

PENGUIN REFERENCE BOOKS

A Dictionary of Geology

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A DICTIONARY OF GEOLOGY

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PENGUIN BOOKS

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Plates 7b, 10a, 10b, 11, 12a, 12b, 13, 14, 15, 16a, 16b are Geological Survey photographs, and are reproduced with the permission of the Controller of H.M. Stationery Office.

A

AA. Hawaiian name for block-lava consisting of rough tumultuous assemblages of scoriaceous masses resembling clinker. Cf. *Pahoehoe*.

ABLATION. The removal of rock debris by the action of the wind.

ABRASION. The mechanical wearing away of rocks by fragments of rock suspended in water, carried by the wind, or frozen into the sole of a glacier or ice-sheet.

ABYSSAL DEPOSITS. Deposits accumulating in depths of the ocean exceeding 1,500 fathoms; they include the organic oozes, the blue muds, and the red clays.

ABYSSAL ROCKS. Alternative name for *Plutonic Rocks*.

ACADIAN SERIES. Name applied to the Middle Cambrian strata of the Atlantic Province in North America (Newfoundland, Nova Scotia, and Eastern Massachusetts).

ACCESSORY MINERALS. Minerals occurring in small quantities in a rock, whose presence or absence does not affect the true nature of the rock.

ACHANARRAS BAND. A fossiliferous bed, yielding fish remains, some 10,000 ft above the base of the Old Red Sandstone in NE. Scotland.

ACICULAR. Term applied to elongated needle-like crystals.

ACID ROCKS. Igneous rocks containing more silica than *orthoclase*, the limiting value being taken generally as 66 per cent. Called also *oversaturated* and *persilicic rocks*. These rocks are characterized by the presence of free quartz.

ACME. The period of maximum vigour of an individual race or species.

ACMITE. Synonym for *Aegirine*, q.v.

ACTINOLITE. A member of the group of monoclinic amphiboles, $\text{CaO} \cdot 3(\text{Mg}, \text{Fe})\text{O} \cdot 4\text{SiO}_2$. Generally occurs as long, slender, glassy, greenish prisms in schists and altered igneous rocks.

ADAMELLITE. A variety of granite containing approximately equal proportions of alkali-felspar and plagioclase.

ADULARIA. A colourless, transparent variety of felspar, of the same composition as *orthoclase*; differs from *sanidine* in its crystal habit.

AEGIRINE. A silicate of iron and sodium, $\text{Na}_2\text{O} \cdot \text{Fe}_2\text{O}_3 \cdot 4\text{SiO}_2$, which occurs commonly as long brown prismatic crystals, with sharp terminations, in soda-rich igneous rocks, such as nepheline-syenite, phonolite, etc.

AEOLIAN DEPOSITS. Finely divided fragmentary deposits which have been transported to their present positions by the action of the

wind. They include sand-dunes, desert sands, loess, and some volcanic tuffs and ashes.

AGATE. A variegated form of *chalcedony* (q.v.), composed of different coloured bands which may be either sharply demarcated, or which shade imperceptibly into one another. *Moss Agate*, or *Mocha Stone*, is a variety containing small dendrites which consist of ferric oxide or a ferruginous chlorite.

AGGLOMERATE. A coarse-textured rock, consisting chiefly of angular fragments of igneous rock embedded in an ashy matrix, resulting from explosive volcanic activity. Typically occurs in and around volcanic vents.

AGGRADATION. The building up of the surface of the land by deposition of solid material in the lower areas; the term is usually applied to the laying down of sediment in the bed of a river.

ALABASTER. A fine-grained, compact, non-crystalline form of *gypsum* (q.v.), snow-white or light-coloured.

ALBERTITE. A pitch-black, lustrous carbonaceous solid, sometimes found in oil-bearing strata.

ALBIAN STAGE. A division of the Cretaceous System lying between the Aptian stage below and the Cenomanian stage above; approximately equivalent to the Gault and Upper Greensand in Great Britain.

ALBITE. One of the end members of the plagioclase series of feldspars. Ideally, the composition would be $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$, but small quantities of lime are almost invariably present. Occurs in the acid and intermediate igneous rocks, granite, syenite, and diorite, and their hypabyssal and volcanic representatives.

ALBITISATION. The process by which a soda-lime feldspar, or plagioclase is replaced in igneous rocks by albite.

ALEXANDRITE. A greenish variety of *chrysoberyl* (q.v.) which is reddish by transmitted light.

ALLANITE; ORTHITE. A brown form of epidote, containing cerium; occurs as an accessory mineral in some granites.

ALLEGHENY SERIES. The Lower Productive Coal Measures of the eastern parts of the United States of America.

ALLOPHANE. A hydrated silicate of aluminium, $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2 \cdot 5\text{H}_2\text{O}$. Generally occurs as white or honey-coloured incrustations on joint planes and fissures in chalk and sandstone.

ALLOTRIOMORPHIC. An epithet used to describe those minerals in igneous rocks which are not bounded by their characteristic crystal faces.

ALLUVIAL DEPOSITS. Deposits of material of any grade which has been carried in suspension by a river or a flood, and laid down

where the speed of flow has suffered a check. Deposits of this kind, of geologically recent origin, are known as *Alluvium*.

ALMANDINE. A member of the garnet family, consisting of a silicate of iron and aluminium, $3\text{FeO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2$. It is deep red in colour and is of common occurrence in metamorphic rocks, mica schists and gneiss, also in granites. Also found in detrital deposits, as in Ceylon. Many of the garnets used in jewellery are of this type.

ALPINE REVOLUTION. The period of earth-movement which culminated in the Miocene, when the Alps and other existing mountain chains came into existence.

ALUNITE, or ALUMSTONE. Hydrated sulphate of aluminium and potassium, $\text{K}_2\text{O} \cdot 3\text{Al}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 6\text{H}_2\text{O}$, resulting from the alteration of trachytes or rhyolites by solfataric action. Used in the manufacture of alum.

AMAZONITE, or AMAZONSTONE. A green variety of microcline, which is sometimes cut and polished as a gemstone.

AMBER. A fossil resin, derived from several species of conifers of Lower Oligocene age. The amber beds of Königsberg consist of lignitiferous sands, resting on marine glauconitic sands, at the base of which is a band containing abundant pieces of amber. The latter have yielded many (estimated at 2,000) species of insects, arachnids, and myriapods.

AMETHYST. Mauve-coloured quartz, used as a semi-precious gemstone. *Oriental Amethyst* is a rare crystalline form of *corundum*, having the colour of amethyst.

AMIANTHUS. A fine silky variety of asbestos.

AMMONITES. A group of extinct *cephalopoda* related to the *Nautilus*, having chambered shells, coiled in a plane spiral, and characterized by complicated frilling of the sutures at which the margins of the septa separating the chambers join the outer shell. The ammonites had a short range in time, appearing in the Trias, and becoming extinct at the end of the Cretaceous Period. They are therefore certain index-fossils for the identification of Mesozoic deposits. The ammonites had remarkable powers of adaptation to the prevailing conditions of life and produced many species, none of which persisted for long periods; they are therefore very valuable fossils for zoning a series of beds.

AMMONOIDEA. An extinct order of *cephalopoda*, having chambered shells, generally coiled in plane spirals, but which may be straight, curved, or turreted. The septal sutures are always curved into forwardly-pointing *saddles* and backwardly-pointing *lobes*. In the *Goniatites* (q.v.), the sutures are comparatively simple, but in the

Ammonites, elaborate frilling or puckering is met with. The range in time of the *Ammonoidea* is from the Lower Devonian to the Upper Cretaceous.

AMPHIBOLES. An important group of dark-coloured rock-forming minerals, analogous in chemical composition to the *Pyroxenes* (q.v.). They are silicates of iron, magnesium, calcium, sometimes potassium and sodium, with or without silicate of aluminium. They crystallize in the orthorhombic, monoclinic and triclinic systems, but differ from the pyroxenes in the forms and angles of the crystals. Like the pyroxenes, the amphiboles show good prismatic cleavage, but the angle between the cleavage faces is nearly 120° in contrast with the nearly 90° of the pyroxenes. Important members of the group are: *Orthorhombic*, Anthophyllite; *Monoclinic*, Tremolite, Actinolite, Asbestos, Nephrite, Smaragdite, Hornblende, Glaucophane, Riebeckite, q.v.

AMPHIBOLITE. A coarse-grained, crystalline rock, containing amphibole as an essential constituent, with felspar and often garnet. Formed, like hornblende-schist, as the result of regional metamorphism of basic igneous rocks, but is not foliated.

AMYGDALES, or AMYGDULES. Vapour cavities and vesicles: in volcanic and, occasionally, intrusive rocks, which have subsequently become filled with secondary minerals, such as zeolites, calcite, or silica, generally in the form of agate or chalcedony.

AMYGDALOIDAL ROCKS include rocks such as basalts, andesites, etc., which have conspicuous amygdales.

ANALCIME. One of the zeolite family; hydrated silicate of sodium and aluminium, $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot 2\text{H}_2\text{O}$. Generally secondary, but occasionally occurs as a primary mineral in dolerite.

ANATASE. One of the forms of titanium oxide, TiO_2 . Crystallizes in slender, nearly transparent tetragonal pyramids, brown in colour, passing into indigo blue and black; also in tabular crystals. An alteration product of other titanium minerals. See also, *Rutile*, *Brookite*, and *Octahedrite*.

ANDALUSITE. Aluminium silicate, $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$. A product of the contact metamorphism of argillaceous rocks, andalusite and the variety *Chiasolite* occur as 'spots' which, under the lens may be resolved into square or rhomboidal crystals, sometimes showing cruciform sections.

ANDESINE. The member of the plagioclase group of feldspars with a small excess of soda over lime. Occurs as a primary mineral in intermediate igneous rocks, diorites and andesites.

ANDESITE. A volcanic rock, belonging to the intermediate group (containing 55 to 66 per cent silica), composed essentially of a

plagioclase felspar (andesine or oligoclase), with a pyroxene (augite or enstatite), hornblende or biotite, and more or less of a glassy base. Fresh samples are dark grey to black; weathered specimens tend to be reddish or brownish, but not the 'rusty' colour characteristic of basalt. There are numerous varieties of andesite, such as *Dacite*, which contains quartz; others are distinguished by the use of a mineral-prefix to the name.

ANDRADITE. Common garnet; silicate of calcium and iron, $3\text{CaO} \cdot \text{Fe}_2\text{O}_3 \cdot 3\text{SiO}_2$. A mineral of common occurrence in igneous and metamorphic rocks.

ANGLESITE. Sulphate of lead, PbSO_4 . When found in sufficient quantity, is a valuable ore of lead. Generally associated with galena, PbS , of which it is an oxidation product, in the upper portions of lead veins.

ANHYDRITE. Anhydrous sulphate of lime, CaSO_4 . Occurs as a saline residue associated with gypsum and rock-salt, at Stassfurt, and elsewhere.

ANIMIKIE SERIES. A member of the Pre-Cambrian of the Canadian Shield, extending into the Arctic regions. May be 14,000 ft thick and contains important iron ores, carbonaceous slates, and boulder conglomerates.

ANKERITE. A carbonate of calcium, magnesium and iron, which is often associated with iron ores. The term *ankeritic* is often applied to the white partings of mineral matter which are often found on the joints in coal seams.

ANNABERGITE. Hydrated arseniate of nickel, $\text{Ni}_3 \cdot \text{As}_2\text{O}_8 \cdot 8\text{H}_2\text{O}$, produced by the decomposition of kupfernickel (q.v.); occurs as a coating of capillary crystals.

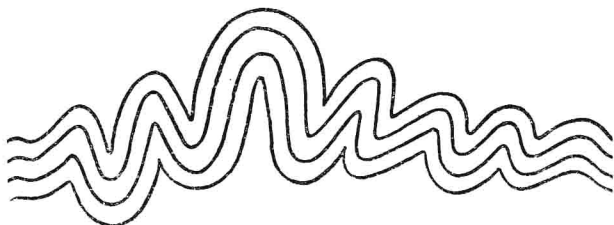
ANORTHITE. The lime-rich member of the plagioclase series of felspars. Ideally $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$; small quantities of soda are always present. Occurs as a primary constituent of basic igneous rocks, such as gabbro.

ANTHOPHYLLITE. An orthorhombic amphibole $(\text{Mg}, \text{Fe})\text{O} \cdot \text{SiO}_2$, brown in colour, which occurs often in aggregates of prismatic needles and in radiating fibres, as a mineral of metamorphic origin in gneisses and schists.

ANTHRACITE. A lustrous variety of coal, which does not soil the fingers. Contains 92 per cent and over of carbon, and yields not more than 8 per cent volatile matter when heated out of contact with air. Burns smokelessly and slowly, without flame, and is therefore particularly suitable for use in slow-combustion appliances.

ANTICLINE. A structure resulting from the upfolding of beds into an arch-like form, so that the beds incline away from the crest to either side, with the lower beds within the upper.

ANTICLINORIUM. A complex major structure, consisting in gross of an anticline, on which numerous minor folds are superimposed. See *Synclinorium*.



An Anticlinorium. Diagrammatic

ANTIGORITE. A form of the mineral serpentine, having a lamellar or blade-like habit.

ANTIMONITE. Another name for *Stibnite*, q.v.

APATITE. Phosphate and fluoride or chloride of calcium, $3\text{CaP}_2\text{O}_8 \cdot \text{CaF}_2$, or $\text{Ca}_3\text{P}_2\text{O}_8 \cdot \text{CaCl}_2$. Commonly occurs as hexagonal prisms combined with pyramids, truncated by basal planes. Generally pale sea-green, bluish-green, yellowish-green or yellow. Found as small prismatic crystals in igneous rocks.

APHANITIC. A term applied to any fine-grained igneous rock or groundmass, the constituents of which cannot be distinguished by the naked eye.

APLITE, OR HAPLITE. A finely-crystalline variety of granite occurring as dykes or veins. It is characterized by the almost complete absence of dark-coloured minerals. The original application of the term was to granites poor or lacking in mica, but the name is now applied to muscovite-granites.

APOPHYLLITE. A zeolite, consisting of hydrated silicate of calcium and potassium, $8\text{CaO} \cdot \text{K}_2\text{O} \cdot 16\text{SiO}_2 \cdot 16\text{H}_2\text{O}$. Occurs in decomposed geodes in basalts and other rocks.

APOPHYSES. Veins, dykes, and tongues which are offshoots from larger igneous intrusions, the connexion with which can be directly traced.

APPALACHIAN REVOLUTION. An era of intense mountain-building movements which took place during the interval between the Permian and Trias, in which deposits in the Appalachian and Cordilleran geosynclines were folded to form the Appalachian and

Palaeocordilleran mountains. The revolution was equivalent to, but later than, the Armorican and Hercynian movements in Europe.

APPLECROSS SERIES. Coarse-grained feldspathic sandstones, *or arkoses, forming the middle division of the Torridonian or Torridon Sandstone, the youngest Pre-Cambrian rocks in the N.W. Highlands of Scotland.

APTIAN. A division of the Cretaceous, lying between the Necomian below and the Albian above. Equivalent approximately to the Lower Greensand.

APTICHUS. A heart-shaped body, consisting of a pair of symmetrical calcareous plates, frequently found in the body-chamber of an *ammonite, which in life served as an operculum to close the aperture.

AQUAMARINE. A pale blue variety of beryl.

ARAGONITE. The rather unstable form of crystalline calcium carbonate, which is deposited as orthorhombic crystals from warm water, but is liable to revert to calcite.

ARBROATH SANDSTONE. Coarse red sandstones and flags, about 1,200 ft thick, high in the Lower Old Red Sandstone of the Midland Valley of Scotland.

ARCHEAN ROCKS. Broadly, rocks of Pre-Cambrian age; the term is sometimes restricted to the older, crystalline part of the Pre-Cambrian.

ARDEN SANDSTONE. A local development of the upper portion of the Keuper Marl (Triassic), containing fossil fish and plant remains in the English midland counties.

ARENACEOUS OR PSAMMITIC ROCKS. Sedimentary rocks consisting of grains of sand which may be loose or cemented.

ARENIG SERIES. The lowest series of the Ordovician System.

ARGENTIFEROUS GALENA. Galena which contains sufficient silver to be worth extracting.

ARGENTITE. Silver sulphide, Ag_2S . An important ore of silver. Also called *Silver Glance*.

ARGILLACEOUS OR PELITIC ROCKS. Sedimentary rocks characterized by an abundance of clay minerals, and a predominance of the mud grades. See *Grade*.

ARGILLITE. An argillaceous rock cemented by silica; more compact and less laminated than shale.

ARKOSE. A coarse-grained, highly feldspathic sandstone or grit, formed by the rapid disintegration of granite or gneiss. It differs from feldspathic grit and sandstone in that the high percentage of feldspar has suffered little or no alteration by weathering.

ARMORICAN REVOLUTION. An era of intense mountain-building activity which took place during the interval between the Carboniferous and Permian Periods, resulting in the formation of a great mountain chain, extending from Western Ireland, through Southern Britain, through Brittany and the Massif Central in France, and thence into the Harz Mountains. In Southern Britain, the general trend of folding is west-to-east; in France it swings round to north-west to south-east, and then north-eastwards from Central France, and thence east-north-eastwards through the Southern Rhineland. The movements are sometimes also referred to as the *Hercynian*.

ARSENICAL NICKEL. See *Kupfernickel*.

ARSENICAL PYRITES. Also called *Mispickel* (q.v.) and *Arseno-Pyrite*.

ASBESTOS. Mineralogically, the name should be restricted to the fibrous varieties of *actinolite*, but is generally taken to include any amphibole which is found in long, flexible fibrous crystals which are sufficiently flexible to be spun into cloth. *Commercial* asbestos includes minerals in the anthophyllite, hornblende and serpentine groups.

ASBOLANE, or ASBOLITE. A variety of *Wad*, or hydrated manganese dioxide, containing a variable proportion, sometimes as much as 40 per cent, of oxide of cobalt in mechanical mixture.

ASHDOWN SANDS. The thickest division of the Hastings Beds (Lower Wealden), comprising a maximum of 700 ft of sands and sand-rock.

ASHGILL SERIES, or ASHGILLIAN. The highest series of the Ordovician. Together with the Caradocian, is equivalent to the Bala Series of North Wales.

ASPHALT. A bituminous deposit, representing the more or less dried up remains of an oil-pool.

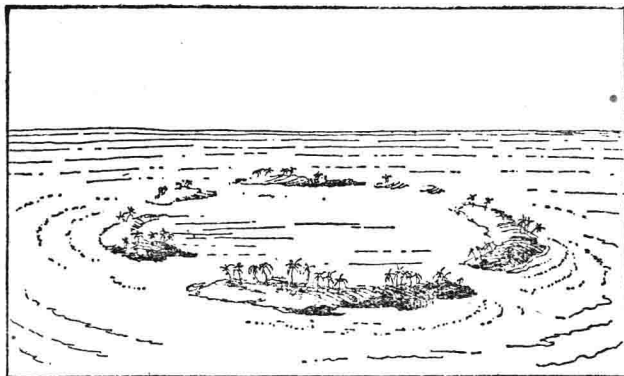
ASSIMILATION. The absorption of extraneous matter by an igneous magma.

ATACAMITE. Hydrated oxychloride of copper, $\text{CuCl}_2 \cdot 3\text{Cu}(\text{OH})_2$, of deep green colour, which occurs in the zone of weathering or gossan of some copper lodes.

ATLANTIC PROVINCE. Regions bordering on the Atlantic Ocean where Cambrian strata crop out. The faunal assemblage of the Cambrian differs from that which characterizes the Pacific Province.

ATOLL. A coral reef, in the shape of a ring or a horseshoe, enclosing a lagoon.

AUGEN GNEISS. A gneissose rock containing large eye-like kernels (*augen*) of felspar or quartz, which simulate the porphyritic



A typical Atoll in the Pacific Ocean

crystals of igneous rocks, dispersed through a finer matrix. These represent larger crystals or crystalline aggregates which have been broken down and dragged out by shearing movements during regional metamorphism.

AUGITE. An important member of the group of *Pyroxenes*, q.v. A complex silicate of calcium, magnesium, iron and aluminium of variable composition. Occurs as short, black to greenish-black prismatic crystals in many igneous rocks, particularly those of basic composition. An essential constituent of basalt, dolerite and gabbro.

AUTHIGENOUS, OR AUTHIGENIC. Formed *in situ*; applied to the constituents of a rock that came into existence with or after the formation of the rock of which they form a part. For example, the primary and secondary constituents of an igneous rock, or the cement of a sedimentary rock.

AUTOCLASTIC. Term applied to rocks such as crush-breccias that have been brecciated mechanically in place.

AUTUNITE. Lime uranite, consisting of hydrated phosphate of calcium and uranium, $\text{CaO} \cdot 2\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$. Occurs as nearly square, orthorhombic crystals, citron to sulphur yellow in colour, with other uranium minerals.

AVENTURINE FELSPAR, AVENTURINE QUARTZ. Varieties of adularia, albite and quartz, spangled with minute crystals and flakes of hematite, ilmenite, limonite, mica, etc., which cause specimens to emit fire-like sparkles. The aventurine feldspars are also known as *Sunstone*.

AVONIAN. Synonymous with the Lower Carboniferous; equivalent to the Dinantian Stage of the continental geologists. So-called from the type-section in the Avon Gorge, near Bristol.

AXINITE. Complex borosilicate of calcium and aluminium, occurring as minute wedge-shaped, brown, triclinic crystals which are the product of pneumatolysis.

AYMESTRY LIMESTONE. A deposit of shallow-water limestone occurring between the Lower and Upper Ludlow Beds in the Silurian System. It forms a prominent escarpment in the neighbourhood of Ludlow and Wenlock in Shropshire.

AZURITE. A deep azure-blue hydrated carbonate of copper, $2\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$, found associated with other ores of copper in the zone of weathering of copper lodes.

B

BAGGY BEDS. A member of the Upper Devonian Series in North Devon, comprising green shales and yellowish sandstones containing lamellibranchs, gastropods and plant remains.

BAGSHOT BEDS. The formation of the British Eocene which succeeds the London Clay in both the London and Hampshire Basins. The beds consist of current-bedded sands with bands of pipeclay which, in Hampshire and Dorset, have yielded many remains of plants, indicating a warm climate.

BAJOCIAN SERIES. In general terms, the lower division of the Middle Jurassic rocks, including, in Great Britain, the sands above the Lias, the Inferior Oolite and the Dogger, the Lower Estuarine Sands and Millepore Grits of Yorkshire.

BALA SERIES. The uppermost division of the Ordovician in Britain. So named from the type-locality in North Wales, where the beds consist of fossiliferous sandstones, with a thin limestone.

BALAS RUBY. A rose-red variety of *Spinel*, q.v.

BALCLATCHIE BEDS. A series of sandstones and shales in the Upper Ordovician (Ardmillan) Series of Southern Scotland.

BALLAGAN BEDS. The lowest division of the Lower Carboniferous rocks in the Glasgow district. They comprise sandstones, shales, and limestones.

BALLSTONE. A name applied to masses of fine unstratified limestone, representing colonies of corals in the position of growth, and found particularly in the Wenlock Limestone of Shropshire.

- BANDED STRUCTURE.** A structure met in many igneous and metamorphic rocks, owing to the alternation of layers which differ conspicuously in mineral composition or texture, or both.
- BANGOR SERIES.** Pre-Cambrian rocks in North Wales, including granitoid and felsitic masses, with a large thickness of grits, slates, and conglomerates.
- BANKET.** A Dutch term, originally applied to the gold-bearing conglomerates of the Witwatersrand; now used more widely for other compact, siliceous vein-quartz conglomerates having pebbles about the size of a pigeon's egg, and generally resembling the type-rock of the Rand.
- BANNISDALE SLATES.** The uppermost division of the Salopian Series of the Silurian in Westmorland.
- BARBADOES EARTH.** A deep-water siliceous deposit made up of the remains of radiolaria.
- BARGATE BEDS.** A local development of calcareous sandstones and conglomerates forming part of the Lower Greensand in Surrey.
- BARITE.** See *Barytes*.
- BARKHAN.** An isolated, crescent-shaped sand-dune; the horns of the crescent project down-wind. Also spelt *Barchan*.
- BARMOUTH GRITS.** A thick formation of grits in the Harlech Series (Lower Cambrian) of North Wales.
- BARR SERIES.** The middle division of the Ordovician of the Girvan district of Scotland. It includes shales, sandstones, conglomerates, and a horizon of limestone.
- BARREMIAN STAGE.** The highest of the three stages into which the Nocomian of the Continent is divided. The equivalent in Great Britain is the Snettisham Clay.
- BARRIER REEF.** A reef of coral parallel with the shore-line and enclosing a lagoon between itself and the land. A stage intermediate between a fringing reef and an atoll.
- BARTONIAN SERIES.** The highest division of the Eocene in England. In the type-locality, the beds comprise the Barton Clay, with a rich molluscan fauna, and the Barton Sands above. In the London Basin, the Bartonian is sandy throughout and not very fossiliferous. In the Paris Basin, the famous body of gypsum from which many vertebrate remains have been obtained forms part of the equivalent of the English Bartonian.
- BARYTES.** Also known as Heavy Spar. Barium sulphate, BaSO_4 . Crystallizes in the orthorhombic system, commonly as crystals consisting of combination of prism, basal plane, and macrodome; also found massive. Perfect cleavage in three directions. Colourless or white, when pure, often tinged with yellow, red and brown. A

common veinstone with ores of lead, and is found as nodules in the fullers' earth beds of Surrey.

BARYTOCALCITE. Double carbonate of calcium and barium, $\text{CaCO}_3 \cdot \text{BaCO}_3$. Sometimes associated with lead veins.

BASALT. A fine-grained igneous rock, often porphyritic, forming a lava flow or minor intrusion; composed essentially of plagioclase (labradorite or anorthite), with augite and some magnetite or limonite. If olivine is present, the rock becomes an *olivine-basalt*. The basalts belong to the basic group of igneous rocks, containing from 45 to 55 per cent of silica. Basalt varies from dark grey to black; when weathered, it becomes softer and has a greenish or rusty-brown tinge, especially on the surface of joints or cracks. It is generally very compact, although black, shining crystals of augite and patches of bottle-green olivine may often be detected with the naked eye or under a lens. The jointing is often very perfect columnar; the columns may be straight or curved and may be divided into short sections by ball-and-socket joints. Good examples of columnar jointing may be seen in Fingal's Cave and the Giant's Causeway. In the field, the term *basalt* is generally restricted to lava-flows; similar rocks occurring as minor intrusions are called *dolerites*.

BASANITE. A basalt containing plagioclase, augite, olivine, and a feldspathoid (nepheline, leucite, or analcite).

BASIC ROCKS. Igneous rocks containing a relatively low percentage of silica, under about 55 per cent. Called also *Subsiliic* and *Under-saturated*.

BASIN. A structure in which the strata dip towards the centre.

BASTITE. A variety of serpentine resulting from the alteration of rhombic pyroxene, enstatite or bronzite. It is olive-green, blackish-green, or pinchbeck-brown in colour and, on the cleavage surfaces, has a metallic to pearly lustre. Also called *Schillerspar*.

BATHSTONE. A building stone quarried from the Great Oolite near Bath.

BATHOLITH. See *Bathylith*.

BATHONIAN SERIES. The upper member of the Lower Oolite Series, comprising the Great or Bath Oolite below, followed by the Forest Marble and Bradford Clay, above which is the Cornbrash. Sometimes also known as the *Great Oolite*.

BATHYAL ZONE. The sea floor between 600 and 3,000 ft below sea-level; characterized by muddy deposits and occasional organic oozes.

BATHYLITH, or BATHOLITH. A large body of intrusive igneous rock, frequently granite, with steeply plunging sides and no detectable floor.

BAUXITE. Aluminium hydroxide, $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$, found as an amorphous earthy granular or pisolitic mineral of dirty-white, greyish,