Historic England

Glossary

Building Stones of England

The Building Stones of England

England's rich architectural heritage owes much to the great variety of stones used in buildings and other structures. The building stones commonly reflect the local geology, imparting local distinctiveness to historic towns, villages and rural landscapes.

Historic England and the British Geological Survey (BGS), working with local geologists and historic buildings experts, have compiled the Building Stones Database for England to identify important building stones, where they came from and potential alternative sources for repairs and new construction.

Drawing on this research, plus BGS publications and fieldwork, guides have been produced for each English county. The guides are aimed at mineral planners, building conservation advisers, architects and surveyors, and those assessing townscapes and countryside character. The guides will also be of interest if you want to find out more about local buildings, natural history, and landscapes.

The Building Stones of England guides include many geological terms. This Glossary is designed as a companion volume to explain these terms. It uses the BGS Lexicon of Named Rock Units (2020) available online at https://www.bgs.ac.uk/technologies/the-bgs-lexicon-of-named-rock-units/.

This guide is based on original text by Andy King (Geckoella Ltd).

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Front cover: Bridge wall at Hartwell House, near Aylesbury. Large ammonite (titanite type). Geckoella © Historic England

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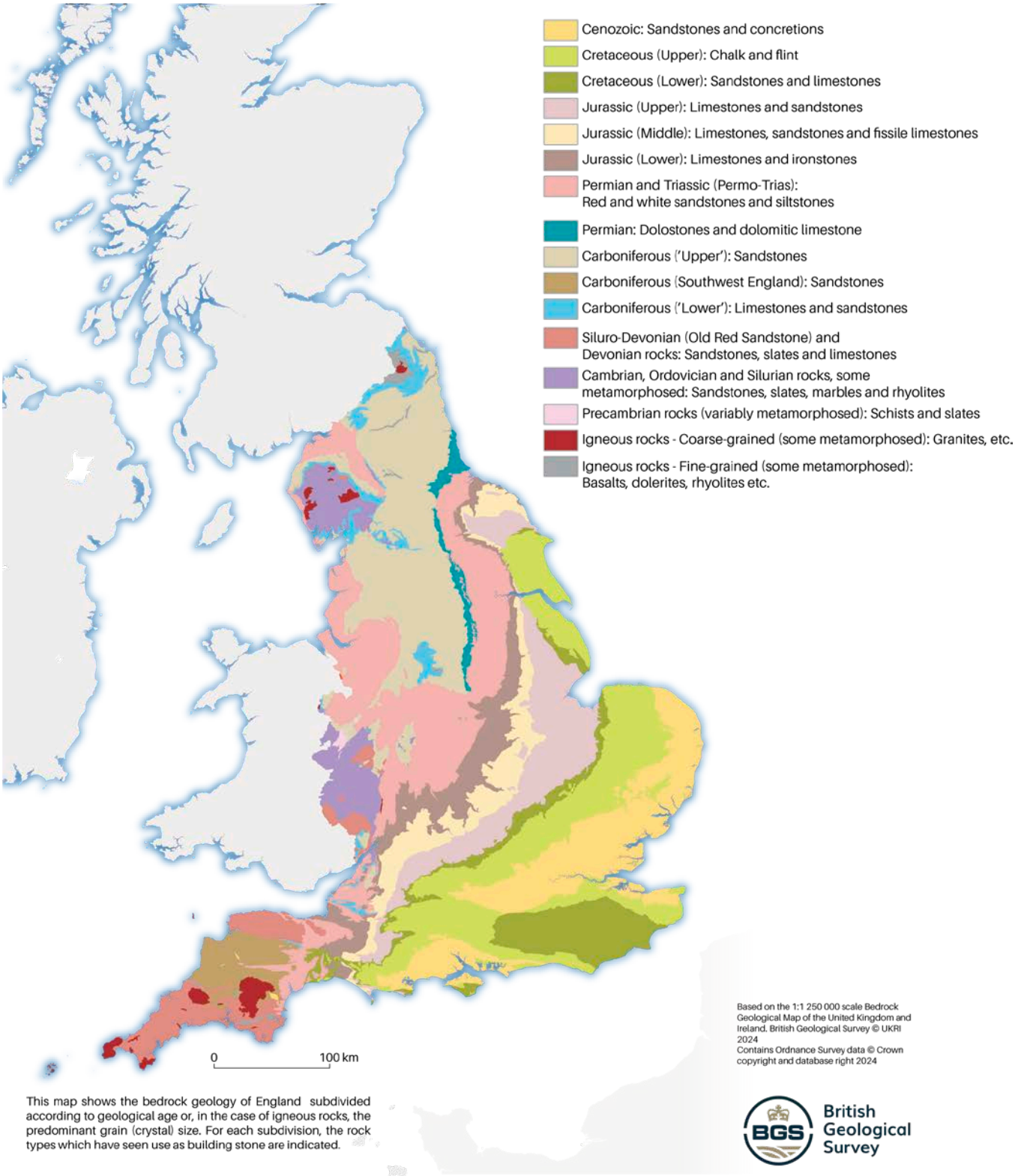
Contents

1 Geological Timechart

Era		Period		Series	Age (millions of years old)
Cenozoic		Quaternary		Holocene	0.01
				Pleistocene	2.6
		Tertiary	Neogene	Pliocene	
				Miocene	23
			Palaeogene	Oligocene	
				Eocene	
				Palaeocene	66
Mesozoic		Cretaceous		Upper	
				Lower	145
		Jurassic		Upper	
				Middle	
				Lower	201
		Triassic		Upper	
				Middle	
				Lower	252
Palaeozoic	Late	Permian			299
		Carboniferous		Upper	
				Lower	359
		Devonian		Upper	
				Middle	
				Lower	419
	Early	Silurian		Pridoli	
				Ludlow	
				Wenlock	
				Llandovery	444
		Ordovician		Upper	
				Middle	
				Lower	485
		Cambrian			541
Proterozoic		'Precambrian'			2,500

2 Bedrock Geology of England



This map shows the bedrock geology of England subdivided according to geological age or, in the case of igneous rocks, the predominant grain (crystal) size. For each subdivision, the rock types which have seen use as building stone are indicated.

A

Acicular
A descriptive term for the needle-like form of crystals.

Acidic igneous rock
An igneous rock which chemically contains a high proportion of pale, silica-rich minerals, such as quartz or potassium feldspars. Granite is an example of an acidic igneous rock (see Basic).

Actinolite
A bright green to grey-green coloured mineral, containing silica (quartz), calcium, magnesium, and iron.

Adit
A horizontal passage from the ground surface entering into a mine (also known as level, drift or slant).

Figure 1: Adit

Aeolian
A descriptive term which refers to sediments formed by wind action in an arid, desert-like environment, usually fine-grained, red coloured and containing large-scale sedimentary structures.

Aggregate
Natural or artificial mineral substances, such as sand, gravel, crushed rock, stone, slag and other minerals which, when bound, are used to produce concrete, mortars and roadstones. Unbound, it can be used as a bulk fill material in, for example, road-making and as railway track ballast.

Agglomerate
A type of coarse-grained pyroclastic (volcanic) rock dominated by large, rounded fragmented rock debris.

Alabaster

A compact, very fine grained, pale and translucent gypsum used for carving.

Figure 2: Alabaster

Algal limestone, algal mudstone

A sedimentary rock containing rounded layers or filaments of fossilised algae (hence algal limestones or algal mudstones depending on the sediment type).

Figure 3: Algal limestone

Alluvial

A descriptive term for a sediment which has been eroded, transported by rivers or streams and re-deposited in a non-marine environment (see Alluvial fan).

Alluvial fan
A wedge-shaped deposit of gravel, sand and silt (alluvium) created where tributary alleys enter into a larger, flatter valley plain.

Ammonite
An extinct marine mollusc, the spirally coiled shells of which are very common fossils in Jurassic and Cretaceous sedimentary rocks.

Figure 4: Ammonite

Amygdale (adj. amygdaloidal)
A void in an igneous rock, containing secondary minerals, often in the form of crystals.

Andesite (adj. andesitic)
A fine-grained, extrusive igneous rock intermediate in composition between a rhyolite (acidic) and a basalt (basic). It is composed predominantly of plagioclase feldspar and pyroxene or hornblende minerals.

Anticline
A type of ridge or fold of stratified rock which is arch-shaped with the strata sloping downwards from the crest. The oldest rocks occur in the core of the arch.

Anticlinal axis
The hinge line of an anticline, along which the stratified rocks are folded.

Apatite
A widely occurring pale green to purple calcium phosphate mineral containing fluorine and chlorine. It is a common accessory mineral particularly in igneous and metamorphic rocks.

Figure 5: Apatite

Arenaceous

A descriptive term for a sediment consisting of sand or grains of a substance similar to sand. Usually the grains are composed of quartz or feldspar.

Arenite (adj. arenitic)

A quartz-rich sandstone with grain size between 0.06mm - 2mm and containing less than 15% matrix.

Argillaceous

A descriptive term for a sedimentary rock which contains a significant proportion of fine- to very-fine grained sediment, such as a clay or silt. Argillaceous rocks are typically soft and often weather into flakes or fine layers.

Figure 6: Agillaceous rock

Armourstone

A natural stone chosen for its durability and resistance to wear and erosion and employed as large irregular blocks ('rock armour') in coastal defence and flood protection structures.

Ash flow

A flowing mixture of mainly volcanic ash and large angular blocks of volcanic material formed during volcanic eruptions.

Augen

A large, lenticular 'eye-shaped' mineral grain or mineral aggregate visible in some foliated metamorphic rocks. Feldspar, quartz and garnet are common minerals which form augen.

Figure 7: Augen

Augite

A common rock-forming pyroxene mineral composed mainly of silica and aluminium with lesser amounts of calcium, magnesium, iron and titanium. It chiefly occurs in dark-coloured igneous rocks.

B

Baryte

An important industrial source of the element barium, the ore mineral baryte ($BaSO_4$) is typically pale coloured, very dense and heavy. It occurs as veins or stringers in sedimentary rocks and occasionally as small blebs or cement in sandstones.

Figure 8: Baryte

Basalt

A dark, fine-grained, extrusive (volcanic) igneous rock with a low silica (quartz) content, but is rich in iron, magnesium and calcium minerals. It generally occurs in lava flows, but also as dykes (basaltic dykes) and small intrusions. Basalt makes up most of the ocean floor and is the most abundant volcanic rock in the Earth's crust.

Basement bed

The lowest, distinctive unit of strata or layer within a geological sequence. Typically, basement beds are harder than surrounding geological layers, and/or display particular geological characteristics such as being conglomeratic and containing clasts from the top of the underlying strata following a time gap.

Basement high

A portion of a basement in a sedimentary basin that is higher than its surroundings (see Basin).

Basic igneous rock

A type of igneous rock which chemically contains a high proportion of dark iron or magnesium rich minerals. Basalt and dolerite are examples of basic igneous rocks (see Acidic, Basalt and Dolerite).

Basin

A large low-lying area, often below sea level, in which sediment accumulates and often forms thick sequences of rocks.

Bedded

A description of a unit of rock which shows a layered structure, such as individual beds of rock lying adjacent to each other (see Massive).

Figure 9: Bedded rock

Bedding plane

The divisions separating the strata or beds in sedimentary rock.

Bedrock

A solid rock underlying loose deposits such as soil or alluvium and superficial sediments such as glacial till or river terraces.

Belemnite

An extinct marine mollusc resembling a squid. Typically, only the internal bullet-shaped shell (called a 'guard') is found as a fossil in rocks of Jurassic or Cretaceous age.

Bench

A long, relatively strip of level or gently inclined land or rock (typically in a quarry) that is bounded by distinctly steeper slopes above and below it.

Berthierine

A green, iron-containing aluminium-silicate mineral (closely related to chamosite) that commonly occurs in sedimentary rocks. A rock containing berthierine may be described as berthierinitic.

Bioclast
A fragment or grain of any fossil, skeletal or shelly material contained within a sediment, often fine enough to be regarded as part of the matrix.

Bioclastic
A descriptive term applied to a sediment (such as bioclastic limestone, bioclastic sandstone) that contains grains or fragments of fossil material.

Figure 10: Bioclastic rock

Biogenic
A descriptive term for a materials which is formed by the actions of living organisms.

Biomoldic
A descriptive term for texture in a sedimentary rock comprising voids (or later infillings of voids) arising from the dissolution of fossil shells or other organic remains.

Biotite
A common rock-forming mineral of the mica family. Biotite is a black to dark brown silicate rich in iron, magnesium, potassium and aluminium. Like other micas it forms flat book-like crystals that separate into individual flakes.

Bioturbated
A descriptive term for sediments that have been reworked or disturbed by burrowing organisms such as worms or small crustaceans (see Trace fossils).

Figure 11: Bioturbated stone

Bivalve

A mollusc with two, often symmetrical shells (valves), which occur in marine, brackish or freshwater environments. Examples are cockles, clams, scallops and oysters. May be found as a hollow mould (see Lamellibranch).

Figure 12: Bivalve shelly limestone

Botryoidal

A descriptive term applied to a mineral, often chalcedony or iron-containing minerals, which has formed with a smooth, grape-like or bubble-like structure.

Boulder

A large rock fragment, typically one that has been worn smooth by erosion, with size greater than 256mm diameter. In common usage, a boulder is too large for one person to move.

Boulder clay

A clay containing many large stones and boulders, formed by deposition from melting glaciers and ice sheets (see Till).

Bowel stone

A greyish, hard, rounded, siliceous concretion that occurs in lower Cretaceous siltstone and sandstones. It is occasionally used as a decorative walling stone.

Figure 13: Bowel stone

Boxstone

An oval or lozenge-shaped ironstone pebble up to 50mm in diameter that typically occur in layers of sandstone or siltstone.

Brachiopod

A shelled organism with two, asymmetrical shells (valves) which lives exclusively in marine environments. It is also called 'lamp shell'. Fossil brachiopods may be found as hollow moulds (see Chonetid, Rhynchonellid).

Figure 14: Fossilised brachiopods

Brash

A soil with high concentrations of pebbles or angular pieces of material derived from the underlying rock.

Figure 15: Brash

Breccia

A sedimentary rock made up of angular fragments of rock (clasts) set within a finer-grained matrix (see Breccio-conglomerate, Conglomerate).

Figure 16: Breccia

Breccio-conglomerate

A sedimentary rock that contains a mixture of angular and rounded rock fragments or clasts (see Breccia, Conglomerate).

Bryozoan

An aquatic, mainly marine, colonial organism, often encrusting, which forms a calcareous skeleton of lime. Fossil bryozoans may resemble corals, but are usually much smaller.

C

Calcarenite (adj. calcarenitic)
A type of limestone containing more than 50% sand-sized (2 - 0.0625mm in diameter) carbonate grains (medium-grained limestone).

Calc-alkaline
A term used to describe igneous rock and magma that contain alkaline earths (magnesium and calcium oxide) and alkali metals (such as sodium, potassium).

Calcareous
A descriptive term for a type of rock which contains significant (10-50%) calcium carbonate ($CaCO_3$) principally in the form of a cement or matrix.

Calcilutite (adj. calcilutitic)
A type of limestone containing more than 50% clay to silt-sized (0.002 - 0.05mm in diameter) carbonate grains (very fine-grained limestone).

Calcite
An ubiquitous mineral made of calcium, carbon and oxygen; the principal carbonate ($CaCO_3$) component of limestone, chalk and marble.

Calcrete
The carbonate layers or nodules formed in the soil profile just below ground surface by evaporation and various other chemical and geological processes.

Carbonaceous
A descriptive term meaning to consist of, contain or yield carbon.

Carbonate
A general term used for sedimentary rocks consisting of 50% or more of either calcium carbonate or calcium magnesium carbonate (see Limestone, Dolostone).

Carboniferous Period
A geological period that spans from the end of the Devonian Period 358.9 million years ago, to the beginning of the Permian Period, 298.9 million years ago. The sedimentary rock of this period give rise to an important range of sandstones and limestones which have been used as building stones.

Carstone (carrstone)
A quartz-rich sandstone with a light to rusty red colour caused by iron oxide staining and cement, formed during the Cretaceous Period.

Figure 17: Carstone with galletted mortar joints

Cavitation
A process which forms cavities or bubbles in an igneous rock.

Cement (adj. cemented)
The materials which bind the grains and/or fossil components together to form a rock.

Cementation
The diagenetic process by which the constituent framework grains of a rock are bound together by minerals precipitated from associated pore fluid such as such as silica or calcite.

Cementstone
A type of concretion, often fine-grained, composed of clay or silt with a limestone component (see Nodule, Septaria).

Figure 18: Cementstone nodules and ferricrete. Church of St Peter and St Paul, St Osyth, Essex.

Chalcedony
A variety of silica, with a waxy to vitreous lustre, commonly found as chert and flint nodules in chalk.

Chalcedonic silica
A cryptocrystalline silica polymorph (SiO_2), often with a massive, botryoidal, nodular or stalactitic crystal form (see Chalcedony).

Chalk

A soft, white micritic limestone which is sometimes powdery. It is principally composed of microscopic skeletal remnants known as coccoliths. It was formed during Late Cretaceous times and often contains fossils and beds of flint (see Flint).

Figure 19: White chalk and Hunstanton red chalk

Chamosite

A green to brown, iron-rich member of the chlorite group of minerals. It is found in some low to moderate metamorphic rocks, and some igneous rocks.

Chatter marks

The small cracks and indentations on the surface of a flint or chert pebble (or sometimes on the surface of a sarsen stone) caused by collisions with other objects (usually pebbles).

Figure 20: Chatter marks

Chert
An opaque, extremely fine-grained sedimentary rock composed of silica (quartz). It occurs as nodules (flint), concretionary masses, or occasionally as layered deposits.

Chlorite
A group of platy silicate minerals containing various amounts of magnesium, iron, aluminium, water, and small amounts of other elements.

Chonetid
A type of fossil brachiopod shell, often semi-circular shaped, the surface of which is ornamented with fine radial ribs or lines (see Brachiopod).

Cinderstone
A dark, fine-grained variety of ferricrete, typically purple-black coloured and massive in form, sometimes containing small pebbles (see Ferricrete).

Figure 21: Cinderstone.

Clast
A particle of rock or single crystal which has been derived by weathering and erosion or pre-existing rocks and represents the basic constituents of a clastic sediment similar to sandstone.

Clay
A sediment of very fine-grained particles which are less than 2 microns (μm) in diameter. In reality pure clays are rare, most fine-grained sediments are muds (mudstones) which are a mixture of clay and silt-grade particles. Clay-grade carbonate sediments and cement are termed micrite (see Micrite).

Clay-gall
The fragments of clay-rich clasts often found at the base of sandstone beds as lenses. When concentrated, they form a conglomerate with a sandy matrix.

Cleavage
The tendency for a rock or mineral to break along a plane of weakness, attributable to the crystal lattice structure and alignment of minerals.

Cleaved surface
A planar surface, created as a rock is broken along a cleavage plane (see Cleavage).

Clunch
A loosely used builders term for rubble infill, usually referring to chalk or (erroneously) to malmstone.

Coal Measures
A lithostratigraphic term assigned to the Upper Carboniferous of the UK, where thick sequences of sandstones, shales and coals occur and may be economically worked. Often associated with ganister and seatearths (see Ganister, Seatearth).

Cob
A building method whereby clay (mud), sand, straw and water are mixed and formed into walls without the use of stone blocks.

Cobbles
The rounded rock clasts (of any lithology) which are between 64mm – 256mm in diameter.

Coccolith
A marine nannofossil; calcium carbonate plates formed by marine algae (coccolithophores). These fossils are the primary constituent of chalk.

Comminuted
A descriptive term for a material that is reduced to very small particles or fragments. In sedimentary rocks, the term often refers to broken fossil shell debris.

Competent rock
A rock that is relatively resistant to deformation, erosion and weathering.

Conchoidal fracture
A smooth fracture surface, often occurring in a fine-grained rock such as flint, which shows a curved pattern of fine concentric rings or ripples.

Concretion (adj. concretionary)
A rounded or elliptical mass of harder rock occurring within a (usually softer) sedimentary rock. Concretions are often calcareous, such as cementstone.

Conglomerate

A sedimentary rock made up of rounded pebbles (larger than 2mm in diameter), cobbles and/or boulders of rock in a finer-grained matrix (see Puddingstone).

Figure 22: Conglomerate

Consolidated

A descriptive term for a rock or sediment that has been compacted and cemented to form a hard rock that is resistant to deformation (see Unconsolidated).

Contact metamorphism

A form of high temperature, low pressure metamorphic alteration caused by the intrusion of igneous rocks into cooler surrounding rocks. The resultant metamorphosed rocks are usually very hard (see Hornfels).

Coprolite

Fossilised faeces, a type of trace fossil, formerly extracted in parts of eastern England as a fertiliser due to their high phosphate content (see Trace fossil).

Coquina

A type of limestone formed almost entirely of sorted and cemented fossil debris, often coarse shell and shelly fragments.

Corallian limestone

A coralliferous, white-grey limestone, found in the Corallian Group of the Late Jurassic Period (see Coralliferous limestone).

Coralliferous limestone

A limestone that contains an abundance of fossilised coral.

Figure 23: Coralliferous limestone

Coral rag

A rough limestone, composed of abundant fossilised corals and other carbonate marine fossils.

Coralline Crag

A yellow-brown limestone, unique to Suffolk, derived from the Coralline Crag Formation. It is readily cut and dressed into tabular blocks for building purposes.

Figure 24: Coralline Crag

Cornstone

A mottled red and green limestone characteristic of the Old and New Red Sandstone (see Old Red Sandstone, New Red Sandstone).

Cortex

The outer layer on a nodule, often referring to a flint nodule, where the outer thin cortex is white coloured.

Country rock

A rock indigenous to an area, in contrast to any igneous intrusion, rock salt (in salt domes) or unconsolidated sediments.

Cretaceous Period

A period of geological time that lasted from approximately 145 million - 65 million years ago. Sedimentary rocks of this age are the source of a number of important types of building stone such as greensand, flint and chalk.

Crinoid

A fossil ‘sea-lily’ related to modern day starfish and sea urchins. The stem is composed of circular discs (ossicles) which are frequently found as isolated fossils, especially in limestones (see Ossicles).

Crinoidal limestone

A sedimentary rock primarily composed of calcium carbonate grains with an abundance of crinoid fossil (notably isolated ossicles).

Figure 25: Crinoidal limestone column

Cross-bedding

A structure in the layers (beds) of a sedimentary rock formed by a movement of water or air. The term is usually applied to sandstone and the feature itself typically resembles sets of lines which are inclined with respect to the bedding planes or form regular arc-shaped patterns (see Planar cross-bedding, Trough cross-bedding).

Figure 26: Cross-bedding

Cross-lamination, cross-stratification

The layers of sediment within a bed, inclined relative to the bedding planes. A common feature of sandstones which records the transportation processes that occurred during deposition (see Cross-bedding).

Cryptocrystalline

A term used to describe a type of crystalline material, the constituent crystals of which are not optically resolvable, such as chert.

Current bedded

A term to describe the sedimentary rocks with features formed from moving water or air (see Cross-bedding, Imbrication).

Cut-and-fill structures

A structure in a sedimentary rock characterised by a concave-upwards erosion surface cut into the underlying rock strata by a high-velocity flow of water, and subsequently filled by sediment.

Cyclothem

A term typically applied, but not restricted to Coal Measures, to describe cyclic layers of sandstone, mudstone or shale and coal seams (see Coal Measures).

D

Dacite (adj. dacitic)

A fine-grained volcanic lava formed by the rapid cooling of lava, which is high in silica content (mainly quartz and feldspar) and low in alkali (sodium, potassium) metal oxides.

Figure 27: Dacite

Decalcification

The dissolution and removal of calcium carbonate (calcite) from a material. This process can form empty holes (called vugs) in a rock and also increase the porosity of the affected rock.

Deltaic

A term to describe an environment where rivers meet a larger water body such as an ocean. Often characterised by sediment fans and anastomosing streams.

Delves

The local names for small pits cut in the ground surface to extract stone, coal or minerals.

Derived fossils

A fossil material that has been transported from its original rock and redeposited in a new, younger rock.

Detrital

A descriptive term for a particle, generally of a resistant mineral, derived from an existing rock by weathering and/or erosion and deposited elsewhere.

Devonian Period

A geological time period spanning approximately 419.2 to 358.9 million years ago during the Paleozoic Era. It led to the formation of the Old Red Sandstone, a significant source of building stone.

Diagenic alteration, diagenesis
The chemical and textural change to sediments caused by temperature and/or pressure increase during burial.

Diorite
An intermediate, intrusive, coarse-grained igneous rock comprising of plagioclase feldspar, amphibole, pyroxene and less than 10% quartz.

Dip
The inclination of a plane (bed) within a rock, measured between 0-90 degrees, perpendicular to strike.

Dip slope
A gentle slope in the land that follows that the orientation of the underlying rock strata.

Dogger
A large, irregular nodule, often of clay rich ironstone, sometimes containing fossils, found in a sedimentary rock.

Dolerite
A medium-grained basic igneous rock found as small to medium-sized intrusions. Sometimes also termed micrograbbro (see Microgabbro).

Figure 28: Dolerite coursed masonry.

Dolomitised, dolomitic

Terms applied to limestones that have had some or all of their constituent calcium carbonate replaced by dolomite (calcium magnesium carbonate $CaMg(CO_3)_2$) (see Dolostone).

Figure 29: Dolomitic limestone.
Sea wall, Hartlepool, Durham.

Dolostone

A sedimentary rock (often a limestone), primarily composed of the mineral dolomite (calcium magnesium carbonate) (see Carbonate, Limestone and Dolomitic limestone).

Down-faulted

A descriptive term to an area of land or rock adjoining a geological fault that has been lowered as a result of movement along that fault line.

Drift deposits

The unconsolidated sediments of Quaternary or recent age, often deposited unconformably above older bedrock (see Superficial deposits).

Dripstones

A rock type formed through the precipitation of minerals (often calcite) from flowing water. Associated features include stalactites and stalagmites.

Dunham classification

A system of rock classification used to distinguish and name different types of limestones (see Folk classification).

Dyke

An intrusion morphology that is commonly sub-vertical and discordant to primary structures such as bedding. Commonly referring to igneous intrusions.

E

Echinoid

A marine organism formed of calcareous plates, commonly called a sea urchin. Fossil echinoids are often found in chalk sediments, flints or limestones.

Figure 30: Fossilised echinoid.

Elvan

A Cornish mining term for an igneous dyke cutting granite. Elvan rocks are often fine-grained and acidic in composition, although porphyritic varieties also occur; elvans often represent high quality stone for building purposes.

Figure 31: Elvan masonry.

Figure 32: Elvan

Epoch
A subdivision of the geological timescale that is smaller than a period. For example, the Early Jurassic (Liassic) is an epoch of the Jurassic Period.

Erosive base
The lowest level of the bedrock that has been eroded by water.

Escarpment
A steep slope or cliff often formed by faulting or differential erosion.

Estuarine
A descriptive term relating to the mouth of a water course, where the river meets a tidal, brackish water body.

Evaporite
A rock composed primarily of minerals derived from evaporation such as gypsum and rock salt (halite).

Figure 33: Evaporite

Exfoliation
A type of weathering pattern, often seen in sedimentary rocks, in which the surface layers of rock are weathered and split away as thin layers (see Spheroidal weathering).

Exposure
The natural or man-made outcrop of a geological unit. These can sometimes be observed in road cuttings or cliff faces.

F

Facies
A descriptive term for a sedimentary rock which indicates it mode of genesis. For example, dune sandstone facies and marine mudstones. Any named rock body may have several facies represented within it.

Fault
A planar discontinuity through which displacement has occurred, accommodating crustal deformation. Often associated with seismic activity.

Feldspar
A commonly occurring aluminosilicate mineral of potassium, sodium and calcium. Feldspars are widely distributed in igneous (such as granite), sedimentary (such as sandstone) and metamorphic rocks (such as gneiss).

Feldspathic
A descriptive term for a material that contains feldspar.

Felsite
A light coloured, fine-grained igneous rock containing mainly quartz and feldspar minerals.

Ferricrete
A dark reddish-brown coloured iron-oxide cemented layer formed in soil profiles or superficial (surface) deposits of Quaternary age. Typically containing rounded or angular pebbles of flint, chert or sandstone up to 60mm in diameter (see Cinderstone).

Figure 34: Ferricrete

Ferromagnesian
A stone containing iron- and magnesium-rich minerals such as olivine.

Ferruginous
A descriptive term for a rock that contains iron minerals usually in the form of an iron oxide which gives the rock a 'rusty' stain.

Figure 35: Ferruginous stone.

Festoon-bedding
A form of cross-bedding in sedimentary rocks which form elongated, scoop-like structures containing finer lines (laminations).

Fissile
A descriptive term for a rock that is easily split or cracked, often associated with cleavage planes or laminations such as shale.

Flaggy
A descriptive term for a finely laminated sedimentary rock that splits into thin sheets when exposed to weathering and may be used for paving (see Flagstone).

Flagstone
A sedimentary rock, often a sandstone, which splits naturally into slabs along foliation or bedding planes and may be used for paving or roofing.

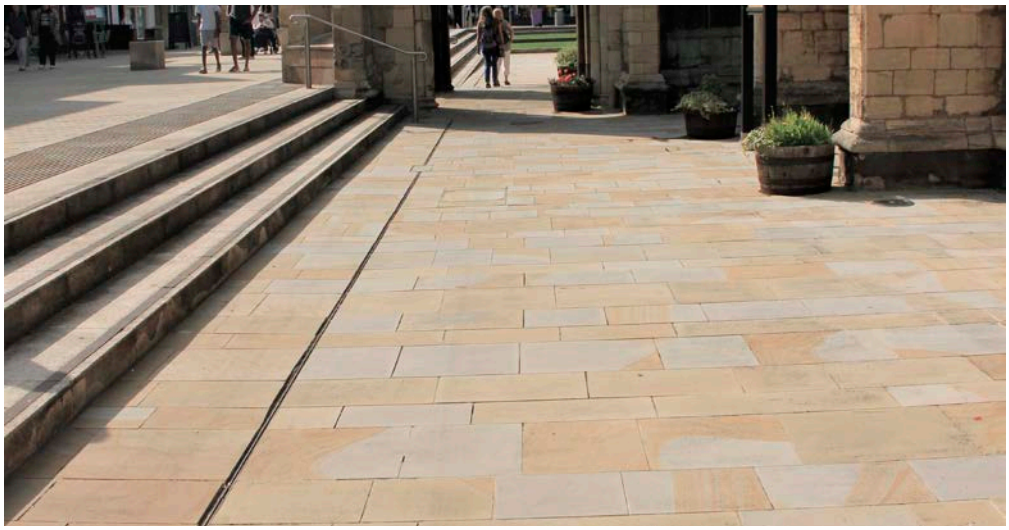


Figure 36: Flagstone

Flint

The hard, resistant beds or nodules composed of cryptocrystalline silica found only in Upper Cretaceous chalk strata and the superficial deposits derived from these rocks by erosion (see Chert).

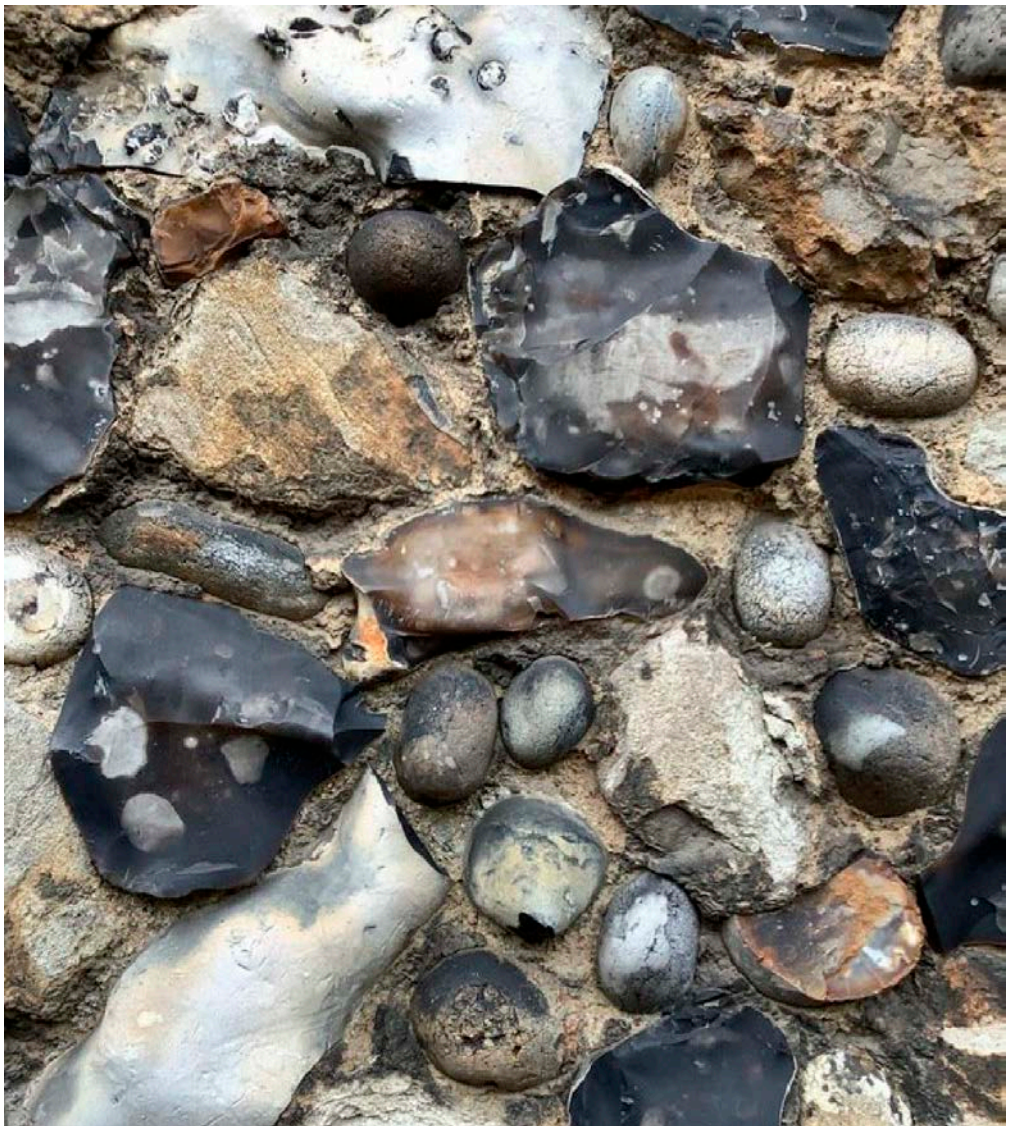


Figure 37: Flint

Fluvial

A term used to describe materials, processes or environments relating to or found in a river, for example fluvial sediments or fluvial processes.

Fluvio-glacial

A descriptive term applied to gravel and sand beds that were deposited from flowing meltwater discharged from ice sheets.

Folia, foliation

In metamorphic rocks where pressure flattens or elongates minerals so that they become aligned, the rock develops a platy or sheet like structure (folia, foliation) that reflects the direction that pressure was applied.

Folk classification

A system of rock classification used to distinguish and name different types of limestones (see Dunham classification).

Foraminifera
A very small single-celled marine organism that can be an abundant fossil in sedimentary rocks.

Foreset
A structure found in sedimentary rocks relating to the steeper side (the lee side or down-current side) of fossil ripple marks.

Formation
A named lithostratigraphic rock unit with distinguishable geological characteristics and boundaries that can be mapped, forming part of a group such as Bromsgrove Sandstone Formation.

Fossil cast
The 3D preservation of a fossil which occurs when the original organism/ plant dies and dissolves, and the void is filled with minerals and/or sediment before it is lithified.

Fossiliferous
A descriptive term for a rock bearing or containing fossils.

Figure 38: Fossiliferous stone

Freestone
A term used by masons to describe a rock that can be cut and shaped in any direction without splitting or failing.

Friable
A descriptive term used to describe the weak or crumbly texture of a rock.

G

Gabbro
A black, coarse-grained intrusive igneous rock that is the compositional equivalent of dolerite. Composed of calcium-rich feldspars, pyroxene and possible olivine, but containing little to no quartz.

Galleries
A horizontal or near horizontal underground passage, usually in a mine.

Galliard
An old Yorkshire term for flagstone.

Ganister
A hard quartzitic sandstone, commonly used to line fireplaces/furnaces due to its heat-resistant properties (see Coal Measures, Seatearth).

Gastropod
A mollusc with one shell, which may be marine or freshwater. Examples include whelks, snails and limpets.

Geode
A round rock which contains a hollow (often central) cavity, lined with crystals.

Geophantasmogram
A diagram used in a geological study to summarise visually the geologist's interpretation or origin of the rocks under discussion.

Glauconite
A mineral composed of iron and silica. It often occurs in Cretaceous and Tertiary sedimentary rocks as small greenish-coloured specks or grains. It gives the green colour to the rock type greensand.

Gneiss
A coarse-grained, foliated metamorphic rock that commonly has alternating bands of light and dark-coloured minerals.

Figure 39: Gneiss.

Goethite
A dark reddish-brown or yellowish-brown mineral consisting of oxyhydroxide iron, occurring typically as masses of fibrous crystals.

Goniatite
A common extinct marine mollusc with a spiral form, identifiable by its 'goniatitic suture' pattern on its shell.

Graded bedding
The systematic upwards transition from coarser to finer grains within a bed, reflecting the preferential deposition of larger/denser grains during early formation.

Grainstone
A grain-supported limestone with less than 1% mud (see Dunham classification).

Granite
A coarsely crystalline, light-coloured, acidic igneous rock composed primarily

Figure 40: Granite. Cottages, Tresco, Cornwall.

of quartz, feldspar and mica, with crystal sizes greater than 3mm.

Granodiorite
A coarse igneous rock with a composition between that of granite and diorite, consisting mainly of pale quartz and plagioclase feldspar with lesser amounts of pink orthoclase feldspar and dark, iron-rich minerals.

Granophyric
A descriptive term applied to an igneous rock in which there is a fine, irregular intergrowth of quartz and alkali feldspar.

Greensand
A sandstone of Cretaceous age, so-called because of the abundant presence of the greenish-brown mineral glauconite. It is used widely as a building stone in southern England.

Figure 41: Greensand. Carisbrooke Castle, Isle of Wight.

Greenstone

A low-grade metamorphosed basic igneous rock that frequently contains green minerals such as chlorite, epidote and talc.

Figure 42: Greenstone. Church of St Meryan, Meryan, Cornwall.

Greisenisation
A hydrothermal alteration of a granite, forming veins or vugs, containing quartz, topaz, tourmaline and fluorite (also metals such as tin, gold and tungsten).

Greywacke
A compositionally and texturally immature ('dirty') sandstone with more than 15% clay minerals and grain-size differences. It is often formed by turbidity currents (see Turbidite).

Griotte
A dark red marine limestone, often nodular with marine fossils.

Gritstone
A coarse-grained sedimentary rock composed mainly of grit-sized particles, typically with a diameter of between 2mm - 4mm. Typically applied to coarse carboniferous sandstones from the Pennines.

Groove cast, groove mark
The linear ridges or marks on the bedding surface of a sedimentary rock that indicate where an object has been dragged across the sediment by flowing water.

Groundmass
The fine-grained or glassy matrix surrounding larger crystals, typically within an igneous rock.

Group
A geological or stratigraphical term for a unit of related formations.

Gryphaea
A form of fossil oyster, often with a curved shape, particularly common in Jurassic sedimentary rocks.

Figure 43: Gryphaea

Haematite
A major mineral of iron (iron oxide) with a red-brown colour, found as an accessory mineral in many rocks and formerly an important source of iron and pigments.

Haematitisation
An alteration process where the iron oxide mineral haematite is precipitated in pores or replaces other minerals, often turning the rock a rusty red colour.

Hemipelagic
A descriptive term applied to a silt-bearing muddy sediment deposited in a deep-sea environment.

Hornblende
A dark green to black-coloured silicate mineral which forms in many igneous and metamorphic rocks.

Heterolithic
A descriptive term for a rock formation composed of different types or sizes of clasts, grains, or rock fragments. It indicates a mixed composition rather than a uniform one.

Heterolithic bedding
A fine interbedding of sand and mud formed in an area of variable current flow.

Horizon
A bedding plane surface where there is a marked change within a sequence of sedimentary or volcanic rocks, or a distinct layer or thin bed with a characteristic appearance, lithology or fossil content within a rock sequence.

Hornfels
A hard, metamorphosed rock, typically formed at the contact edge of a granite intrusion such as seen on Dartmoor.

Hybridised rocks
The igneous rock types that represent the crystallised products of 'hybrid' magmas formed as a result of different types of magma mixing (for example, the mixing of acidic and basic magmas).

Hydrothermal
A descriptive term relating to the action of water under high temperature, important for forming some mineral deposits and cements.

Hypersthene
A dark-coloured, iron and magnesium pyroxene mineral found in igneous and some metamorphic rocks, and sometimes meteriorites.

I

Iddingsite
A mineral that is formed from alteration of the mineral olivine and consists of a mixture of remnant olivine, clay minerals and iron oxides.

Igneous rock
The rock formed when molten magma cools and solidifies, forming extrusive rocks erupted from volcanoes (such as basalt and other lavas) and intrusive rocks that cool beneath the Earth's surface such as granite, gabbro, granodiorite, dolerite).

Ileminite
A dark, black-coloured mineral composed of iron and titanium oxide. It typically occurs in metamorphic or igneous rocks, but when weathered it can concentrate in sandy deposits where it may be commercially worked.

Imbrication (adj. imbricate)
The grains or clasts within a rock that are aligned in a common direction and overlapping, formed from deposition in flowing water such as on the base of a river (see Current bedded).

Impersistent
A term used to describe a rock layer or stratum that is not continuous across a wide area. It may thin out, disappear, or change in character over short distances.

Incline
A surface that has been tilted from its original horizontal plane (see Dip).

Induration
The process of hardening a rock or sediment through cementation commonly during diagenesis (see Diagenetic alteration/Diagenesis).

Infauna
Aquatic animals that live in the substrates of water bodies. They are commonly found in soft sediments.

Inlier
An outcrop of older rocks, often (but not always) bounded by faults, or formed by erosion, completely surrounded by geologically younger rocks (see Outlier).

Figure 44: Inlier. Ingleborough, North Yorkshire

Inoceramid
An extinct type of bivalve clam that resembled marine mussel shells and often exhibited coarse wrinkles on the shell surface. Often encountered in cretaceous, especially chalk, deposits.

Interbedded
A descriptive term applied to beds (layers of rock) of a particular lithology that alternate with beds of a different lithology. For example, sedimentary rocks may be interbedded if there were sea level variations in their sedimentary depositional environment (see Lithology).

Figure 45: Interbedded rock

Interdigitate
A term to describe different units of rock with varying lithologies that occur adjacent to one another and interlock, sometimes repeatedly.

Intergradational
The nature of two or more features gradually merging into one another.

Intermediate
A descriptive term for an igneous rock which has a chemical (and mineral) composition between acidic and basic (see Acidic, Basic).

Interstitial
A term to describe the water that occurs naturally within the pores of a rock.

Intraformational
A descriptive term for a feature or system that occurred or exists within a geological formation (see Formation).

Intrusive
A term to describe a body of igneous rock formed from molten magma that has been injected into pre-existing rock. Examples of intrusive rocks include the granite bodies of South West England and the dolerite Great Whin Sill of northern England.

Inundation
The process of exceeding or overwhelming a system such as rising floodwater overwhelming flood defences.

Ironpan
A near-surface horizon where iron minerals have accumulated and consolidated from fluid movement or weathering of the underlying rock (saprolite).

Iron-shot limestone
A carbonate rock containing spots or small veins of iron minerals, creating a speckled appearance on its surface (see Limestone).

Iron staining
The rusty-coloured patches, blotches, lines, crusts or veins on the surface of iron-rich rocks, especially sandstones.

Ironstone
A hard sedimentary rock cemented by iron oxide minerals, often a dark brown or rusty red colour.

Figure 46: Ironstone. Cottages, Rockingham, Northamptonshire.

J

Jurassic Period

A period of geological time that lasted from approximately 145 million – 200 million years ago. Sedimentary rocks of this age are the source of a number of important types of building stone such as Northampton Ironstone, Bath Stone, Blisworth Limestone, Portland Limestone and Purbeck Limestone.

K

Kaolinisation

A common weathering (or alteration) process that breaks down minerals such as alkali feldspar, into the clay mineral kaolinite.

Karstic

A term to describe a landscape of soluble rocks (such as limestone) that have been extensively chemically weathered and dissolved, forming a rugged landscape with caves and sinkholes.

Killas

A Cornish mining term for metamorphic rocks in Cornwall and Devon that were originally of sedimentary origin but which have been altered by heat from the granite intrusions. Many killas resemble slates and are used for walling and roofing.

Knapped flint

A worked flint which has been fractured (cleaved) to reveal the interior of the nodule.

Figure 47: Knapped flint. Church of St Mary, Santon Downham, Suffolk.

L

Lacustrine
A term used to describe materials, processes or environments relating to or found in a lake, for example lacustrine deposits.

Lamellibranch
An old term used as an alternative equivalent name for bivalve (see Bivalve).

Laminae
The thinnest type of layers in sedimentary rocks, less than 10mm in thickness.

Lamination
A small-scale sequence of fine layers that occur in sedimentary rocks.

Lamprophyre
A name applied to various dark-coloured, porphyritic igneous rocks that contain abundant phenocrysts of iron or magnesium minerals such as mica, hornblends, pyroxene and olivine. Any feldspar minerals present are usually only present in the rock groundmass.

Lava
A magma that reaches the Earth's surface through a volcanic eruption. When cooled and solidified, forms extrusive (volcanic) igneous rock.

Lenses
A body of material that is thick in the centre, thin on the edges and laterally discontinuous, forming an oval-like shape in cross section that resembles a lens.

Lenticular horizon/beds
The strata or beds of rock, that are convex and laterally discontinuous, resembling a lens.

Leucocratic
A descriptive term for a light-coloured rock, caused by an abundance of light-coloured felsic minerals such as quartz, muscovite mica, orthoclase feldspar (see Melanocratic).

Lias (adj. Liassic)
A former term for the Lower Jurassic extending from approximately 180 million years – 200 million years ago. This is a source of building stone, Blue Lias limestone (see Jurassic).

Liesegang, Liesegang banding

A type of banded structure which is characteristic of ironstones and iron-rich rock. In individual stone blocks, it is often seen as different colour patterns, typically shades of red, orange, brown or purple.

Figure 48: Liesegang banding

Lignite

A low-grade variety of coal, derived from compressed peat and other plant matter.

Lime

Calcium oxide (CaO) made by burning limestones or chalk. By adding water (slaking) it is converted to calcium hydroxide ($Ca(OH)_2$). This is used in lime mortar, plaster, render and as an agricultural fertiliser.

Limestone

A sedimentary rock consisting mainly of calcium carbonate ($CaCO_3$) grains such as ooids, shell and coral fragments and carbonate mud. Often highly fossiliferous (see Carbonate, Dolostone).

Figure 49: Limestone

Limonite (adj. limonitic)
A hydrated iron oxide ore that varies in colour from dark brown to yellow.

Lithic
A grain or clast of lithified rock that has been reworked and redeposited in a younger rock.

Lithium-mica
A pink or lilac, lithium-bearing mica found in granite rocks and pegmatites.

Lithology (adj. lithological)
The description of a rock based on its mineralogical composition and grain-size such as sandstone, limestone, mudstone and so on.

Littoral
A descriptive term applied to an area on the coastline between the high water limit and the base of the inter-tidal zone.

Load cast
The bulges, lumps and lobe-shaped structures typically found on bedding planes in sedimentary rocks. Load casts are formed when a 'load' (the denser layer of sediment) sinks into an underlying (less dense) layer of sediment.

M

Mafic
A descriptive term for an igneous rock that usually contains silica (in the form of feldspar, not quartz) and abundant mafic minerals such as hornblende and pyroxene. Examples of mafic rocks include gabbro, dolerite and basalt.

Macrofossil
A fossil which is large enough to observe without the need for magnification, such as ammonites.

Magmatic
A descriptive term for the igneous systems containing hot, molten igneous rocks.

Magnesian limestone
A limestone which contains a significant proportion of magnesium in the form of dolomite ($MgCa(CO_3)_2$) and/or magnesium within the calcite ($CaCO_3$) crystal structure.

Figure 50: Magnesian limestone

Malmstone
A massive, rarely fossiliferous calcareous siltstone of the Cretaceous Upper Greenstone Formation, with a variety of colours from creamy white to brown. It is used as a building stone and may erroneously be referred to as 'clunch'.

Mammillated
A descriptive term for a type of texture in a rock or mineral comprising of clusters of rounded, smooth grape-like structures.

Marble
A limestone which has undergone metamorphism and has been converted into a marble. The term is also used loosely by the quarrying or stone industry for a polished sedimentary rock such as limestone.

Figure 51: Malmstone. Public house, Buriton, Hampshire.

Marl
A carbonate mudstone containing a large proportion of clay-sized mineral grains.

Marlstone
A Jurassic-aged formation (Marlstone Rock Formation) containing ferruginous ironstones and calcareous sandstones. It is used locally as a valued building stone.

Marl parting
A thin, discontinuous bed of marl within a rock formation.

Massive
A descriptive term for a sedimentary rock which is homogeneous and lacks any internal structures (such as cross-bedding or ripple-marks) or fractures.

Matrix
The fine-grained, often microscopic minerals within a rock forming the groundmass around larger crystals or grains (see Groundmass).

Megacryst (adj. megacrystic)
A crystal or grain that is significantly larger than the surrounding groundmass, in igneous and metamorphic rocks (see Porphyritic).

Megalith
An enormous stone, often elongate and usually standing upright or forming part of a prehistoric structure (see Menhir, Sarsen).

Melanocratic
A descriptive term for a dark-coloured rock, caused by an abundance of dark-coloured mafic minerals such as olivine, pyroxene, amphibole, biotite and so on (see Leucocratic).

Member
A lithologically distinct, named lithostratigraphic unit that forms part of a formation such as the Ridgeway Member of the Lulworth Formation.

Menhir
A large, usually elongated, upright standing stone (see Megalith, Sarsen).

Mesocratic
A descriptive term for an igneous rock with approximately equal amounts of dark and light-coloured minerals (see Leucocratic, Melanocratic).

Metalliferous mineralisation
A geological process which causes the formation of metal-bearing minerals such as copper, tin, lead or zinc ores (see Mineralisation).

Metamorphic
A descriptive term for a rock which has been subject to heat and/or pressure, causing changes in its solid state such as mudstone to slate and limestone to marble.

Metamorphism (adj. metamorphosed)
Alteration of the minerals, textures and composition of a rock by exposure to heat, pressure and chemical actions.

Metasedimentary
A descriptive term for a sedimentary rock that shows evidence of having been subjected to metamorphism (increased temperature and/or pressure) (see Metamorphosed).

Mica
A group of silicate minerals composed of aluminium, potassium, magnesium, iron and water. Mica forms flat, plate-like crystals that cleave into smooth flakes. Biotite mica is dark, black or brown; muscovite mica is light-coloured or clear.

Figure 52: Mica

Micaceous
A descriptive term for a rock which contains a high proportion of the platey mica minerals muscovite and/or biotite (see Mica).

Micrite (adj. micritic)
A limestone consisting of microcrystalline calcite mud or a finely crystalline carbonate cement.

Microcrystalline
A descriptive term for a crystalline material, of which the constituent crystals can be seen only with a microscope.

Microgabbro
A medium-grained igneous rock with the mineral assemblage and chemistry of dolerite (see Dolerite).

Microgranite
A medium-grained igneous rock with the mineral assemblage and chemistry of granite (see Granite).

Millet seed grain
A very well sorted, well-rounded sand-sized grain of (mainly) quartz, resembling millet seeds.

Millstone Grit
A group of highly resistant, course quartz-rich sandstones and gritstones, of Carboniferous age, historically used as millstones in the UK, but also an important source of building stones. The 'Millstone Grit Group' includes the Ashover Grit, Chatsworth Grit and Rough Rock among others (see Gritstone).

Figure 53: Millstone Grit. Warehouses, Bristol.

Milk-flake texture

A product of weathering where layers or 'flakes' of rock are released from exposed bedrock (see Spheroidal weathering).

Mine

An underground site of mineral or stone extraction accessed by a shaft or adit. It may also be applied to surface workings, such as an opencast coal mine.

Mineralisation

The formation of minerals. New minerals may be added to fractures and empty spaces in a rock or by replacing pre-existing minerals with different ones.

Minestone

A by-product of coal or ore mining, either surface or underground, where non-coal or non-ore bearing material is separated from the coal and tipped on site. It is likely to contain varying proportions of sandstone, shale, mudstone and coal fragments, which can be reworked or used for restoration purposes. In Cornwall, minestones from ore workings are commonly encountered in buildings and field walls.

Mollusc

A large phylum of invertebrates commonly with an external calcareous shell and includes the ammonites, bivalves (clams) and gastropods. Fossil molluscs may be found in building stones and sometimes as hollow moulds, such as Portland Roach.

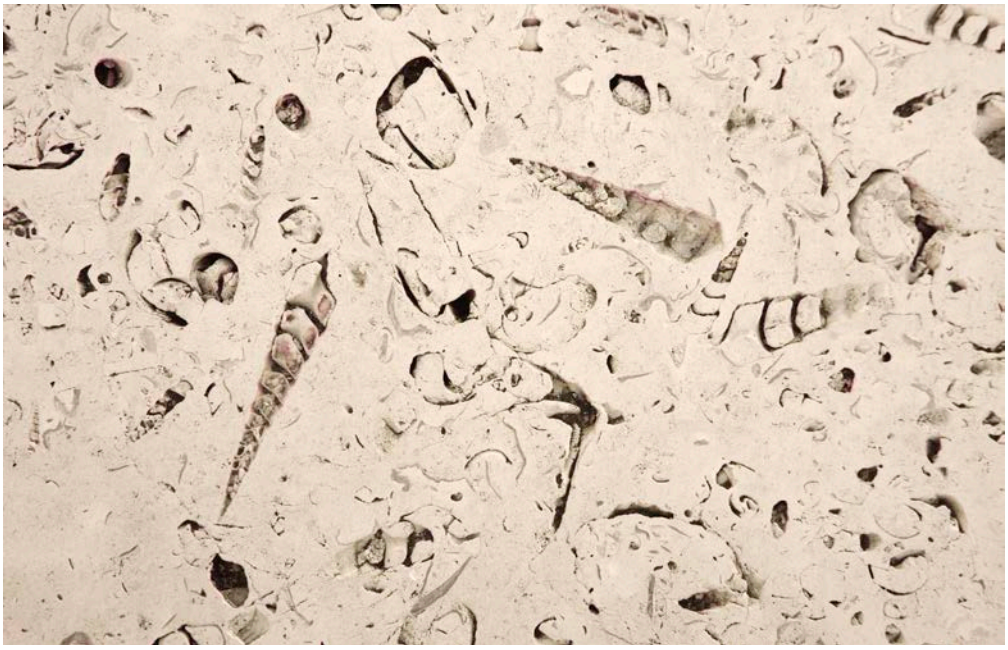


Figure 54: Fossilised molluscs

Moldic porosity

A type of secondary porosity in a rock formed by the dissolution of a pre-existing constituent such as a shell or rock fragment or grain. The pore spaces preserve the shape or mold of the dissolved material.

Mudclast conglomerate

A rock containing rounded pebbles, composed of clay and silt-sized grains (mudstone), within a finer-grained matrix (see Conglomerate).

Mudcrack

Also known as dessication cracks, mudcracks are polygonal sedimentary structures formed as muddy sediment dries and contracts. Such structures are sometimes seen fossilised in mudstones and fine-grained siltstones.

Mudstone

A fine-grained sedimentary rock composed of a mixture of clay and silt-sized particles. When metamorphosed by pressure, this forms many rock types such as slate and schist (see Shale, Schist, Slate).

Muscovite

One of the mica family of minerals. Muscovite is light-coloured or clear mica, sometimes incorrectly called isinglass.

N

Nappe
A large body or sheet of rock that has been moved a distance of approximately 2km or more from its original position by folding or faulting (see Fault).

Namurian
A subdivision of the Carboniferous Period of geological time with an age approximately between 326 - 313 million years ago.

Neolithic Period
A period of time marking the end of the Stone Age, characterised by the development of stone tools and farming (approximately between 4,000 - 2,500BC).

Neoproterozoic Era
An era of geological time that lasted from approximately 1,000 million years - 541 million years ago.

New Red Sandstone
The beds of red sandstones and associated rocks deposited during the Permian and Triassic (Permo-Triassic) periods of geological time. It is an important source of building stones (see Old Red Sandstone).

Figure 55: New Red Sandstone

Nodule
An irregular, spherical to ellipsoidal, flattened to cylindrical body, commonly composed of calcite, siderite, pyrite, gypsum and chert, common in many sedimentary rocks including soils and evaporites.

O

Old Red Sandstone

The beds of red sandstones and associated rocks deposited during the mid Silurian to Devonian periods of geological time. An important source of building stones (see New Red Sandstone).

Figure 56: Old Red Sandstone

Ooid (adj. ooidal)

A sand-sized (less than 2mm) spheroidal grain formed by the precipitation of calcium carbonate in concentric layers around a central nucleus of mineral or fossil material.

Oomoldic porosity

A type of porosity in a rock formed by the dissolution of a pre-existing ooid (see Moldic, Ooid).

Oolith (adj.oolitic)

A type of limestone composed principally of ooids.

Figure 57: Oolitic limestone

Orogeny
A tectonic mountain-building event, caused by faulting and folding of rocks at convergent plate boundaries such as the Alpine Orogeny forming the Alps.

Orthoclase
A variously-coloured potassium, feldspar, common in igneous and metamorphic rocks.

Orthoquartzite (adj. orthoquartzitic)
A sedimentary rock made up almost exclusively of quartz sand and is relatively free of, or lacks, a fine grained matrix.

Ossicles
The 'stem' parts of crinoids and marine animals related to starfish and sea urchins (see Crinoids, Crinoidal Limestone).

Ostracod
A small fossil shell (of crustaceans), usually less than 2mm long, which resembles a seed.

Ostreid
The marine shell belonging to the family Ostreidae, or oysters.

Figure 58: Ostreid

Outlier
An outcrop of younger rocks, sometimes fault bounded but also caused by folding or erosion, completely surrounded by older rocks (see Inlier).

Outcrop
An area where solid bedrock is naturally exposed at the ground surface.

Overburden
A quarrying term, relating to the uneconomic soil or rock cover that needs to be removed to extract the valuable, underlying rocks or minerals below. It may be tipped on site and reworked or used for restoration (see Minestone).

P

Packstone
A grain-supported limestone with more than 1% mud matrix (Dunham classification).

Palaeo-river
The remains of an inactive or ancient river, or its former path, which has often been filled in or buried by younger sediment.

Palaeogene Period
A period of geological time (also informally called the Lower Tertiary) lasting from the end of the Cretaceous Period (65 million years ago) to the beginning of the Neogene Period (23 million years ago).

Palaeolithic Period
An extensive period of time (approximately 2.5 million - 11,000 million years ago) in which early Homo genus arrived in Europe and developed stone tools.

Pebble
A rounded or subrounded piece of rock which has a diameter of between 4mm and 64mm.

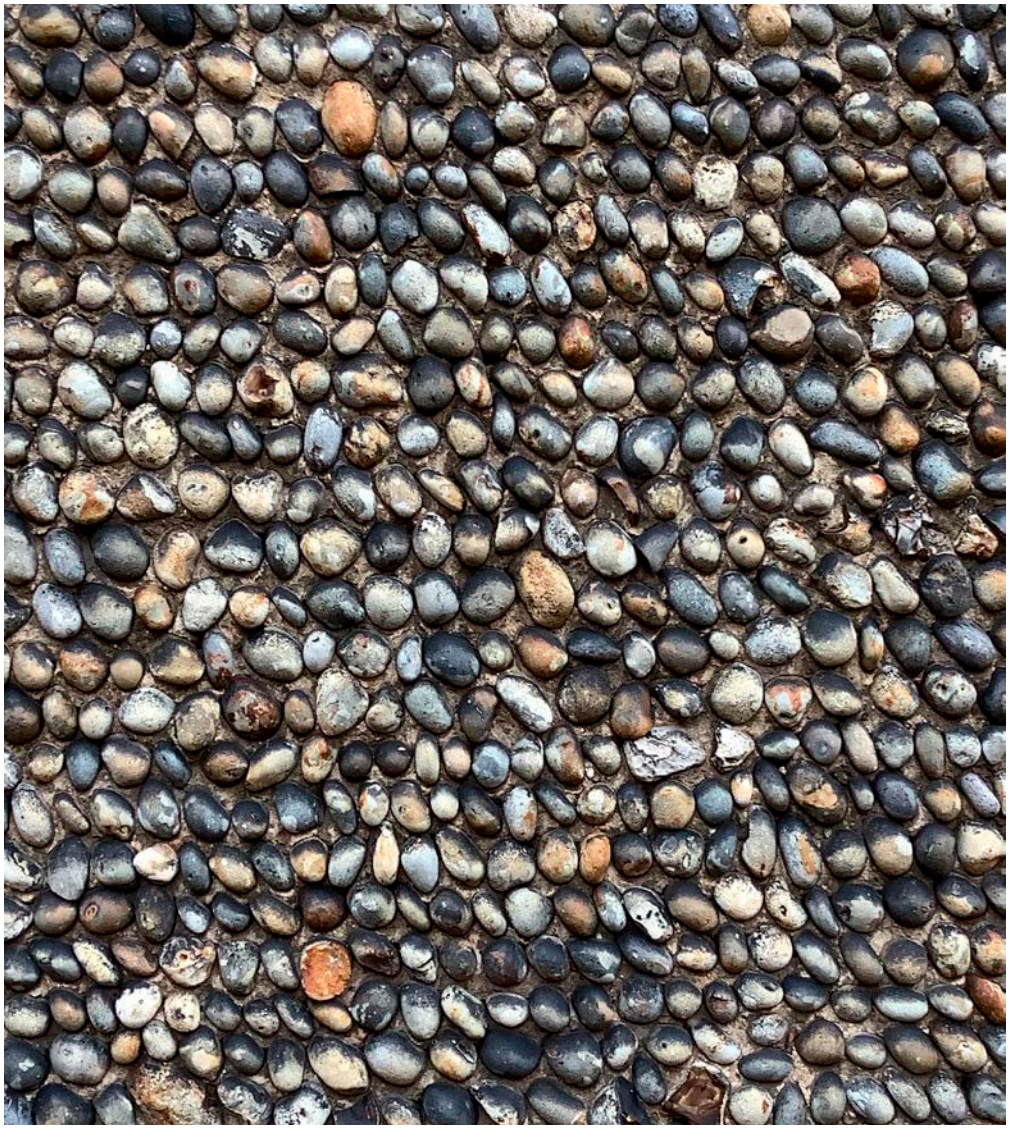


Figure 59: Pebble

Pedogenic
A descriptive term relating to processes occurring within or generating soil.

Pegmatite
A very coarse-grained igneous rock with phenocrysts over 250mm in length, usually of granitic composition and forming at a late stage of crystallisation of a magma.

Pellets
The minute rounded clay or micritic carbonate lumps, generally of faecal origin.

Peloid
A sand-sized grain of carbonate mud.

Peloidal
A descriptive term for a type of limestone that contains peloids which are similar to ooids (see Oolitic Limestone) but typically are formed of very fine-grained mud which lacks any discernible internal structure or concentric layering.

Pentacrinoid
A type of crinoid which has a distinctive 5-sided, star-shaped cross-section to its stem ossicles (see Crinoid, Ossicles).

Figure 60: Pentacrinoid

Peridotite
A dark-coloured, coarse-grained ultrabasic igneous rock that is made up mainly of olivine and pyroxene, with quartz or feldspar.

Periglacial
A descriptive term for an environment, adjacent to a glacial environment, that exhibits freezing and thawing of water and ice.

Period
The basic division of the geological time scale, examples include Devonian, Carboniferous, Jurassic and Cretaceous.

Permafrost
A subsurface zone within soils and sediment in cold climates, that is permanently frozen for more than two years. It is recognised as important carbon sinks.

Permo-Triassic
A duration of geological time combining the Permian and Triassic periods, informally called the New Red Sandstone (see New Red Sandstone).

Petrographic
A term to describe the microscopic details of a rock, including composition, structure and genesis.

Phanerozoic
The current geological eon, beginning 541 million years ago, characterised by abundant animal life.

Phenocryst
The relatively large and usually conspicuous crystals, surrounded by smaller crystals that form the main fabric of igneous rock.

Figure 61: Phenocryst

Phosphatic
A descriptive term for a rock containing phosphate minerals, either dispersed as cements or in the form of nodules.

Pigeonite
A dark-coloured, iron and magnesium silicate mineral (one of the pyroxene minerals) which also contains up to 25% calcium. It is mainly found in igneous rocks, and sometimes meteorites.

Pisoid
A carbonate-coated grain over 2mm in diameter, with an origin similar to an ooid.

Pisoidal, pisolitic
A descriptive term for a carbonate rock containing an aggregate of individual pisoid grains (see Pisoid).

Plagioclase
A form of feldspar, consisting of a series of calcium to sodium-rich aluminosilicate minerals (aluminium, silicon and oxygen). They are usually a white/off-white colour, and commonly occur in igneous and sedimentary rocks.

Planar lamination
A sedimentary structure, common in sandstones, resembling inclined laminations bounded by straight (planar) surfaces (see Cross-bedding).

Figure 62: Planar Lamination

Platy
This describes minerals that crystallise in thin sheets and tend to flake along cleavage planes.

Playa lake
A dry lake bed in the form of a basin or depression that formerly contained a standing surface water body which disappeared when rates of evaporation exceeded recharge (such as through low rainfall). Playa lakes characteristically occur in arid climates.

Pleistocene Period
A geological period of time existing between 2.6 million years and 11,700 years ago, containing the last Ice Age.

Pluton (adj. plutonic)
An intrusive igneous body, often referred to intrusions that are emplaced at depth.

Polyzoa
A group of marine and freshwater invertebrate organisms. Another term for Bryozoa.

Porcellaneous
A term to describe to a smooth surface resembling porcelain, often used to describe rock surfaces and mollusc or foraminifera shells (see Foraminifera).

Porphyritic
A descriptive term for an igneous rock texture characterised by larger crystals (see Phenocrysts) in a matrix of distinctly finer crystals (see Groundmass).

Figure 63: Porphyritic

Porphyry
An igneous rock that exhibits a porphyritic texture. Often named by the mineral which forms the largest crystals (phenocrysts) in the rock matrix, for example quartz porphyry.

Porosity
The ratio of the fraction of voids to the volume of rock in which they occur.

Porous
A descriptive term for a material. containing pores (voids containing air or fluid) (see Porosity).

Puddingstone

A local name for a conglomerate, usually containing clasts of various colours, such as Hertfordshire Puddingstone (see Conglomerate).

Figure 64: Puddingstone

Pyrite (adj. pyritic)

A common metallic, brass-yellow iron sulphide mineral, commonly cubic or massive. Informally called fools gold.

Pyroclastic rock

A rock formed by the accumulation of material generated by the explosive fragmentation of magma and/or existing solid rock during a volcanic eruption (see Ash-flow).

Pyroxene

A group of dark-coloured, rock forming silicate minerals that contain iron and magnesium and are commonly found in igneous and metamorphic rocks.

Q

Quarry
A surface site of stone or mineral extraction. The term may be locally applied to underground workings, for example, those for Bath Stone (see Mine).

Quartz
The crystalline form of silica (silicon dioxide, SiO_2).

Quartzite
A durable metamorphic rock consisting mainly of quartz grains and silica cement, formed by alteration of a sandstone by heat and pressure.

Quartzitic sandstone
A sandstone composed almost exclusively of quartz grains and cemented with quartz cement forming a very hard and resistant rock.

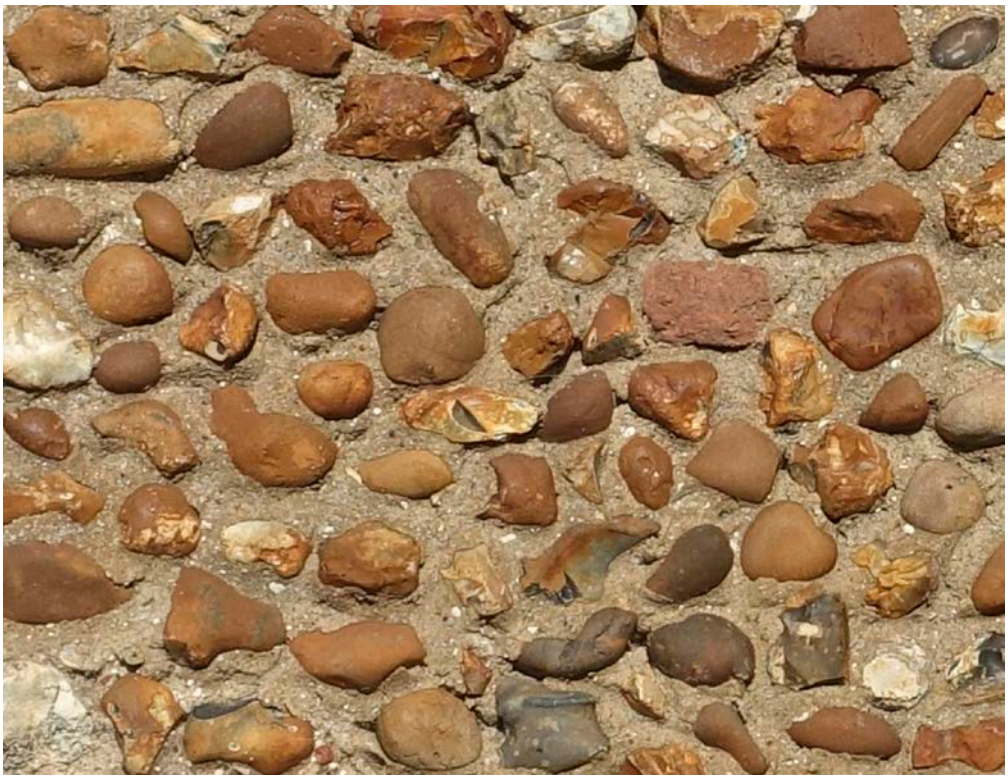


Figure 65: Quartzitic Sandstone

Quartz porphyry
The name given to a group of hemi-crystalline acid rocks containing porphyritic crystals of quartz in a fine-grained matrix.

Quaternary Period
A period of geological time that lasted from approximately 2.6 million years ago to the present day. It includes the last Ice Age.

R

Ragstone
A vernacular term for a coarse, shelly limestone.

Reef knoll
A geomorphological ridge or hill composed of carbonate material (fossiliferous limestone) that accumulated on the ridge of an ancient sea floor.

Remanié
A part or fragment (often a pebble or fossil) of an older geological formation which has been incorporated into a geologically younger deposit.

Rhynchonellid
A type of brachiopod shell this is typically triangular shaped and has strong radiating ridges on its shell (see Brachiopod).

Rhyolite
A fine-grained, acidic volcanic rock containing high amounts of quartz and plagioclase feldspar.

Figure 66: Rhyolite

Ripple marks

Wave-like structures that occur in sandstones caused by the movements of water or wind when the sands were being deposited (often best seen on the upper surfaces of sandstone layers or beds).

Figure 67: Ripple marks

Rip-rap

A range of rocky material placed along shorelines, bridge foundations, steep slopes and other shoreline structures to protect them from scour and erosion.

Rip-up clasts

Gravel or pebble-sized pieces of clay or mud created when an erosive current flows over a bed of clay and mud and removes pieces of clayey sediment or shale and transports them a short distance. Often found at the base of sandstone channels.

Rottenstone

A porous sandy carbonate rock, commercially exploited for its use as a metal polish when in powder form.

Rugose coral

A type of fossil coral that is often circular in section and horn or ice-cream cone shaped

Figure 68: Rugose coral

S

Saccharoidal

A descriptive term for an irregular, crystalline or granular mineraological texture that resembles granulated sugar.

Saliferous

A term describing a rock or stratum that contains or produces salt.

Salt-and-pepper texture

A texture seen in several sandstones caused by the alternation of minute cavities left by fossil sponge spicules and disseminated glauconite grains.

Sandstone

A sedimentary rock composed of sand-sized grains (such as generally visible to the eye, but less than 2mm in size) usually composed of quartz. May also be used in a loose sense to describe quartz-rich stones of various compositions.

Figure 69: Sandstone. Cottages, Staithes Harbour, North Yorkshire.

Sandrock
A rock made of cemented quartz sand, often unconsolidated and soft with a carbonate-rich cement.

Sarsen, sarsen stone
A very hard sandstone formed mainly of silica-cemented quartz grains. Often found as boulders or rounded pebbles.

Figure 70: Sarsen stone. Avebury, WIltshire.

Scarp
A steeply inclined topographic surface formed by the exposure of a fault plane due to vertical displacement and/or erosion. It can also result from folding, as seen in features like the chalk scarps of the North and South Downs.

Schist
A metamorphic rock derived from fine-grained sedimentary rock such as shale. Schists have visible crystals, commonly aligned mica and are named for their mineral constituents and schistose texture (see Schistosity).

Schistosity
A planar metamorphic fabric caused by shearing and/or growth of new minerals during metamorphism (see Schist).

Scour-and-fill
A sedimentary structure formed by the high velocity flow of water, comprising a concave-upwards surface (the scour) and a sedimentary infill (the fill).

Scree
The fragmented debris collected on the slope and foot of an exposure of rock face, caused by freeze-thaw weathering.

Seatearth
The layer of sedimentary rock underlying a coal seam (see Coal Measures).

Sea urchin
An echinoderm with a sub-spherical form and composed of calcium carbonate plates and spines (see Echinoid).

Sedimentary rock
A rock that is commonly formed by the binding together (see Lithification) of sediment particles (such as sandstone, siltstone, mudstone, limestone).

Sedimentation
The process whereby loose and weathered material is transported (by water, wind, ice or volcanic eruption for example) and then deposited as layers of sediment.

Seminula ooilte, seminula pisolite
A type of oolitic or pisolitic limestone that contains the fossil remains of a terebratulid brachiopod shell called Seminula (see Oolitic limestone, Brachiopod, Terebratulid).

Septaria, septarian nodule
A type of nodule which contains angular cavities or cracks which are partially or wholly filled by the mineral calcite. Formerly, it was an important raw material for the production of cement on the Thames Estuary (see Cementstone).

Figure 71: Septaria

Serpentinite

A rock composed of one or more serpentine group minerals. Minerals in this group are formed by serpentinization.

Figure 72: Serpentinite

Serpentinisation

The process of hydration and metamorphic transformation of basic rocks to form serpentinite rocks.

Serpulid

A fossil marine worm, with a straight, curved or coiled tube.

Shaft

A deep vertical passage from the ground surface entering into a mine (see Adit).

Shale

An argillaceous rock with closely spaced, well-defined laminae (see Mudstone).

Figure 73: Shale

Siderite (adj. sideritic)
An iron carbonate mineral, commonly encountered in iron-rich sedimentary rocks. Also applies to a rock or nodule that contains the iron mineral siderite.

Silica
Silicon dioxide (SiO_2), which commonly exists in the form of quartz – an essential framework constituent of many sedimentary and igneous rocks, but which also occurs as a natural cement and in nodular form in both sandstones and limestones (see Quartz, Chert, Flint).

Siliceous, silicic
Descriptive terms for a rock which has a significant silica content (non-granular) usually in the form of an intergranular cement (such as siliceous limestone, siliceous sandstone).

Silicification
The process by which original materials in a rock are replaced with silica materials such as quartz.

Silicified
Describing a hard rock that has undergone silicification, usually resulting in the formation of a cryptocrystalline quartz cement.

Siltstone
A sedimentary rock composed of silt-sized grains (such as only just visible to the eye). Laminated forms may be used as flagstones.

Skeletal packstone
A grain-supported limestone with more than 1% carbonate mud, where the grains are primarily skeletal material (see Packstone).

Slate
A compact fine-grained metamorphic rock with a closely spaced cleavage formed by the alteration of a mudstone or siltstone by heat and pressure (see Mudstone, Siltstone).

Figure 74: Slate

Slump structures
A sedimentary structure consisting of overturned and irregular folds and disrupted bedding, formed by the mass sliding of soft sediments downslope under the influence of gravity.

Spalling
The deterioration in the form of detached flakes, scales or lens-shaped fragments from a generally sound surface.

Spar
An informal mining term describing any crystalline mineral that has observable faces or cleavage planes.

Sparite
A sparry calcite, occurring as the cement in some limestones and formed by nucleated precipitation and growth in the pore space.

Spheroidal weathering
A type of weathering that produces concentric or spherical layers that tend to weather or fall off (spall) as concentric shells or flakes like the layers of a peeled onion. Also referred to as 'onion-skin weathering' (see Exfoliation, Milk-flake Texture).

Spherulite
The small, rounded bodies that commonly occur in vitreous igneous rocks. They are often visible in specimens of obsidian, pitchstone and rhyolite as millimetre-size globules with a lustre more dull than the surrounding groundmass.

Spicule, sponge spicule
The very thin calcium carbonate or silica spine making up the skeleton of marine organisms called sponges.

Spicular chert
A material composed of cryptocrystalline silica, formed from the dissolution of sponge spicules (see Spicules).

Spoil
A by-product of mine or quarry working or processing. The uneconomical soil and/or rock overlying valuable minerals or rock or aggregated with the rock that must be removed or split from it and tipped (see Overburden, Minestone).

Stone slate
A fine-grained sedimentary rock which can be split into thin layers (usually around 2cm thick) and used as slates for roofing or paving.

Figure 75: Horsham Stone slate.
Lychgate at Church of St James, Shere, Surrey.

Strata
A package of layered or bedded rocks.

Stratigraphy (adj. stratigraphic)
A branch of geoscience dealing with stratified rocks (generally of sedimentary origin) in terms of time and space, and their organisation into distinctive, generally mappable, units.

Strike
The orientation of a bed of rock perpendicular to its dip.

Stringer
The elongated and thin mineral vein often associated with faults and alteration zones.

Stromatolite
A biologically induced sedimentary structure, formed in a shallow marine or lake environments by photosynthetic algae and/or bacteria.

Stromatoporoid
An extinct carbonate sponge that was an important reef-building organisms, it is found in Paleozoic and Mesozoic limestones.

Stylolote (adj. stylolitic)
An angular to rounded, suture-like structure caused by pressure-dissolution of a carbonate rock. Stylolites are defined by a fine layer of non-soluble particles such as clay.

Sub-conchoidal
The fractured surface of a mineral that lies somewhere between conchoidal and even (see Conchoidal fracture).

Succession
A package of geological beds, arranged chronologically. Older beds are below and younger beds are above.

Subarkosic
A descriptive term for a type of sandstone that contains both feldspar and quartz minerals and is intermediate between an arkose (feldspar dominated) and quartzite (quartz dominated) sandstone (see Quartzitic sandstone).

Supergroup
A stratigraphic term referring to two or more associated groups of rocks that share certain lithological characteristics (see Stratigraphy, Group).

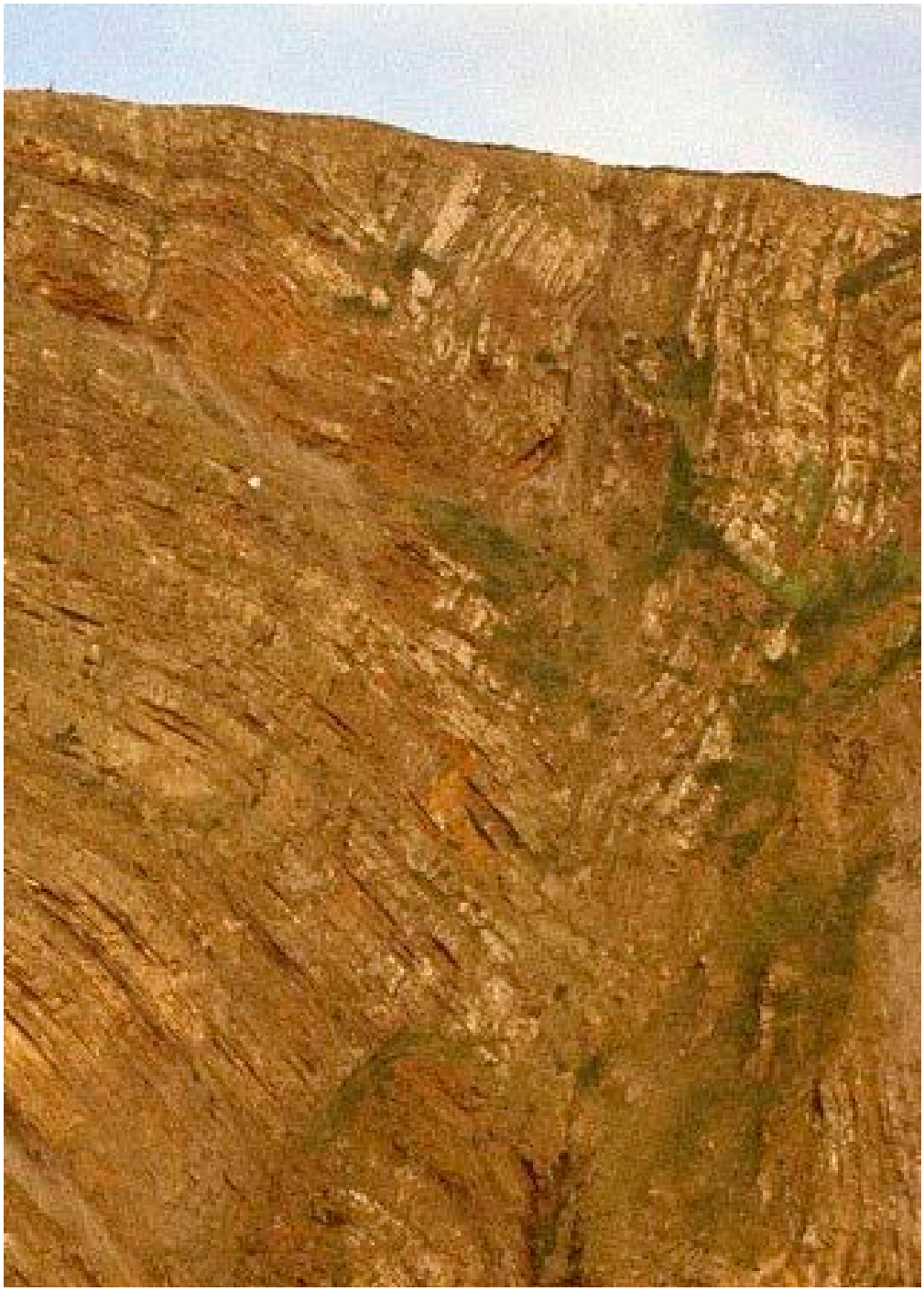
Superficial cambering
The mass movement of rock on a large scale, caused by the deformation and plastic flow of a softer rock underlying a competent rock.

Superficial deposit
Surface deposit and sediment of various types formed during the Quaternary period, usually unconsolidated but includes consolidated stones such as Norwich Crag (see Drift deposits, Fluvio-glacial, Till, Boulder clay).

Figure 77: Superficial deposit

Syncline
A downward, U-shaped fold or trough in the layers of rock in the earth's surface, with younger rocks in its core.

Figure 78: Syncline



Synclinorium

A large syncline with superimposed smaller folds of rock (see Syncline).

Syenite

A type of igneous rock that is essentially composed of an alkali feldspar (containing sodium, aluminium) and a ferromagnesian (containing iron, magnesium) mineral.

T

Tachylite

A type of basaltic volcanic glass formed naturally by the very rapid cooling of molten basalt.

Tabulate coral

An extinct type of coral that form colonies with adjacent corals being joined by small tubes and pores (see Rugose).

Figure 79: Tabulate Coral

Talc

A very soft silicate mineral containing magnesium and water. Talc is often platy like mica, and easily carved with a knife. It is commonly found as an alteration product of magnesium and iron-containing minerals.

Talus apron

A fan of unconsolidated sediment, derived from weathering and erosion of a nearby rock exposure, often in arid climates.

Tectonic block

Part of the Earth's crust that may be bounded by faults and may behave and move independently from adjoining tectonic blocks.

Tectonism

The process of deformation in the Earth's crust that produces the continental plates, ocean basins, plateaus, mountains, folded and faulted rock strata.

Terebratulid

A type of brachiopod shell that is typically bulbous shaped and has a smooth shell (see Brachiopod).

Figure 80: Terebratulid

Tertiary Period

A period of geological time lasting from approximately 65 million - 2.6 million years ago.

Tholeiitic

A descriptive term for a type of basalt that contains feldspar and pyroxene. Tholeiitic basalt is one of the most common types of volcanic rock and was formed by underwater volcanic eruptions.

Till

An unstratified, unconsolidated, heterogenous mixture of clay, sand, pebbles, cobbles and boulders deposited directly by glacial ice (see Boulder clay).

Figure 81: Till

Tonalite
A plutonic (granitic-type, coarse-grained) rock having the composition of diorite, but containing 5% to 20% quartz.

Topaz
An aluminosilicate mineral, found in granite pegmatites and used as a gemstone.

Tor
A topographic high, usually an erosion feature, typically with exposed rock at the peak such as Great Links Tor, Dartmoor.

Tourmaline
A hard, variously coloured crystalline borosilicate mineral.

Figure 82: Tourmaline

Tourmalinisation
A hydrothermal reaction (commonly in granite), producing assemblages of quartz, pink orthoclase feldspar and tourmaline.

Trace fossil
The fossilised features in a sedimentary rock left by animal activity such as burrows, faeces, tracks, trails or footprints (see Bioturbation, Coprolite).

Trachyte
A fine-grained, light-coloured igneous rock composed mainly of alkali feldspar (feldspar containing sodium, aluminium).

Trough cross-bedding

A sedimentary structure formed by aeolian sand dunes, as well as in fluvial, estuarine and marine environments. In cross section, these structures appear as inclined laminations, bounded by scooped-shaped planes, and truncating the rocks below. The scale of trough cross-bedding may be so large that it is not discernible in individual building stone blocks (see Cross-bedding).

Tufa

A highly porous encrustation of limestone formed by the precipitation of carbonate minerals from springs, streams or other water bodies.

Figure 83: Tufa

Tuff

A fragmental sedimentary rock dominated by volcanic ash-grade debris (see Pyrocloastic).

Turbidite (adj. turbiditic)

A descriptive term for sediments laid down in deep water by a turbidity current (a variety of density current) (see Greywacke).

U

Ultrabasic, ultramafic

Descriptive terms for an igneous rock that contains little to no silica, and abundant mafic minerals such as olivine and pyroxene such as peridotite.

Unconformity

The contact surface between two packages of rock strata which are separated by a period of geological time when there was no deposition of any intervening strata, or those intervening strata were removed by erosion. The older beds are commonly folded or deformed, creating an angular unconformity with flat-lying beds above. The rocks either side of an unconformity lie on each other.

Figure 84: Unconformity

Unconsolidated

A descriptive term for the loose sediments that are often unlithified with no cement, common within drift sediments such as sands and gravels (see Drift).

V

Veining
A term used to describe a rock that contains veins of minerals.

Veinstone
A mining term, describing a rock containing gangue material (uneconomic minerals such as quartz and feldspar) in the form of a vein.

Vesicles (adj. vesicular)
The small (mm to cm scale) voids within an igneous rock, formed from gas bubbles as the rock cooled. These voids may subsequently be filled with secondary minerals (see Amygdale).

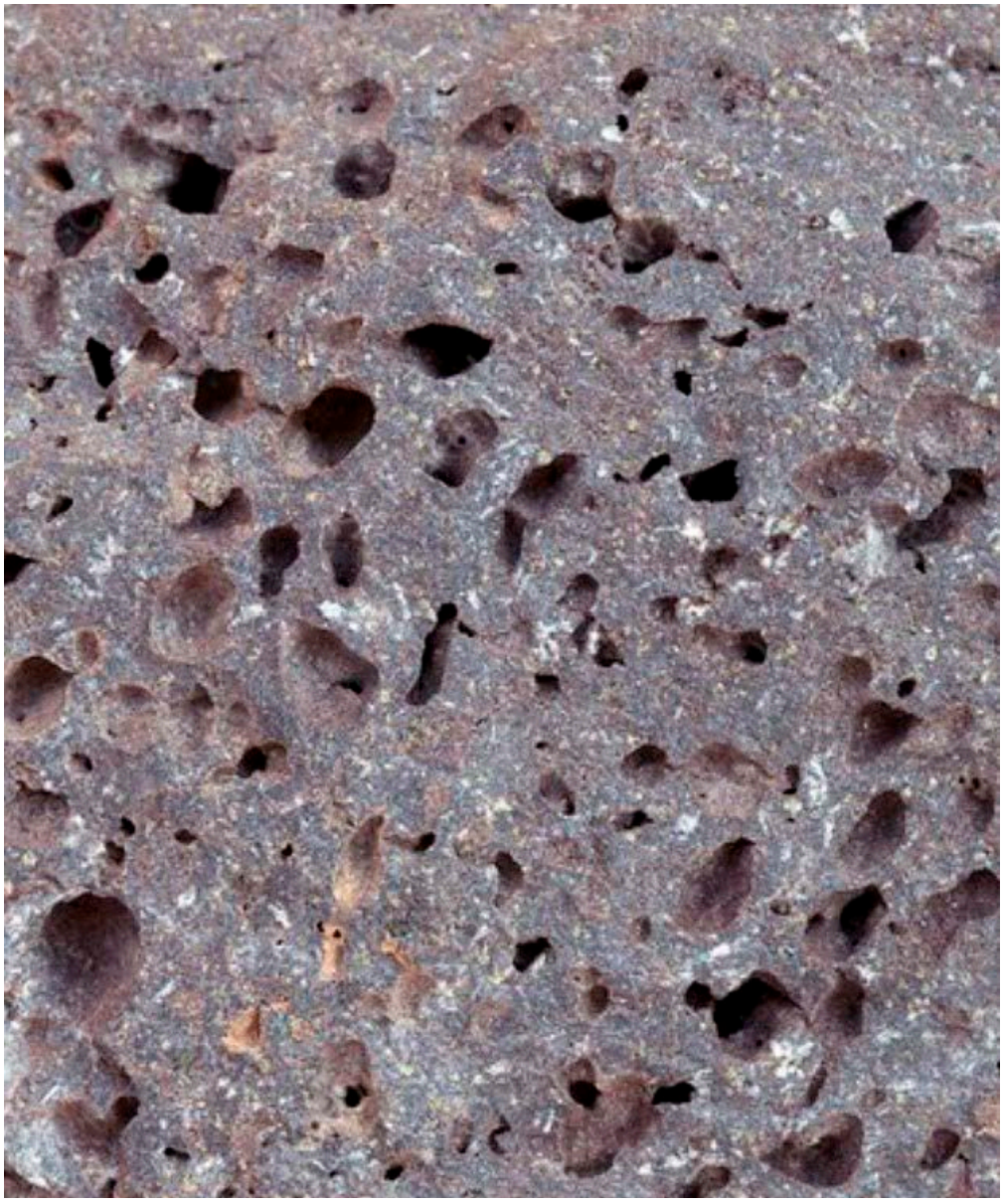


Figure 85: Vesicles.

Volcaniclastic
A descriptive term referring to the entire range of fragmental volcanic products, whether deposited directly from eruptions or subsequently reworked (see Pyroclastic).

Vuggy

A term describing a rock with medium-sized cavities, formed from a variety of processes such as dissolution. Vuggy rock can be partially or completely filled with minerals or sediment (see Geode, Diagenesis).

Figure 86: Vuggy rock

W

Wacke
A type of sandstone in which the mud matrix amounts to between 15% - 75% of the composition of the rock.

Wackestone
A limestone containing more than 10% carbonate grains, supported in a mud matrix (clay and silt particles).

Washout structure
The channel or channel-like feature in sedimentary rocks produced by the scouring action of flowing water and later filled with the sediment of a younger deposit (see Cut-and-fIll structures).

Washsand
A material composed of sand-sized particles that has had finer particles (clay and silt) removed. It is used in concrete and mortar.

Well-bedded
A descriptive term for a sedimentary rock which displays well-defined bedding planes or lines, usually in a linear, parallel pattern.

Figure 87: Well-bedded rock

Well-sorted
A term to describe sediments or sedimentary rocks that contain grains of similar size and (often) composition(s), usually as a result of much transport which segregated and sorted the constituent grains.

Y

Yellow ochre
An iron-rich, deep yellow-coloured, powdery material, often produced by the surficial weathering of stones containing the iron oxide/hydroxide mineral limonite.

Younging
The direction in which a rock sequence progresses from geologically older to younger rocks.

Z

Zeolite

Porous and hydrated aluminosilicate minerals (silicon, aluminium, oxygen), common in low-grade metamorphic rocks.

Zircon

A highly resistant mineral of zirconium silicate $ZrSiO_4$, formed of glassy-looking, microscopic, four-sided prisms. Most commonly-formed in igneous rocks.

3 Building Stones of England Series

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4 Contact Historic England

East of England
Brooklands
24 Brooklands Avenue
Cambridge CB2 8BU
Tel: 01223 582749
Email: eastofengland@HistoricEngland.org.uk

Fort Cumberland
Fort Cumberland Road
Portsmouth
Hampshire PO4 9LD
Tel: 023 9285 6700
Email: fort.cumberland@HistoricEngland.org.uk

London and South East
4th Floor
Cannon Bridge House
25 Dowgate Hill
London EC4R 2YA
Tel: 020 7973 3700
Email: londonseast@HistoricEngland.org.uk

Midlands
The Foundry
82 Granville Street
Birmingham B1 2LH
Tel: 0121 625 6888
Email: midlands@HistoricEngland.org.uk

North East and Yorkshire
Bessie Surtees House
41-44 Sandhill
Newcastle Upon
Tyne NE1 3JF
Tel: 0191 269 1255
Email: northeast@HistoricEngland.org.uk

North East and Yorkshire
37 Tanner Row
York YO1 6WP
Tel: 01904 601948
Email: yorkshire@HistoricEngland.org.uk

North West
3rd Floor, Canada House
3 Chepstow Street
Manchester M1 5FW
Tel: 0161 242 1416
Email: northwest@HistoricEngland.org.uk

South West
Fermentation North
(1st Floor)
Finzels Reach
Hawkins Lane
Bristol BS1 6JQ
Tel: 0117 975 1308
Email: southwest@HistoricEngland.org.uk

Swindon
The Engine House
Fire Fly Avenue
Swindon SN2 2EH
Tel: 01793 445050
Email: swindon@HistoricEngland.org.uk

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