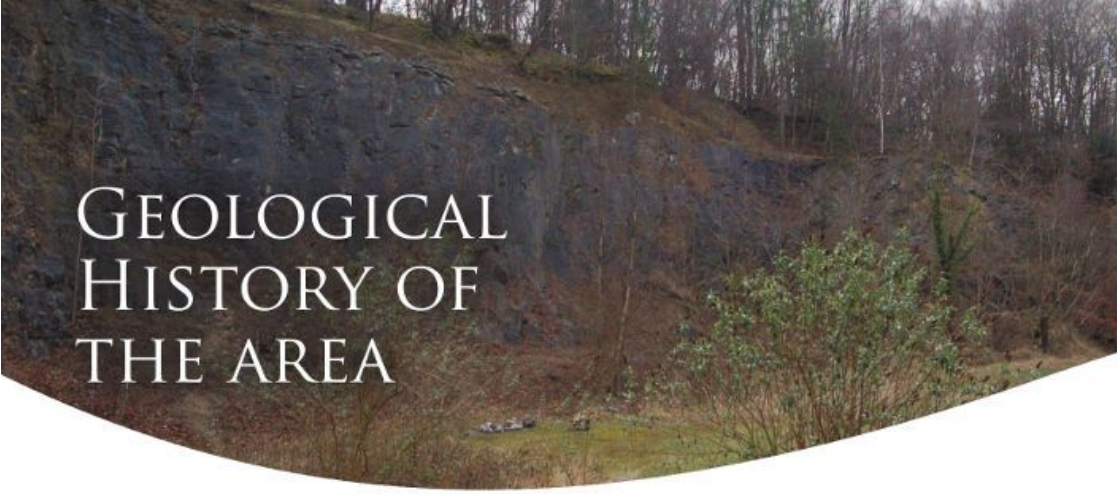
King Arthur's Cave & Quarry

Community Earth Heritage
CHAMPIONS
project

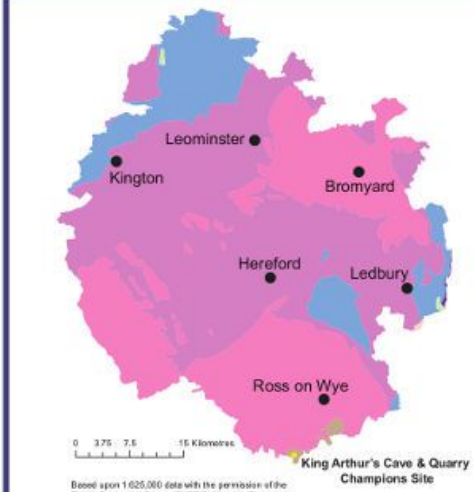


Geological History of the Area

Eight geological systems are represented in Herefordshire:

1. Precambrian (4600 million years ago to 542 million years ago)
   - Igneous and metamorphic rocks making up the Malvern Hills, here they are approximately 680 million years old, and amongst the oldest in England.
2. 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.
3. Ordovician (488 million years ago to 444 million years ago)
   - Shales deposited within a deep ocean environment; found in a small area near Pedwardine and west of the Malvern Hills, as well as igneous intrusions seen near Eastnor.

Geological Map of Herefordshire



Key to Geological Map of Herefordshire

Quaternary (1.8 million years ago to recent)	
Neogene (23 million years ago to 1.8 million years ago)	
Palaeogene (66 million years ago to 23 million years ago)	
Cretaceous (146 million years ago to 66 million years ago)	
Jurassic (199 million years ago to 146 million years ago)	
Triassic (251 million years ago to 199 million years ago)	
Permian (299 million years ago to 251 million years ago)	
Carboniferous (359 million years ago to 299 million years ago)	
Devonian (416 million years ago to 359 million years ago)	
Silurian (444 million years ago to 416 million years ago)	**Pridoli stage** (419 million years ago to 416 million years ago)
	Llandovery, Wenlock and Ludlow stages (444 million years ago to 419 million years ago)
Ordovician (488 million years ago to 444 million years ago)	
Cambrian (542 million years ago to 488 million years ago)	
Precambrian (4600 million years ago to 542 million years ago)	

Location of King Arthur's Cave & Quarry

The site is accessed via a trackway that leads off Sandyway Lane in the village of Great Doward. Parking is available in the Forestry Commission's car park next to Doward Park Campsite.

4. Silurian (444 million years ago to 416 million years ago)
   - *a* Pridoli stage (419 million years ago to 416 million years ago)
     - Mudstones, sandstones and calcretes (calcium-rich fossilised soil) deposited within a flat, arid landscape near the coast, crossed by seasonal streams.
   - *b* Llandovery, Wenlock and Ludlow stages (444 million years ago to 419 million years ago)
     - Limestones and shales deposited in warm, shallow seas.

5. Devonian (416 million years ago to 359 million years ago)
   - Sandstones and conglomerates (sediments containing rounded pebbles) deposited by streams in an otherwise flat arid landscape.

6. Carboniferous (359 million years ago to 299 million years ago)
   - Thick beds of limestone on the southern margin of the county with very small amounts of coal measures around Howle Hill.

7. Permian (299 million years ago to 251 million years ago)
   - Red desert sandstones and breccias (sediments containing angular fragments) formed during catastrophic events such as flash floods or earthquakes. These rocks are found in a small area south of Ledbury. There is also a small igneous intrusion of this age near Bartestree.

8. Triassic (251 million years ago to 199 million years ago)
   - Siltstones and mudstones representing a change in environment from a flat, arid landscape covered in rivers and lakes, into oceanic conditions; found in a small area north of Malvern

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 (but not shown on the geological map).

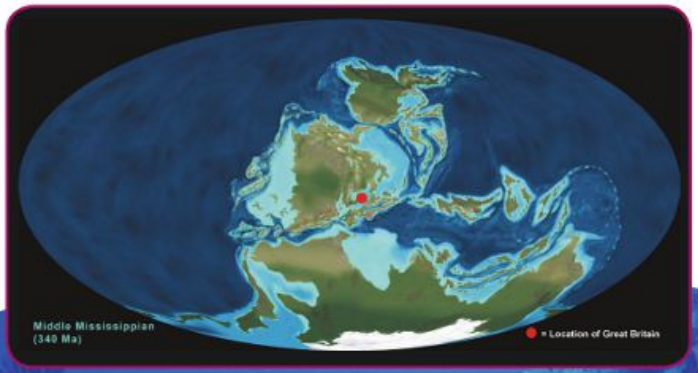
The Devonian Period and the Pridoli time of the Silurian make up a group of rocks known as the 'Old Red Sandstone' which covers most of the county. It gives the soils their characteristic red colour and in the centre of the county it reaches a thickness of up to 2000m. The other Silurian rocks give the overlying soils a grey colour.

Geological History of the Site

The rocks seen at King Arthur's Cave and in the quarry north of the cave were formed during a period of time known as the Carboniferous, approximately 345 million years ago. At this time the layout of the oceans and continents across the Earth looked very different and England and Wales were part of a continent known as Laurasia which sat just north of the equator.

During the early Carboniferous, this area was covered by a warm, shallow sub-tropical sea which was full of life.

The remains of all of these creatures fell to the sea floor shortly after death; their shells helping to form calcium-rich sediments. These sediments were compacted over a long period of time and eventually formed the limestones we see today.



◀
Carboniferous palaeomap
Image copyright to Ron Blakey, Colorado Plateau Geosystems, Inc

▼
Carboniferous Sea
Image courtesy of John Watson

The Formation of the Caves

Did you know?

Caves are formed from just two commonplace ingredients: rock and water. Not just any rock will do though; you must have a rock that can dissolve in water. Most caves are formed from gypsum, limestone, dolomite or even salt.

The limestone cliffs seen along the trackway down to King Arthur's Cave is full of caves of varying sizes. Looking carefully at the limestone you will see that the rock from the base of the cliff up to the top of the caves is very smooth. Looking at the limestone above the caves you will see that it is very rough. This difference in texture gives us a clue about the development of the caves here.

The caves were cut into the limestone by running water, a river flowing along the base of the cliff.

As the water flowed past it started to dissolve the limestone and gradually wore a crack, and then a larger gap, and then a cave by moving back into the cliff face. If you stand next to the cliff looking along the cliff line you will see that the base of the cliff is cut back, this is due to the action of this river which has now long gone.

Where the water ran next to the limestone it smoothed the surface, above this point the limestone remained rough. The change in texture actually shows us the level which the river reached along the cliff line.

▶ Cut back cliff line

Biodiversity

The long narrow strip of woodland which stretches above and below the massive limestone crags is a remnant of the original Lord's Wood and apart from the areas immediately around the old crushing and quarrying works is ancient semi-natural woodland. The canopy is dominated by beech, oak and ash with occasional whitebeam and yew.

A diverse range of understorey species may be seen including hazel, field maple, hawthorn, spindle and guelder rose. Spurge laurel, a distinctive evergreen shrub which flowers early in the year and is often associated with limestone woodland may be found. Dog's mercury is very dominant within the ground flora together with bluebell, wood spurge, woodruff, wild garlic and note the tussocky pendulous sedge.

On the shady rock outcrops ferns may be found, notably hart's-tongue, common spleenwort and the local maidenhair fern while broad buckler and male ferns can be seen on the woodland floor. In autumn the woodland supports a rich variety of fungi. Cramp ball is a strange black fungus which grows on ash and beech while the slimy porcelain fungus may be seen on dead beech trunks and branches. The devil's bolete may sometimes be found along the reserve boundary.

Secondary woodland has developed around the old quarrying works and this small area is dominated by ash and silver birch. Ivy is dominant in the ground flora within this area.

King Arthur's Cave supports a wide range of woodland birds including green and great spotted woodpecker, marsh tit, and the summer visiting blackcap and chiffchaff.

Of particular significance is a small area of species-rich calcareous grassland on the quarry floor that supports a diversity of notable plants; including marjoram, salad burnet, glaucous sedge, common calamint, eyebright, perforate St. John's-wort, ploughman's spikenard, rough hawkbit, common spotted orchid and fairy flax.

Did you know?

The species-rich calcareous grassland on the quarry floor is here because of the calcium-rich limestone underlying it. Habitats form according to the underlying geology and the soils generated by it.

▲ Part of the remaining area of species-rich calcareous grassland in the quarry floor.

Archaeology

King Arthur's Cave, and the other caves and rock shelters that can be seen along the path have yielded some of the earliest evidence of human settlement in England. King Arthur's Cave is a very well studied site. It was first investigated in June, 1871 by Reverend W S Symonds, a well known amateur geologist, after iron ore miners discovered the remains of Pleistocene mammals. Further investigations followed in the 1920s and 1950s by the University of Bristol Speleogical Society, and most recently in the 1990s by Dr. N. Barton of Oxford-Brookes University.

The investigations have yielded evidence of human settlement and the landscape they lived in, stretching back some 25,000 years to the early part of the Late Palaeolithic. Flint tools including knives, scrapers, burins, awls and backed blades have been found. Animal remains found in the cave include those of red deer, horse, cave bear, woolly rhinoceros and hyena.

The variety of animal remains shows the changing climatic conditions of the time with woolly rhinoceros and cave bear being associated with the colder periods and the red deer and horse being associated with the warmer periods and the development of forests.

Caves like this would have provided shelter during the last phases of the Ice Age (18,000 - 10,000 years ago) when glaciers extended over the west of Herefordshire. Two hearths of fires were identified near the entrance, one of which was dated to about 12,120 years ago and there were a significant number of red deer bones with the cut marks of cooking preparation on them.

Occupation of the cave continued through the later prehistoric periods. The late 19th century excavations of Symonds found the remains of two burials of the Romano-British period.

The first excavation at King Arthur's Cave in 1871, which shows the surface level at the time. *Image from the Monmouth Museum collections*

Did you know?

The excavations at King Arthur's Cave have moved a large amount of soil from the cave. The mound that you stand on outside the cave is the spoil from these excavations.

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.

Community Conservation Champions

heritage lottery fund
LOTTERY FUNDED

NATURAL ENGLAND
Supported through Defra's Aggregates Levy Sustainability Fund

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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