

ROCKS IN THE STONE SPIRAL

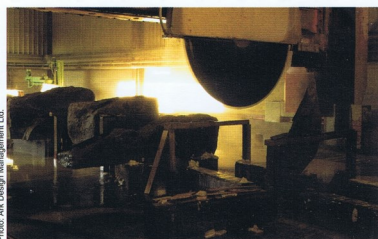
The locations of the stones are indicated by their numbers on the spiral plan. Rock types are listed below within their geological categories and are **not** strictly in numbered order.

Sedimentary Rocks

- **1-2. Hollington Red Sandstone**
(donated by J. Oldham & Co, Hollington, Staffs)

The Hollington Red is similar to the Mansfield Red stone used in the Cemetery itself. The red colour comes from the natural cement, an iron oxide called haematite. It is typical of sediments which were formed in deserts. The rock is about 220 million years old, so the UK must have passed into desert latitudes, about 20°N, by then. Some red sandstones are actually "fossilised" sand dunes from the desert floor, but others are formed by sand blowing into a seasonal river. Look for clues in the blocks that show which it was in this case.

- **3-10. Crosland Hill Sandstone**
(donated by Johnsons Wellfield, Huddersfield).



When fresh, this sandstone is greyish coloured, but weathered surfaces show darker shades of brown, as iron oxides are released. Some blocks display the fossilised remains of tree bark, from tropical vegetation which grew in this country 310 million years ago. Tropical? – how's that? At that time, the UK was on the Equator and has slowly drifted northwards since then.

- **25. Dolomitic Limestone**
(donated by Tarmac Central Ltd, Hulme Hall Quarry, Maltby)

This limestone was formed in shallower warm tropical water than the Mandale Limestone. The evaporating power of the sun caused some of the calcium in the limestone to be exchanged for magnesium in the sea water. This has changed the structure of the stone and has destroyed most of the fossils. You can see some dark squiggly lines running across the block. These are called stylolites and show where some of the limestone has been dissolved away under the pressure of overlying rocks, leaving only the insoluble residue.

- **19-24. Greenmoor Rock**
(donated by Marshalls, PLC, Appleton Quarry, Shepley)



The local variety of this sandstone was known as the **Brincliffe Blue** and it was quarried at the top of Psalter Lane – very convenient!

Some of these blocks show the original blue-grey colour in their central parts, with wide bands of brown weathering nearer the surface. You can compare the width of the weathered zone in these blocks with that on broken gravestones. The cut specimen on the display board is from a 100 year old gravestone and its weathered zone is about 1 centimetre thick, so you can work out very roughly how long it took for the big block to become so weathered.

Some of the blocks contain marks which look just like the ripples on a sandy river bed today – and that is exactly what they are – only the ancient river was 300 million years or so ago.

- **26. Mandale Limestone**
(donated by The Mandale Stone Co. Ltd. near Sheldon)



The crowded remains of the sea creatures make up the bulk of the limestone. Most of the fossils look like Polo mints, and they are the remains of crinoids, which are related to sea urchins. Today, crinoids only live in the sea, proving that Derbyshire once lay under the water, although it was probably only a few metres deep. Look to see if the crinoid stems are lined up – if so, this could be evidence for currents on the ancient sea bed.

Igneous Rocks

- **27. Kemnay Granite**
(Fyfglen Rock, Aberdeen)

The grey Kemnay Granite occurs near Aberdeen. It is similar to the Rubislaw Granite, but is a paler colour, owing to less black biotite mica and more of the silvery muscovite mica. Many of Aberdeen's buildings are faced with this rock, as is the new Scottish Parliament building.

- **28. Peterhead Granite**
(Fyfglen Rock, Aberdeen)

This pink granite was once very popular but it is no longer quarried. The pink colour comes from the mineral called *feldspar*, which can be white, grey, pink, or even red. Compare the amount of platy micas in this granite with the other two in the Stone Spiral.

Granites often contain dark inclusions of older rocks, which became caught up in the liquid rock and nearly altered beyond all recognition. Can you find any of these "heathen" in our granites?



- **29. De Lank Granite**
(Ennstone Breedon Ltd. De Lank Quarry near Bodmin, Cornwall)

When fresh, the feldspar in this granite gives it a clean white colour, mottled with the lustrous black micas. Quartz is the other mineral, occurring in greyish, rather shapeless crystals. Can you identify all three minerals?

Metamorphic Rocks

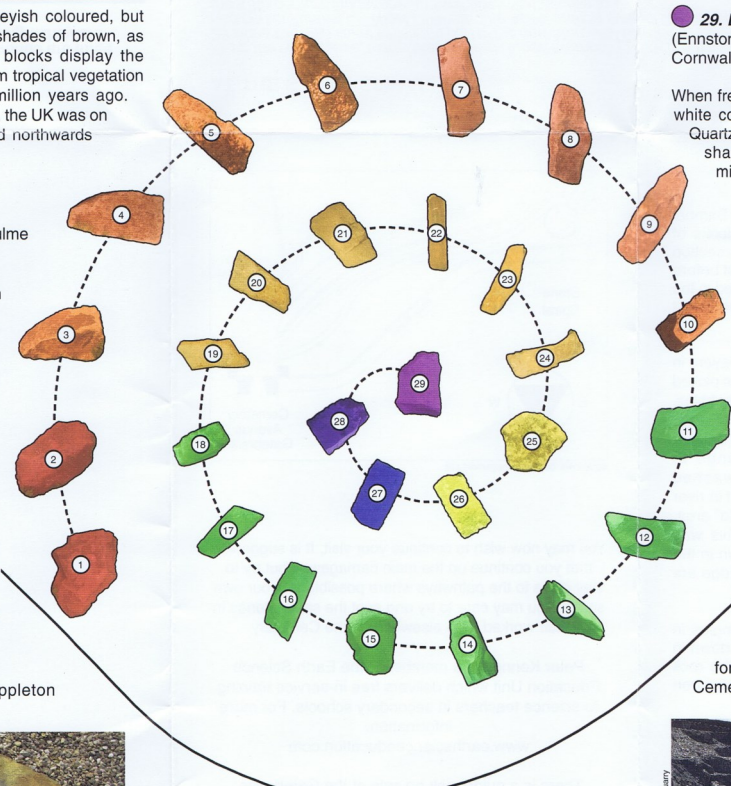
- **11-18. Slate**
(donated by Alfred McAlpine Slate Ltd, Bethesda, North Wales)

Slate represents the third group of rocks, *metamorphic*. Slate is formed from muddy rocks, such as shale or even fine volcanic ash. This slate is about 545 million years old. When two ancient "plates" collided, the mud-rocks were heated and squeezed between them and the rock became recrystallised. The new minerals lined up at right angles to the forces, and this is the direction along which the rock now splits, or *cleaves*.

One of the blocks displays some good colour banding, which shows the original bedding of the mud-rock. Slate is split by hand, to give the familiar thin, durable slates for roofing, including the Anglican Chapel in this Cemetery.



We should like to have had a 1 tonne block of the metamorphosed limestone, **Marble** from Carrara in Italy, but could not afford it, so if you can bring one back for us from your holidays...



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Rocks from all three groups have been used in the construction of the Stone Spiral, so you can work out the Rock Cycle by walking from one to another. Sedimentary rocks become metamorphosed: metamorphic rocks partly melt; molten rock cools to form igneous rock; igneous rock becomes weathered, eroded and transported, to form sedimentary rock, and so on.