



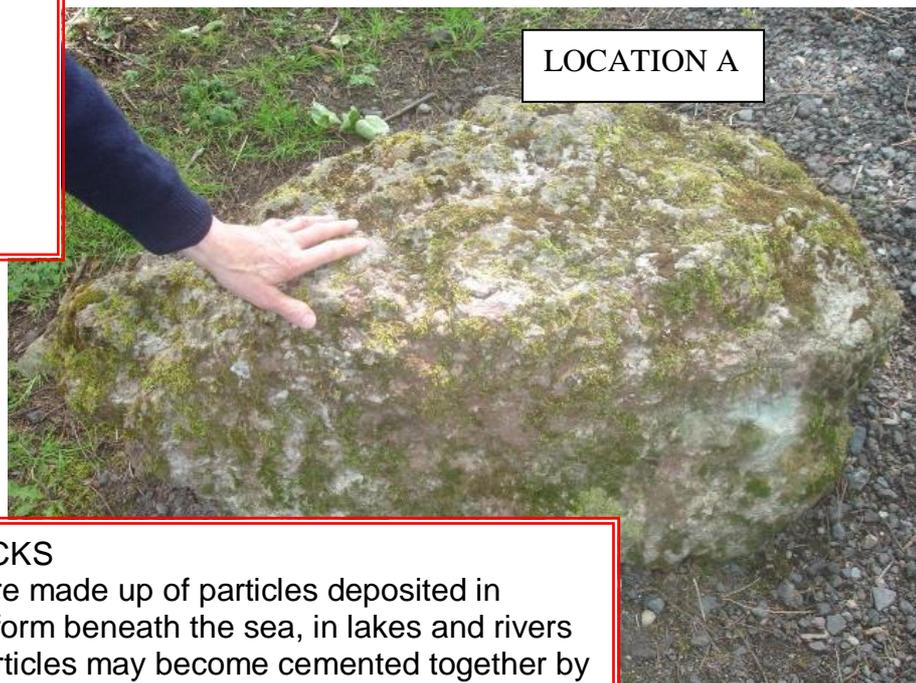
An Arboretum Geology Trail – ½ mile (0.8km)

The Arboretum and surrounding areas are underlain by rocks of various ages (see GEOLOGICAL TIME SCALE text box). On your drive to the Arboretum you may have noticed red sandstones along the roadside. These are sedimentary rocks that formed in vast deserts in the Permian period. In the Arboretum grounds the underlying rocks are Silurian, Devonian and Carboniferous in age and you will encounter some of these rocks on this trail.

FOLLOW THE MAP ON THE BACK PAGE. Note that the location letters do not exist on the ground.

GEOLOGICAL TIME SCALE (start of periods in millions of years ago)
Quaternary 1.6
Neogene 23
Paleogene 65
Cretaceous 142
Jurassic 205
Triassic 248
Permian 290
Carboniferous 354
Devonian 417
Silurian 443
Ordovician 495
Cambrian 545
Precambrian 4600

Start at the visitor centre. With the lake in front of you turn left and follow the track through the gate. After 50m on your left and near double gates you will see a large boulder – this is LOCATION A. This specimen is also a sedimentary rock and is known as the Bishops Frome Limestone. It forms a band of rock that crosses the site, which although it cannot be seen in the ground there are plenty of other similar boulders around the Arboretum.



SEDIMENTARY ROCKS

Sedimentary rocks are made up of particles deposited in layers. They usually form beneath the sea, in lakes and rivers or in deserts. The particles may become cemented together by specks of mud or new minerals such as iron or calcium carbonate. Over millions of years the sediments become rock.

Continue along Poplar Dingle. After 100m pass through a kissing gate into the field and proceed towards The Square. On route look to your right – this is LOCATION B. In the distance you will see the striking wooded ridge that forms Kinver Edge. This high ground is underlain by the Permian sandstone mentioned earlier.



SANDSTONE

As the land is eroded small particles of rock are carried away by wind and water to be deposited on river beds, in deserts or on the sea bed. Sand sized particles may accumulate to a thickness of many metres. Over time the sediment is buried, compressed and cemented into a hard rock called sandstone.

Continue through The Square and on towards the top of the hill for 50m until you reach a small quarry. Here (LOCATION C) you will see steeply dipping thin layers of sandstone. These are Devonian in age and were formed when sand was deposited in river channels. Subsequent movements in the Earth's crust through geological time, has resulted in the folding and tilting of the rocks. Look carefully and you will also see evidence of modern day activity – pieces of slag, brick, concrete and pottery.



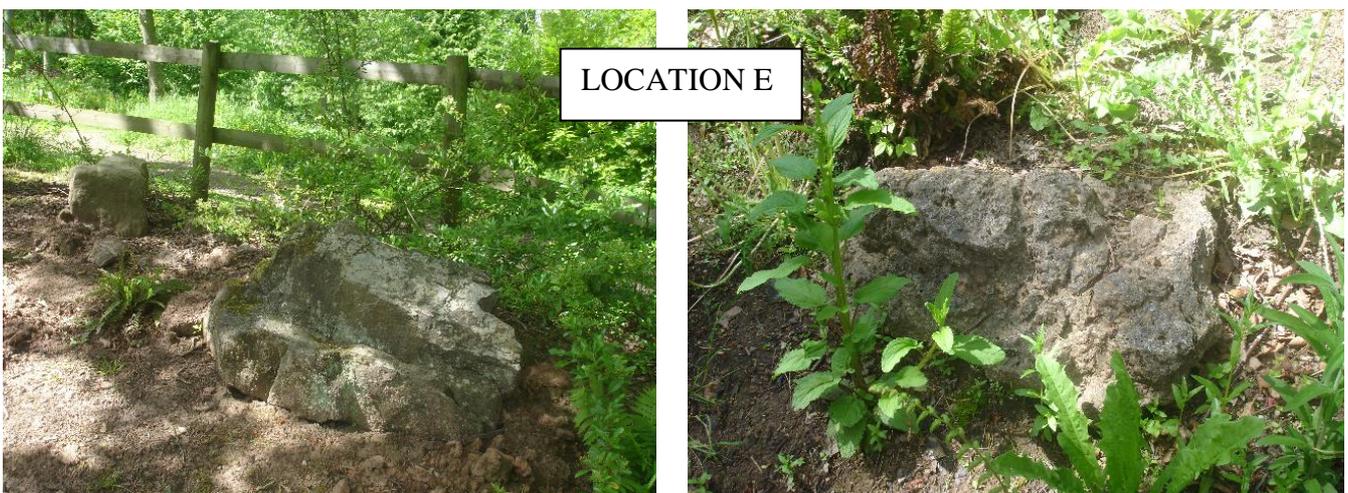
LOCATION C

Walk down the field to the kissing gate and into the area around Top Pool. Follow the track towards The Fernery. The track is surfaced with dark grey aggregate of the igneous rock dolerite (see IGNEOUS ROCKS text box). This is LOCATION D. The dolerite formed beneath volcanoes from molten rock known as magma, which was being forced upwards from deep within the Earth's crust. The rock has come from the quarries on Clee Hill where these intrusions happened at the end of the Carboniferous period.

IGNEOUS ROCKS are formed when molten material (magma) rises from deep within the Earth. As it cools it solidifies to form igneous rock. When magma is forced into spaces in existing rocks it is known as an intrusive igneous rock. Examples are granite and dolerite. When the magma reaches the surface and forms a volcano it is known as an extrusive igneous rock. Basalt is an example.



Continue to The Fernery. This is LOCATION E. Here you will see more boulders of Bishops Frome Limestone (right below). There are also large smooth blocks of brown sandstone (left below) contrasting with the rubbly appearance of the surface of the pieces of grey limestone.

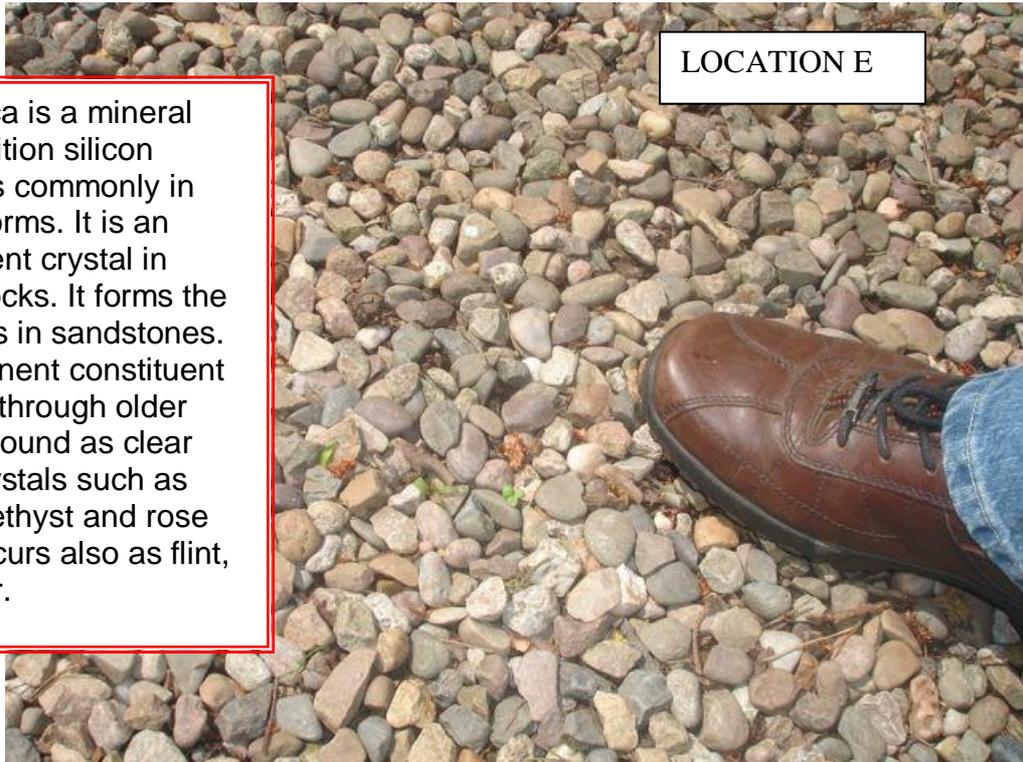


The path in The Fernery is surfaced with grey, brown and white gravel. It is gravel sourced from quarries adjacent to the River Severn near Worcester where pebbles were deposited from the floodwaters of the river over 10,000 years ago.

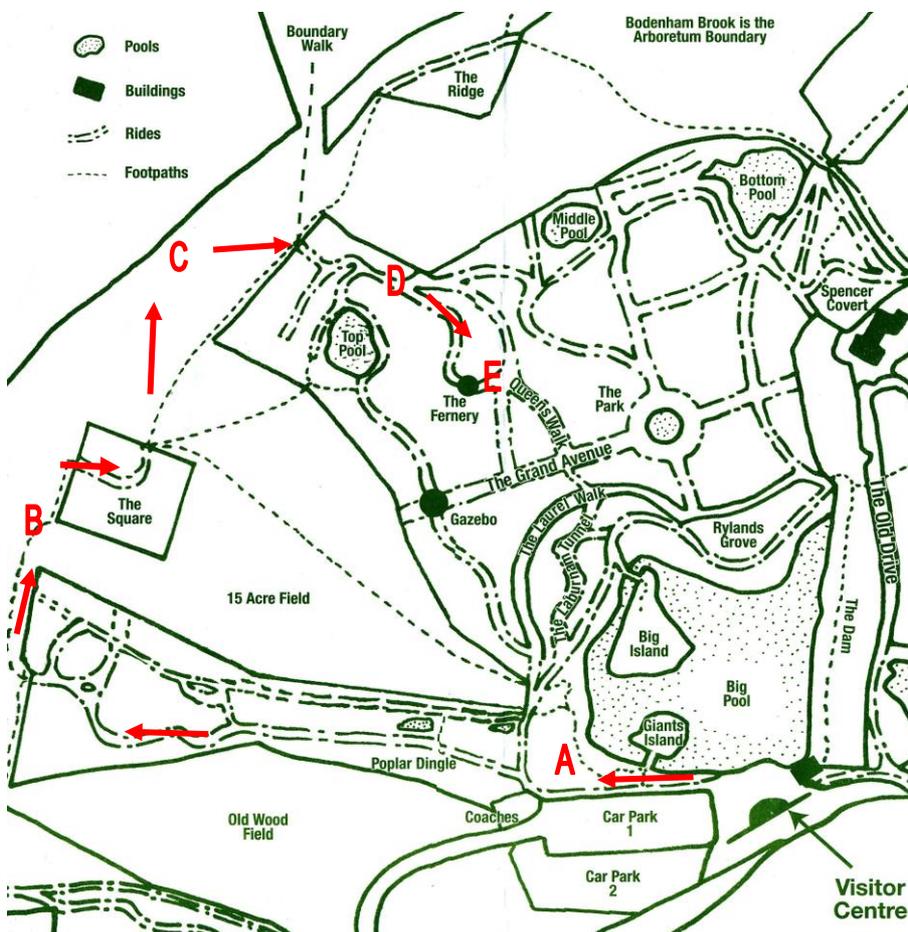
There are many different rock types amongst the pebbles but look for the fragments of white vein quartz (see QUARTZ text box).

LOCATION E

QUARTZ or Silica is a mineral with the composition silicon dioxide. It occurs commonly in many different forms. It is an original constituent crystal in many igneous rocks. It forms the bulk of the grains in sandstones. It is also a prominent constituent of veins that cut through older rocks. It can be found as clear and coloured crystals such as rock crystal, amethyst and rose quartz. Silica occurs also as flint, agate and jasper.



Continue to enjoy your walk around the Arboretum. Look out for other rocks as you make your way back to the Visitor Centre.



We hope you have enjoyed this trail. To find out more about geology in the Abberley and Malvern Hills Geopark go to www.geopark.org.uk