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The story of Barr Beacon and Pinfold Lane Quarries is told by its rocks. The evidence to explain the sequence of events that took place over millions of years is there for you and the children to find. Most of the materials have been recycled over those millions of years, with Man recently using them as aggregates.

Key points to investigate

We are looking at four aspects of these exposures of rock material and the surrounding area:

1 - to try to identify pebbles in the sands and gravels and their origins.
2 - to find out how they got here, after they were formed.
3 - to find out what is naturally happening to the sands and gravels today or in the recent past.
4 - to find out what they have been used for by Man and the effect on the landscape.

Summary of the Geological history

The hills of Barr Beacon and Pinfold Lane Quarries are made of red sandstones and conglomerates [pebble beds] of Early Triassic age. The lower ground on the west consists of grey shales, mudstones, sandstones, ironstones and coals of Carboniferous age. Beyond are older, harder rocks, including Devonian sandstones [Clee Hills], Silurian limestones [Sedgley Beacon and Dudley], Cambrian sandstones and Precambrian volcanics [Wrekin]. To the east are younger, softer Triassic rocks.

- Over millions of years mountains were formed, eroded and washed into the seas. Collisions of the Earth's plates compressed the sediments in the seas to produced more mountains with volcanoes and the cycle continued. Evidence for these events lie out in the hills to the west.

- 300 to 280 million years ago, during the Carboniferous Period, the Coal Measures rocks were deposited. Britain was then on the equator. The hot, wet, muddy environment of river floodplains, swamps and deltas was ideal for ancient plant growth, now preserved as coal. These rocks give rise to the grey clay soils on the western side of Barr Beacon.

- Over the next 50 million years, during Permian times, much of the country was uplifted, folded, faulted and eroded.

- By Lower Triassic times, between 248 and 241 million years ago, plate tectonics had moved Britain north of the equator. The environment of this time was that of a hot, arid desert. Sands and pebble beds were deposited on the ancient landscape by flash floods and intermittent rivers. As each flash flood subsided, great thicknesses of sands and gravels were deposited as horizontal bars on the beds of wide river channels, with finer materials settling out in quieter waters. At the downstream edge of sand or gravel bars the moving sediments avalanche down the slopes producing "cross" beds. This "cross-bedding" slopes generally to the north in the Barr Beacon area, indicating a river flowing from south to north.

- The lowest layers here consist of material eroded from nearby hills to the south, as indicated by the angular shape of the sand grains and rock fragments. This is known as the Hopwas Breccia.

- An examination of the pebbles in the layers above also indicates a flow from the south. This is the Kidderminster Conglomerate. Most of the pebbles are fairly smooth and well rounded, indicating long-distance transport by water. There are many rock types present as pebbles. The most common is quartzite and the mineral, quartz. The quartzites likely came from the borderlands of South Wales. Less common are granites and other igneous rocks, originating from what is now S.W.England and N.W France, long before the English Channel existed.

- The red colour of the rocks is due to the presence of haematite, an iron oxide mineral, coating the grains of quartz sand and also found in the fine clays mixed with the sand. Haematite is typically formed in hot arid conditions. In some places patches of a buff/grey colour can be seen. One possible cause for this is the chemical reduction of the red iron oxide. This may be due to the presence of plant debris or other organic material trapped in the sediments, which used up some of the oxygen in the decay process. The soils on the Triassic rocks are usually sandy and often pebbly. In places they may be red and clayey.

- Fossils are rare. Hot deserts with flash floods are not the best environments for living things and are even worse for preserving them as fossils. In other areas mudstones have been found with microfossil plant spores and sandstones with fossil footprints of reptiles. None have been found at Pinfold Lane.

- As the sands and gravels became buried under layers of later sediments they were compressed. Water circulating through the sediments dissolved chemical elements and precipitated them on the sand grains and pebbles, helping to cement them together. Where there is plenty of quartz cement it produces hard sandstones and conglomerates. At Barr Beacon there is less quartz in the loose gravels. Many pebbles show solution hollows at their points of contact, where silica has been dissolved, only to be precipitated around the points, cementing grains of sand onto the pebble. These contact points are called pressure solution points and pebbles may also be found broken through these contacts, a result of the weight of overlying rocks endured over millions of years.

- Since Triassic times the area has been subjected to earth movements. During the Jurassic and Cretaceous Periods [205 – 65 Ma] much of the Midlands and SE England was below sea level, but later uplift and erosion have removed all the evidence. During Tertiary times the rocks at Barr Beacon were tilted by 5-10 degrees eastwards and broken by several ENE-WSW trending faults, which must have produced great earthquakes. The tilting and faulting were important factors which limited the quarrying operations. Subsequent weathering and erosion by rivers and ice sculpted the present landscape.

More recent events

- The extraction of coal, iron and clay from the Coal Measures, and sand and gravel from the Triassic rocks began in the late 18th century. There was great demand for sand and gravel for use as building material in concrete and road aggregate from the 1930s. By 1950 all quarrying had ceased and the area was abandoned. Recent weathering has helped to form soil which has been colonised by a range trees and other plants, with their associated animals.

- The excellent exposures of river-lain deposits, revealed by the quarrying, offer a unique opportunity to view the sequence of sandstones and pebble beds. Pinfold Lane Quarries have been designated a Site of Importance for Nature Conservation [SINC, the equivalent of a RIGS] for its Geology. It is anticipated thar Barr Beacon will be granted the same status.