboidal, cubical, or laminated fragments with polished surfaces. Spar constitutes the sixth order of the second class in the natural history system of mineralogy. Spar is not metallic; its streak is white, grey, brown, or blue. Hardness from 3·5 to 7·0. Specific gravity from 2·0 to 3·7. As the term spar is applied to stones of different kinds, without any regard to the ingredients of which they are composed, an additional term must necessarily be employed to express the constituent parts as well as the figure; for instance, calcareous spar, gypseous spar, adamantine spar, cubic spar, brown spar, &c. &c.

**SPA'RRY I'RON.** The fer-oxidé carbonaté of Haüy; spath eisenstein of Werner; fer spathique of Brongniart; sparry iron-stone of Jameson; sparry iron-ore of Kirwan. Carbonate of iron. It is of a yellow, grey, brown, or black colour; occurring crystallized in rhombohedrons, or in laminated and lamellar masses. It is found in metalliferous veins, as well as in common veins, in primary, transition, and secondary rocks. It consists principally of protoxide of iron and carbonic acid; some specimens yielding manganese and lime; others, magnesia, oxide of manganese, and lime, but in very small proportions. Sparry iron is a valuable ore, from the facility with which it may be converted into excellent steel. It is, from the last circumstance, sometimes called *steel ore*.

**SPA'DIX.** (*spadix*, Lat.) In botany, an elongated receptacle: a spike, the sessile flowers of which are very crowded, the principal axis thick and fleshy, and enveloped in a large, coloured, bractea, is termed a spadix.

**SPATA'NGUS.** A genus of echini, of the section *Cor marinum*, belonging to the class *Pleurocysti*. It is characterized by the bilabiated mouth being in the third region of the axis of the base, and the anus in the side of the truncated extremity. There are a great many species of the genus. The shell of the spatangus is oval, possessing a great number of spines, by the action of which it buries itself in the sand. Fossil spatangi are very abundant in the chalk formation. Dr. Mantell enumerates four species found in the chalk, one species found in the chalk marl, and one in the upper green-sand.

**SPATHE.** (*spatha*, Lat.) In botany, a kind of bractea; a large coloured bractea which envelops the principal axis of sessile flowers; it forms a sort of hood or sheath, opening longitudinally, at some distance from the flower; the arum, calla, &c. are examples.

**SPATHIC.** In mineralogy, lamellar; foliated.

**SPATULATE.** (from *spatula*, Lat.)

1. In botany, applied to leaves shaped like a spatula or battledore, having the upper part of a roundish figure, the base tapering and linear.

2. In conchology, applied to shells which are rounded and broad at the top, and becoming narrower below.

3. In entomology, applied to the figure of insects, when commencing with a narrow base, gradually widening by the lateral margins sloping out, and terminated at the extremity by a sudden straight line.

**SPECIES.** (*species*, Lat.)

1. That which is predicated of many things as the whole of their essence.

2. In mineralogy, a species may be defined, a collection of minerals, which are composed of the same ingredients, and combined in the same proportions.

3. In entomology, a group of natural bodies which agree together in all their essential, unchangeable characters. The idea of species comprises in it a congruency, that is to say, not a mere conformity, but also a resemblance of its individuals. Species is the lowest of all the systematic groups, and, consequently, the most fixed and conformable.

4. In botany, according to Jussieu and others, a species is a combination of individuals alike in all their parts. De Candolle makes it "a collection of all the individuals which resemble each other more than they resemble any thing else; which can by mutual fecundation produce other individuals; and which reproduce themselves, by generation, in such a manner that we may from analogy suppose them

all sprung originally from one single individual."

The physiological definition of a species is, that all the individuals that belong to it will breed together and produce successors, having the same power of reproduction by seed.

**SPHA'GNOUS.** Mossy; containing peat-moss.

**SPHA'GNUM PALU'STRE.** A kind of moss, generally constituting a large portion of the entire mass of peat-bogs. The sphagnum palustre has the property of throwing up new shoots in its upper part, while its lower part decays, and from this circumstance it mainly contributes to the formation of beds of peat.

**SPHERE.** (*sphæra*, Lat. *σφαῖρα*, Gr. *sphère*, Fr. *sfera*, It.) A solid, generated by the revolution of a semicircle about its diameter, which remains fixed; a globe; an orbicular body; a body of which the centre is at the same distance from every point of the circumference; such a solid body that all lines drawn from its centre to its surface are equal. The lines are called radii.

**SPHERICAL.** (*sphérique*, Fr. *sferico*, It.) Round; orbicular; globular.

**SPHERICITY.** Roundness; globosity.

**SPHEROID.** (from *σφαῖρα*, a sphere, and *εἶδος*, likeness, Gr. *sferoide*, It. *sphéroide*, Fr. *corps solide, dont la figure approche de celle de la sphère.*) A solid body approaching to the form of a sphere. A spheroid may be either oblate or prolate; an oblate spheroid resembles an orange, having its poles flattened, such is the form of the earth and planets; a prolate spheroid has its poles drawn out, and its form somewhat resembles an egg.

**SPHEROIDAL.** Having the form of a spheroid, whether oblate or prolate.

**SPHENOPTERIS.** A very beautiful and delicate genus of fossil ferns described by M. Ad. Brongniart. Three species are figured in Dr. Mantell's *Geology of the South-East of England*, namely, *Sphenopteris Sillimani*, named after Prof. Silliman; *Sphenopteris Phillipsii*, named after Prof. Phillips; and *Sphenopteris Mantelli*, named, by M. Adolphe Brongniart, in honour of Dr. Mantell.

**SPHERULE.** (*sphæcula*, Lat.) A little globe; a globule.

**SPHINCTER.** (from *σφιγγω*, Gr. to contract; *sphincter*, Fr.) The name given to certain muscles whose office it is to contract the part in all directions, drawing it together as the mouth of a purse is contracted by a circular string.

**SPI'CATE.** (from *spicatus*, Lat.) Having a spike or ear.

**SPI'DER.** The different species of spiders compose the genus named *Aranea* by

Linnaeus, order Pulmonariæ, class Arachnides. The male spider possesses four pairs of legs, the female five, the additional pair enabling her to carry her eggs. The legs are composed of seven joints, the two first forming the hip, the third the thigh, the fourth and fifth the tibia, the sixth and seventh the tarsus. The feet are spread out in diverging rays, so as to include a wide circle, and afford an extensive base of support; they terminate in two, or, sometimes, in three hooks. In front of the head are placed members resembling feet, having affixed to them, or terminating in, a moveable hook, or pincers, flexed inferiorly, underneath which is a minute opening that permits exit to a venomous fluid contained in an adjoining gland. By the injection of this poisonous fluid the common spider of this country is able to kill a fly in a few minutes, and the large spider of South America can, by the same means, destroy the smaller vertebrated animals, and produce even in man severe constitutional disturbance. The greater number of species possess a curious apparatus for spinning threads, and for constructing nets, for the entanglement of flies and small insects. This net or web is as various as the species, each species constructing its own peculiar form of net: in addition to the principal web, which is spun out for the capture of small insects, the spider frequently constructs a smaller one, both as a residence and a place of ambush. Between these two constructions there is placed a thread of communication, and no sooner is the struggling insect involved in the meshes of the larger net than the vibrations of this communicating thread afford information to the concealed spider, who instantly rushes towards his victim and endeavours to destroy it by piercing it with his dart and infusing into the wound his poisonous fluid. The web is produced by a double series of spines, opposed to each other, and planted on a prominent ridge of the upper side of the metatarsal joint, or that usually regarded as the first joint of the foot of the posterior legs next the abdomen. These spines are employed as a carding apparatus, the low series combing, or extracting the ravelled web from the spinneret, and the upper series, by the insertion of its spines between those of the other, disengaging the web from them.

Fossil remains of spiders exist in strata of very high antiquity. Prof. Buckland is of opinion that, although spiders have not yet been discovered in the carboniferous series, the probability is they did exist at that period. Count Munster has established the existence of spiders in the

Jurassic portion of the secondary formations.

**SPIKE.** (*spica*, Lat.) In botany, a species of inflorescence, in which the flowers stand sessile along a common peduncle, and are either placed alternately and crowded together, or in separate groups. When the flowers are sessile they form a spike: the plantain, lavender, corn, &c., afford examples.

**SPI'KELET.** In botany, the term applied to a subdivision of a spike, forming, as it were, a small spike: by some authors this word is applied exclusively to the spike of grasses.

**SPI'NAL.** (*spinalis*, Lat. *spinal*, Fr. *spinale*, It.) Relating to the spine; belonging to the spine.

**SPINE.** (*spina*, Lat. *epine*, Fr. *spina*, It.)

1. In anatomy, the vertebral column or back-bone of vertebrated animals.

2. In botany, a sharp point, or thorn; the spines of plants differ from prickles, inasmuch as they proceed from the wood of the plant, whereas a prickle comes from the bark only.

3. In zoology, a thin pointed spike. Some of the spines of fishes are simply imbedded in the flesh of the animal, and attached to muscles; others are articulated with bones which lie beneath them.

4. The word spine is occasionally used to signify a ridge.

The fossil spines of various fishes are found in strata from the greywacke series to the chalk inclusive; they have obtained the name of ichthyodorulites.

**SPI'NEL.** } (*spinelle*, Fr. *spinella*, It.) A  
**SPI'NELLE.** } species of corundum both of

an octahedral and a dodecahedral form. Its colours are red, black, blue, brown, yellow, and white. It occurs in regular crystals, and, occasionally, in rounded grains. It scratches quartz, its hardness being = 8.0. Its structure is usually foliated, with laminæ parallel to the faces of the octahedron. Specific gravity from 3.5 to 3.8. It is infusible before the blow-pipe, and intense heat does not even deprive it of its colour. It consists of alumina 82.47, magnesia 8.78, chromic acid 6.18, loss 2.57. Sometimes its colouring matter is oxide of iron instead of chrome. The spinelle ruby is a subspecies.

**SPINE'LLANE.** A variety of dodecahedral zeolite. A mineral of a plum-blue or blackish-brown colour, found on the banks of the river Laach, near Andernach. It occurs in hexahedral prisms, terminated by three-sided summits, whose faces stand on alternate, but different, lateral edges at each extremity. It fuses easily before the blow-pipe, becoming white, and is converted into a porous

enamel. It consists, according to the analysis of Klaproth, of silica 43·0, alumina 29·5, soda 19·0, lime 1·4, oxide of iron 2·0, sulphuric acid 1·0, water 2·6.

**SPI'NTHERE.** The name given by Haiiy to a mineral of a greenish-grey colour found in the department of the Isere, in France.

**SPI'NY.** } Having spines, thorns, or  
**SPI'NOUS.** } points.

1. In botany, applied to plants possessing thorns or spines; also to leaves, the margins of which are beset with thorns.

2. In anatomy, applied to certain processes of bones.

**SPI'RACLE.** (*spiraculum*, a breathing-hole, Lat. *spiraglio*, It.) The spiracles are the external orifices from which the air tubes of insects commence: they are also called stigmata.

**SPI'RAL.** (from *spira*, a spire, Lat. *spiral*, Fr. *spirale*, It.) Winding in a circular form, and, at the same time, rising: a corkscrew is an example of spiral form.

**SPIRE.** (from *σπείρα*, Gr. *spira*, Lat. *spire*, Fr. *spiro*, It.) That part of a body which shoots up to a point.

In conchology, the spire of univalve shells consists of all the whorls except the lower one, which is termed the body. The spire is a prominent feature in univalve shells, and upon its being elevated, depressed, &c., depends much of the generic and specific definition. There are several kinds of spire; the depressed spire, when the spire is very flat; the involuted spire, when the whorls are concealed in the inside of the first whorl, as in the nautilus; the reversed spire, when the whorls turn in the contrary direction to a right-handed screw, &c.

**SPI'RIFER.** (from *spira*, a spire, and *fero*, to bear, Lat.) A genus of bivalve shells, distinguished from terebratula by its very extraordinary internal spiral processes or cones, from which it obtains its name.

**SPIROLI'NA.** A genus of microscopic foraminiferous multilocular univalves, described by Lamarck, who discovered several species of them in the fossils of Grignon.

**SPIRO'RBI.** A genus of shells belonging to the family of the Serpulacea. A familiar example of spirorbis is afforded in the common, small, white, coiled shell so frequently seen upon the shell of the lobster. The spirorbis is found on sea-weed, shells, &c.

**SPI'RULA.** (from *spira*, Lat.) Both a recent and a fossil shell. A genus of multilocular shells, partly spiral and partly straight, the whorls being arranged in a discoidal form, and separate from each other; the last turn being elongated, and continued in a straight line. The siphunculus, instead of being membranous, is formed by one continuous shelly tube.

It appears that the spirula, notwithstanding it possessed a siphuncle, was, altogether or in part, an internal shell. The living spirula is an inhabitant of tropical seas; it floats on the surface of the ocean.

**SPI'RULITE.** A fossil spirula. Spirulites are sometimes termed litinites, from their supposed resemblance to a bishop's pastoral staff. They are found principally in Normandy, Mecklenberg, and, as is stated, in Switzerland.

**SPL'ENDENT.** (*splendens*, shining, Lat. *splendente*, It.) In mineralogy, a term applied to metals as regards their degree of lustre. A mineral is *splendent* when perceptible in full day-light at a great distance, as in highly polished metals.

**SPL'ENT COAL.** An impure variety of cannel coal, occurring in Scotland.

**SPLI'NTERY.** In mineralogy, a term applied to a particular fracture of minerals. The fracture is called *splintery*, when the surface, produced by breaking a mineral, is nearly even, but exhibits little splinters or scales, somewhat thicker at one extremity than the other, and still adhering to the surface by their thicker extremities.—*Cleaveland*.

**SPO'DUMENE.** (from *σποδών*, Gr. in *cinerem redigo*.) The Triphane of Haiiy; Spodumene of Jameson. A rare mineral of a greenish white or gray colour; occurring massive, and in large granular concretions. Spodumene has been found in the iron-mine of Uton, in Sweden, and in primary rocks in Ireland. According to the analysis of Vauquelin, it consists of silica 64·4, alumina 24·4, potash 5·0, lime 3·0, oxide of iron 2·2. Arfwedson discovered in a specimen of spodumene nearly nine per cent. of lithion.

**SPO'NDYLUS.** A genus of rough, slightly-eared, inequivalved, marine, bivalves, with unequal beaks; hinge with two recurved teeth, separated by a small hollow. Spondyli are found only in the ocean, attached to rocks, corals, &c.: they are remarkable for their spines, and the richness of colouring of the shells. No species have been found in the seas of our coasts. They are eaten like oysters.

Lamarck has described one species as occurring fossil in the neighbourhood of Paris, and very fine fossils are found in Tuscany.

**SPONGE.** (*σπογγία*, Gr. *spongia*, Lat. *eponge*, Fr. *spugna*, It.) This word is pronounced, and frequently written, spunge. A porous marine substance found adhering to rocks, formerly supposed to be a vegetable production, but now classed among the zoophytes: it is soft, light, porous, and easily compressible, readily imbibing fluids, and thereby distending.

Sponges assume a great variety of shapes, each according to its species, and resemble shrubs, globes, tubes, fans, vases, &c., &c. For a description of living sponges, the reader is referred to the article *Porifera*.

**SPO'NGE'OUS.** (*spongieux*, Fr.) Of the nature of sponge; full of small pores.

**SPO'NGIFORM QUARTZ.** The name given to a white or grey, porous, variety of quartz, so light as to swim on water, and also called *Floatstone*.

**SPO'NGIOLE.** In botany, an organ situated at the extremity of the root, and thus named from its peculiar texture. It is by the spongioles, thus situated, that plants are enabled to absorb. They are constructed of common cellular spongy tissue, and they imbibe the fluids which are in contact with them, partly by capillary action, and partly, also, by a hygroscopic power.

**SPO'RULE.** (from *σπορά*, a seed, Gr.) The organ of reproduction in cryptogamic plants. Ferns are increased by minute bodies, called *sporules*; these are produced either on the backs, or in the axillæ of the fronds, and on other parts. The organs of reproduction in mosses consist of *sporules*, contained within an urn or theca, placed at the top of a thin stalk. In lichens, the organs of reproduction are *sporules*.

**SPRINGS OF WATER.** "All permeable strata," says Prof. Buckland, "receive rain-water at their surface, whence it descends until it is arrested by an impermeable subjacent bed of clay, causing it to accumulate throughout the lower region of each porous stratum, and to form extensive reservoirs, the overflows of which on the sides of valleys constitute the ordinary supply of springs and rivers. The water, however, which descended from the atmosphere in the form of rain, having passed through the various strata, does not re-issue in the same condition. Rain-water contains carbonic acid; in passing through the strata it absorbs oxide of iron, lime, &c., and on issuing in the form of springs it loses its excess of carbonic acid, and again deposits carbonate of iron, &c. Springs usually possess one particular average temperature, generally identical with that of the ground through which the particular spring passes. That the generality of springs owe their supply to the atmosphere is evident from this, that they become languid, or entirely cease to flow, after long droughts, and are again replenished by copious showers of rain. For the constancy and uniformity of their volume they are most probably indebted to the large extent of those subterranean reservoirs with which they communicate.

**SPUNGE.** See *Sponge*.

**SQUA'LOID.** (from *squalus*, a shark, Lat. and *είδος*, resemblance, Gr.) The squaloid, or third division of fossils of the family of sharks, appears for the first time in the chalk formations, and extends through all the tertiary deposits to the present period. Species of the squaloid division only, abound in all the strata of the tertiary period.

**SQUA'LUS.** The name given by Linnæus to the true shark.

**SQUA'MOSE.** } (*squamosus*, Lat.) Scaly;   
 **SQUA'MOUS.** } covered with scales.

**SQUA'RROUS.** (from *squarra*, roughness of skin, Lat. *ἰσχάρα*, Gr.)

1. In conchology, consisting of scales spreading every way, or standing upright, and not parallel with the plane.

2. In botany, applied to parts with scales widely divaricating.

**STALA'CTIC.** } Resembling stalactite; of   
 **STALA'CTICAL.** } the character and appearance of stalactite.

**STALA'CTITE.** (*σταλακτίς*, from *σταλάζω*, Gr. to drop or distil; *stalactite*, Fr.) A concretion of carbonate of lime pendent from the roof of a cavern, and produced by the percolation and dripping of water, holding in solution, or super-saturated with, carbonate of lime. The mode of formation of a stalactite resembles that of an icicle; the water, as it slowly drips from the roof, continually deposits upon the pendent stalactite a small quantity of its carbonate of lime, and thus the stalactite increases in length and bulk.

**STALACTI'TIC.** } Synonymous with *sta-*   
 **STALACTI'TICAL.** } *lactic* and stalactical.

**STALA'GMITE.** (from *σταλαγμός*, Gr. *stalagmite*, Fr.) A concretion of carbonate of lime produced by the dripping of water holding in solution carbonate of lime. The difference between a stalactite and a stalagmite is this: the former is attached to, suspended from, and formed at, the roof of a cave or grotto; the latter is formed upon the floor: the stalactite generally resembles a large icicle; the stalagmite is an unshapen mass upon the floor. It sometimes happens that from the stalactite lengthening downwards, and the stalagmite increasing upwards, the two become united, and thus form a column extending from the roof to the floor.

**STALAGMI'TIC.** } (from *stalagmite*.) Re-   
 **STALAGMI'TICAL.** } sembling stalagmite; containing stalagmite.

**STA'MEN.** (*stamen*, Lat.) A constituent part of a flower, situated within the corolla, consisting of two parts, the filament and the anther. The stamens are the male organs of the plant. In the plural the word is written either *stamens* or *stamina*.

**STA'NDARD.** In botany, the upper large petal of a papilionaceous flower; also called the banner.

**STAUROLITE.** (There appears to be some incorrect arrangement, or confused mixing together, by some authors, of the words *staurolite* and *staurotide*. Dr. Ure, in his explanation of staurolite, gives merely "grenatite, or prismatic garnet;" then, immediately after, in his dictionary of mineralogy, comes staurotide, which he states to be "grenatite, prismatic garnet, or staurolite. Dr. Webster, in his dictionary, brackets staurolite and staurotide, as meaning the same mineral. I believe both these gentlemen to be wrong, and I imagine staurolite and staurotide to be two distinct minerals.) Staurolite is the name given by Kirwan to the harmotome of Häuy, the cross-stone of Jameson; kreutzstein of Werner. The composition of staurolite differs entirely from that of staurotide. Staurolite contains, according to some analyses, upwards of twenty per cent. of baryta, and no oxide of manganese; whereas staurotide contains no baryta, but four per cent. of oxide of manganese. For a description of staurolite, see *Cross-stone*.

**STAUROTIDE.** The name given by Häuy to prismatic garnet or grenatite. The prismatoidischer garnet of Mohs; the granatit of Werner; the grenatite of Jameson and Brochant. This mineral occurs crystallized in four and six-sided prisms, sometimes intersecting each other at right angles. Its primitive form, under which it sometimes appears, is a four-sided prism, whose bases are rhombs with angles of  $129^{\circ} 30'$  and  $50^{\circ} 30'$ . Its integrant particles are triangular prisms. Its colours are reddish-brown to blackish-brown. Specific gravity from 3.3 to 3.9. Hardness from 7.0 to 7.5. It feebly scratches quartz, but does not yield sparks with steel. Fracture uneven or imperfectly conchoidal. It does not fuse before the blow-pipe, but its surface is converted into a kind of black frit. It consists of silica, alumina, lime, and the oxides of iron and manganese. It is found in primary rocks only. It may be distinguished from garnet by its form and infusibility.—*Cleveland. Jameson. Brande.*

**STEARIN.** } (from *στῆαρ*, Gr.) The name  
**STEARINE.** } given by Chevreul to the solid part of oil and fatty matter. Fat is composed of two constituent principles, which Chevreul distinguished by the terms *stearine* and *elaine*.

**STEATITE.** (from *στῆαρ*, gen. *στῆαρος*, Gr. *stéatite*, Fr.) Called also soap-stone. See *Soap-stone*.

**STEATITIC.** Containing steatite; resembling steatite.

**STEEL.** (*stahl*, Germ.) Iron combined with carbon. The proportion of carbon has, perhaps, never been accurately ascertained; but steel containing one-sixtieth of its mass of carbon is said to have the maximum degree of hardness. The following are some of the properties of steel:—It is so hard as to be unmalleable when cold; it is brittle, resists the file, cuts glass, affords sparks with flint, and retains the magnetic virtue for an indefinite length of time. By being ignited, and afterwards slowly cooled, it loses its hardness. It fuses at  $130^{\circ}$  Wedgewood. When red-hot it is malleable. It is more sonorous than iron, and may be hammered out into much thinner plates. The conversion of iron into steel is effected by combining it with carbon. This combination is performed in three ways, by three different processes, and the products are distinguished by the names of *natural steel*, *steel of cementation*, and *cast-steel*. Of these, the most valuable is cast-steel, its texture being the most compact, and it admitting of the finest polish. The manufacture of articles of steel, says Mr. Babbage, affords a most striking example of the value conferred by human labour on the raw produce of nature. The value of a pound of crude iron is twopence. This pound of iron, after having been converted into steel, is manufactured into balance-springs for watches. One of these springs weighs  $\frac{15}{100}$  of a grain, and sells for twopence. After deducting for waste, a pound of iron will make fifty thousand springs, and the twopenny-worth of iron becomes worth 41*l.* 13*s.* The value of the charcoal is too minute to be taken into the calculation.

**STEINHEILITE.** A variety of iolite, a mineral of a blue colour.

**STELLA MARI'NA.** The name employed by Linck, on the authority of Pliny, to signify the asteria or star-fish.

**STELLITE.** A fossil asteria or star-fish.

**STELLERIDAN.** An animal resembling an asteria. Fossil stelleridans have not been discovered in strata more ancient than the muschel-kalk, a member of the new red sandstone group.

**STELLIFEROUS.** (from *stella*, a star, and *fero*, to bear, Lat.) Having stars, as some of the corallines.

**STELLIFORM.** In the form of a star; radiated.

**STELLULAR.** Having markings resembling stars. The surface of the tubipora, or organ-pipe coral, is covered with a green fleshy substance, studded with *stellular* polypi.—*Mantell*.

**STENEOSAURUS.** A genus of fossil sau-

rians, with long and narrow beaks ; thus named by M. Geoffroy St. Hilaire.

**STERNAL.** (from *sternum*, the breast-bone.) Pertaining to the sternum or breast-bone.

**STERNUM.** (*στέρονον*, Gr. *sternum*, Lat.) The breast-bone. In the human subject the sternum is divided into three parts ; in some vertebrated animals it is formed of nine elementary species, each proceeding from a separate centre of ossification. Few subjects in comparative osteology, says Dr. Roget, are more curious and instructive than to trace the development of these several elementary parts in the different classes of animals, from the rudimental states of this bone as it occurs in fishes, to its greatly expanded conditions in the tortoise and the bird, which severally exhibit the most opposite proportions of these animals.—*Bridgewater Treatise*.

**STIGMA.** (*στίγμα*, Gr. *stigma*, Lat.) In botany, the apex of the pistil ; the stigma is variously formed, being either a fine point, a round head, or lobed ; generally downy, often hollow and gaping, and more or less moist. Sometimes, though there is only one style, there are two or more stigmas : when there is no style, the stigma is sessile on the ovarium.

**STIGMARIA.** A family of extinct fossil plants of the coal formations. Professor Buckland says, "the centre of the plant presents a dome-shaped trunk or stem, three or four feet in diameter, the substance of which was probably yielding and fleshy ; both its surfaces were slightly corrugated, and covered with indistinct circular spots." The stigmara was an aquatic plant, inhabiting swamps or lakes, and, as regards its external structure, resembled the euphorbiacæ. Fragments of stigmariæ occur abundantly in the coal shales. It appears to have been dicotyledonous.

**STIGMATA.** Spiracles from which the tracheæ of insects commence. See *Spiracle*.

**STILBITE.** (from *στίλβω*, to shine, Gr.) The name given to this mineral from the degree of lustre which it possesses. The radiated zeolite of Jameson ; strahlzeolith of Werner ; prismatoidischer kuphon-spath of Mohs. Stilbite is of a white colour generally, sometimes pure, at others shaded with grey, yellow, or red. It occurs both crystallized and massive. It is splendid externally ; internally shining and pearly. Translucent, and sometimes transparent. Specific gravity 2.2. It does not scratch glass. It consists of 52.5, alumine 17.5, lime 11.5, water 18.5. It occurs in secondary trap rocks, in Scotland, Norway, and in the Faroe islands.

**STINK STONE.** The name given to a variety of limestone, from the fetid odour which it gives out on friction ; a smell resembling rotten eggs. It is the chaux carbonatée fetide of Haüy ; the stinkstein of Werner. It occurs in masses, either compact, or having a granular or foliated structure, frequently forming large beds, or even whole mountains.

**STIPE.** (*stipes*, Lat.) In botany, the stem or base of a frond ; a species of stem passing into a leaf, or not distinct from the leaf : the name given to the stem of palm trees ; it differs essentially in form, structure, and mode of growth, from the trunk, increasing in length only, and not in thickness. The stem of a fungus is also called a stipe, as is the thread, or slender stalk, which supports the down, and connects it with the seed.

**STIPULA.** } (from *stipula*, Lat.) In bo-  
**STIPULE.** } tany, a membranous leafy appendage, placed at the part of the stem whence the leaf or footstalk arises. Stipules vary in number, being solitary or in pairs ; in situation, being either external with regard to the leaf or footstalk, or internal, the internal sometimes embracing the stem in an undivided tube ; in form, linear at the base, or crescentic ; in attachment, connected directly with the stem, or with the petal ; in direction, erect, or variously reflected. Stipulæ serve to protect the nascent leaves.

**STIPULATE.** Having stipules ; producing stipulæ.

**STONE GALL.** The name given by the workmen to an oval or round mass of clay, occurring in variegated sandstone. These stone galls often fall out of the sand-stone, when it is exposed to the weather, and diminish the value of the stone for architectural purposes.

**STONE-BORER.** The name for a molluscous bivalve which mechanically perforates, or bores into, rocks. These stone-borers are also called lithophagi : they effect their purpose by means of a fleshy foot, upon which they turn as upon a pivot.

**STRATA.** The plural of stratum. See *Stratum*.

**STRATIFICATION.** The arrangement of substances in strata or layers, like the leaves of a book, one upon another.

**STRATIFIED.** Arranged in layers or strata, one upon another, like the leaves of a book.

**STRATUM.** (*stratum*, Lat. from *sterno*, to lay out, to spread.) A layer of any deposited substance. The term *stratum*, says Professor Phillips, is of general signification, and independent of the absolute thickness of the mass : it need never be used as a special term of definition,

but reserved for general reasoning. Mr. Bakewell observes, "though the word *stratum*, in its original language, and by general acceptation in speaking of rocks, denotes a bed, it is convenient to restrict the term bed to a stratum of considerable thickness; for such *beds* are often subdivided into several distinct minor *strata*, and we cannot well describe a *stratified stratum*." The true thickness of a stratum is measured by a line perpendicular to the upper and under surface, let its inclination be whatever it may.

**STREAK.** (*streich*, Germ.) In mineralogy, the appearance of a mineral which arises from its being scratched by a hard sharp instrument. The *streak* is said to be *similar*, when the colour of the powder produced by scratching the mineral is the same with the colour of the mineral itself; when the colour varies, the streak is said to be dissimilar.

**STREPSIPTERA.** An order of insects, parasitic animals, that have two ample wings, forming the quadrant of a circle, and of a substance between coriaceous and membranous; and two elytriform sub-spiral organs, appendages of the base of the anterior legs. The above is Mr. Kirby's description of the order he has named Strepsiptera; Latreille has given to this order the name Rhipiptera.

**STRIÆ.** (*stria*, a streak, Lat. *stries*, Fr. This word is used in the plural only.)

1. In conchology, *striæ* are fine thread-like lines, generally on the exterior surface of shells, longitudinal, transverse, or oblique.

2. In botany, fine thread-like lines running in parallel directions.

**STRiated.** (*strié*, Fr.) Arranged in fine lines running parallel to each other, let the direction of the lines be what it may. Marked with fine thread-like lines running parallel to each other.

**STRIKE.** (*streich*, Germ. stroke, stripe.) The line of bearing of strata. The strike or direction of strata is always at right angles to their dip.

**STRO'BIL.** } (from *strobilus*, Lat.) In bo-  
**STRO'BILE.** } tany, a pericarp formed from an ament by the hardening of the scales; a catkin hardened and enlarged into a seed-vessel; a seed-vessel composed of ligneous scales.

**STRO'MBITE.** A fossil strombus; a petri-fied strombus. Strombites are very rare: Lamarck describes one shell only of the genus strombus, as found in the environs of Paris. In the mountains of Arragon, and in the Veronese, some specimens beautifully preserved have been discovered.

**STRO'MBUS.** The name given by Linnæus to a genus of univalve, spiral, marine,

shells; aperture much dilated: lip expanding and produced into a groove. Lamarck has divided this genus into two subgenera, Strombus and Pteroceras. In some of the shells of this genus the spines are of great length, and are arranged round the circumference of the base, being at first tubular, and afterwards solid, according to the period of growth. In Turton's Linné fifty-five species of strombi are described; of these, two only have been found in the seas of this country.

**STRO'NTIA.** } A mineral was brought to  
**STRO'NTIAN.** } Edinburgh about the year 1787, from the lead-mine of Strontian in Argyleshire, from which was obtained the earth thus named by Klaproth. It has subsequently been found in England, America, and France. It is sometimes transparent and colourless, but generally has a tinge of yellow or green. Its hardness is 5. Specific gravity from 3.4 to 3.9. Its texture is generally fibrous; sometimes it occurs crystallized in slender prismatic columns of various lengths. The mineral is composed of carbonic acid and a peculiar earth, to which Dr. Hope gave the name of Strontites, and Klaproth that of Strontian. The carbonic acid may be expelled from the carbonate, and the strontian obtained pure, by mixing the mineral with powdered charcoal, and exposing it to a heat of 140° Wedgewood. When strontian is combined with sulphuric acid, forming a sulphate of strontian, it may be separated from the sulphuric acid by mixing the mineral with the eighth part of its weight of charcoal-powder, and keeping it for some hours red-hot in a crucible; it will then be reduced to a sulphuret of strontian. Dissolve the sulphuret in water, and pour nitric acid into the solution, the sulphur will then be precipitated. This solution, which consists of nitric acid combined with strontian, is to be filtered and evaporated slowly till it crystallizes. The crystals are then to be put into a crucible, and subjected to a strong heat, the nitric acid will be driven off and pure strontian remains.

Strontian is of a greyish-white colour; its taste is acid and alkaline; it converts vegetable blues to green. The principal use of strontian is to communicate a beautiful red colour.

**STRO'NTIANITE.** Carbonate of strontian. The Strontian carbonatée of Haüy; Strontianit of Werner; Strontiane of Jameson; Stronthianite of Kirwan. A mineral first brought to Edinburgh from the lead-mines of Strontian, in Argyleshire, in the year 1787. It greatly resembles carbonate of barytes, but it is not poisonous.

**STRO'NTITES.** The name given by Dr. Hope to the earth obtained from strontianite; it has been named strontian by Klaproth, and is more usually known under that designation.

**STRO'NTIUM.** The metallic base of strontia. Strontium greatly resembles barium in its appearance, although it is indeed, a very different substance. Strontium is harmless, but barium and all its salts are poisonous. The salts of strontium communicate to flame a fine red tinge; those of barium, a yellow.

**STRU'CTURE.** (*structura*, Lat. *structure*, Fr. *struttura*, It.)

1. A term used in mineralogy, to denote one of the characters of minerals. The structure of a mineral depends on the shape, size, and arrangement of the minute parts of which it is composed. It is sometimes used synonymously with fracture, but it is not correct so to do, there existing a considerable difference between the two terms.

2. The manner of organization of animals and vegetables. The manner in which the parts of an organized body are arranged among themselves.

**STU'FA.** (*stufa*, It.) A jet of steam issuing from a fissure of the earth. In volcanic regions stufas are by no means uncommon. The name is taken from the Italians, who thus apply it.

**STYLE.** (*stylus*, Lat.) In botany, that part of the pistil which elevates the stigma above the germen. The style is not absolutely essential, and is sometimes wanting. The style is a continuation of the midrib, and constitutes a portion of the pistil.

**SUB-A'PENNINE.** "This term," says Mr. Lyell, "is applied geologically to a series of strata of the older pliocene period. The beds which have been termed subapennine are composed of sand, clay, marl, and calcareous tufa; they are all tertiary deposits, and abound in marine shells of genera and species which prove some of them to be contemporaneous with the crag deposit, and others of a more ancient epoch: they rest unconformably upon the inclined beds of the Apennine range. Brocchi, an Italian geologist, gave to this group the name it bears.

**SUBA'PENNINES.** The name given to certain ranges of hills, rising at the height of from one to two thousand feet, which flank or skirt the great chain of the Apennines.

**SUBA'QUEOUS.** (from *sub*, under, and *aqua*, water.) Being under the water; formed under water; deposited under water.

**SUBDIVI'SION.** A more minute division of something already divided.

**SUBGLO'BULAR.** In botany, approaching to, but not completely globular.

**SUBJA'CENT.** (from *sub*, under, and *jacens*, lying, Lat.) Lying beneath or below. A term applied to rocks, beds, or strata which lie under, or are covered by others.

**SUBLIMA'TION.** (*sublimation*, Fr. *sublimamento*, It.) That operation by which solids are, by the aid of heat, brought into a state of vapour, and again condensed into a solid form. One of the hypotheses proposed to explain the filling of chasms in solid rocks with metallic ores, is by a process of sublimation from subjacent masses of intensely heated mineral matter.

**SUB'MARINE.** Under the sea, as *submarine* forests, *submarine* volcanoes, &c. Growing under the sea, as *submarine* plants; formed under the sea, as *submarine* lava, *submarine* strata, &c.

**SUBORBI'CLAR.** } Approaching to a cir-  
**SUBORBI'CLATE.** } cular form, but not quite circular.

**SUBO'RDINATE.** Inferior in the order of superposition.

**SUBO'VATE.** Not perfectly ovate.

**SUBRO'TUND.** Nearly globular; almost round.

**SUBSE'SILE.** In botany, applied to leaves having very short footstalks.

**SUBSID'ENCE.** The act of sinking; tendency downwards. The subsidence of large tracts of country, or of volcanic hills, may be either gradual or sudden, according to the circumstances of weakness, &c. in the earth's crust.

**SUB'SOIL.** That portion of the earth's covering which intervenes between the surface soil and the rocks on which it rests.

**SUBSE'CIES.** A division of a species: used plurally for the more minute division of a species into several subspecies.

**SUBSTANCES, SIMPLE.** See *Elementary substances*.

**SU'BSTANTIVE CO'LOURS.** Dr. Bancroft divided colours into *substantive* and *adjective*: those which he termed substantive colours, communicate their colour without the intervention of some other substance; those which he called adjective, require the aid of a mordant or basis.

**SUBSTRA'TUM.** A stratum lying under another stratum.

**SUBTE'ND.** (from *sub*, under, and *tendo*, to stretch, Lat.) To extend under.

**SUBTE'NSE.** The chord of an arch.

**SUBTERRA'NEAN.** } (from *sub*, under, and  
**SUBTERRA'NEOUS.** } *terra*, the earth, Lat.  
*souterrain*, Fr. *sotteraneo*, It.) Lying under the earth; placed below the surface of the earth.

**SU'BULATE.** (from *subula*, an awl, Lat.) Awl-shaped.

1. In botany, applied to leaves, when thickest at the base, and gradually tapering towards the point.

2. In conchology, applied to shells tapering gradually to a point.

3. In entomology, a long thin cone softly bent throughout its whole course.

**SU'CCINITE.** (from *succinum*, amber, Lat.) A mineral of an amber-yellow colour, thus named by Bonvoisin. It occurs in small rounded masses about the size of a pea. Some mineralogists refer succinite to the idocrase; others, to the garnet.

**SU'CCULENT.** (*succulentus*, Lat. *succulent*, Fr. *sugoso*, It.) Juicy; full of juice. A term applied to plants with a soft and juicy stem, as distinguished from those called ligneous.

**SU'DES.** (*sudes*, Lat. a spear.) A class of spines comprising several genera, as *Sudes villarum*, *Sudes fortalitorum*, &c.

**SU'FFOLK CRAG.** A marine deposit of the older pliocene period. It consists of beds of sand and gravel, abounding in shells and corals.

**SU'LCATED.** (from *sulcus*, a furrow, Lat.) Furrowed; grooved.

1. In botany, applied to stems marked with broad deep lines; also to leaves having broad, deep, parallel lines.

2. In conchology, applied to shells that are deeply furrowed, or marked with ridges or broad furrows.

**SU'LCUS.** Plural sulci. A broad furrow or groove.

**SU'LPHATE.** (from *sulphur*.) A combination of sulphuric acid with any salifiable base.

**SU'LPHITE.** A combination of sulphurous acid with any salifiable base.

**SU'LPHUR.** (*sulphur*, Lat. *soufre*, Fr. *zolfo*, It.) One of the fifty-five simple or elementary substances, and a non-conductor of electricity. It is of different shades of yellow, and occurs either in masses or crystallized. Mr. De La Beche says, "sulphur must be a more abundant substance in rocks, than, at first sight, we might suppose. We are in the habit of associating our ideas of the connexion of sulphur and rocks more especially with volcanic rocks. When so estimated, the amount, though often locally great, is, taken generally, not considerable. Sulphur is, however, widely disseminated among many rocks. As a sulphuret of iron, it is distributed over the surface of the earth to a great extent, more particularly in those rocks which I have elsewhere termed the superior stratified or fossiliferous rocks, and in those usually known as trappean. In

many clays sulphuret of iron prevails to a great extent. Iron pyrites is a necessary and abundant substance in the aluminous shales. By far the larger portion of the ores of copper and lead are sulphurets. In the state also of sulphate of lime, sulphur is widely spread. Not only does sulphur thus occur among rocks, but it is also disseminated throughout the ocean, sulphate of soda being one of the salts constantly present in sea-water. We may therefore consider that sulphur is far from being a rare substance on the face of the earth." The specific gravity of sulphur is from 1.9 to 2.1. By friction it acquires negative electricity. It is very brittle and friable. When its combustion is slow, it burns with a bluish flame and with a suffocating vapour, which is sulphurous acid; but when its combustion is rapid, the flame is white, the vapour less suffocating, and the product is sulphuric acid.

**SU'LPHURET.** A combination of sulphur with a metallic base; as sulphuret of iron.

**SU'LPHURET OF IRON.** Iron pyrites. This is very commonly found in irregular and subglobular nodules and masses in the chalk formation.

**SU'MMIT.** (*summitas*, Lat. *sommet*, Fr.) In conchology, the most elevated point of the shell in which the hinge is placed.

**SUPERFICIES.** (*superficies*, Lat. *superficie*, Fr. *c'est longueur et largeur sans profondeur*.) The surface only of a body; the exterior part.

**SUPERIMPOSED.** Laid upon something else; as one stratum is superimposed on a stratum below.

**SUPERINCUMBENT.** (from *super*, above, and *incumbens*, lying, Lat.) Lying above or upon something else.

**SUPERPOSED.** Placed upon or above some other matter or substance, as superposed structures.

**SUPERPOSITION.** The order in which bodies are placed upon or above other bodies, as more recent strata upon those that are older; secondary rocks upon primary; tertiary upon secondary, &c. &c. The order of superposition of rocks is never reversed, unless it be by volcanic agency, when rocks may be forced from below and thrown, as it were, upon those which in the usual order of superposition would be above them. Beds, or strata, may be altogether wanting, but wherever similar beds occur together, the order of superposition is never inverted. Thus the Wealden deposits are never found above the chalk; the chalk is never found above the London clay; the London clay is never found above the crag: nor do we meet with the chalk under oolite; the lias

under the red sandstone, or the coal under the greywacke.

**SUPRA-CRETA'CEOUS.** (from *supra*, above, and *cretaceous*, chalky, Lat.) Above the chalk; formations more recent than those of the chalk. The supra-cretaceous deposits, says Mr. De La Beche, are very commonly termed tertiary. This is, however, a name exceedingly objectionable, as it would imply that there were three great classes of rocks possessing marked characteristic distinctions, and that the deposits above the chalk constituted the third of such classes. The supra-cretaceous rocks constitute a large portion of the dry land of Europe, among the lowest of which in Western Europe are those of the London and Paris basins. The supra-cretaceous group passes so insensibly, apparently, into the present order of things, viewing the subject on a large scale, that probably no line of demarcation will ever be drawn between them. Still, even during the time that the upper portion of the series was being deposited, great changes must have been produced in animal life over a considerable part of the earth's surface. Mr. Bakewell considers the term supra-cretaceous, or, as he writes it, super-cretaceous, to be peculiarly inappropriate, and adds, "if a new name were necessary, *post-cretaceous* should have been chosen."

**SURBE'D.** To set stone edgewise, contrary to the posture it had in the quarry.

**SURTURBRAND.** A name given to Bovey coal, or brown coal. See *Brown Coal*.

**SUSSEX MARBLE.** A member of the Wealden group: this occurs in layers varying from a few inches to upwards of a foot in thickness, the layers being separated by seams of clay, or loose friable limestone. It is a fresh-water deposit, and contains in great abundance shells of paludinæ, a genus of fresh-water univalves.

This limestone has obtained the name of Sussex marble from its great abundance throughout the Weald of that county. It is of various shades of grey and bluish-grey, mottled with green and yellow; it bears a high polish, and is used extensively for architectural and ornamental purposes.

**SUTURE.** (*sutura*, a seam, Lat. from *suo*, to sew, *suture*, Fr. *cucitura*, It.) A seam; the junction of the bones of the head by an irregularly jagged zig-zag line.

**SWILLEY.** A provincial term for a coal-field of very limited extent.

**SWINE-STONE.** The name given by Kirwan to fetid carbonate of lime or stink-stone. See *Stink-stone*.

**SY'ENITE.** See *Sienite*.

**SYLVANITE.** Native tellurium. A recently discovered metallic substance.

**SYMPHYSIS.** (*σύνφωσις*, Gr. from *σύνφω* to grow together; *symphyse*, Fr.) A term used in anatomy to denote a particular form of union of two bones. Bones united by symphysis have no manifest motion.

**SY'NCHRONAL.** } (from *σύν*, the same, and  
**SY'NCHRONOUS.** } *χρόνος*, time or age,  
Gr. *synchrone*, Fr.) Occurring at the same period of time; simultaneous; of the same age.

**SY'NCLINAL LINES.** "A term," says Mr. Lyell, "first used, I believe, by Prof. Sedgwick: lines which form ridges and troughs running nearly parallel to each other."

**SYNGENE'SIA.** (from *σύν*, with, and *γένεσις*, generation, Gr.) In botany, the nineteenth class of plants in Linnæus's artificial system. This class contains plants with syngenesious anthers: the orders of this large class, five in number, are founded on the circumstance of the florets of the capitule being hermaphrodite and unisexual, variously combined in the disk and ray. The anthers are united into a tube, and the flowers are compound. The following are the five orders composing the class Syngenesia; they are determined by the arrangement of their flowers, and by the sex of their florets.

1. Polygamia æqualis, where each floret is perfect, being furnished with stamens and pistils, and capable of bringing its seed to maturity: the leontodon taraxacum, or dandelion, is a familiar example. 2. Polygamea superflua. The florets of the disk perfect, those of the margin having pistils only: the anthemis nobilis, or chamomile, is an example. 3. Polygamia frustranea. Florets of the disk perfect or united, those of the margin neuter, or destitute of pistils as well as of stamens. 4. Polygamia necessaria. The florets of the disc are male, of the ray female: the garden marygold affords an illustration. 5. Polygamia segregata. Several florets, either simple or compound, but with a proper calyx, included within one common calyx: the globe-thistle is an example. To these five orders, some authors add a sixth, namely, Monogamia, which has the flowers separate, and not crowded in heads.

**SYNGENE'SIAN.** } Belonging to the class  
**SYNGENE'SIOUS.** } Syngenesia.

**SYNO'VIA.** (from *σύν*, with, like, and *ὠδον*, an egg, Gr. *synovie*, Fr.) A glairy lubricating fluid contained within the capsular ligament of joints, serving the purpose of preventing friction, and resembling the white of an egg, whence its name.

**SYNO'VIAL.** Pertaining to synovia; resembling synovia; secreting synovia.

**SY'NTHESIS.** (*σύνθεσις*, Gr. from *συντι-θημι*, to join together; *synthèse*, Fr.) The act of joining; opposed to analysis. Water is proved to consist of oxygen and hydrogen by *analysis*, that is, by decomposing water and ascertaining its constituents; it may however be proved to consist of oxygen and hydrogen by *synthesis*, that is, by uniting the relative proportions of oxygen and hydrogen.

**SY'PHON.** } See *Siphon* and *Siphun-*  
**SY'PHUNCLE.** } *cle.*

**SYRI'NGODENDRON.** The name given by Count Sternberg to many species of sigillaria, from the parallel pipe-shaped flutings that extend from the top to the bottom of their trunks. These trunks are without joints, and many of them attain the size of forest trees.—*Prof. Buckland. Bridgewater Treatise.*

**SYSTE'MIC CIRCULA'TION.** The circulation

of the blood through the body generally, as distinguished from that other circulation which is confined to the respiratory organs and the heart, or the respiratory circulation.

**SY'STOLE.** (*συστολή*, Gr. contraction, *systole*, Fr.) A term used to signify the heart's contraction. The two movements of the heart are its systole and diastole; by the systole of the heart, or its contraction, the blood is pressed out of the heart and forced into the arteries; by its diastole, the blood is received from the veins into the heart.

**SY'ZIGY.** (from *σύνυγία*, Gr. conjunction; *syzygie*, Fr.) A term applied to the conjunction or opposition of a planet with the sun. The syzygies of the sun and moon occur at the time of full and new moon; the tides are much increased, and are called spring tides, in the syzygies.

## T

**TABASHEE'R.** A siliceous concretion found in the joints of the bamboo: by some it has been supposed to be the juice of the plant inspissated and hardened. It is remarkable on account of its peculiar optical properties; its refractive power is between air and water, namely 1.111. The finest varieties reflect a delicate azure colour, and transmit a straw-yellow tint, which is complementary to the azure. When it is wetted slightly with a wet needle or pin, the *wet spot instantly becomes milk-white and opaque*. The application of a larger quantity of water restores its transparency. The word is from the Persian.—*Dr. Brewster.*

**TA'BULAR.** (from *tabularis*, Lat.) Formed in laminæ or plates; having a flat or square surface; in large plates.

**TA'BULAR STRU'CTURE.** This form of structure consists of parallel plates, separated by regular seams; it is the consequence of crystallization, and though closely allied to the columnar structure, is not uncommonly confounded with stratification.—*Mr. Bakewell.*

**TA'BULAR SPAR.** The schaalstein of Werner; spathen tables of Haüy; prismatischer augit-spath of Mohs. A greyish-white mineral, occurring massive and in granular concretions. Lustre pearly; fracture splintery; translucent. Specific gravity 2.7 to 3.2. Its constituents are silica 51.40, lime 45.0, oxide of iron a trace, water 4.0. It occurs in primary rocks in Norway and other places.

**TA'BULATED.** (from *tabula*, a table, Lat.) Having a flat surface.

**TALC.** } (*talk*, Germ. *talc*, Fr.) A some-  
**TALCK.** } what fibrous and very commonly foliated mineral, resembling mica in its lamellar structure, but its laminæ not being elastic as are those of mica. Its colours are white, pale yellow, or greenish. Both its surface and powder are unctuous to the touch. It is so soft as to be easily scratched with the finger-nail. Its lustre is often pearly, or inclined to metallic. It is translucent, and, when divided into thin laminæ, transparent. Specific gravity from 2.58 to 2.90. Before the blow-pipe it whitens, its laminæ separate, and their extremities fuse into a white enamel. Its constituents are principally siliceous and magnesia, with small quantities of potash, alumine, oxide of iron, and water. Talc and chlorite are nearly allied, and pass by insensible gradations, into each other. Talc is sometimes used as a substitute for glass, and windows are formed of its laminæ, which are sometimes obtained of the size of twelve inches square. There are two varieties of talc, namely, fibrous talc and indurated talc.

**TA'LCITE.** The nacrite of Brongniart; talc granuleux of Haüy; erdiger talc of Werner. A rare mineral, occurring in coats or reniform masses, composed of very minute shining spangles or scales. The French have given to it the name of nacrite in consequence of its pearly lustre. When rubbed between the fingers, it leaves a pearly gloss. For its constituents and other particulars, see *Nacrite*.

**TA'LCOUS.** } Resembling talc; containing  
**TA'LCY.** } talc.

**TA'LUS.** (*talus*, Lat. *talus*, Fr. *inclinaison que l'on donne à la surface latérale et extérieure d'un mur, de telle sorte que de haut en bas il aille toujours en s'épaississant. Il se dit aussi d'une terrasse sans murs, lorsque ses faces latérales s'élargissent de haut en bas.*)

1. A sloping heap. When, from disintegration, the fragments of a face of rock accumulate at its base and form a sloping heap, the heap is called a talus.

2. In anatomy, a name sometimes given to one of the bones of the tarsus, the astragalus.

**TA'NGENT.** (from *tango*, to touch, Lat. *tangente*, Fr. *tangente*, It.) A straight line which touches a curved line in one point without cutting it.

**TA'NTALITE.** The name given by some mineralogists, and in the first instance by Ekeberg, to the ferruginous oxide of columbium. The tantale oxidé ferromanganésifère of Haiüy; the tantale tantalite of Brongniart. Called also columbite. The ore of tantalum or columbium. When recently broken, tantalite is of a dark bluish-gray or nearly iron-black colour. It occurs in octohedral crystals, and in small masses. Its specific gravity is from 5.9 to 7.9. It consists of oxide of columbium 80.0, oxide of iron 12.0, oxide of manganese 8.0. It has been found in Finland, and in the United States of America.

**TA'NTALUM.** A metal extracted from tantalite; it appears to be the same substance as columbium, and identical with it.

**TA'PIR.** A genus of mammalia, belonging to the family Pachydermata Ordinaria. The nose of the tapir may be compared to a small fleshy proboscis, the snout being lengthened and moveable. There are several species of this genus still surviving, but they are all natives of tropical climates. The general appearance of the tapir is that of a pig, but some of the species are as large as the ass. The fore feet have four toes each, all of equal size; the hind feet have only three each. The skin is of a dark colour, nearly black, with but few hairs.

Fossil tapirs are found in different parts of Europe.

**TAP-ROOT.** In botany, the main root of a plant, which passes directly downwards.

**TARDIGRA'DA.** } (from *tardigradus*, slow-  
**TARDIGRADE.** } paced, Lat.) A family of quadrupeds of the order Edentata.

These animals have obtained their name from the extreme slowness of their motions. The only existing genus is the *Bradypus* or sloth. Their nails are enormously long, compressed, and crooked. The molars are cylindrical; the canini

sharp, and longer than the molars. They live in trees, and so great is their indispotion to locomotion, that they continue on the same tree till they have devoured every leaf to be found thereon. Some authors state that, to avoid the trouble of a regular descent, they tumble themselves down from the branch they happen to be on. When they have eaten their full, they can roll themselves into a ball, and take a long and reckless sleep.

**TAR MI'NERAL.** A variety of bitumen, bearing a great resemblance to petroleum, but more viscid, and of a darker colour.

**TARN.** A bog; a fen; a marsh; a pool. This word appears to be of Icelandic origin.

**TA'RSAL.** Pertaining to the tarsus or instep, as the tarsal bones, &c.

**TA'RSUS.** (*ταρσος*, Gr. *tarse*, Fr.)

1. The instep, or that part of the foot situated between the bones of the leg and the metatarsus.

2. In entomology, the tarsus, or foot, of insects is the last division of the limb: it is divided into several joints, which have been supposed to represent the toes of quadrupeds. The last joint of the tarsus is generally terminated by a claw, which is sometimes single and sometimes double, and which contributes to fasten the foot, under a variety of circumstances both of action and repose. The hooks of the anterior tarsi are directed backwards, those of the middle pair inwards, of the hindermost pair forwards. Many insects are provided with cushions at the extremity of the feet, which break the force of falls, and prevent the jar which the frame would otherwise have to sustain. These cushions are formed of dense velvety tufts of hair, lining the underside of the tarsi, but leaving the claw uncovered. — *Rev. W. Kirby.*

**TA'RTARIN.** } Vegetable alkali, or potash:  
**TA'RTARINE.** } a name assigned to it by Kirwan.

**TAXO'NOMY.** (from *τάξις*, order, and *νόμος*, law, Gr.) The classification or arrangement of animals or plants, according to certain principles, in divisions and groups.

**TE'GMEN.** (*tegmen*, any sort of covering, Lat.) A covering of the body, as the cuticle, &c.; used in botany to denote one of the coats of the seed; in entomology, applied to the coverings of the wings of the order Orthoptera, or straight-winged insects.

**TE'GUMENT.** The same as *tegmen*.

**TELEOSA'URUS.** A new genus of fossil saurians, thus named and arranged by M. Geoffroy St. Hilaire. The *teleosauri* have long and narrow beaks, the nostrils forming almost a vertical section of the an-

terior extremity of the beak.—*Professor Buckland.*

**TELLINA.** (*tellina*, Lat. a *limpin.*) A genus of orbicular or ovate transverse equivalved, marine bivalves, with a fold on the anterior part, and short beaks, found in sands, at depths varying to fifteen fathoms. Hinge with usually three teeth, the lateral ones smooth on one side. The shells of this genus are chiefly known by the inflection, or irregular fold, on the fore part; in the one valve the fold is convex, in the other, concave. There are three families of tellinæ: ovate and thickish, ovate and compressed, sub-orbicular. Some conchologists have divided tellina into three genera; *Tellina*, *Cyclas*, and *Pandora*. Ninety-four species are described in Turton's Linné, twenty-two of which have been found in the seas of our coasts. The tellina is remarkable for the quickness and agility with which it can spring to considerable distances, by first folding the foot into a small compass, and then suddenly extending it; while the shell is at the same time closed with a loud snap.

Many species of this genus are found fossil; Lamarck enumerates ten, as having been found in the neighbourhood of Paris. Dr. Mantell gives three species as occurring in Sussex; two in the lower green sand, *Tellina æqualis* and *Tellina inæqualis*, and one in the alluvial deposits, *Tellina solidula*.

**TELLINIDES.** A genus of sub-equivalve, inequilateral, transverse, marine bivalves, found in sandy mud at depths varying from five to fifteen fathoms.

**TELLINITE.** A fossil tellina. See *Tellina*.

**TELLURIUM.** The name given by Klaproth to a metal first discovered by him or by Müller in 1782, from an ore of gold, with which metal it is found combined in the Transylvanian mines. Its colour is nearly a tin white, with a shade of blue. Structure foliated. Specific gravity 6.1. Before the blow-pipe it fuses easily, and is very volatile, giving out a pungent odour, compared by some to that of a radish. Tellurium is not used in any form.

**NATIVE TELLURIUM.** Rhombohedral Tellurium. The tellure natif auro-ferrifère of Haüy; gediegen silvan of Werner; tellure natif ferrifère of Brongniart. This ore is never perfectly pure. It always contains a greater or less quantity of gold, and sometimes silver, lead, copper, and sulphur. It is found in Transylvania only, in veins, traversing greywacke. It is of a white colour; of a shining and metallic lustre; brittle and frangible. Its constituents are tellurium 92.6, iron 7.2, gold 0.2.

**TEMPERATURE.** (*temperatura*, Lat. *température*, Fr. *tempra*, It.) Constitution of nature; the constitution or state of the atmosphere, whether it be hot or cold, humid or dry; the condition of a body, as manifested by its influence on the thermometer.

A question of great importance, in the study of geology, arises as regards the existing and the former temperature of this planet. Whether the nebular hypothesis be correct, (and assuredly, if we dispassionately examine the question with our minds divested of prejudices and preconceived notions, there are many very powerful arguments in its favour,) or otherwise, it certainly does appear that a very high temperature did once exist on this planet; and that such temperature has been gradually diminishing. Whether also the nucleus of the globe be in a state of incandescence or fusion is a question which probably never will be solved, till the heavens shall be rolled away as a curtain, and the elements shall melt with fervent heat. Still we well know that the temperature of the earth does increase in a fixed and certain ratio as we descend into its depths. The following observations on this interesting subject are extracted from some of our most able geologists and greatest authorities. There is so much grandeur and simplicity in the idea of the condensation of gaseous matter into those spheres and spheroids which exist, not only in our solar system, but also by myriads throughout the universe, that we are irresistibly led to adopt some view of this kind, more particularly as it would accord with the unity of design so evident throughout creation. There is no argument, à priori, against the hypothesis that the matter composing our globe may once have existed in a gaseous state, and in that state have revolved round the sun. If it be highly probable that heat to a certain extent resists the action of gravitation in the sun, Jupiter, and Saturn, there is nothing unphilosophical in the inference that heat has resisted, and may continue to resist, in a minor degree, the action of gravitation in our planet. The following are general results from the various facts observable on the earth's surface, and such depths thereof as man has hitherto been able to penetrate. 1. Numerous experiments in mines show an increase of temperature from the surface downwards, that is, from those depths where the action of the solar rays ceases to produce a variable heat. 2. Thermal springs occur in all parts of the world, and among all varieties of rock. 3. The temperature of the water in Artesian wells is found to increase with the depth. 4. Terrestrial

temperature, at small depths, does not coincide with the mean temperature of the atmosphere above it. 5. Igneous matter has been ejected at all periods from the interior of the earth. 6. Active volcanoes occur widely spread over the surface of the world, and so closely resemble each other, that they may be considered as produced by a common cause, and that cause deep-seated. 7. Geological phenomena attest a great decrease of temperature on the surface of the globe. 8. A decreased temperature of the earth would, by radiation, produce the various mountain ranges and fractured strata found on the surface of our planet. "When all these circumstances," says the able and learned author, H. T. De la Beche, Esq., from whose work, *Researches on Theoretical Geology*, I have extracted the preceding observations, "are taken into consideration, and we add the probability that heat counteracts the effects of gravity in the sun and certain planets, and that the free passage of the particles of terrestrial matter among each other was necessary to produce the figure of the earth, the evidence in favour not only of a central heat at present, but also of a heat of far greater intensity at remote geological epochs, becomes exceedingly strong; so strong, indeed, that there is some difficulty in resisting the impression that we have, by various means, made as fair an approximation to the truth, as the nature of the subject will admit. If the theory of central heat be founded on probability, the very general occurrence of tilted and fractured rocks is of easy explanation."

M. Adolphe Brongniart has shewn, says Professor Buckland, "that the existing submarine vegetation seems to admit of three great divisions which characterize, to a certain degree, the plants of the frigid, temperate, and torrid zones. If we take a general review of the remains of terrestrial vegetables, that are distributed through the three great periods of geological history, we find a similar division of them into groups, each respectively indicating the same successive diminutions of temperature upon the land, which have been inferred from the remains of submarine vegetation. Thus, in strata of the transition series, we have an association of a few existing families of endogenous plants, chiefly ferns and equisetaceæ, with extinct families both endogenous and exogenous, which some modern botanists have considered to indicate a climate hotter than that of the tropics of the present day. In the secondary formations, the species of these most early families become less numerous, and many genera and families entirely cease;

while a large increase takes place in Cycadeæ and Coniferæ, two families comprehending many existing forms of vegetables. The united character of the groups thus associated, indicate a climate, whose temperature was nearly similar to that which prevails within the present tropics. In the tertiary deposits, the greater number of the families of the first series, and many of those of the second disappear, and a more complicated dicotyledonous vegetation takes place of the simpler forms, and the general character marks a climate nearly approaching to that of the Mediterranean. This third great change in the vegetable kingdom is considered to supply another argument in favour of the opinion, that the temperature of the atmosphere has gone on continually diminishing from the first commencement of life upon our globe."

"To know the temperature of the interior parts of the globe at the present period," says Professor Phillips, "and the effects depending on its condition in this respect, is important, as furnishing one, and that, perhaps, the most instructive, of the elements for computing the changes which have, in earlier times, affected its structure and configuration, and varied its adaptations for organic life. That the earth has below its surface a source of great heat, independent of solar influence, is perfectly ascertained by volcanic phenomena; that this heat is very generally diffused, is equally certain, from the extent of country in which thermal springs are found; that it is universally spread below our feet, becomes continually more and more probable from experimental researches."

From a series of experiments, it appears that the temperature of the earth's crust increases at the rate of 1° Fahrenheit for every forty-five feet of perpendicular descent.

The uninjured corals and chambered univalves of Iglulic, Melville Island, and other high latitudes, sufficiently prove that during the carboniferous period there was an elevated temperature even in the northern regions bordering on the Arctic circle. The heat and the humidity of the air, and the uniformity of climate, appear to have been most remarkable when the oldest strata hitherto discovered were formed. The approximation to a climate similar to that now enjoyed in these latitudes does not commence till the era of the formations termed tertiary; and while the different tertiary rocks were deposited in succession, the temperature seems to have been still further lowered, and to have continued to diminish gradually, even after the appearance upon the earth

of a great portion of the existing species.

—*Mr. Lyell.*

**TENA'CITY.** (*tenacitas*, Lat. *ténacité*, Fr.)

Viscosity; adhesiveness; glutinousness; cohesiveness. The degree of force with which the particles of bodies cohere. It is in consequence of possessing the property of tenacity, that certain substances permit themselves to be drawn out into wire or flattened under the blows of the hammer.

**TE'NDON.** (*tendo*, Lat. from *τείνω*, to stretch, Gr. *tendon*, Fr.) The fibrous cord-like extremity of a muscle.

**TE'NDINOUS.** (*tendineux*, Fr. *tendinoso*, It.) Composed of tendons; resembling tendon.

**TE'NDRIL.** (*tendron*, Fr.) In botany, a spiral appendage to certain plants, its use being to clasp and wind round other bodies, by which means weak and climbing stems support themselves, and rise to a great height.

**TE'NNANTITE.** A variety of sulphuret of copper of a lead-grey or blackish colour. It has been thus named by Mr. R. Phillips. It occurs in copper veins in some of the mines of Cornwall. Its constituents are, according to the analysis of Mr. Phillips, copper 45·32, arsenic 11·84, iron 9·26, sulphur 28·74, silica 5·00. Hardness 4·0. Specific gravity from 4·3 to 4·4. It occurs massive, and crystallized in rhomboidal dodecahedrons, cubes, and octohedrons.

**TE'NTACLES.** } Feelers; exploring organs.

**TENTA'CULA.** } In its most restricted sense, says the Rev. W. Kirby, this term is understood to signify organs, appendages of the mouth, which have no articulations, but, in a larger sense, the term has been applied also to all jointed organs in its vicinity, and used for a similar purpose, which indeed are the precursors of feelers and antennæ. It is to these organs, as well as for their food, that polypes are indebted for what constitutes their principal ornament, that resemblance of a plant or shrub in full blossom adorned with crimson or orange-coloured flowers. In the fixed polypes, the tentacles are the only motive organs. The tentacles of the fresh-water polypes, forming the locomotive genus hydra, are not, as those of the fixed marine ones, shaped like the petals of a blossom, but are long hair-like flexile arms, somewhat resembling the branches of a chandelier. Amongst the Radiarids, tentacles exist in some genera, and not in others. In the Stelleridans and Echinidans, there are no tentacles, but the Fistulidans present a floriform coronet of tentacles. Tentacles as exploratory, prehensory, and locomotive organs, exist in several other

classes of animals. In none, however, are they more remarkable than in the Cephalopoda: in these animals they are used as arms for prehension, as legs for locomotion, as sails for wafting their possessors over the boundless deep, as oars for passing through its waves, as a rudder for directing their course, and as an anchor for fixing themselves. The tentacula of the various tribes of Polypi, of Actiniæ, and of Annelida, are organs both of prehension and of touch.

**TEREBE'LLA.** A genus of Annelidans, or annulose animals, placed by Cuvier in the order Tubicola. They are inhabitants of the sea, and are met with generally in shallow water, on the coasts, and on shells, &c. The body is oblong, creeping, naked, often enclosed in a tube, furnished with lateral fascicles, or tufts, and small branchiæ; mouth placed before, furnished with lips without teeth, and protruding a clavate proboscis; feelers numerous, ciliate, capillary, seated round the mouth. Terebellæ not being provided by nature with any external shell, endeavour to furnish themselves with an armature. For this purpose they collect grains of sand, or fragments of decayed shells, or other substances, which they agglutinate together by means of a viscid exudation, so as to form a firm defensive covering, like a coat of mail. These coverings, however, composed as they are of extraneous materials, and not being organic productions of the animals themselves, are structures wholly foreign to their systems. Terebellæ are provided with tentacles, issuing from the head, which, when the rest of the body has retired within the tube, is the only part exposed.

**TE'REBRA.** A genus of turreted subulated marine univalves: the opening short, and notched in the lower part. The basis of the columella twisted. Two species are found fossil in the environs of Paris, namely, *Terebra plicatula*, and *Terebra scalarina*.

**TE'REBRATING.** A term applied to shells which form holes in rocks, wood, &c., and reside therein.

**TEREBRA'TULA.** A genus of the class Brachiopoda. Terebratulæ are marine bivalves found moored to rocks, shells, &c., at depths varying from ten to ninety fathoms. The valves are unequal and united with a hinge, but having no ligament: the summit of one, more salient than the other, is perforated to permit the passage of a fleshy pedicle, by means of which the animal attaches itself to rocks, shells, &c. The recent species are few, but the fossil are very numerous. In the fossil shell, the operculum which

serves for the attachment of the animal to the object to which it is moored, can rarely be traced. The casts of some species of fossil Terebratulæ are of a most extraordinary form. These casts are said to have been first noticed by Pliny, who describes certain stones, some of which were white and others brown. Agricola next noticed these bodies, as having been found whilst digging near the fortress of Ehrenbreitstein, in Treves. After various opinions had been offered respecting the true origin and nature of these fossils, Wolfart advanced the opinion that they were the casts of marine shells. Terebratulæ are found most abundantly in the secondary and tertiary formations. Dr. Mantell enumerates the following species as occurring among the organic remains of Sussex. In the chalk formation Terebratula subrotunda, very common, T. carnea, T. ovata, T. nudata, T. subplicata, T. elongata, and T. plicatilis. In the two last species, namely, T. elongata and T. plicatilis are included as varieties T. undulata, T. subundata, T. intermedia, T. semiglobosa, T. octoplicata, and T. concinna. In the chalk marl are found Terebratula subrotunda, T. undulata, T. striatula, T. Mantelliana, T. Martini, T. rostrata, and T. squamosa. In the upper green-sand, Terebratula biplicata. In the Shanklin sand Terebratula ovata, and T. lata.

**TEREDINA.** (from *teredo*, a little worm that eateth wood, Lat.) A genus of acephalous testacea, belonging to the family Includa, or, according to Lamarck, Tubicolaria. The valves are equal and inequilateral, with a little hollow on the inside of each valve, and a small, free, shield-shaped piece on the hinge. Tereidinae are known only in a fossil state.

**TEREDO.** (*teredo*, Lat. a little worm that eateth wood; *τερηδών*, from *τερέω*, to bore, Gr.) A genus of marine bivalves, belonging to the family Includa, in Cuvier's arrangement, and to Tubicolaria, in Lamarck's. The Teredo is contained in the lower end of a cylindrical tubular shell, generally open at both ends, two opercula being adapted to the upper end: it is capable of penetrating wood. The shells of this genus inhabit the bottoms of ships, and wood under water. One species, *Teredo gigantea*, has been found in mud at the bottom of the ocean; it attains to a great size, one specimen measuring five feet four inches in length, with a circumference at the base of nine inches. The body of the shell had an appearance resembling stalactites, and was found filled with a soft gelatinous flesh. When arrived at its full growth the *Teredo gigantea* closes up the end of its shell.

**TEREDO NAVA'LIS.** The ship-worm. The name given to a species of Teredo from the circumstance of its insinuating itself into the timbers of the bottoms of ships, even although the oak is perfectly sound: it very soon completely destroys the timbers it attacks. This destructive creature was brought originally, by our ships, from tropical climates, but it has now become an inhabitant of most of the harbours of this country. The *teredo navalis* or ship-worm, will destroy every thing constructed of timber that is under the surface of the water. Their object is not to devour the wood, but to make for themselves a cell in which they may be safe from their enemies. They bore in the direction of the grain of the timber, deviating only to avoid the track of others. Fortunately these animals cannot exist in fresh-water.

**TERMINAL.** (from *terminalis*, Lat.) In botany, applied to flowers and umbels proceeding from the extremity of the stem or branches.

**TERMINOLOGY.** For an explanation of this term, see *Orismology*.

**TERNA FO'LIA.** In botany, leaves growing three together in a whorl. This term, it must be remarked, is very different in its signification from *ternate*.

**TERNARY.** (*ternarius*, Lat. of or belonging to three; *ternaire*, Fr. *ternario*, It.) Proceeding by threes; consisting of three. Applied to things arranged in order by threes: thus, in botany, a flower is said to have a ternary division of its parts when it has three sepals, three petals, three stamens, or twice or thrice as many.

**TERNATE.** (from *ternus*, Lat.) A term in botany, applied to compound leaves that consist of three leaflets on a petiole: the leaf of the strawberry affords a familiar example of a ternate leaf.

**TERRA PONDEROSA.** Another name for barytes. See *Barytes*.

**TERRA SIE'NNA.** The name given to an ochreous earth from its being brought from Sienna: it is a sort of brown bole, and is used as a pigment.

**TERRAIN TERTIA'IRE.** The name given by the French geologists to the tertiary strata. The Germans call these, *Tertiärgebilde*.

**TERRE VERTE.** Green earth. The grün erde of Werner; talc zographique of Haüy; chlorite baldogée of Brongniart. An earth of a green colour, sometimes passing to olive. It consists, according to Klaproth, of silice 53, magnesia 2, potash 10, oxide of iron 28, water 6. Vauquelin states that it contains 7.00 of alumine. It is found in Germany, France, Italy, and North America. It is ground with oil, and used as a pigment.

**TERREOUS.** (*terreus*, Lat. *terreux*, Fr.

*terroso*, It.) Consisting of earth ; earthy.

**TERRESTRIAL.** (*terrestris*, Lat. *terrestre*, Fr. *terrestre*, It.) Pertaining to the earth ; consisting of earthy matter.

**TERRESTRIAL REFRACTION.** It is the power which air possesses, in common with all transparent media, of refracting the rays of light, or bending them out of their straight course, which renders a knowledge of the constitution of the atmosphere important to the astronomer. Whenever a ray of light passes obliquely from a higher level to a lower one, or vice versâ, its course is not rectilinear, but concave downwards ; and of course any object seen by means of such a ray, must appear deviated from its true course, whether that object be, like the celestial bodies, entirely beyond the atmosphere, or, like the summits of mountains, seen from the plains, or other terrestrial stations, at different levels, seen from each other, immersed in it. Every difference of level, accompanied, as it must be, with a difference of density in the aerial strata, must also have, corresponding to it, a certain amount of refraction. This refraction between terrestrial stations is termed *terrestrial refraction*. The refraction of a terrestrial object is estimated differently from that of a celestial body. It is measured by the angle contained between the tangent to the curvilinear path of the ray where it meets the eye, and the straight line joining the eye and the object. The quantity of terrestrial refraction is obtained, by measuring contemporaneously the elevation of the top of a mountain above a point in the plain at its base, and the depression of that point below the top of the mountain. The distance between these two stations is the chord of the horizontal angle ; and it is easy to prove that double the refraction is equal to the horizontal angle, increased by the difference between the apparent elevation and the apparent depression. Whence it appears that in the mean state of the atmosphere, the refraction is about the fourteenth part of the horizontal angle.—*Mrs. Somerville. Str John Herschel.*

**TERTIARY.** Third. A term applied to those formations which have been deposited subsequently to the chalk formation.

**TERTIARY STRATA.** A division of sedimentary formations called tertiary, as being of newer origin than the secondary, and characterized by distinct species of fossil animals and plants. They present a most decided contrast with the secondary and older strata in most of their essential characters. The most striking feature of these formations consists in the

repeated alternations of marine deposits with those of fresh water. We are indebted to Cuvier and Brongniart, for the first detailed account of the nature and relations of a very important portion of the tertiary strata, namely, those which occur in the neighbourhood of Paris. These were found to fill a depression in the chalk, and to be composed of different materials, sometimes including the remains of marine, sometimes of fresh-water animals. The first discovery of the tertiary strata in the Isle of Wight and south-east of England, we owe to Mr. Webster. The whole of the tertiary accumulations are stratiform deposits, exhibiting various kinds of lamination and bedding. Previously to the commencement of the present century, the true nature of the tertiary formations was unknown, the chalk was considered the highest known rock, and the tertiary deposits as mere superficial sands, gravels, or clays.

The tertiary system may be said to constitute a series of formations which link together the present and the past ; while the more ancient tertiary deposits contain organic remains related to the secondary formations, the most recent contain many existing species of animals and plants, associated with forms now extinct. The English series of marine tertiary deposits is most distinctly shewn in the Hampshire basin, and the Isle of Wight, in the London basin, and on the eastern coast, from the mouth of the river Yare to that of the Thames. In France, however, we find a much more full development than in England of the tertiary strata. From the commencement of the tertiary period, there appears to have been a constantly increasing provision for the diffusion of animal life. The term tertiary has been altogether disapproved of by some geological authors. Mr. De La Beche considers the name highly objectionable, " inasmuch as it would imply that there were three great classes of rocks possessing marked characteristic distinctions, and that the deposits above the chalk constituted the third of such classes." He proposes that the term *supra-cretaceous* be employed in preference to tertiary. On the other hand, Mr. Bakewell says, " the name of tertiary has been given with much propriety to all the strata that are more recent than the secondary ; the term is intelligible, and ought not to be changed without sufficient reason. The name of *supercretaceous*, which has recently been applied to the tertiary strata, is peculiarly inappropriate, as these strata may cover any of the lower rocks, and in Auvergne

they may be seen resting on granite. If a new name were necessary, *post-cretaceous* should have been chosen; as all geologists are agreed that the tertiary strata were deposited after the chalk."

The tertiary strata have been subdivided by Mr. Lyell and M. Deshayes into four principal groups, to which Mr. Lyell has assigned the terms eocene, miocene, older pliocene, and newer pliocene; each group being characterized by the relative proportion of recent and extinct species of shells therein contained. To this nomenclature of Mr. Lyell's, Mr. De La Beche urges the following objections. "Classifications entirely founded on organic remains are at all times liable to be erroneous, if contemporaneous deposition be thence inferred as a necessary consequence; they therefore may be considered as doubly liable to error when employed in proving contemporaneous origin in such rocks as those of the supra-cretaceous period, and which may contain a certain per centage of the remains of molluscs resembling those of the present day. When we appropriate names of this kind to rocks, derived from one character alone, and that character one which cannot be considered constant, we theoretically pre-empt the place which the rocks should occupy in a geological series, where the comparative date of the deposit itself is sought, not the particular proportion of given organic remains detected in it, which is necessarily a secondary consideration. If it be considered convenient to divide the supra-cretaceous rocks of Europe into three or more sub-groups, names which imply their actual geological position in the series, such as superior, medial, and inferior; upper, medial, and lower, or others of the like kind, would be preferable to those derived only from a per centage of certain organic contents."

These little differences of opinion, however, between our leading geologists will give place to the general advancement of the science. A multiplied nomenclature is greatly to be deprecated, leading not only to much confusion, but being, in itself, a source of discouragement to the student, and deterring many from entering on the study of any branch of science.

Although the tertiary or supra-cretaceous formations may be said to include all the deposits from the chalk upwards, yet, by some geologists, those of what is termed the recent period form a distinct subdivision, and the tertiary formations include only the four groups, namely, the eocene, miocene, older pliocene, and newer pliocene. Commencing therefore

from below upwards, we find included in the tertiary series, 1. The eocene, comprising marine and fresh-water deposits, including in the former, the calcaire grossier and the London clay, in the latter, the calcaire siliceux. 2. The miocene, comprising the faluns of the Loire, marine deposits, and sands, clays, lignites, &c. &c.; fresh-water deposits. 3. The older pliocene, consisting of subapennine marl, subapennine yellow sand, English crag, marine deposits; and sands, clays, lignites, &c., fresh-water formations. 4. Newer pliocene. In this, the most recent of the tertiary deposits, we have limestone, sand, clays, conglomerates, marls, &c. containing marine fossils, being marine stratifications; and sands, clays, sandstones, lignites, &c., containing fresh-water fossils, being fresh-water deposits.

**TE'SSELATED.** (*tesselatus*, Lat. wrought in chequer-work.) Chequered, like a chess board. In conchology, applied to shells that are coloured in regular and defined patches.

**TE'SSULAR.** A term applied to a system of crystallization, not susceptible of variation. The cube, tetrahedron, and several other forms belong to the tessular system.

**TE'STA.** (*testa*, Lat. a shell.)

1. Commonly applied to the shelly covering of testaceous animals.

2. In botany, the outer coat of the seed. The seed, or ripened ovulum, consists of coverings called integuments or seed-coats, the outer of which is called the *testa*.

**TESTA'CEA.** (from *testa*, Lat. a shell; *testacé*, Fr.) In the Linnæan system of natural history, the third order of vermes. This order comprises all shell-fish, arranged by Linnæus under thirty-six genera. The testacea differ from the crustacea in their composition; the calcareous part of the shells of testacea being carbonate of lime, whereas in the shells of crustacea it is phosphate of lime. The testacea also retain their shells as long as they live; the crustacea cast them annually, or, at least, periodically.

**TESTA'CEOUS.** (*testaceus*, Lat. *testacée*, Fr. *testaceo*, It.) Belonging to the order testacea; having a strong thick shell, the calcareous portion of which consists of carbonate of lime.

**TESTACEO'LOGY.** A modern term for the natural history of shells, and synonymous with conchology.

**TESTU'DINATE.** (*testudineatus*, Lat.) Arched; vaulted; resembling the back of a tortoise.

**TESTU'DO.** (*testudo*, Lat.)

1. A genus of the order Chelonia; the

- tortoise. This genus has been divided into five subgenera.
2. The land tortoise, a sub-genus of the genus above mentioned.
- TETRACAULODON.** An extinct animal of the order mammalia; allied to the mastodon, and referrible to the miocene period. One species only has been discovered hitherto; at Epplesheim, in Germany.
- TETRADECYLOUS.** (from τετραδάκτυλος, Gr. *quatuor digitos habens.*) Having four toes.
- TETRADYNA'MIAN.** } A term applied to  
**TETRADYNA'MOUS.** } plants that have six  
 stamens, four of which are longer than  
 the other two: the wall-flower is a familiar example.
- TETRAGON.** (from τετράγωνος, Gr. *tetragonus*, Lat.) A quadrangle; a figure that has four angles, as a square.
- TETRA'GONAL.** (*tetragone*, Fr.) Having four sides and four angles; four-cornered.
- TETRAGYN.** In botany, a plant that has four pistils.
- TETRAHE'DRAL.** Having four triangles, equal and equilateral.
- TETRAHE'DRON.** } (from τέτρα, four, and  
**TETRAË'DRON.** } ἔδρα, side, or base, Gr.  
*tétrædre*, Fr.) The solid angles of a tetrahedron are formed by three equilateral plane triangles, and the solid is bounded by four equal and equilateral plane triangles, therefore it is a pyramid; a four-sided solid contained by four equal-sided triangles; a solid contained by four triangular surfaces.
- THALLITE.** The name given by Lemethrie to the Epidote of Haiÿ, or Pistazit of Werner.
- THALLUS.** (from θαλλός, a green leaf, Gr.) In botany, a name given to the frond, or leaf-like part, of certain plants. Lichens are stemless, leafless, plants, consisting of a tough wrinkled substance, called a *thallus*.
- THECA.** (fromθήκη, Gr. *theca*, Lat.) A case or sheath. The sporules of plants are contained within theca.
- THECODONTOSAURUS.** A recently discovered genus of fossil saurians, found in the magnesian limestone: the vertebræ are deeply concave at each end.
- THERMAL.** (*thermal*, Fr. θερμός, warm, from θερῶ, to make warm, Gr.) A term applied principally to warm springs and waters. The temperatures of different thermal springs vary greatly from each other, but the same spring is found to be of a uniform temperature at all seasons of the year. Thermal waters are found to be, on the average, neither more nor less pure than springs of common temperature. There is no one product of thermal springs, constantly found in them, which
- never occurs in cold waters; but it appears, from Dr. Daubeny's researches, that nitrogen gas is very common in hot springs, and, perhaps, very rare in cold waters. Thermal waters prove the extensive effects of subterranean heat, deriving their temperature from a deep-seated internal source of heat, and not from any local cause, or from chemical changes. Some thermal springs have flowed without any known diminution of temperature for nearly two thousand years. The range of temperature of the thermal springs of Europe is from 66° to 165° Fahrenheit.
- THERMO-ELECTRICITY.** Electricity developed by heat.—*Lyell*.
- THIN OUT.** This is a term used by geological writers to express the appearance of a stratum which gradually becomes thinner, till it wholly disappears.
- THOMSONITE.** A mineral, thus named after Dr. Thomson, a variety of zeolite, crystallized in rectangular prisms. It is found near Dumbarton, in Scotland.
- THORACIC.** (*thorachique*, Fr. from *thorax*, Lat.) Pertaining to the chest. The name given to the duct into which the absorbents empty themselves, namely, the *thoracic duct*, and which terminates in the left subclavian vein.
- THORAX.** (*thorax*, Lat. θώραξ, Gr. *thorax*, Fr.) The cavity of the chest, containing the heart, lungs, &c., &c.
- THORINA.** An earth discovered by Berzelius, in 1816 or 1817, in gadolinite. It bears a strong resemblance to zirconia, but differs from it in many particulars. After being heated to redness it is soluble in acids. No precipitate is caused by the addition of sulphate of potash to a solution of it. Thorina is colourless and infusible after ignition. Dr. Ure states that a strong solution of the sulphate becomes a thick mass by boiling, but it is soluble in cold water; a property which particularly characterizes the new earth.
- THORITE.** A mineral discovered a few years since, in Norway, by Esmark, and named thorite by Berzelius. It is compact; of a black colour; brittle. Specific gravity 4.8. It is rare, and not used.
- THORINUM.** } The metallic base of the  
**THORIUM.** } earth thorina.
- THULITE.** A mineral of a peach-blossom colour, occurring in Norway; it is very rare.
- THUMMERSTONE.** } A mineral, thus named,  
**THUMMERSTONE.** } by Kirwan, from its  
 being found, in masses, near Thum, in Saxony. It is the Axinite of Haiÿ and Brongniart; the Axinit of Werner; La pierre de Thum of Brochant. For a description of this mineral, see *Axinite*.

**THYRSE.** } (*thyrsus*, Lat. *θύρσος*, Gr.  
**THYRSUS.** } *thyrsé*, Fr.) In botany, a  
 kind of inflorescence, as when the middle  
 branches of a panicle are longer than the  
 others. The horse-chesnut, lilac, &c.,  
 afford examples.

**TIBIA.** (*tibia*, Lat. *tibia*, Fr.) The name  
 given to the shin-bone, or large bone of  
 the leg. It is said to have received its  
 name from a supposed resemblance to a  
 pipe or flute.

**TIDE.** (*ebbe and fluth*, Germ. *flusso del  
 mare*, It.) The flow of the water in the  
 ocean; the alternate rise and fall of the  
 surface of the sea twice in the course of  
 a lunar day, or in 24h. 50m. 28s. of solar  
 time. The tides are a subject on which  
 many persons find a great difficulty of  
 conception. As the tides depend upon  
 the action of the sun and moon, their rise  
 and fall are classed among astronomical  
 problems, of which they are the most  
 difficult, and their explanation the least  
 satisfactory. That the moon, by her attraction,  
 should heap up the waters of the  
 ocean under her, seems to most persons  
 very natural,—that the same cause should,  
 at the same time, heap them up at the  
 opposite, appears to many a palpable  
 absurdity. Yet nothing is more true, nor  
 indeed more evident, when we consider  
 that it is not by her *whole* attraction, but  
 by the *differences* of her attractions at the  
 two surfaces and at the centre that the  
 waters are raised. In the semi-diurnal  
 tides there are two phenomena particu-  
 larly to be distinguished, one occurring  
 twice in a month, and the other twice in  
 a-year. The first phenomenon is that  
 the tides are much increased in the syz-  
 igies, or at the time of new and full moon.  
 In both cases the sun and moon are in  
 the same meridian: for when the moon  
 is new they are in conjunction; when she  
 is full they are in opposition. In each of  
 these positions, their action is combined  
 to produce the highest or spring-tides  
 under that meridian. The neap tides  
 take place when the moon is in quadra-  
 ture. The higher the sea rises in full  
 tide, the lower it is in the ebb. The  
 second phenomenon is the augmentation  
 in the tides occurring at the time of the  
 equinoxes, when the sun's declination is  
 zero, which happens twice every year.  
 The greatest tides take place when a new  
 or full moon happens near the equinoxes,  
 while the moon is in perigee. The height  
 to which the tides rise is much greater in  
 narrow channels than in the open sea, on  
 account of the obstructions they meet  
 with. The tides in the British channel  
 sometimes, in some parts, rise as high as  
 fifty feet; whereas on the shores of some  
 of the islands near the centre of the Pacific

ocean, they do not exceed one or two  
 feet. One of the most remarkable cir-  
 cumstances in the theory of the tides is  
 the assurance, that in consequence of the  
 density of the sea being only one-fifth of  
 the mean density of the earth, and the  
 earth itself increasing in density towards  
 its centre, the stability of the equilibrium  
 of the ocean can never be subverted by  
 any physical cause. A general inundation  
 arising from the mere instability of the  
 ocean is therefore impossible.—*Mrs. Som-  
 merville. Sir John Herschel.*

**TIN.** (*zinn*, Germ. *etain*, Fr. *stagno*, It.)  
 A metal of a white brilliant colour, slightly  
 tinged with grey, being one of the fifty-  
 five simple or elementary bodies. Its  
 specific gravity is 7.3. It fuses at a tem-  
 perature of 442° Fahrenheit. It is of  
 greater hardness than lead, but not so  
 hard as gold. It is very malleable, and  
 may be beaten out into leaves one two-  
 thousandth of an inch in thickness. It is  
 more tenacious than lead, and a wire of  
 tin one-tenth of an inch in diameter will  
 sustain a weight of forty-seven pounds.  
 It is very flexible, and, while being bent,  
 it causes a crackling noise. Tin unites  
 with many metals, forming valuable alloys.  
 The bronze of the ancients consisted of  
 88 or 90 parts of copper, with 10 or 12  
 parts of tin. Bell-metal consists generally  
 of one-fifth of tin to four-fifths of copper.  
 The gongs of the Chinese are formed of  
 one-fifth of tin and four-fifths of copper.

Tin is mentioned repeatedly in the  
 Pentateuch. It is generally believed that  
 the Phœnicians came to Britain for tin,  
 and, from the importance of the trade,  
 that they concealed the situation whence  
 it was obtained; it is certain that be-  
 fore the time of Herodotus tin was ob-  
 tained from Cornwall. The period at  
 which Cornish tin was first worked and  
 exported would appear to be lost in the  
 obscurity of past ages. Mr. Hawkins con-  
 siders that the Phœnician colony of Gades,  
 on the western coast of Spain, was the  
 medium or entrepôt of the commercial  
 intercourse between Phœnicia and Corn-  
 wall. Diodorus says, "we will now give  
 an account of the tin which is produced  
 in Britain." The total value of tin-ores  
 sold in 1837, according to a statement  
 in Mr. De La Beche's Geological Report  
 of Cornwall, &c. amounted to £363,322  
 16s. 4d. Mr. W. Phillips states "at  
 about 80 or 100 feet under the surface,  
 the first traces of copper or tin are usually  
 found. If tin be first discovered, even  
 without a trace of copper, it is not un-  
 usual that, in the course of sinking 80 or  
 100 feet, or more, all trace of it is lost, and  
 copper only is found; but if, instead of tin,  
 copper be first discovered at a depth of 80 or

100 feet, it seldom or never happens that tin is found below it in the same vein." There are, however, many instances of tin-ore accompanying copper-ore to great depths.

Tin occurs in rocks of granite, gneiss, &c., in veins or fissures, called lodes; also in horizontal beds termed floors; and it is also found loosely scattered among pebbles.

**TINSTONE.** Oxide of tin; an ore containing tin. Tinstone sometimes yields nearly 80 per cent. of its weight in tin.

**TITANIFEROUS.** (from *titan* or *titanium*, and *fero*, Lat. to produce.) Yielding titanium; containing titanium.

**TITANITE.** The ore or oxide of titanium; it is nearly a pure oxide; is of a brown colour, and is met with in granite and quartz.

**TITANIUM.** (from *titavos*, Gr.) One of the substances commonly known as metals, forming one of the fifty-five simple or elementary bodies. Titanium was first discovered by the Rev. Mr. Gregor in 1789; it is of a dark, copper-red colour, with a strong metallic lustre, which tarnishes by exposure to the atmosphere. Werner gave the name of Menak to titanium, from the circumstance of its having been first found at Menachan, in Cornwall.

**TOAD-STONE.** A provincial term for a species of wack, or basaltic rock, found in Derbyshire. Mr. Phillips asks whether this word is derived from the German *toadstein*, in which case it would signify, in mining language, a rock unproductive of mineral treasures, a character generally applicable to toadstone. It appears, however, that writers on mineralogy generally state the name to be given to toadstone from a supposed resemblance in its general aspect to the exterior of a toad. Toadstone is a pyrogenous or volcanic production that has been erupted in a fluid state. Its ordinary colours are brownish grey, purplish brown, bluish, or greenish; and its vesicles are either empty, or filled with carbonate of lime. Toadstone is found abundantly in Derbyshire, lying between beds of limestone; in some instances, beds of toadstone and limestone are found alternating with each other.

**TONGUE-SHAPED.** In botany, applied to leaves of an oblong, blunt, thick form, being generally of a cartilaginous substance at the edges.

**TOOTHED.** See *Dentate*.

**TO'PAZ.** (from *τοπάζιον*, Gr. *topaz*, Fr.) A precious stone or gem, generally of a yellow colour. It is the silice fluatée aluminéuse of Haüy; the topaze of Brongniart and Brochant. It is harder than quartz, with a specific gravity of from 3.4 to 3.6. There are many varieties of topaz, differing greatly in form

and colour. The highly crystallized and transparent varieties are named precious topaz. In some places, as in Scotland, the topaz is found in alluvial earths. The Scotch pebble, called *cairn-gorum*, is a topaz. Generally the topaz occurs in primary rocks, the finest specimens being obtained from the mountains of Brazil, and from the Uralian mountains of Asiatic Russia. The precious topaz consists of alumina, silica, and fluoric acid, with, sometimes, a small quantity of iron.

**TOPAZOLITE.** A pale yellow, nearly transparent, subvariety of garnet, found in Piedmont. Its constituents are, silice 37, alumine 2, lime 29, glucine 4, iron 25, manganese 2.

**TORNATELLA.** A genus of oval, spirally grooved, marine, univalves, belonging to the family Plicacea. Recent tornatellæ are found in shallow water, creeping on sands, and leaving furrows. Several species are found in the oolite and superjacent strata.

**TORO'SE.** } (*torosus*, Lat.) Swelling into  
**TO'ROUS.** } knobs or protuberances. A term used both in botany and conchology.

**TORPE'DO.** (*torpedo*, Lat. from *torpeo*, to benumb.) A subgenus of fishes, belonging to the genus *Raja*. The torpedo is found fossil in the tertiary formations. The torpedo is furnished with an electrical apparatus, resembling the voltaic battery, which it has the power of charging and discharging at pleasure. The benumbing effect producible by the torpedo depends on certain singularly constructed organs composed of membranous columns, filled from end to end with laminæ, separated from each other by a fluid.

**TO'RRELITE.** A new mineral brought from the United States, and thus named after Dr. Torrey.

**TO'RTOISE.** (*tortue*, Fr.) An order of the class Reptilia, or reptiles; tortoises are also termed Chelonians. The chelonians, or tortoises, were all included by Linnaeus in one genus, namely, *testudo*; they are now divided into five subgenera. 1. *Testudo*, or land-tortoise; 2. *Emys*, or fresh-water tortoise; 3. *Chelonia*, or sea-tortoise; 4. *Chelys*; 5. *Trionyx*, or the tortoise with a soft shell.

This order of reptiles, geologists inform us, began to exist at about the same period with the order of Saurians, and has continued from that time to the present. No fossil remains of the tortoise have been discovered in any strata not more recent than the coal formations.

**TOURMALINE.** } A mineral which has been  
**TOURMALIN.** } divided by some mineralogists into two sub-species, namely, *schorl* and *tourmaline*; by others, *tourmaline* is regarded as a sub-species, or va-

riety, of schorl. It is the tourmalin of Werner; the tourmaline verte of Haüy; the schorl électrique of Brochant.—It is of various colours, the shades of some of which are so dark as to approach nearly to black. Its hardness is about 7·5. Specific gravity from 3·0 to 3·2. By friction it yields vitreous electricity; by heating, vitreous electricity at one extremity and resinous electricity at the other. It occurs imbedded in granite, gneiss, mica slate, &c. in Scotland, Sweden, America, Spain, and other parts. Its property of polarizing light is thus described by Mrs. Somerville.—“If a brown tourmaline, which is a mineral generally crystallized in the form of a long prism, be cut longitudinally, that is, parallel to the axis of the prism, into plates about the thirtieth of an inch in thickness, and the surfaces polished, luminous objects may be seen through them, as through plates of coloured glass. If one of these plates be held perpendicularly between the eye and a candle, and turned slowly round in its own plane, no change will take place in the image of the candle. But if the plate be held in a fixed position, with its axis or longitudinal section vertical, when a second plate of tourmaline is interposed between it and the eye, parallel to the first, and turned slowly round in its own plane, a remarkable change will be found to have taken place in the nature of the light. For the image of the candle will vanish and appear alternately at every quarter revolution of the plate, varying through all degrees of brightness, down to total or almost total evanescence, and then increasing again by the same degrees as it had before decreased.”

TRA'CHEA. (*tráchea*, Lat. from *τραχὺς*, Gr. rough.)

1. The windpipe, or that canal which leads from the throat to the lungs.

2. In botany, the vessels of plants in which the internal fibres run in a spiral direction; they are also called air-tubes.

TRA'CHEAL. Belonging to the trachea, as tracheal-vessels.

TRACHELIPODS. (from *τράχηλος*, the neck, and *πούς*, a foot, Gr.) In Lamarck's arrangement, the third order of Molluscans: they have the greatest part of the body spirally convolved, always inhabiting a spirivalve shell; the foot free, attached to the neck, formed for creeping. Trachelipods may be divided into herbivorous and carnivorous, the latter possessing a respiratory siphon, which the herbivorous have not. This order contains fourteen families, and upwards of seventy genera.

TRA'CHYTE. (from *τραχὺς*, Gr. rough.)

A kind of volcanic porphyry, usually containing crystals of glassy felspar, and excessively rough to the touch. It is not found in this country, but is very abundant in the neighbourhood of all volcanic craters. Trachyte sometimes possesses a columnar structure; it is generally of a coarse grain, and with a degree of porosity. From this latter circumstance it easily breaks down, and forms frequently a conglomerate with other substances. It sometimes is found to contain augite and hornblende. In some districts trachyte seems little else than granite which has been again fused, and, having been exposed to different conditions, no longer presents the appearance of granite.

TRACHY'TIC. Composed of trachyte; resembling trachyte; rough.

TRANSITION ROCKS.

TRANSITION SERIES.

TRANSITION FORMATIONS.

} The name transition FORMATIONS. } has been applied to certain rocks from an opinion that they had been formed at a period when the globe was undergoing a great change, fitting it for the reception of organized beings. The term, though no longer applicable in its original signification, is still retained. The rocks usually included in the transition series are the Dudley limestone, the Caradoc sandstones, and the British and Llandilo rocks; the whole possessing a thickness of upwards of two thousand four hundred yards, and containing, throughout, organic remains. The transition rocks rest upon the rocks called primary, and are themselves covered by the old red sandstone formation. Professor Buckland observes, “it is most convenient to include within the transition series, all kinds of stratified rocks, from the earliest slates, in which we find the first traces of animal or vegetable remains, to the termination of the great coal formation.

TRANSLUCENCY. (from *trans*, through, and *luceo*, to shine, Lat.) A term used in mineralogy to express the property, which some minerals possess, of permitting the passage of rays of light, but without sufficient transparency to perceive objects through the mineral.

TRANSLUCENT. A mineral is said to be translucent when light evidently passes, but objects cannot be distinguished through the mineral.

TRAP.

} (*trappa*, a stair, Sw. *trapp*, TRAP ROCKS. } a step, Germ. probably from *τάπεζα*, Gr. a table.) Kirwan gave the name of trap to basalt, which he divided into two families, namely, Common Trap, and Figurate Trap. The word trap is usually employed to designate certain volcanic rocks, frequently occurring in large tabular masses at different

heights, and forming a succession of terraces or steps. The term is applied to various igneous rocks, without any regard to their constituent parts, but merely in reference to their form. Mr. Bakewell, in his Introduction to Geology, says, "trap-rocks not only reveal the secret of their birth, but, from their close alliance to many of the most ancient primary rocks, they disclose the operations by which a large portion of the earth's surface was consolidated, in the most remote geological epochs. Many of the trap-rocks are so similar in structure and composition to the products of active volcanoes, and to the beds of lava erupted in our own times, that we may be said to see the very cause in operation by which they were formed. Many of the trap-rocks are also so similar in structure and composition to some of the most ancient primary rocks, that we can scarcely doubt respecting their having had the same origin, though they may have been consolidated under different degrees of heat or pressure, and with different attendant conditions."

**TRAPPEAN ROCKS.** Another name for trap rocks.

**TRAPEZIUM.** (from *τραπέζιον*, a little table, Gr. *trapèze*, Fr.)

1. In anatomy, the name given to one of the bones of the carpus, or wrist.
2. In geometry, a quadrilateral figure, whose four sides are not equal, and none of its sides parallel.

**TRAPEZOÏD.** (from *τραπέζιον*, a little table, and *εἶδος*, likeness, Gr. *trapezoïde*, Fr.)

1. In anatomy, a small bone of the wrist, placed in the same row with the trapezium.
2. An irregular solid figure, whose four sides are not parallel.

**TRAPEZOÏDAL.** In mineralogy, when the surface is composed of twenty-four trapeziums, all equal and similar.

**TRAUMATE.** (from *θραῦσμα*, Gr. a fragment.) The name given by the French geologists to grauwacke, a term about as euphonious as that they have substituted it for.

**TRAVERTIN.** An Italian name for a concretionary limestone or calcareous precipitate, deposited by water holding in solution a considerable quantity of carbonate of lime. The water parting with some of its carbonic acid gas, which rises in bubbles to the surface, the lime becomes deposited. In Italy, immense masses of travertin are being constantly formed from waters copiously charged with carbonate of lime. At the baths of San Filippo a manufactory of medallions in *basso-relievo* is carried on. The water is first conducted into pits, where it frees

itself from its grosser parts; it is then conducted by a tube to the top of a small chamber, and made to fall through a space of ten or twelve feet in height. The stream is broken in its descent by means of numerous sticks placed across, by which the spray is dispersed upon moulds, which are slightly soaped, and the result is a cast of the figures formed in the mould, of a solid, marble-like substance. The waters of the lake of the Solfatara, between Rome and Tivoli, are so supersaturated with carbonic acid gas, that they appear in a constant state of ebullition; from the extrication of the gas. The Coliseum, and the majority of the public buildings of Rome, are composed of travertin.

**TREMOLITE.** (from *Tremola*, a valley of St. Gothard, where it was first found.)

A nearly white, grey, or bluish, variety of hornblende or hemiprismatic augite. It occurs in crystals, but most commonly in fibrous or radiated masses, composed of minute, imperfect prisms or fibres. There are several subvarieties of tremolite, namely, common tremolite, glassy tremolite, fibrous tremolite, and Baikalite. Tremolite is found almost exclusively in primary rocks, but it sometimes occurs in secondary. Specific gravity from 2.9 to 3.2. Hardness from 5.0 to 6.0. Before the blow-pipe, tremolite fuses into a white glass, full of pores. Its constituents are siliceous, lime, magnesia, water and carbonic acid, and oxide of iron. Very differing analyses are, however, given by different chemists and mineralogists; some describe it as containing fluorid acid and alumina.

**TRIANDRIA.** (from *τρεις*, three, and *άνηρ*, a male, Gr.) The name of the third class in Linnæus' sexual system, consisting of plants with hermaphrodite flowers, having three stamens or male organs. This class is divided into three orders:—1. Monogynia. 2. Digynia. 3. Trigynia.

**TRICAPSULAR.** A plant that has three capsules to each flower.

**TRICUSPIDATE.** Three-pointed.

**TRIDACNA.** A genus of subtransverse inequilateral, equivalve, marine, bivalves, belonging to Lamarck's family of Tridacnacea, and found both recent and fossil. Recent tridacnæ are found at depths varying to seven fathoms, moored by a byssus to rocks, and on coral reefs. The shells of this genus are exceedingly beautiful, being radiately ribbed, the ribs adorned with vaulted foliations, and waved at the margins. The hinge is formed of two compressed and entering teeth. One species, the *tridacna gigas*, is met with of immense size. Fossil shells of this genus

are very rare ; it is said some large specimens have been obtained from the neighbourhood of Verona.

TRIDACTYLOUS. Having three toes.

TRI'GONAL. (*trigonalis*, Lat.) Triangular ; three-cornered ; having three sides.

TRIGONE'LLITES. A genus of shells described, and thus named, by Mr. Parkinson. A slightly rounded, trigonal, thick shell, gaping on each side. The anterior margin nearly on a straight line ; the posterior in a gently waving, and the upper side in nearly a circular direction. The outer surface of each valve thickly pierced by foramina, which, passing nearly through its substance, give it the cancellous appearance of bone : the inner surface smooth, but marked with striæ, concentric with the upper margin. The hinge completely linear, without teeth ; there being only an appropriate surface on the anterior margin of each valve, for the attachment of the cartilage externally. Mr. Parkinson also observes, " this shell, which I have presumed thus to name and to dispose of, is exceedingly anomalous in every respect : it is of an extraordinary degree of thickness, being, in some specimens, full three-eighths of an inch thick, and even in young specimens, full one quarter of an inch thick."

In the supplementary notes attached to Prof. Buckland's *Bridgewater Treatise* it is stated, " it is shown in a notice read by M. Voltz to the Natural History Society at Strasbourg, that the problematical fossils known by the name of *Aptychus*, *Trigonellites*, &c., which are sometimes found lodged in pairs within the first chamber of the ammonites, were opercula connected with the foot, or organ by which the animals inhabiting these shells moved along the bottom of the sea."

TRIGON'IA. } (from *τριγωνον*, triangular,  
TRI'GON. } Gr.) A genus of marine bivalves, found both fossil and living, belonging to the family *Ostracea*.

The *trigonia* is a triangular or suborbicular, inequilateral, equivalve, transverse bivalve. One valve has two oblong, flat, diverging, hinge teeth, transversely grooved on each side ; the other has four flat, oblong, diverging, hinge teeth, transversely grooved on one side only, disposed in pairs, receiving between their grooved sides the two hinge teeth of the opposite valve. Recent *trigoniæ* have hitherto been discovered near Australia only, in sandy mud. They are nearly related to the *cardium*, or *cockle*, the foot of the animal being bent, like that of the *cockle*, at an acute angle, so as,

upon pressure, to form a very elastic organ. The species found recent has been named *Trigonia Margaritacea*, or *pearl trigon*, from the pearly lustre of the inside of its shells.

Fossil *trigoniæ* differ considerably from the 'recent ; nine species have been described by Mr. Parkinson. Three species are mentioned by Dr. Mantell as occurring in the Shanklin sand. *Trigons* are also found in the *lias*, *oolite*, and tertiary formations.

TRILO'BATE. (from *tres*, three, and *lobus*, a lobe, Lat.) Divided into three lobes having three lobes.

TRILO'BITE. (So named from its being divided into three lobes or principal parts.) A family of fossil crustaceans, which appear to have become extinct at the close of the period during which the carboniferous series were formed, no traces of their remains having been discovered in strata of a more recent period. Twelve genera and fifty-two species have been described. For a long time, fossil trilobites were confounded with insects, under the name of *Entomolithus paradoxus* : several names have also been given to them, derived chiefly from the three lobular divisions by which they are so characteristically marked, as well as from their being found sometimes in a coiled, sometimes in an extended state. By Bromel, the trilobite was named *Lapis insectiferus* ; by Wolsterdorf, *Conchitus trilobus* ; by Hermann, *Pectunculites trilobus imbricatus* ; by Da Costa, *Pediculus marinus* ; by Linnæus, *Entomolithes paradoxus* ; by Baumur, *Trigonella striata* ; and by Wilke, *Entomolithus cancriformis marini*. The trilobite is often called the *Dudley fossil*, from its having been first noticed in the transition limestone near that town. Mr. Bakewell states that the largest species are found in the slate quarries at Angers, in France, and that he possesses a specimen from that place which measures seven inches in length. The following details are extracted from Prof. Buckland's very interesting and copious description of trilobites :—" The great extent to which trilobites are distributed over the surface of the globe, and their numerical abundance in the places where they have been discovered, are remarkable features in their history. They have been found throughout all northern Europe, and in numerous localities in North America, in the Andes, and at the Cape of Good Hope. The anterior segment of the trilobites is composed of a large semi-circular, or crescent-shaped shield, succeeded by a body composed of numerous segments folding over each other,

like those in the tail of a lobster, and generally divided by two longitudinal furrows into three ranges of lobes. The nearest approach among living animals to the external form of trilobites is that afforded by the genus *serolis*, in the class Crustacea."

**TRILÓCULAR.** (from *tres*, three, and *loculus*, a partition, Lat.) A term applied in botany to seed-vessels divided into three portions or cells.

**TRI'ONYX.** (*trionices*, pl.) A subgenus of *testudo*, belonging to the order Chelonia. The soft-shelled tortoise. Two species are mentioned, namely, *Ægyptiacus* and *ferox*: the latter, or *Trionyx ferox*, will attack, and master, aquatic birds. The soft-shelled tortoises have no scales, the shell and sternum being merely enveloped in a soft skin; many of the pieces that are bony in the tortoise being replaced by a simple cartilage or membrane. Fossil remains of *trionices* are found in fresh-water Wealden formations of the secondary series: one species, named *Trionyx Bakewelli*, is described by Dr. Mantell, as occurring in Hastings beds. Remains also are abundantly found in the lacustrine deposits of the tertiary formations.

**TRI'POLI.** An admixture of silex and clay. It has obtained its name from having been originally brought from Tripoli, in Barbary. It is a mineral of a dull argillaceous appearance, occurring usually in friable or earthy masses. Its powder is fine, but dry and rough to the touch, and sufficiently hard to scratch metals, glass, &c. It is employed for the polishing of metals and stones. Rotten-stone and polishing-slate, the *Polierschiefer* of Werner, appear to be varieties of Tripoli.

**TRISE'PALOUS.** (from *tres*, three, and *sepal*.) A term used in botany for a calyx that has three sepals.

**TRI'TON.** A genus of the molluscous order of Nudibranchiata, inhabiting an oblong, thick, ribbed, or tuberculated spiral shell. The body is oblong; mouth with an involute spiral proboscis; tentacula twelve, six on either side, divided nearly to the base, the hind one cheliferous.

**TROCHÍTA.** A detached vertebra of a radiated animal. When several trochitæ are united, so as to form part of a column, the series is termed an entrochite.

**TRO'CHUS.** (*trochus*, Lat. a top.) A genus of conical, spiral, thick, striated, marine, univalves, found both fossil and recent. The animal is a *Limax*; aperture transversely depressed, and somewhat quadrangular; columella oblique; operculum horny, with numerous whorls.

Recent trochi are found in the ocean at depths varying to forty-five fathoms; they most commonly, however, are met with near the shore, creeping on rocks, sands, and gravel. One hundred and thirty-three species are described in Turton's Linné. Lamarck has separated from the genus *trochus* of Linnæus certain shells possessing peculiar characters, which he has arranged under two new genera, namely, *Solarium* and *Monodonta*. These genera, as well as *trochus*, are comprised in the family *Turbineacea*.

Of fossil trochi, Dr. Mantell enumerates six species as occurring among the Sussex fossils. One species in diluvium, one in the London clay, one in the chalk, two in the chalk-marl, and two in the upper green-sand. Very large casts of trochi are found in Oxfordshire, Gloucestershire, and Somersetshire.

**TRO'PHI.** The name given by Kirby and Spence to the elementary parts which enter into the composition of the mouth of an insect.

**TRUN'CATED.** (*truncatus*, Lat.) Cut off; shortened.

**TRUNCA'TION.** A term used in mineralogy, implying that a segment is cut off or separated from the predominant form. The term may be applied either to an edge, or a solid angle of a crystal, and will leave a face more or less large in place of the edge or angle. A truncation is said to be oblique, when the face does not make equal angles with all the contiguous faces.—*Cleveland*.

**TUBE.** (*tubus*, Lat. *tube*, Fr. *tubo*, It.) A pipe; a siphon. In botany, the round hollow part of a monopetalous flower.

**TU'BER.** In botany, a fleshy irregular stem produced under ground, and distinguished from a root by its having eyes or buds, which the true root never possesses: the potatoe is a familiar example.

**TU'BEROUS.** (*tubereus*, Fr. *tuberoso*, It.) Having prominent knots or excrescences.

**TUBICINE'LLA.** (from *tubicen*, Lat. a trumpeter.) A genus of multivalve tubular shells, not spiral. *Tubicinella* is placed by Lamarck in the order *Sessile cirripedes*. The tube is cylindrical, and composed of six elongated valves, laterally united. The aperture circular, with a four-valved operculum. *Tubicinellæ* are not described as occurring fossil; the recent are found imbedded in the blubber of whales.

**TUBI'COLA.** (from *tubus*, a tube, and *cola*, an inhabitant, Lat.) An order of *Articulata*, comprising *Serpula*, *Sabella*, *Terebella*, *Amphitrite*, *Syphostoma*, and *Dentalium*.

**TUBIPORA.** } Organ-pipe coral, consisting  
**TUBIPORE.** } of tubes of a stony substance, each containing a polype. A genus of corals or zoophytes belonging to the class Polypifera; subgenus Cyclo-neura, or Radiata. There are several species. In one species, Tubipora musica, the tubes are placed parallel to each other, like the pipes of an organ, with transverse partitions at regular intervals: in another species, Sertularia, the tubes are joined together endwise, like the branches of a tree, leaving lateral apertures for the protrusion of the tentacula of each separate polype. Tubipores are found among the earliest traces of organic bodies in the ancient strata.

**TUBIPORITE.** A fossil tubipore. Many marbles and pebbles are beautifully marked by the sections of the inclosed tubipores. One very remarkable form is found in the Dudley limestone, the tubes, which are oval, being arranged in undulating lines; from its reticulated appearance it has obtained the name of chain coral. The pebbles gathered upon the coast of Sussex frequently display beautiful specimens of tubiporæ: these are cut, polished, and formed into ornamental articles.

**TUBIPORITIC.** Containing tubiporæ; as tubiporitic marble, &c.

**TUBULAR.** In the shape of a hollow tube. In botany, applied to the florets of a compound flower, when they form a cylindrical tube, and are five-cleft.

**TUBULARIA.** (from *tubulus*, a hollow pipe, Lat.) A genus of corals belonging to the class Polypifera. Simple or branched tubes of a horny substance, each tube containing a polype. Tubulariæ are both fresh-water and marine. Some species of this genus establish themselves in the fissures of rocks, which serve them instead of a shell to protect the membranous tubes into which they retract their petaliform tentacles. Of this kind is the *Tubularia magna* of Shaw; found in the rocks of the coast of Jamaica.

**TUBULARII.** (*tubularius*, Lat.) A family of the order Coralliferi, class Polypi. The tubularii inhabit tubes of which the common gelatinous body traverses the axis, like the medulla of a tree, the tubes being open, either at their sides or summits, to allow the passage of the polypi.—*Dr. McMurtrie.*

**TUFA.** (*tuf*, Fr. *tufa*, It.) An earthy precipitate deposited from water. See *Calcareous Tufa.*

**TUFF.** } A name applied to se-  
**TUFA, VOLCA'NIC.** } veral different substances the production of volcanic eruptions. Generally, an aggregate of sand,

volcanic ashes, and fragments of scoria and lava, united by an argillaceous or muddy cement. Sometimes it is composed of volcanic ashes and sand, transported and deposited by rain water.

Tuff, or volcanic tufa, as distinguished from calcareous tufa, presents various shades of grey, brown, red, yellow, &c. or it is sometimes spotted. Hardness moderate; fracture dull and earthy.

**TUFA'CEOUS.** Having the appearance or texture of tufa.

**TUNGSTEN.** (from *tung*, heavy, and *sten*, stone, Dan.)

1. A greyish white metal, brittle, and very hard. Specific gravity 17·4. Fusible in the most intense heat only, its infusibility equalling that of platinum. It has been obtained only in the form of grains of extreme hardness. It was discovered by Scheele, and by Werner has been named Scheel; by Häuy, Scheelin.

2. A mineral, of a grey or yellowish-grey colour, occurring in Bohemia, Sweden, and Cornwall, massive and disseminated. Its external lustre is shining and splendid; internal lustre shining and resinous. Specific gravity from 5·57 to 6·06. It can be scratched with a knife, and is easily broken. It is infusible, but before the blow-pipe it becomes opaque, and decrepitates. By digestion in nitric acid it is converted into a yellow powder, which is the oxide of tungsten. It consists of oxide of tungsten 77·75, lime 17·60, silice 3·00, according to Klaproth: Berzelius gives its analysis as consisting of oxide of tungsten 80·24, lime 19·40. It is the Scheelin calcaire of Häuy and Brongniart; the schweinstein of Werner; the tungsten of Kirwan.

**TUNICARIES.** A class of acephalous molluscs in Lamarck's arrangement. The Rev. W. Kirby says, "the characters of the class may be thus stated: animal either gelatinous or leathery, covered by a double tunic, or envelope. The external one, analogous to the shell of molluscs, distinctly organized, provided with two apertures; the interior envelope, analogous to their mantle, provided also with two apertures, the one oral, the other anal, adhering to those of the outer one. Body oblong, irregular, divided interiorly into many cavities, without a head; gills occupying, entirely or in part, the surface of a cavity within the mantle; mouth placed towards the bottom of the respiratory cavity between the gills; alimentary tube, open at both ends; a ganglion, sending nerves to the mouth and anus. These animals are found both simple and aggregate, fixed or floating."—*Bridgw. Treat.*

**TUNICA'TA.** (*tunicatus*, coated, Lat.) The

tunicated animals have no external shell nor internal solid parts, but are covered with a tough, elastic, homogeneous tunic, in the form of an enveloping sac, with a respiratory and an anal orifice. This exterior sac is the analogue of the valves of conchifera, and has the muscular fibres of the lining mantle inserted into its inner surface. The word is synonymous with tunicaries.

**TU'NICATED.** Covered with one or more tunics or membranes.

**TU'RBINATED.** (*turbiné*, Fr. *turbinatus*, from *turbo*, a top, Lat.) Of a spiral oblong form; in conchology, applied to shells, broad at the base, and becoming gradually narrower till they are pointed at the apex.

**TU'RBINATED BONES.** Two bones of the nostrils. These are curiously folded, and often convoluted in a spiral form.

**TU'RBO.** (*turbo*, a top, Lat.) Plural, *turbines*. A genus of marine univalves, found on rocks and sea-weeds at depths varying to ten fathoms. The genus *turbo* is placed by Cuvier in the family Trochoida, and by Lamarck, in the family Turbinacea. The *turbo* of Linnæus comprises all the species with a completely and regularly turbinated shell and a perfectly round aperture.

The *turbo* is a conoidal or slightly turreted shell, the aperture complete, rounded, and not toothed; the margins disjoined in the upper part; the columella smoothed at the base. In Turton's Linné one hundred and fifty-one species of turbinæ are described, sixty-nine of which are indigenous to Britain. Four species of turbinæ have been described as found fossil.

**TU'RKOIS.** } (*turquoise*, Fr.) A gem of  
**TU'RQUOISE.** } a blue or greenish colour,

and opaque, found in roundish masses, from the size of a pea to that of an egg. The finest specimens are brought from Persia, where they occur in small veins in slate-clay.

**TU'RRILITE.** (from *turris*, a tower, Lat. and *λίθος*, a stone, Gr.) A spiral, turriculated, multilocular shell; the turns contiguous and all visible. The chambers divided by sinuous septa, pierced by a siphuncle in their disks. The mouth round. The shells of this genus abound in the chalk marl, gault, and Shanklin sand. They are extremely thin, and their exterior is adorned and strengthened with ribs and tubercles. The outer chamber, which contained the animal, is large. Professor Buckland states that turritiles do not appear until the commencement of the cretaceous formations, and that having thus suddenly appeared, they become as suddenly extinct at the same period with the ammonites.

**TURRITE'LLA.** A genus of turreted, elongated, marine univalves, of the family Turbinacea, found both recent and fossil. Turritellæ are commonly known by the name of screw-shells. Recent turritellæ are found in sandy mud, at depths varying from five to twenty fathoms. Fossil turritellæ are found in the tertiary deposits. Dr. Mantell enumerates four species as occurring in the London clay of Sussex, and Lamarck mentions ten species as discovered among the fossils of Grignon, &c.

**TY'MPAN.** } (*tympanum*, Lat. *τύμπανον*,  
**TY'MPANUM.** } Gr. *tympan*, Fr. *timpano*,  
It.) A cavity or chamber of the ear. It is sometimes also applied to a membrane that stretches across the cavity of the ear, called also the drum of the ear.

## U

**UL'NA.** (*ulna*, Lat. from *ὠλένη*, Gr.) The cubit or large bone of the fore-arm. The two bones that form the fore-arm, or that portion of the upper extremity situated between the elbow and the wrist, are the radius and ulna; of these the ulna is the larger.

**U'LNAR.** Pertaining to the ulna.

**ULTRAMARI'NE.** Azure stone; lapis lazuli. A pigment remarkable for the durability of its colour. For a description see *Lapis Lazuli*.

**U'MBEL.** (*umbella*, Lat.) In botany, a peculiar form of inflorescence: an umbel consists of several flower-stalks or rays, nearly equal in length, which spread from one common centre, and the summits of

which form a regular surface, either level, convex, or globular; sometimes, but rarely, concave. An umbel is either simple or compound: a simple umbel has the stalks springing from the same part of the principal one, and each bears but one flower. A compound umbel has each ray or stalk terminating in another set of rays; the carrot, parsnip, parsley, &c. furnish familiar examples of compound umbels.

**UMBELLA'TA.** (from *umbella*, Lat.) The name given to the partial or smaller umbel of a compound umbel.

**U'MBELLATED.** Having umbels; bearing umbels; in the form of an umbel.

**UMBELLA'TÆ.** One of Linnæus' natural classes or orders of plants. The um-

- bellatæ are plants whose flowers grow in umbels, with five petals, and two naked seeds joined at top and separated below. The parsley, fennel, &c. are examples.
- UMBELLI'FERÆ.** A large order of plants characterized by their flowers being in umbels. Calyx entire or five-toothed. Petals five, usually inflexed at the point. Stamens five, alternate with the petals. Ovary two-celled. Fruit consisting of two carpels, separable from a common axis. Seed pendulous. Herbaceous plants with fistular stems.
- UMBI'LICATED.** (*umbilicatus*, Lat.) In conchology, a term applied to such shells as have a depression in the centre like a navel. Univalves that have the umbilicus covered in a greater or less degree by a thin process, are termed sub-umbilicated.
- UMBILI'CUS.** (*umbilicus*, Lat.) The navel. In conchology, a circular perforation in the base of the lower whorl, or body, of many spiral univalves, and common to most of the Trochi, in some of which it runs from the base to the apex.
- UMBO.** (*umbo*, Lat.) A boss or protuberance. In conchology, that point of a bivalve shell situated immediately above the hinge. This word makes *umbones* in the plural.
- UMBONATED.** Bossed; knobbed in the centre.
- UNCONFO'RMABLE.** In geology, a term applied to a stratum or strata lying in a different plane from the subjacent strata upon which they rest. Strata not lying parallel with those beneath them. Supposing certain strata to have been upheaved, so that their inclination is at an angle with the horizon, or even vertical, such strata may all be, notwithstanding, conformable one with another; if, however, upon these tilted strata, fresh strata be deposited, the more recent strata lying horizontally upon the subjacent vertical or inclined strata, then the superjacent strata are termed *unconformable*.
- UNCONFO'RMABLY.** Not being in the same plane with those upon which they are deposited. Strata lie unconformably when placed upon others having a different line of direction or inclination.
- UNCTUO'SITY.** Greasiness. A character belonging to certain minerals, which is very useful in assisting to distinguish them. Some minerals, when the finger is passed over their surface, or their powder is rubbed between the finger and thumb, feel as if they were coated with some greasy matter. The sensation is different from that produced by mere smoothness of surface.
- UNDATED.** (*undatus*, Lat. from *unda*, a wave.) Waved; having a waved surface.
- UNDULATED.** (*undulatus*, Lat. from *undula*, a little wave.) Waved; having a waved surface. In botany, applied to leaves when the margins are waved obtusely up and down.
- UNFA'THOMABLE.** Of a depth that cannot be ascertained; that cannot be sounded, or the depth of which cannot be discovered, by a lead and line.
- UNGUAL.** (from *unguis*, a nail or claw, Lat.) A name applied to such bones of the feet as have attached to them a nail, claw, or hoof.
- UNGUICAL.** The name given to the claw-bone of certain animals.
- UNGUICULATED.** Clawed; possessing claws.
- UNGULATE.** (from *ungula*, a hoof, Lat.) Shaped like the hoof of a horse.
- UNICA'PSULAR.** (from *unus*, one, and *capsula*, a capsule, Lat.) Having one capsule only to each flower.
- UNILO'CLAR.** (from *unus*, one, and *loculus*, a cell or partition.) Having one chamber or cell only. In conchology, applied to shells which are not divided by septa into chambers. In botany, applied to seed vessels not separated into cells.
- UNIO.** (*unio*, Lat. a pearl.) A genus of freshwater bivalve shells, placed by Lamarck in the family Nayades, and by Cuvier in the family Mytilacea. Uniones are equivalent, inequilateral, transverse, internally pearly, externally covered with an epidermis, bivalves; they are commonly called fresh-water muscles. Mr. Parkinson states that uniones are not known in a fossil state; Dr. Mantell, however, mentions five species as being found in the strata of Tilgate Forest, namely, *Unio aduncus*, *U. antiquus*, *U. porrectus*, *U. compressus*, and *U. cordiformis*. Of these he states *Unio antiquus* to be the most abundant.
- UNIPA'ROUS.** (from *unus*, one, and *pario*, to produce, or bring forth, Lat.) Producing one only at a birth.
- UNIVALVE.** (from *unus*, one, and *valva*, a shell, Lat.) A shell which is complete in one piece. The Linnæan arrangement of shells consists of three orders, namely, multivalves, bivalves, and univalves. Univalves are far more numerous than either multivalves or bivalves, both in genera and species. Univalves are divided into sections; those having a spire, called also turbinated shells, and those without a spire. Some conchologists have named those spiral univalves having an operculum, sub-bivalve shells.
- UNIVA'LVULAR.** Having but one shell or valve.
- UNMA'LEABLE.** That cannot be extended by hammering; that cannot be hammered out into plates or laminæ.

**UNO'RGANIZED.** Having no parts instrumental to the motion or nourishment of the rest.

**UNO'XIDATED.** } Not converted into an  
**UNO'XIDISED.** } oxide by combination with oxygen.

**UNOXY'GENATED.** Not combined with oxygen.

**UNSTRA'TIFIED.** A term applied to rocks that are not stratified, or not arranged in strata. Mr. De La Beche observes, "the terms stratified and unstratified have been commonly considered as respectively synonymous with aqueous and igneous. Practically, this division is highly valuable; but theoretically, it is not so satisfactory, at least, if we are to infer that all rocks divided into tabular masses, one resting on another, must have been deposited either chemically or mechanically from water. We should be careful not to couple too far stratification with aqueous deposition, as sheets of igneous rocks may cover pre-existing sheets of similar rocks, and the result be stratification."

**UPHEA'VED.** Lifted up by some expansive or elevating power from below.

**U'PPER TE'RTIARY STRA'TA.** These strata are considered to be of more recent origin than those usually denominated tertiary, and, by some geologists, have been termed quaternary. They are supposed to be of more recent origin than any of the strata

composing the formations of the London and Paris basins.

**U'RANITE.** An ore of Uranium of a black or green colour, called also Pechblende.

**URA'NIUM.** (Thus named by Klaproth, who discovered it in 1789.) A metallic substance of a grey colour, obtained with great difficulty from a mineral called pechblende. It is infusible. Specific gravity 9.0. It is found in Saxony and Cornwall. It imparts a deep orange colour to the enamel of porcelain. Little however is known of its properties, nor is it much used, in consequence of the extreme difficulty that exists in obtaining it.

**U'RCEOLATE.** (from *urceolus*, Lat. a water-pitcher.)

1. In conchology, a term applied to a shell that swells in the middle, and is therefore supposed to bear a resemblance to a water-pitcher.

2. In botany, applied to a calyx or corolla swelling out like a pitcher.

**U'RCHIN.** (*erinceus*, Lat.) The hedgehog. The name of sea urchin has been given to the echinus.

**U'TRICLE.** (*utriculus*, Lat. a little bottle.)

In botany, a term applied to a species of capsule resembling a small bladder, or capsule of one cell, which never opens by valves, and drops with the seed. It is thin and transparent, and is more frequently considered to be the external coat of the seed than a real capsule.

V

**VA'GINATED.** (from *vagina*, a sheath, Lat.) A term used in botany, sheathed.

**VAGINOPE'NNOUS.** (from *vagina*, a sheath, and *penna*, a wing, Lat.) Sheath-winged; having the wings covered with hard cases.

**VAGINU'LA.** A genus of minute pyramidal shells, known only as fossils, and found in the tertiary strata near Bordeaux.

**VALVA'TA.** A genus of small freshwater univalves belonging to the family Peristomata. Valvatæ are found both recent and fossil. Dr. Mantell mentions one species, *Valvata piscinalis*, as occurring in the alluvial deposits of Sussex.

**VALVE.** (*valva*, Lat. *valve*, Fr. *valva*, It.)

1. In conchology, the shell. When the whole shell of the animal is in one piece, it is called an univalve; when there are two shells, or the shelly covering consists of two pieces, as in the oyster, muscle, &c., they are called bivalves; and when the covering consists of more than two pieces, multivalves.

2. In anatomy, a folding door or lid attached to a hollow vessel by means of a

hinge, which allows the valve to open in one direction only for the passage of fluids, and prevents their retrograde motion, or regurgitation. Thus there are valves in the heart; valves in the veins; valves in the lymphatics, &c.

**VANA'DIUM.** A metal recently discovered in Sweden, and thus named after Vanadis, a Scandinavian deity. Its properties are not yet known.

**VARIETY.** (*varietas*, Lat. *variété*, Fr. *variété*, It.) A subdivision of species, arising from accidental, or unimportant and trifling, differences.

**VARI'OLITE.** (from *variola*, Lat.) The name given to an amygdaloidal or porphyritic rock, merely in consequence of its spotted appearance.

**VAS'CLULAR.** (from *vasculum*, Lat. a little vessel; *vasculaire*, Fr.) Containing vessels or tubes; full of vessels within which the fluids are confined, and by which their course and their velocity are regulated.

**VE'GETABLES.** The first appearance of vegetable existence may be discovered in

the transition slate, which contains impressions of algæ or sea-weeds. A few fronds of ferns have been found in some of the transition rocks. "It appears," says Prof. Buckland, "that nearly at the same points in the progress of stratification, where the most striking changes take place in the remains of animal life, there are found also concurrent changes in the character of fossil vegetables."

VEIN. (*vena*, Lat. *veine*, Fr. *vena*, It.)

1. In anatomy, elastic tubes pervading every part of the body, and conveying dark or venous blood from the arteries to the heart. The veins are larger and more numerous than the arteries, and may be compared to rivers, which, collecting all the water that is not imbibed by the soil, and reconveying it into its general receptacle, the ocean, perform an analogous office in the economy of nature.

2. In geology and mineralogy, fissures in rocks filled up by mineral or metallic substances differing from the rocks in which they are situated. Mineral repositories of a flat or a tabular shape, which in general traverse the strata of mountains, crossing the strata, and having a different direction from them, and filled with mineral matter differing from the nature of the rocks in which they occur. Mr. Bakewell, in his admirable work "Introduction to Geology," says, "perhaps the reader may obtain a clearer notion of a metallic vein, by first imagining a crack or fissure in the earth a foot or more in width, and extending east and west on the surface, many hundred yards. Suppose the crack or fissure to descend to an unknown depth, not in a perpendicular direction, but sloping a little to the north or south. Now, let us again suppose each side of the fissure to become coated with mineral matter of a different kind from the rocks of which the fissure is made, and then the whole fissure to be filled by successive layers of various metallic and mineral substances; we shall thus have a type of a metallic vein. Its course from east to west is called its *direction*, and the dip from the perpendicular line of descent its *hading*. Thus it is said to *hade* or dip to the north or south."

Veins appear to have been originally fissures cutting through different beds of rocks, that have been subsequently filled with metallic ores, intermixed with other mineral matter, of a different nature from that of the rock which is intersected. Metallic veins are generally of a more recent formation than the rocks they intersect. They occur principally in the primary and transition rocks, but they are also found in the lowest of the secondary series.

As regards the geographical distribution of mineral veins, it is an established fact, that while extensive plain countries are totally destitute of them, there are few mountainous districts in which they are not abundantly found. It has been very generally observed that the character of metalliferous veins changes with the structure of the rock through which they pass. It is not necessary that there should be an absolute difference of rock, such as from slate to granite: a change in the hardness and general mineralogical structure of the same system of rocks will frequently cause alterations of the vein sufficiently remarkable. Among the best conditions for expecting to find fissures filled not only with an abundance of metals, but also with kinds most useful to a civilized state of society, is the proximity of some mass of granite, porphyry, green-stone, or rocks of that class, to stratified rocks, such as slates and others.

The depth to which metallic veins descend is not known, all large veins continuing beyond the reach of the deepest mine. The expense of working them beyond a certain depth rendering it unprofitable, and the influx of water impossible, to proceed. They frequently contain totally different ores at different depths.

Veins vary in width from less than an inch to thirty feet and upwards; sometimes the same vein at one part contracting, so as to be almost lost, and then expanding to an immense width. This, however, is not always the case, some veins continuing of nearly the same width throughout.

Werner supposed that veins had become filled by matter descending into them from above, in a state of aqueous solution: Hutton, on the other hand, imagined that their contents were injected from below, in a state of igneous fusion. A third hypothesis refers the filling of veins to a process of sublimation from subjacent matters of intensely heated mineral matter, into apertures and fissures of the superincumbent rocks. A fourth hypothesis attributes these metallic collections to segregation, or infiltration. Professor Buckland, in his wonted delightful style, says, "Whatever may have been the means whereby veins were charged with their precious contents; whether segregation or sublimation were the exclusive method by which the metals were accumulated; or, whether each of the supposed causes may have operated simultaneously or consecutively in their production; the existence of these veins remains a fact of the highest importance to the human race: and although

the disturbances, and other processes in which they originated, may have taken place at periods long antecedent to the creation of our species, we may reasonably infer, that a provision for the comfort and convenience of the last, and most perfect creatures He was about to place upon its surface, was in the providential contemplation of the Creator, in His primary disposal of the physical forces, which have caused some of the earliest and most violent perturbations of the globe."

**VEINED.** Variegated; streaked; marked with lines, either parallel to, or intersecting, each other.

**VEIN-STONE.** The earthy, stony, saline, or combustible substance, which contains the ore, or is mingled with it, without being chemically combined, is called the gangue, or *vein-stone*.

**VENA CAVA.** A large vein which transmits the blood from the extremities to the heart. There are two *venæ cavæ*; the superior or descending, which conveys the returning blood of the head, neck, superior extremities, and part of the thorax; and the ascending, which returns the blood of the lower extremities, abdominal viscera, &c. These two great veins pour their accumulated torrent of blood into the general reservoir, the heart.

**VENERICARDIA.** A genus of equivalved, inequilateral, marine, oblong bivalves; ribbed longitudinally on the outside; two thick hinge-teeth disposed obliquely, and in the same direction: muscular impressions two. *Venericardiæ* are found recent and fossil. The recent are met with at depths of the ocean varying to fifty fathoms in mud and sands. Fossil *venericardiæ* are found in the secondary and tertiary formations. Dr. Mantell enumerates several species as occurring among the fossils of the Sussex strata; *Venericardia planicosta*, and *V. acuticosta*, in the London clay; *V. Brongniarti* in the Bognor sandstone; and one species in the chalk marl. Mr. Parkinson states that the most beautiful species of this genus is *V. planicosta*, a remarkably thick shell, obliquely cordated, with flat smooth longitudinal ribs: one specimen in his possession measured four inches and a half.

**VENTRICLE.** (from *ventriculus*, Lat. *ventricule*, Fr.) A chamber or cavity; the stomach. A term applied to different cavities of the body. The heart contains two chambers distinguished as the right and left ventricles, as well as two others, termed auricles. Certain cavities found in the brain are also called ventricles.

**VENTRICOSE.** } 1. In botany, applied to  
**VENTRICOUS.** } parts of plants which are

distended, bellied, or swelling out in the middle.

2. In conchology, applied to shells, inflated, or swelling in the middle.

**VENTRICULITE.** A zoophyte found fossil in flints and in the chalk. Dr. Mantell has fully described different species of ventriculites in his *Geology of the South-East of England*, and from that work, and from his *Wonders of Geology*, I have made the following extracts. The ventriculite, when living, must have been of a cyathiform figure, and composed of a tough, jelly-like substance, capable of expansion and contraction. The smaller extremity was attached to the rock by root-like processes; the outer tissue consisted of a net work of cylindrical, perhaps tubular, fibres; the inner surface of the funnel-like cavity was studded with poly-piferous cells or openings. The specimens enveloped in flint are usually of a cyathiform or turbinated shape, while those imbedded in chalk are more frequently expanded into a broad circular disk. When contracted into a cylindrical form, the ventriculite is from one to six inches in length; when expanded, its diameter generally exceeds nine inches: the thickness of its substance is rarely more than 0·2 inch.

Whether the recent ventriculites were stationary, being confined to one spot by their radical processes, or possessed a power of locomotion, cannot be positively ascertained; but Dr. Mantell considers it more probable that, like the *alcyonia* and *actinæ*, they were permanently attached to the rock on which they grew.

**VENUS.** (from *Venus*, the goddess of beauty.) A genus of exceedingly beautiful marine bivalves. Equivalve, inequilateral, subglobose, transverse shells, the frontal margin flattened, with incumbent lips; hinge with three teeth, all of them approximate, the lateral ones divergent at the tip. The middle tooth, which is sometimes bifid, is placed straight, and the one on each side obliquely. The shells of this genus have only been known to inhabit the ocean; they are found at depths varying to fifty fathoms, lurking in mud and coarse sands. Some of the shells are of the most elegant and beautifully diversified description, being rugose, striated, and ribbed. Twenty-five species have been discovered in the seas of our coasts. Lamarck enumerates six fossil species which are found in the neighbourhood of Paris, and Dr. Mantell, five species as occurring in the Sussex beds, namely, *Venus Ringmeriensis* in the chalk marl, and four species, *V. parva*, *V. angulata*, *V. Faba*, and *V. ovalis*, in the Shanklin sand.

Cuvier places Venus in the family Cardacea. The common clam is a true Venus.

**VERDE-ANTI'QUE.** A very beautiful marble, highly prized, and used for ornamental purposes. It is an aggregate of serpentine and white crystallized marble, irregularly mingled.

**VERRUCOSE.** } (*verrucosus*, full of warts,  
**VERRUCOUS.** } from *verruca*, Lat.)

1. In entomology, applied to the surface of insects, when studded with large smooth elevations, resembling warts.

2. In conchology, applied to shells beset with excrescences resembling warts.

3. In botany, applied to the surface of stems, beset with hard tubercles or warts.

**VERTEBER.** } (*vertebra*, Lat. from *verto*, to  
**VERTEBRA.** } turn; *vertèbre*, Fr.) A

bone of the spinal column, or back-bone. The different vertebræ composing the back-bone are distinguished into cervical, dorsal, and lumbar. The vertebral column or spine, from the constancy with which it has been found in all animals of this type, and from the uniformity of plan with which, amidst endless variations, it is modelled, has been chosen as the distinctive character of all that great assemblage of individuals denominated Vertebrata. In man the number of vertebræ is twenty-four, namely, seven cervical, twelve dorsal, and five lumbar. In different animals the number of vertebræ varies exceedingly; the vertebral column of the Ichthyosaurus consisted of more than one hundred joints. The cervical vertebræ alone of the Plesiosaurus were about thirty-three in number. In birds the number varies from nine to twenty-three, and in living reptiles from three to eight. In the Mososaurus, the whole number of vertebræ amounted to one hundred and thirty-three.

**VERTEBRATA.** The whole animal kingdom has been distributed into four great divisions, namely, Vertebrata, Mollusca, Articulata, and Radiata. In the ascending series, the first of the true vertebrated animals is the class of Fishes; then follows Amphibia, comprehending the various forms of frogs, toads, and tritons; the third class is the reptiles. These three classes are all cold-blooded. The fourth class comprises the birds; these form the first class in the ascending series of hot-blooded animals; the fifth, or highest class, comprehends Mammalia, and includes man.

**VERTEBRATED.** (*vertebratus*, Lat.) Possessing an osseous spinal column.

**VERTEX.** (*vertex*, Lat.) The crown, or top of the head; the summit. In conchology, in some shells the most prominent part, in others the apex.

**VERTICAL.** (*vertical*, Fr. *verticale*, It.) In a direction perpendicular to the plane of the horizon.

**VERTICIL.** (*verticillum*, Lat. a whirl.)

In botany, a little whorl; thus when, instead of two opposite leaves, three or more are produced from points forming a ring on the stem, such ring is termed a verticil.

**VERTICILLATE.** } (*verticillatus*, Lat. *ver-*  
**VERTICILLATED.** } *ticillé*, Fr.) Whorled;

growing in rings or whorls. Leaves produced from three or more points, forming a ring on the stem, are called verticillate leaves. Verticillate leaves are considered as being produced by the non development of several adjacent internodia.

**VESICLE.** (*vesicula*, a little bladder, Lat. *vesicule*, Fr. *vesicichetta*, It.)

1. A small bladder filled with serum.

2. A small membranous cavity, either in animals or vegetables. The simplest and apparently the most elementary texture met with in vegetables is formed of exceedingly minute vesicles, the coats of which consist of transparent membranes of extreme tenuity. These vesicles vary from the one-thousandth to the thirtieth of an inch in diameter.

**VESICULAR.** Consisting of vesicles; containing vesicles; full of small cavities, hollows, or interstices.

**VESTIBULE.** (*vestibulum*, Lat.) The name given to a cavity of the internal ear.

**VESUVIAN.** (from *Vesuvius*.) The Idocrase of Haüy; the Vesuvienne of Brochant. Pyramidal garnet. A mineral of different shades of green, brown, red, and sometimes, though rarely, of a blue colour, occurring in granular distinct concretions, crystallized, and massive. The primitive form is a four-sided prism with square bases, and one side of the base is to the height nearly as 13 to 14; hence it differs but little from a cube, and is divisible into triangular prisms for the integrant particles. Haüy has described eight modifications of its primitive form. It is somewhat harder than quartz. Specific gravity from 3.2 to 3.4. It is often translucent, sometimes transparent, and sometimes nearly or quite opaque. It possesses double refraction. Fracture uneven, inclining to small conchoidal. Before the blow-pipe, it fuses easily into a yellowish translucent glass which afterwards becomes black. Its constituents vary, in some degree, according to the locality whence it has been obtained. Klaproth obtained from a specimen from the neighbourhood of Vesuvius, silice 35.50, lime 33.00, alumine 22.2, oxide of iron 7.50, oxide of manganese 0.25. It is found abundantly in the vicinity of Mount Vesuvius, from which circumstance it has

- obtained its name, and in primary rocks in Ireland, Scotland, and other parts of Europe.—*Cleaveland. Jameson.*
- VE'XIL. } ( *vexillum*, a standard, or  
 VEXI'LLUM. } banner, Lat.) In botany, the upper large petal of a papilionaceous flower.
- VIBRATILE ORGANS. See *Cilia.*
- VILLI. (from *villus*, a hair, Lat.)  
 1. In anatomy, fine small fibres, resembling a covering of down.  
 2. In botany, fine downy hairs, covering fruits, flowers, and plants.
- VILLOUS. (*villosus*, Lat.) Downy; pubescent; shaggy.
- VISCERA. The plural of viscus. See *Viscus.*
- VISCID. } (*viscidus*, Lat. *visqueux*, Fr.  
 VISCIOUS. } *viscoso*, It.) Glutinous; tenacious; clammy.
- VISCUS. (*viscus*, Lat.) In the plural, viscera; this term is generally applied to the organs connected with digestion; sometimes to the bowels only. Any organ of the body may be denominated a viscus.
- VITREOUS. (*vitreus*, Lat. *vitré*, Fr. *vitreo*, It.) Glassy; resembling glass.  
 1. In mineralogy, a term used to denote a particular lustre of some minerals.  
 2. In anatomy, a term applied to one of the humours of the eye. The *vitreous* humour occupies more than three-fourths of the globe of the eye; it is contained in an exceedingly delicate texture of cellular substance, and is situated behind the crystalline lens.
- VITRIFICATION. } (*vittrification*, Fr.) The  
 VITRIFICATION. } conversion of any matter into glass by the application or aid of heat.
- VITRIFIED. (*vittrifié*, Fr.) Converted into glass by heat.
- VITRIFY. (*vittrifier*, Fr. *vitrum*, glass, and *facio*, to make, Lat.) To convert into glass by the assistance of heat.
- VIVIANITE. The Vivianit of Werner; the Fer Phosphate of Haüy. Phosphate of iron. A mineral of a green or blue colour. Its constituents are, protoxide of iron 47·5, phosphoric acid 32·0, water 20·0.
- VIVIPAROUS. (*viviparus*, Lat. from *vivus*, alive, and *pario*, to bring forth; *vivipare*, Fr.) Animals are termed viviparous in which no egg, properly so called, is formed, but bring forth their young alive and perfect.
- VOLCANIC. Relating to volcanoes; produced by volcanoes.
- VOLCANIC PRODUCTIONS. These are numerous and diversified. Lava, scoria, enamel, and glass, comprise by far the most important and interesting volcanic productions. The different states of lava, whether vitreous, compact, or scoriaceous, depend on the different circumstances under which it has cooled. Aqueous vapour is in general very abundant. The principal gases hitherto detected consist, according to Dr. Daubeny, of muriatic acid gas, sulphur combined with oxygen or hydrogen, carbonic acid gas, and nitrogen. The sublimations of Vesuvius are, according to Sir H. Davy, chloride of sodium, chloride of iron, sulphate of soda, muriate and sulphate of potash, and a small quantity of oxide of copper. The principal metallic substances in volcanic rocks are iron and titanium; but ores of antimony, copper, and manganese, have sometimes been found in the craters of volcanoes. Tellurium, gold, and mercury are also said to occur in some volcanic rocks. The island of Ischia, which is entirely volcanic, contains a mine of gold.—*Bakewell. Cleaveland. Phillips.*
- VOLCANITE. Another name for augite.
- VOLCANO. (*volcan*, Fr. *volcano*, It. from Vulcan, the god of fire.) An opening in the earth's surface made by internal fire. Volcanoes exist in all quarters of the globe, and, according to Jameson, about one hundred and ninety-three active volcanoes have been observed; of which 13 belong to Europe and its islands,—66 to Asia and its islands,—8 to the islands of Africa,—and 106 to America and its islands. Volcanoes have been long considered in the light of safety valves, and this was the opinion entertained of them by Strabo, and it can scarcely be doubted that the tranquillity of the incandescent fluid mass, composing the earth's centre, is owing to these numerous vents for the passage of steam, &c. Although volcanoes generally exist in the neighbourhood of the sea, yet this is not invariably the case, as was once supposed. In central Asia there is a volcanic region with an area of 2500 square geographical miles, at a distance of upwards of 300 leagues from the ocean. Volcanoes frequently will remain in a quiescent state for many centuries, and again burst forth with renewed activity and vigour.
- VO'LVIA. (*volva*, Lat. that wherein a thing is wrapped.) In botany, a species of calyx. A term applied to a membranous wrapper or covering of the fungus tribe, which conceals their parts of fructification: in due time it bursts, and forms a ring upon the stalk.
- VOLV'ARIA. A genus of cylindrical convoluted shells known only in a fossil state. The spire is not extruded; aperture narrow, extending the length of the shell: the columella plicated at its base: outer lip dentated. *Volvaria* approaches very near to *Bulla cylindrica*.
- VOLU'TION. A spiral wreath or turn. The

wreaths or turnings of the shells of univalves are termed volutions.

**VO'LVOX.** (*volvox*, Lat. from *volvo*, to roll.) A genus of globular animalcules. To the presence of one species of volvox, the volvox globator, a loricated animalcule, and to its great abundance in such situations, pools of stagnant water owe their green colour.

**VULCANIST.** One who supports the Vulcanian theory, namely, that all rocks are of igneous production. The Vulcanists were

opposed to the Neptunians, who, on the other hand, maintained that all rocks were of aqueous origin.

**VULCANIAN THEORY.** That theory which explained the formation of all rocks by the agency of fire.

**VULPINITE.** A mineral of a greyish-white colour; thus named from its being found at Vulpino in Italy.

**VULVA.** (Lat.) In conchology, a spatulated mark in shells of the Venus tribe.

## W

**WACKE.** } A name given by the Germans  
**WACKE'.** } to a soft earthy basalt, to which it is nearly allied, and of which it may be deemed a variety. Its colours are greenish grey, sometimes passing into blackish green, brown, and greyish black, with sometimes a shade of yellow or red. It is invariably opaque. It occurs in amorphous masses, compact or vesicular. Fracture uneven, or slightly conchoidal. Hardness moderate. It is easily broken, and may be cut by a knife. Specific gravity from 2.5 to 2.8. Before the blow-pipe it fuses into an opaque, porous mass. It appears to be intermediate between clay and basalt, often passing into basalt. It does not adhere to the tongue, which circumstance distinguishes it from clay, nor will it form a paste with water. It does not, as does marl, effervesce with acids. Wacke is included among the trap rocks. When wacke, being vesicular, contains within its cavities calcedony, agates, &c. it forms a variety of amygdaloid. It is found more abundantly in Germany than in any other country, but it is not confined to Germany.

**WAD.** } Another name for plumbago, or  
**WADD.** } black-lead. See *Black Lead*.

**WADD BLACK.** An ore of manganese. A name given to the earthy manganese of Devonshire: it is a hydrate of manganese, and has the peculiar property of taking fire when dry, moderately heated, and mixed with linseed oil.

**WARM-BLOODED ANIMALS.** In the ascending series of the four great divisions of the animal kingdom, the highest, or vertebrata, alone contains what are called warm-blooded animals. Of this division, consisting of five classes, two classes only, namely aves, or birds, and mammalia, are warm-blooded; the remaining three are cold-blooded. In warm-blooded animals the circulation is two-fold, there being, in fact, two hearts, perfectly distinct from one another, and separated by thick partitions, which do not permit any direct

transmission of fluid from one to the other. These two hearts are joined together, and enclosed within one capsule or envelope. The following is the course of circulation in warm-blooded animals. From the left ventricle the blood is propelled into the aorta, the great artery of the body, to be by it forwarded into all the arterial ramifications of the whole system; from these arteries it passes on through the veins into the venæ cavæ, and by them is carried into the right auricle; from the right auricle it passes into the right ventricle, and by the right ventricle is propelled into the pulmonary arteries, to be conveyed through the lungs, in its passage through which it becomes aerated, loses its dark and assumes a florid colour, and is once more arterial blood; it then passes into the pulmonary veins, and is conveyed into the left auricle, whence it is forced into the left ventricle, and once more into the aorta.

**WART.** A hard excrescence; a protuberance.

**WARTY.** In botany, a term applied to the stems of trees when covered, or studded, with knobs or excrescences.

**WATER.** (*wasser*, Germ.) When pure, water is transparent, and destitute of colour, taste, and smell. The specific gravity of water is always supposed = 1.000, and it is made the measure of the specific gravity of all other bodies. When water is cooled down to 32° Fah. it assumes the form of ice. When heated to the temperature of 212° Fah. it boils, and is converted into steam. Pure water consists of two parts of hydrogen and one of oxygen.

**WATER OF CRYSTALLIZATION.** A variety of substances in crystallizing, combine chemically with a certain portion of water, which in a dry state forms an essential part of their crystals, and seems, in some cases, to give the peculiar determination to their constituent molecules.—*Mrs. Somerville.*

**WATER-WORN.** Worn away, rounded, smoothed, by the action of running water.

**WAVED.** Variegated; undated.

1. In botany, applied to the margins of leaves, when bordered alternately with numerous minute segments of circles and angles.

2. In entomology, applied to insects when the margin of the body is marked with a succession of arched incisions.

**WAVELLITE.** A rare mineral, first discovered in Devonshire by Dr. Wavell, and named after him. Its colours are either pure white or white tinged with grey, green, or yellow; lustre silky. Specific gravity from 2.25 to 2.70. It consists essentially of alumine, being composed of alumine 71.5, water 28.0, oxide of iron 0.5. Sometimes a trace of silice and lime is present.

**WEALD.** (from *wald*, Germ. a wood.) The name given to a valley, or tract of country, lying between the North and South Downs of Kent and Sussex.

**WEALD-CLAY.** A tenacious blue clay, containing subordinate beds of sandstone and shelly limestone, with layers of septaria of argillaceous ironstone, forming the subsoil of the wealds of Sussex and Kent, and separating the Shanklin sand from the central mass of the Hastings beds.—*Dr. Mantell's Geology of the South-east of England.*

**WEALDEN FORMATION.** } The term *Weal-*  
**WEALDEN STRATA.** } *den* was suggested, as the most appropriate that could be assigned to the strata of the Wealds of Kent and Sussex, by J. P. S. Martin, Esq. of Pulborough. The Wealden formation, group, or strata, have been separated into three principal divisions.

1. The Wealden clay, above described.

2. The Hastings sands: grey, white, yellow, and reddish brown sands, and friable sandstone, passing into limestone.

3. The Purbeck beds, called also Ashburnham beds, consisting of grey limestone, alternating with blue clay and sandstone shale. The whole of these are freshwater or fluviatile deposits. Dr. Mantell may be considered the great geological champion and hero of the Wealden, for to his indefatigable exertions in that field, are owing some of the most splendid discoveries in Palæontology. Until the appearance of Dr. Mantell's works on the Geology of Sussex, the peculiar relations of the sandstones and clays of the interior of Kent, Sussex, and Hampshire, were entirely misunderstood. No one supposed that these immense strata were altogether of a peculiar type, and interpolated amid the rest of the marine formations, as a local freshwater deposit.—*Prof. Phillips.*

It was not until the appearance of Dr.

Mantell's illustrations of the Geology of Sussex, that the full value of the evidence which this district affords was made to appear. In that excellent work the author clearly showed that the extraordinary remains which he had discovered in the beds of Tilgate Forest must have originated in a lake or estuary, and have been the produce of a climate much warmer than that which is now enjoyed in England.—*Dr. Fitton.*

To the indefatigable and scientific researches of Dr. Mantell we are indebted for a knowledge of the true geological characters of the Wealden beds.—*Mr. Bakewell.*

Dr. Mantell observes that the Wealden may be considered as covering an area 200 miles in length, from west to east, and 220 miles from north-west to south-east, the total thickness averaging about 2000 feet. Of this series of deposits, clays or argillaceous sediments, with limestone almost wholly composed of freshwater snail-shells, occupy the uppermost place; sand and sandstones, with shales and lignite, prevail in the middle; while in the lowermost, argillaceous beds, with shelly marbles or limestones, again appear; and, buried beneath the whole, is a petrified forest, in which the trees are still standing, and the vegetable mould undisturbed. The organic remains of the Wealden consist of leaves, stems, and branches of plants of a tropical character; bones of enormous reptiles of extinct genera, of crocodiles, turtles, flying reptiles, and birds; fishes of several genera and species, and shells of a fluviatile character. Not a vestige of the mammalia has been discovered in the Wealden. For a knowledge of that enormous reptile, the Iguanodon, we are entirely indebted to the indefatigable and scientific researches of Dr. Mantell; and for a most interesting and elaborate detail of all matters relating to the Wealden deposits and their contents, the reader is referred to Dr. Mantell's Geology of the South-east of England and his Wonders of Geology.

**WEDGE-SHAPED.** In botany, applied to leaves that are broad at the summit and gradually taper toward the base.

**WEIGHT OF THE ATMOSPHERE.** The air is an elastic fluid resisting pressure in every direction, and is subject to the law of gravitation. The pressure of the atmosphere is calculated to be about fifteen pounds to every square inch, so that the surface of the globe sustains a weight of 11,449,000,000 hundreds of millions of pounds.—*Mrs. Somerville.*

**WENLOCK FORMATION.** The lower formation of the upper Silurian rocks, compris-

- ing the Wenlock limestone and Wenlock shale.
- WENLOCK SLATE.** Called also Wenlock shale. An argillaceous, dark-grey or liver-coloured shale, constituting the lower member of the Wenlock formation, and containing nodules of sandstone.
- WERNERITE.** A rare mineral of a greenish-grey, olive-green, or, sometimes, white colour, occurring in eight-sided prisms, terminated by four-sided summits, whose faces form with the alternate lateral plates, on which they stand, an angle of about  $121^{\circ}$ . It is found at Arendal in Norway, and in Sweden and Switzerland. It has been named after Werner. It consists of silic 45.5, alumine 33.5, lime 13.22, oxide of iron 5.75, oxide of manganese 1.47.—*Cleveland.*
- WHEEL-SHAPED.** In botany, a term applied to a corolla of a salver-shaped form, having scarcely any tube.
- WHET SLATE.** } The Novaculite of  
**WHET-STONE SLATE.** } Kirwan; the  
 Wetz-Schiefer of Werner; the Schiste coticulé of Brongniart; the Argile schisteuse novaculaire of Haüy. For a description, see *Hone.*
- WHINSTONE.** A provincial term applied to some of the trap rocks.
- WHITE-STONE.** Felspathic granite, called by the French Eurite, and by Werner Weiss-stein. See *Eurite.*
- WHORL.** In conchology, a wreath, volution, or turn of the spire of a univalve; the axis of revolution is termed the columella, and the turns of the spiral are denominated whorls.
2. In botany, a species of inflorescence, in which the flowers surround the stem in the form of a ring; also applied to leaves, when they arise in a circle round the stem.
- WING.**
1. The limb of a bird or insect by the aid of which it is able to fly.
2. In botany, a membranous appendage to some seeds, serving to waft them along in the air: applied also to the two side petals of a papilionaceous corolla.
- WINGED.** Having wings. In botany, applied to stems, when the angles are extended into leafy borders; also to petioles having a leafy border on each side.
- WITHERITE.** (A mineral first discovered at Anglesark, in Lancashire, by Dr. Withering, and named in honour of him.) Carbonate of Barytes. The Baryte carbonatée of Haüy; the Witherit of Werner; the Barolite of Kirwan. See *Barolite.*
- WOLF.** (*wolf*, Germ.) The wolf affords an excellent illustration of the complete extinction of species. Wolves were formerly exceedingly numerous in Great Britain, and were met with in Ireland even so late as the beginning of the 18th century. At the present day, unless seen in a menagerie, or read of as still existing in other countries, and formerly in this, the natives of these islands might be perfectly unaware that the wolf ever had any existence. In our own days, as it were, the Dodo, a large bird, of the size of a turkey, a few years since only existing in great numbers in the Isle of France, has become extinct; a foot and a head, in the Museum at Oxford, being the only remains we possess, with the exception of fossil bones.
- WOLFRAM.** The name given by Werner to the ferruginous oxide of tungsten. Wolfram occurs in Germany, Sweden, France, Spain, and Great Britain. It is met with, generally accompanied by ores of tin, in primary and transition rocks. It is of a dark brown, brownish black, or nearly black colour. Specific gravity between 6.8 and 7.3. Texture foliated. Easily separated into plates by percussion. Hardness 6 to 8. Before the blow-pipe it decrepitates, but it is wholly infusible. It consists of oxide of tungsten 67.0, oxide of iron 18.0, oxide of manganese 6.25, silic 1.50.
- WOLLASTONITE.** A mineral, thus named in honour of Dr. Wollaston. Prismatic augite.
- WOOD-COAL.** Another name for brown coal. See *Brown Coal.*
- WOOD-OPAL.** Opalized wood. The Holzopal of Werner; the Quartz résinite xyloïde of Haüy; Ligniform opal of Kirman. A variety of opal, occurring in various vegetable forms, and being in reality opalized vegetable matter. It is found in Hungary.
- WOOD-STONE.** Another name for petrified wood.
- WOOD-PIN.** The Etain oxidé concretioné of Haüy; the Kornishches Zinnerz of Werner. A variety of oxide of tin; fibrous oxide of tin. This has been hitherto found only in Cornwall and Mexico. It occurs in fragments which are generally rounded. Its colours are light or chestnut brown, reddish brown, and yellowish grey. It is opaque; of a fibrous texture; easily broken. Specific gravity from 6.4 to 6.7. It is infusible before the blow-pipe, and irreducible. It consists of oxide of tin 91.0, oxide of iron 9.

## X

**XYLOPHAGI.** (from ξύλον, wood, φαγεῖν, to eat, Gr.) A family of coleopterous insects, comprising several genera.

**XI'PHIAS.** (ξίφιας, from ξίφος, a sword, Gr.) The sword-fish.

**XI'PHOID.** (from ξίφος, a sword, and εἶδος, form.) Resembling a sword: a term applied to the cartilage placed at the lower extremity of the sternum or breast-bone.

## Y

**YA'NOLITE.** The name given by Lametheric to the Axinite of Haüy and the Thummerstone of Kirwan. See *Axinite*.

**YE'NITE.** So named from Jena. Called also Lievrite. It is found in the Isle of Elba and in Norway. A mineral of a black or blackish-green colour, occurring crystallized and massive. It is opaque; scratches glass; gives sparks with steel. Specific gravity from 3·8 to 4. Longitudinal fracture foliated; cross fracture conchoidal or uneven: lustre resinous. Before the blow-pipe it fuses into a dull, opaque, black globule, strongly attracted by the magnet. It consists of silic 30·0, lime 12·5, oxide of iron 57·5.

**Y'TTRIA.** A name given by Ekeberg to a new earth discovered by Gadolin, in 1797,

in the quarry of Ytterby in Sweden. It has also been named Gadolinite, after Gadolin. See *Gadolinite*.

**Y'TTRIUM.** The name given by Ekeberg to a metal forming the basis of Yttria. In that mineral it is combined with the oxides of iron and manganese, and a small portion of lime, and silica. When separated from these substances, it has the appearance of a fine white powder, without either taste or smell. It is infusible, and is insoluble in water.

**YTROTANTALITE.** The name given by Brochant to Ittrious oxide of Columbium. Yttrotantalite, like Yttria, is found in the quarry of Ytterby in Sweden. It is of a dark grey colour; shining, metallic lustre; found in reniform masses.

## Z

**ZAFFRE.** An impure oxide of cobalt, obtained by roasting the ore of cobalt, by which process the arsenic and sulphur contained in the ore are driven off. Zaffre melted with silic and potash, and reduced to powder, constitutes the article known under the name of powder blue.

**ZAMIA.** For the following description of this genus of plants, I am indebted to the kindness of Mr. William Munday, of Worthing, who has obligingly extracted and forwarded it to me:—

“Zamia, in botany, a genus of the class Appendix palmæ, Diœcia, order Polyandria, natural order of Palmæ, Filices (Juss). *Generic character*: Male,—calyx; ament strobile-shaped, ovate, obtuse; scales horizontal, pellate, obovate, very blunt, one-flowered, thickened at the top, permanent. Corolla none. Stamina: filaments none. Anthers subglobular, clustered, accumulated in the lower surface of the scales, sessile, two-valved, opening above by a longitudinal cleft. Pollen, farinaceous. Female,—calyx; ament strobile-shaped, larger, ovate, imbricate; scales pedicelled, pellate, angu-

lar, finally distant, permanent. Corolla none. Pistil: germs two, irregular, angular, inserted into the margin under the pelta of the scales, solitary on each side, nodding. Style none. Stigma obtuse, obscurely cloven at the side. Pericarp: berries to each scale two ovate, barked at the base, fleshy, one-celled. Seed one in each berry, ovate. *Essential character*: Male,—ament strobile-shaped, scales covered with pollen underneath. Female, ament strobile-shaped, with scales at each margin; berry solitary.”

“1. *Z. furfuracea*, or broad-leaved zamia. Leaflets wedge-shaped, straight, very smooth from the middle to the tip, serrate, scurfy underneath; stipe spiny, stem thick, seldom rising more than two feet high. It was discovered by Dr. Houstoun in the sands near Vera Cruz in America.

“2. *Z. integrifolia*, or dwarf zamia. Leaflets mostly quite entire, bluntish, awnless, straight, shining; stipe unarmed. The spadix is divided into florets after the manner of the fruit of the cypress. Native of East Florida.

“ 3. *Z. debilis*, or long-leaved zamia. Leaflets linear, awnless, serrulate at the tip from spreading, recurved, longer than the channelled rachis; stipe three-sided, compressed, unarmed. Native of the West Indies.

“ 4. *Z. pungens*, or needle zamia. Leaflets awl-shaped, spreading, strict, rigid, mucronate; the outer margin of the base rounded; stipe roundish, unarmed. Native of the Cape.

“ 5. *Z. zycadis*, or narrow-leaved zamia. Leaflets oblique, linear, lanceolate, awl-shaped, hairy, curved, one, two, or three-spined at the tip; stipe unarmed. Native of the Cape of Good Hope.”—*Encyclopædia Londinensis*.

Fossil zamia have been discovered in the coal formation of Bohemia. In Lindley and Hutton's Fossil Flora figures of cones are given which are referred to the genus *Zamia*, from the sandstone of the Wealden formation at Yaverland, on the south coast of the Isle of Wight. The mode of inflorescence of the zamia is splendidly shown in Prof. Buckland's Bridgewater Treatise.

**ZAMITE.** A fossil zamia. M. Ad. Brongniart has referred the zamite, or fossil zamia, to a new genus, to which he has assigned the name of *Mantellia nidiformis*.

**ZECH-STEIN.** } The second member of the  
**ZETCHSTEIN.** } red sandstone series, in the ascending order. The zech-stein is a calcareous deposit, or magnesian limestone, of a somewhat variable aspect; it is fossiliferous, and in it, as far as observations have yet gone, are found, for the first time, those shells known by the name of *Productæ*. Some geologists are of opinion that the connection between the two formations of red sandstone and zech-stein is so intimate, that the latter may be regarded as a subordinate formation to the former. The zech-stein lies immediately under the red sandstone and above the marl slate, or kupfer schiefer, of the magnesian limestone formation. It is a deposit not widely spread over the European area, and is principally known in Germany and England.

**ZEOLITE.** (from *ζέω*, to swell or foam, and *λίθος*, a stone, Gr.)

1. Under this name some mineralogists comprise eleven subgenera of the mineral genus zeolite, namely, 1. Trapezoidal zeolite, or leucite; 2. Dodecahedral zeolite, or lapis lazuli; 3. Hexahedral zeolite, or analcime; 4. Paratomous zeolite, or cross-stone; 5. Rhombohedral zeolite, or chabasite; 6. Diatomous zeolite, or laumonite; 7. Prismatic zeolite, or mesotype; 8. Prismatoidal zeolite, or stilbite; 9. Hemiprismatic zeolite, or heulandite; 10. Pyramidal zeolite, or apo-

phyllite; 11. Macrytopous zeolite, or Brewsterite. These will all be found described under their several names.

2. A translucent and, sometimes, transparent mineral of a white, yellow, or brownish-yellow colour, exhibiting double refraction. Zeolite is electric by heat, one summit of its prisms becoming positive and the other negative; the latter is usually that summit which was connected with the gangue. It is found in distinct crystals, whose surfaces have a strong lustre, slightly pearly; and in masses composed of several fascicular groups of minute crystals; and in each group the crystals or fibres diverge, or even radiate, from one point, and at the surface frequently appear distinct from each other, or exhibit pyramidal terminations. Some zeolites phosphoresce by friction. Before the blow-pipe zeolite fuses with much ebullition or intumescence into a whitish spongy enamel, and it is from this property that it has obtained its name. When reduced to powder and thrown into nitric acid, it is converted into a jelly in the course of a few hours. This property of becoming gelatinous, as well as that of becoming electric by heat, sufficiently distinguish zeolite from stilbite, analcime, chabasic, harmotome, and prehnite. Zeolite most frequently occurs in amygdaloid, basalt, greenstone, and clinkstone porphyry. It is also found in granite and gneiss.—*Cleveland*.

**ZEOLITIC.** Pertaining to zeolite; containing zeolite; resembling zeolite.

**ZE'RO.** (*zéro*, Fr. *zero*, It.) This word is of Italian derivation, and means a cipher or 0. The expression is used to denote a certain point or mark on the thermometrical scale. In the thermometers of Celsius and Reaumur, zero is the point at which water congeals. In Wedgwood's pyrometer, zero corresponds with 1077° of Fahrenheit's scale. The question has been propounded, “at what degree would a thermometer stand (supposing the thermometer capable of measuring so low) were the body to which it is applied totally deprived of caloric? or what degree of the thermometer corresponds to the real zero?” This question does not appear to have ever been satisfactorily answered. Dr. Crawford placed the real zero 1268° below 0. Mr. Kirwan fixed the real zero at 1048° below 0. Lavoisier and Laplace placed the real zero at 2736° and 5803° below 0.

**ZE'US.** (*zeüs*, Lat.) A genus of fishes of the thoracic order, having the head compressed and sloping, the upper lip arched, the tongue subulated, the body compressed, thin, and shining, and the rays of the first dorsal fin ending in filaments.

In Dr. Mantell's Geology of the South-East of England, a species of zeus, found in the chalk, the zeus Lewesiensis, is beautifully figured. This ichthyolite is from six to eight inches long, and its width is nearly equal to the length of the body.—Dr. Mantell.

**ZEY'TANITE.** The name given by Werner to the mineral ceylanite. See *Ceylanite*.

**ZI'GZAG.** Having contrary windings and turnings; having short turns.

**ZINC.** } (*zink*, Germ. Dr. Webster states

**ZINK.** } that the common orthography of this word, zinc, is erroneous; it may be so, but it is the customary and usual orthography of the best English writers.)

One of the fifty-five simple or elementary bodies. A metal of a bluish-white colour, with a fine granular fracture. Zinc was not obtained in its metallic form till the sixteenth century, though its ores were known to the ancients, and used by them in the formation of their brass or bronze. It does not occur native; its most abundant ore is the sulphuret, called *Blende*, common in most veins which contain sulphurets of iron, lead, copper, &c., in every country. The structure of zinc is foliated. As regards its hardness, it may be easily cut with the knife. Specific gravity from 6.9 to 7.2. It is malleable, but its malleability is greatly increased by heating it to a temperature of 300 Fahrenheit. By exposure to the air it tarnishes and loses its lustre, but it is but little oxidated. United with copper it forms brass. The ores of zinc are few. Its presence may be determined by roasting the ore, and then fusing it by the blow-pipe on charcoal with filings of pure copper. If zinc be present, the copper will be converted into brass. The ore called calamine is a carbonate of zinc.

**ZI'RCON.** A mineral occurring in rounded grains or fragments, or in regular crystals. It is harder than quartz, and possesses double refraction in a high degree. It is transparent, or sometimes only translucent. Specific gravity from 4.3 to 4.7. Before the blow-pipe it is infusible, but loses its colour. It may be distinguished from garnet, idocrase, staurotide, &c., by its infusibility, specific gravity, and strong double refraction. There are two varieties of zircon, called zircon jargon and zircon hyacinth. Zircon jargon consists of zirconia 69.0, silica 26.5, oxide of iron 0.5. Zircon hyacinth of zirconia 70.0, silica 25.0, oxide of iron 0.5. The finest specimens are brought from the island of Ceylon. It occurs in primary and transition rocks, but is usually obtained from the sand of rivers.

**ZIRCO'NIA.** An earth, when pure, white and tasteless, supposed to be a compound

of zirconium, its metallic basis, and oxygen. An oxide of zirconium.

**ZIRCO'NIUM.** The metallic basis of the earth zirconia.

**ZO'DIAC.** (*zodiaque*, Fr. *zodiaco*, It. *zodiacus*, Lat. *ζωδιακός*, Gr.) A broad circle or region in the heavens remarkable, not from anything peculiar in its own composition, but from its being the area within which the apparent motions of the sun, moon, and all the great planets are confined. The centre of the zodiac is the ecliptic, which is inclined to the equinoctial at an angle of about 23° 28', intersecting it at two opposite points, called the equinoctial points. The zodiac extends 9° on either side of the ecliptic.

**ZODI'ACAL.** Pertaining to the zodiac, as the zodiacal constellations, &c.

**ZOI'SITE.** } A mineral, thus named from  
**ZOI'ZITE.** } Baron Von Zois, its discoverer. A variety of Epidote, of a grey, brown, or yellowish colour.

**ZOOLOGICAL.** Pertaining to zoology.

**ZOOLOGIST.** One who studies, or is versed in, the natural history of animals.

**ZOOLOGY.** (from *ζῶον* an animal, and *λόγος*, discourse, Gr. *zoologie*, Fr. *zoologia*, It.) That branch of natural history which treats of animals, their habits, structure, classification, &c. Prof. Buckland says that the study of zoology has become as indispensable to the progress of geology, as a knowledge of mineralogy.

**ZOOLOGY, FOSSIL.** That division of zoology which treats of fossil animals. The examination of the fossil remains of a former state of creation has demonstrated the existence of animals far surpassing in magnitude those now living, and brought to light many forms of being which have nothing analogous to them at present, and many others which afford important connecting links between existing genera.

**ZOO'PHAGA.** (from *ζῶον*, an animal, and *φαγῆν*, to eat, Gr.) A tribe of animals which attack and devour *living* animals. The animals of this tribe have three kinds of teeth, namely, cutting teeth, canine teeth, and grinders; their paws are armed with claws; their muzzle is often set with whiskers, usually called smellers; their mammary organs are dispersed; their intestines are less voluminous than those of herbivorous animals.

**ZOO'PHAGOUS.** Attacking and devouring *living* animals.

**ZOO'PHYTE.** (*ζῳόφυτα*, from *ζῶον* and *φύω*, Gr. *quæ medicæ sunt naturæ inter animalia et plantas*; *zoophyte*, Fr. *zoofito*, It.) Animal plants, corals, sponges, and other aquatic animals which have obtained the name from an opinion formerly entertained that they were intermediate between animals and vegetables. In conse-

quence of their aggregation, which produces trunks and expansions of various forms, together with the simple nature of their organization, and the radiating disposition of their organs, resembling the petals of flowers, these animals owe their name of zoophytes or animal plants. But possessing the power of voluntary motion, enjoying the sense of touch, feeding on matters which they have swallowed, and digesting these in an internal cavity,

they must, in every point of view, be considered to be animals. Zoophytes are either free in the sea, or are attached for life after a very early period of growth.

ZOOPHYTO'LOGY. (from *ζωόφυτα*, a zoophyte, and *λόγος*, discourse, Gr.) That branch of natural history which treats of the structure, habits, &c. of zoophytes.

ZU'RLITE. The name given to a recently discovered Vesuvian mineral.

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