Shrawley Woods & the River Severn.

This leaflet explores the rocks visible in the Woods and explains how they were formed.

The majority of the rocks exposed are **Triassic** (251 to 200 million years old) in age and are made up of red/orange sandstone and mudstone. The rock is called the Bromsgrove Sandstone Formation, from where they were first described.


A modern braided channel


BRIDGENORTH SAND DUNE CLIFFS

The rocks were formed by braided streams and wadis which crossed a vast arid plain. It is easy to find modern examples of braided stream processes at the edge of the sloping ploughed fields where water runs off. Indeed a fine example was at the edge of the field to the west of Olivers Mound. Imagine this scene, but magnified millions of times, and here is a typical braided stream.

In the picture to your left, you can see how the channels part and join and also that old courses have been abandoned. The raised areas between the tiny channels are like the older deposits of Permian desert sand dunes and wind blown sand, that you can see prominently at Bridgnorth (Bridgnorth Sandstone Formation). These rocks were weathered during the Permian (299-251 million years old)period and broken back down into sand. The sand from these dunes has then been recycled into the Triassic rocks in Shrawley Woods. Hence the similarity in colour between thes rocks.

Together, the Bromsgrove and Bridgnorth sandstones are part of a group geologists call the New Red Sandstone.

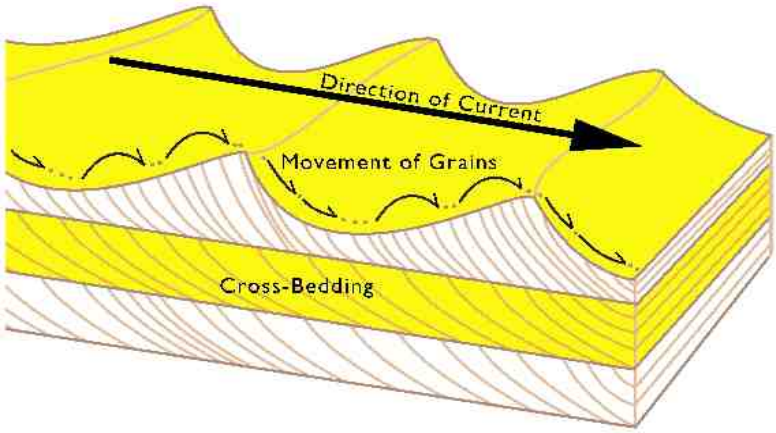
This cliff face in the picture below is at the south end of Shrawley Woods by the footpath.

When you look closely at the sandstone in the middle of the rock face above the muddy layers, you see there is a cross section that has small dipping structures. These are called bed dunes. Ripple marks are also seen as little hummocks on otherwise flat surfaces. Both of these features were

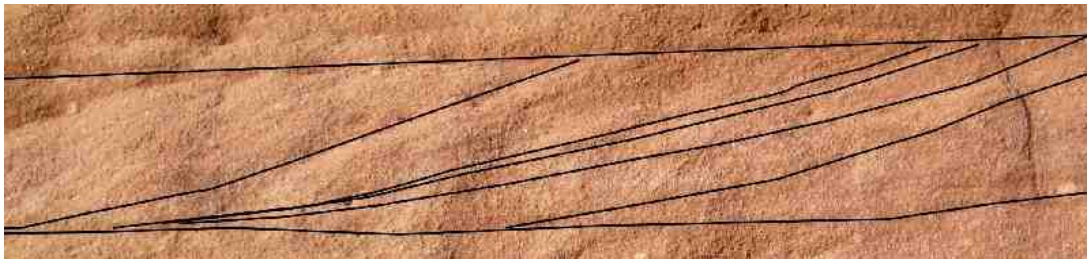
formed as it was being laid down in water. The dunes are similar to those in the picture underneath. These are small ones, and can be found in the pathway to the west.

Looking down on them you can tell which way the water was flowing by using the diagram below. This is very similar to the bed dunes of Bridgnorth except the Bridgenorth wind blown dunes are huge. You can also see small pebbles in the picture. This is due to the stream having different quantities of water running down it, which at times has been large, resulting in pebbles being carried and laid down.

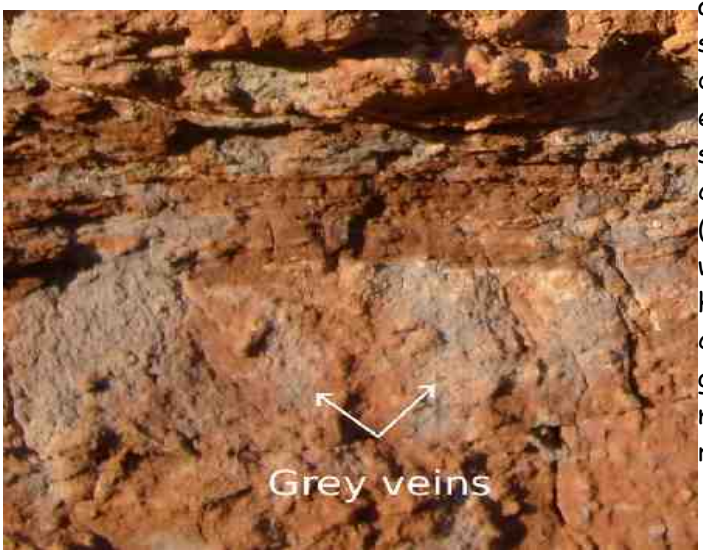
Cross bedding is a structure in the rock formed by such features as ripples and dunes when grains carried by currents or wind, bounce up one side of the ripple and tumble down the other side. It is the lee side (down current layers) that are preserved, as you can see. Cross bedding is most common in streams and tidal deposits as well as desert sand dunes.



The picture below shows some of these in the cliff. Some of them are marked for you. Which way do you think the current flowed?

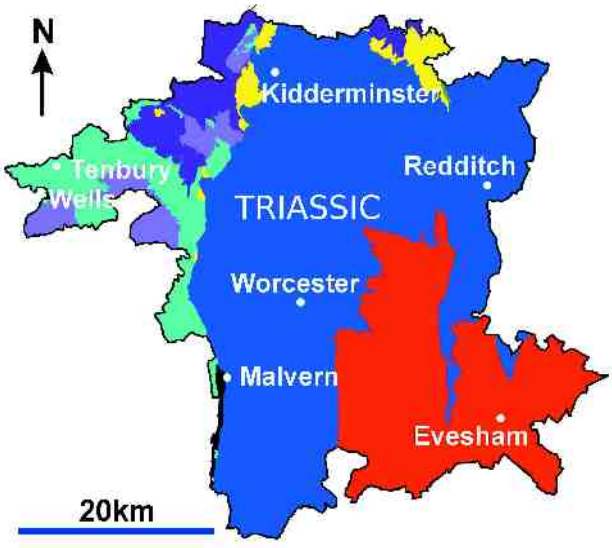


At the bottom of the cliff seen in the picture below, the grains in the rock are much smaller; they are mudstones. These were probably formed in static water in a temporary lake. In the desert like conditions the water has evaporated quickly, leaving soluble minerals such as gypsum (a type of salt) and calcium carbonate, making these beds very calcareous (limey) due to this evaporation process. There was probably salt in these beds too, but these have dissolved away in time. If you look closely you can also see pale blue or grey lines going vertically upwards through the mudstone. These may be the remains of plant roots.



The surface between the mudstone and sandstone is very uneven. This is an erosive surface. As the river flowed above it, it cut down into the underlying mudstone and removed the surface. The flow of these rivers was fast and they could carry bigger material than sand grains. They were able to carry small pebbles along the bottom of the river. This is shown by the channel lag opposite. This is the coarse material carried along the river bottom in floods. You will also see that some of the pebbles are clasts of the mudstone that have been recycled. Lumps of the mudstone were taken up by the river as it cut into the rock, with the fresh material being deposited further downstream.

At the top of the hill and around Oliver's Mound, in the sunken track by the entrance, in molehills and in the path you can find pebbles deposited by the River Severn in a similar way to the mudstone pebbles above. These deposits are about 45,000 years old and were deposited when the river flowed at a higher elevation than today. The pebbles are rounded because they have been carried for large distances by the river. Some of the pebbles have actually been recycled twice and originally came from France by a river that no longer exists. Since they were deposited the river has continued to cut down into the ground, to its present day level. This cutting down of the river is associated with two events; 1) the huge volumes of melt water coming down the valley as the ice melted after the last ice age and 2) the weight of the ice on the land. The ice had depressed the earth's crust. When the ice melted, the land began to rebound, and move slowly upwards. This enabled the river to cut down into the land.



Nine geological systems are represented in Worcestershire

1. Ice Age (1.8 million years ago to recent) — glacial deposits, river sands, gravels and alluvium (not shown on map).

2. Jurassic (199 million years old) limestones and mudstones laid down in a warm shallow sea. (In Red)

3. Triassic (251 million years old) rocks underlie most of the county. These sandstones and mudstones were laid down by rivers and lakes in a desert area (In Blue)

4. Permian (299 million years old) dune-bedded desert sandstones (In Yellow)

5. Carboniferous (359 million years old) clays, coals, shales and sandstones formed in tropical swamps. (not shown)

6. Devonian (416 million years old) Old Red Sandstones were deposited in water in an otherwise arid

landscape. (In Purple)

7. Silurian (444 million years old) limestones and shales were deposited in warm, shallow seas (In Green)

8. Ordovician (488 million years old). A small exposure in the north of the county (In light blue)

9. Precambrian (here — 700 million years old) igneous and metamorphic rocks in the Malvern Hills are amongst the oldest in England (In black)

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