



# SCAR COTTAGE QUARRY



Community Earth Heritage  
**CHAMPIONS**  
project

# GEOLOGICAL HISTORY OF THE AREA

Natural breaks in the geological record allow for geological time to be divided into smaller units. The last 542 million years are split into twelve geological periods (as illustrated by the map key below). Time before 542 million years ago is referred to as the Precambrian.

Nine geological periods and the Precambrian are represented in the rock units of Worcestershire:

Precambrian (4600 million years ago to 542 million years ago)

- Igneous and metamorphic rocks making up the Malvern Hills and three small areas to the north, including a small area in Martley. Here they are approximately 680 million years old, and amongst the oldest in England.

1. Cambrian (542 million years ago to 488 million years ago)

- Quartzite, sandstone and shale formed as the sea level began to rise; found in small areas adjacent to the Malvern Hills and in Martley.

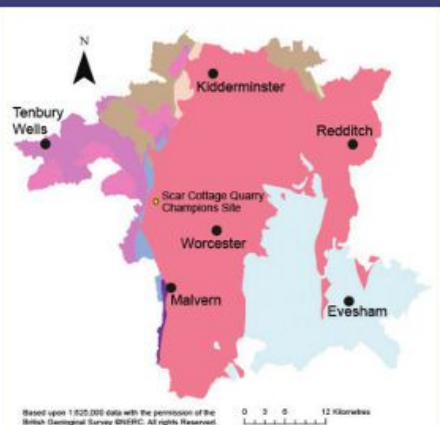
2. Ordovician (488 million years ago to 444 million years ago)

- Volcanic material was erupted and then deposited in water during this time. At a later stage, sand deposited in a warm, shallow sea formed quartzites. Rocks of this age are found in the Lickey Hills.

## Key to Geological Map of Worcestershire

<b>Quaternary</b> (2.6 million years ago to recent)	
<b>Neogene</b> (23 million years ago to 2.6 million years ago)	
<b>Palaeogene</b> (66 million years ago to 23 million years ago)	
<b>Cretaceous</b> (145 million years ago to 66 million years ago)	
<b>Jurassic</b> (199 million years ago to 145 million years ago)	
<b>Triassic</b> (251 million years ago to 199 million years ago)	
<b>Permian</b> (299 million years ago to 251 million years ago)	
<b>Carboniferous</b> (359 million years ago to 299 million years ago)	
<b>Devonian</b> (416 million years ago to 359 million years ago)	
<b>Silurian</b> (444 million years ago to 416 million years ago)	<b>Pridoli stage</b> (419 million years ago to 416 million years ago)
	<b>Llandovery, Wenlock and Ludlow stages</b> (444 million years ago to 419 million years ago)
<b>Ordovician</b> (488 million years ago to 444 million years ago)	
<b>Cambrian</b> (542 million years ago to 488 million years ago)	
<b>Precambrian</b> (4600 million years ago to 542 million years ago)	

## Geological Map of Worcestershire





## Location of Scar Cottage Quarry

The village of Martley, 7 miles north-west of Worcester City, is centered around the junction of the B4294 and B4197. Permission to visit the quarry must be obtained in advance; contact information can be found on the back page of this leaflet.



### 3. Silurian (444 million years ago to 416 million years ago)

#### a. Llandovery, Wenlock and Ludlow stages (444 million years ago to 419 million years ago)

- At the start of the period, sandstones and conglomerates (sediments containing rounded pebbles) formed from the material brought down into a shallow sea during flash flood events. Then limestones and shales formed as the sea level rose.

#### b. Pridoli stage (419 million years ago to 416 million years ago)

- Mudstones, sandstones and calcrites (calcium-rich fossilised soil) deposited within a flat, arid landscape near the coast, crossed by seasonal streams.

### 4. Devonian (416 million years ago to 359 million years ago)

- Sandstones deposited by streams in an otherwise flat arid landscape. These rocks are found in the west of the county around Tenbury Wells.

### 5. Carboniferous (359 million years ago to 299 million years ago)

- Clays, coals, shales and sandstones formed in a flat, swampy delta, which experienced frequent flooding as the sea level rose and fell. These rocks are found around the Wyre Forest Coalfield area and in the north-east of the county. There are also igneous intrusions of this age found in the Teme Valley and near Kidderminster.

### 6. Permian (299 million years ago to 251 million years ago)

- Red desert sandstones. At the start of the period, breccias (sediments containing angular fragments) formed during catastrophic events such as flash floods or earthquakes. These rocks are found in small areas in the north and west of the county.

### 7. Triassic (251 million years ago to 199 million years ago)

- Sandstones, conglomerates, evaporites (salts), breccias and mudstones representing a change in environment from a flat, arid landscape covered in rivers and lakes, into oceanic conditions. These rocks dominate in Worcestershire.

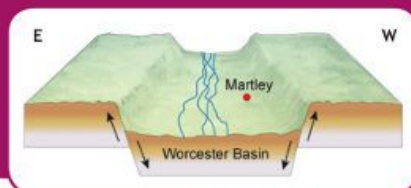
### 8. Jurassic (199 million years ago to 146 million years ago)

- Limestones and mudstones deposited in a warm, shallow sea. These rocks are found mainly in the south-east of the county towards the Cotswold Hills.

### 9. Quaternary (1.8 million years ago to recent)

- Glacial deposits, river sands, gravels and alluvium, and chemical deposits such as tufa, overlying the hard rocks (not shown on the geological map).

# GEOLOGICAL HISTORY OF THE SITE



▲  
A diagram representing the Worcester Basin in Triassic times

The rocks seen in Scar Cottage Quarry formed during a period of time known as the Triassic, which lasted from 251 to 199 million years ago. In Britain the rocks of this period are dominated by red sandstones - commonly referred to as the New Red Sandstone in contrast to the Old Red sandstone from the earlier Devonian period.

From the moment that the Earth's crust formed, large portions of this crust, known as tectonic plates, have been moving against or away from each other at an incredibly slow rate. Mountains, volcanoes, earthquakes, and ocean trenches are all results of this plate movement, as is the migration, over millions of years, of these plates over the Earth's surface.

If we were able to travel back in time to the Triassic period the layout of the oceans and

continents across the Earth would look very different to how they are today. By around 251 million years ago most of the Earth's continents had joined together forming a 'super-continent' called Pangaea. Britain was located some 31° north of the equator, in the middle of this huge continent.

In the Worcestershire area a vast rift valley, the Worcester Basin, was the dominating landscape feature. Its maximum depth was some 3000m. Crossing the basin floor was a series of meandering rivers, part of the 'Budleighensis River' system which flowed from France northwards and through the Midlands. Vast quantities of material (sediment) was deposited from these rivers onto the basin floor. Over millions of years these sediments built up and eventually were consolidated into rock, such as the red sandstone seen in Scar Cottage Quarry.



▲  
A map showing the locations and shape of the continents in mid-Triassic times: 220 million years ago. © Ron Blakey and Colorado Plateau Geosystems, Inc.

Triassic Worcester Basin, although there was less vegetation as the first land plants were only just developing.  
© Marti Miller, University of Oregon.



# SANDSTONES

## What are sedimentary rocks?

Sedimentary rocks are primarily made up of particles deposited in layers. They usually form on the sea floor, in lakes and rivers, or in deserts. The layers of sediment are compacted and consolidated by the weight of overlying material. Eventually, over millions of years, the compressed sediments become rock. Sedimentary rocks today are being formed over much of the Earth's surface.

**S**andstones are sedimentary rocks made up of grains of sand. The individual grains of sand can be cemented together either by particles of mud or by new minerals (e.g. iron compounds or calcium carbonate) carried by water trickling through the gaps between them. The mud or minerals grow between the grains, filling the gaps, and cementing them together. The red colour of the rock in Scar Cottage is due to the presence of iron in the cement holding the sand grains together.

The most obvious feature of the sandstones in the quarry garden is the bedding. As deposits of sediment build up they tend to produce a series of layers. Each layer is called a bed and the junction between them are called bedding planes. The majority of the beds in Scar Cottage Quarry are substantial, being up to 2.5m thick, but near the top of the rock face, particularly on the north-eastern face, the beds are much thinner, being as little as 2cm thick.



▲  
White streaks in  
the red sandstone

Another feature of the quarry is the infrequent, yet obvious, white streaks in the rock face. The most extensive of these is found at the eastern end of the north-eastern rock face. When dilute acid is dripped onto these white streaks they fizz, indicating that they contain calcium carbonate. We know that water is drawn up through the sandstone here by capillary action and that close by there are large quantities of limestone (Penny, Rodge and Pudford Hills, to the north-west are all made up of limestone). It is thought that water passing through the hills dissolved some of the calcium carbonate in the limestone. This water then travelled through the porous sandstone and here, in the quarry, the calcium carbonate precipitated out of solution forming a component of these white streaks.

# BIODIVERSITY

**T**he immediate vicinity of this quarry is a well-tended haven for wildlife. The bare sandstone quarry face is friable and only lichens manage to grow and even they lose their hold as the rock face weathers. Above the quarry face, two closely growing pedunculate oaks have managed to get a toe hold in the cracks and now spread their branches across the grassy area creating shade and demonstrating an amazing root system which supports them in their precarious position.

The many small holes in the cliff have probably been made by solitary bees as they find it easy

to excavate. Many other holes in the rock face have been enlarged by weather and creatures over the years and provide nesting places for birds particularly blue tits and wrens, whilst robins nest in the ivy above. Many other birds have been seen including spotted flycatchers, green woodpeckers, thrushes, blackbirds and chiff-chaffs attracted by the rich insect life.

The well drained sandy soil is attractive to moles and a range of other animals which regularly visit, including slow-worms and grass snakes which have been found in warmer corners at times.

▶ Slow-worm



## Did you know?

Although solitary bees typically produce neither honey nor beeswax, they are important pollinators. Solitary bees only gather pollen from one or a few species of plants, unlike honey bees and bumblebees which are generalists.



# ARCHAEOLOGY

**S**car Cottage Quarry sits on the eastern end of a long line (roughly 600m) of sandstone quarries, known locally as the Nubbins.

The sandstone extracted from these quarries would have been used mainly as a building stone. The sandstone walls in the village and the parish church (St Peter's) are both constructed from this type of sandstone.

Scar Cottage is dated before 1736 and it is possible that extraction could have been taking place from the mid-17th century onwards. By 1885, the

quarry is only recorded as a series of earthworks, suggesting that it had fallen out of use by this date. Around 1974 the ground level of the quarry was raised considerably to its current position with hardcore and rubble excavated from the site of a local building project.

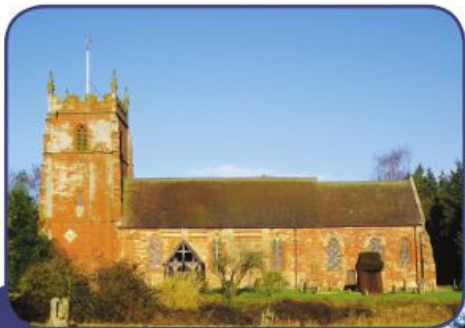
The rock faces in Scar Cottage Quarry are scattered with evidence of their industrial past. Pick marks, plug and feather marks and the more apparent extraction trackway all contradict the tranquil setting which they now occupy.



▲ Pick Marks



▲ Some of the finds from the site. From left to right: round ended strap hinge probably late-18th century, axe head, long nail, piece of drainpipe, parts of hinges, late-18th century latch. Probably associated with the stone extraction.



▲ St Peter's Church,  
Martley

► Part of the  
Nubbins to the  
south-west of  
Scar Quarry  
Cottage





## what is the Community Earth Heritage CHAMPIONS project?

The Community Earth Heritage Champions Project, funded by the Heritage Lottery Fund, and Natural England through Defra's Aggregates Levy Sustainability Fund, has involved communities across Herefordshire and Worcestershire.

Each of the nineteen geological sites chosen for the project has a Champions community group carrying out conservation work, promoting the use of the site to other people in their parish and monitoring the site for any changes in condition.

The idea of the project is to take a holistic view of the environment and to understand the relationships between geology, ecology and archaeology.

The Champions have received training in a number of subjects in order to understand the features observed at their site; knowledge which they will now pass on to new volunteers. The conservation work being undertaken will help to ensure the protection of these important features and enable people to enjoy the natural world for years to come.



For more information about the project, or any aspect of the work carried out by the Herefordshire and Worcestershire Earth Heritage Trust, please contact us at:

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[www.EarthHeritageTrust.org](http://www.EarthHeritageTrust.org)

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