

## 3. Geology of the Stones



***This sheet looks at the rock types you may find in a burial site and what they are used for.***

The stonework in a burial site reveals both the underlying geology of the area and also the range of different stone types used in memorials. Burial sites offer a great opportunity to look at geology, with many rock types brought together in one easily accessible place.

**Monuments** and memorials were made from local stone whilst transportation was limited. If the stonework in a burial site is older than the 1900s then it is likely to have been quarried close by, as transport was difficult and expensive before the railways.

There are exceptions to this; Stonehenge in Wiltshire is made from Welsh rock.

In Victorian times railways made transport easier resulting in granites, slates and Italian marbles becoming fashionable. More recently improvements in international transport have seen memorial stone brought from all around the world; India, China and South Africa are common sources.

**A church**, chapel or other pre-Victorian building is likely to be made of a strong local stone and will reflect the local geology.

**The walls** around a burial site will also be local stone but probably not such good quality as that of the building. This stone may have been cleared from surrounding fields or brought from a quarry close to the site.



**Soils** are derived from the underlying rock and, in turn, affect the plants and animals on the surface. Limestones will have distinctive 'lime-loving' plants, whilst red sandstones produce a rich orange coloured soil which can colour resident frogs bright red!

### THE FOUR MAIN ROCK TYPES

#### Igneous rock

This is made from molten rock called 'magma'. Igneous rocks can be 'extrusive' when volcanic activity pushes the magma to the surface of the earth. 'Intrusive' rock is formed from magma which is pushed upwards but not

to the surface. This includes sills, dykes and batholiths. The magma crystallises on cooling giving a distinctive pattern; the slower the cooling, the larger the crystals. The largest crystals are found in igneous rocks which are intrusive such as Cornish granites.



#### Types and uses

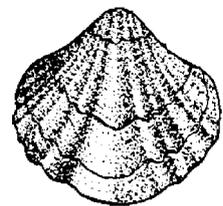
Igneous rocks include granite, basalt and dolerite. These rocks are hardwearing and the crystals within them shine when polished. Unless the burial site is in an area of igneous bedrock such as Cornwall, Shap or Aberdeen, igneous rocks are only used for headstones, pillars and slabs. These hard-wearing rocks are unlikely to be colonised by mosses and lichens.

#### Sedimentary rocks

These are made from grains, gravels and pebbles of other rocks which are weathered, transported by wind or water and then deposited in layers or 'beds' which then compact into rock. Sedimentary rock is extremely variable depending on the parent rock that the grains are made from and on how it has been compacted. Grains may be large or small giving rough or smooth stone and colours vary greatly. Red sandstones tend to form in deserts. Sedimentary rocks can have fossils of plants and animals within them and also ripples or raindrops preserved between individual layers.

#### Types and uses

Sedimentary rocks include: sandstone, mudstone, shale and conglomerate. They are used for buildings, headstones, flagstones and plinths and will often split along the layers in which they were formed, giving flat surfaces. This splitting or 'spalling' can also occur as the rock weathers and may be seen on many headstones.



#### Limestone

Limestone is a type of sedimentary rock as it is formed by the laying down of sediment, in this case the shells and skeletons of millions of microscopic sea creatures. These shells fall to the seabed or are dissolved in seawater. Limestone is made primarily of calcium carbonate, the building block of shells and skeletons.

## BURIAL GROUNDS THROUGH TIME

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Another type of limestone, oolitic limestone, is formed when calcium carbonate in seawater precipitates on fragments of sediment, forming little balls (ooliths) about the size of a pinhead. These then sink to the seabed.

Limestone may be coloured by minerals such as iron, giving a range of colours from white to dark grey or reddish. Limestone can contain fossilised sea creatures such as ammonites, corals, bivalves and sea lilies, or even fish and sea mammal bones. Limestone can be strong and good for carving but is prone to erosion by acid and blackening by soot, smoke and exhaust gases. Many buildings and monuments were eroded and discoloured during the Industrial Revolution, and subsequently from vehicle exhaust gases and by acid rain.

#### *Types and uses*

Limestone includes chalk, Portland and Bath stone. Many buildings, statues and finely carved memorials are limestone, including Roman sarcophagi and St Paul's Cathedral – both made from Portland stone. War graves are often white limestone.



#### **Metamorphic rocks**

After forming, rock may be subjected to intense heat and/or pressure whilst within the earth's crust. This usually takes place when rocks are buried deeply, for example in tectonically active areas. It can also

take place where rocks are squeezed and heated by intrusive igneous rocks. It alters rocks and they become 'metamorphosed'. Metamorphic rock can be hard-wearing and easy to carve and includes slate which is formed from mudstone or volcanic ash and marble which is formed from limestone. Schist, gneiss and quartzite are also metamorphic rocks.

#### *Types and uses*

Slates are used for headstones, slabs and roofing, with characteristic green Lake District slate found in Westminster Abbey. Marbles are used for memorials and statues. Carrara marble has been quarried for 2000 years in the Apennines in Italy and many famous statues including works by Michelangelo are made of this marble.

Buildings, walls and monuments all mimic natural rock faces and cliffs in the wild. In an area without natural outcrops this may be particularly important for the plants, lichens and mosses which colonise rock face.

#### **Tell the story of the stones**

Burial ground geology makes a fascinating story as so many rock types are likely to be present, showing the effects of time and weathering. This information can be used in leaflets, information boards or by schools or clubs. Contact your local **Geology Trust** to see what is already known and if someone could give a guided talk and walk.

#### **Useful contacts**

The Geology Trusts, [www.thegeologytrusts.org](http://www.thegeologytrusts.org)

The Geological Society, [www.geolsoc.org.uk](http://www.geolsoc.org.uk)

#### **Useful reading**

Rocks – Field Studies Council fold-out chart

