Deer Leap and Ebor Gorge. Mendips Field Trip Report for the Bath Geological Society, 9th June 2021

By Graham Hickman

As a pre-view to the trip Dr Doug Robison had given a Zoom lecture entitled 'The Making of the Mendip Hills' to the Bath Geological Society only a few days before. This proved to be the prefect introduction to what was an extremely interesting field trip. This trip was led by Dr Doug Robinson together with his friend and neighbour David Scarth. Both Doug and David live in Wookey Hole Village and part of this field trip was across land owned by David Scarth.

We met at the Deer Leap car park (ST 5190 4928) and the group enjoyed the pleasant views from the Mendips across to the Bristol channel. Being only the second field trip to be held in 2021, members were delighted to be out in the field together, after an abeyance of 15 months when all meetings had to be cancelled because of the Covid-19 pandemic. Doug introduced the geology and described how the Mendip Hills are interpreted as a foreland fold and thrust belt which has undergone shorting by some 20km. In the area around Deer Leap the thrust belts are E-W trending. (Fig. 1).

Fig. 1: Doug Introduces the Geology using the local map.

The group then proceeded to walk west across to several small outcrops of the Clifton Down Limestone and the Oxwich Head (Hotwells) limestone. Dips were measured, confirming the 60 degrees to the SW, shown on the published geological maps (Fig. 2). The coarser nature of the Oxwich Head limestone was also noted. Several of the outcrops showed a karstic weathering while others did not. It was suggested that the lack of karstic features on some outcrops were due to quarrying activities rather than dolomitization, distinct depressions next to them showed where stone had been won. The ancient Deer Leap Standing stones further up the hill confirm this area has been occupied and exploited by man for millennia.

Further down the hill, younger rocks of the Millstone Grit were encountered as we walked ''up the stratigraphy''. Its appearance was as a fine-grained quartz arenite. Doug pointed out how the difference in lithology, which affects how rocks weather, can also be seen as slight breaks in slope. The largest of these being at the boundary with the softer Coal Measures which are composed mainly of shales. To the west a depression marks the location of a palaeo-valley or Wadi infilled during the Permian with the dolomitic conglomerate group.

Fig. 2: Doug demonstrating the SW dip of the bedding

This area of the southern Mendips is unique in that the Ebbor thrust overrides a thin unit of Coal Measures (CM), which are preserved in a tight syncline underlying the thrust (Fig. 3). Finding the Ebbor thrust was our next task.

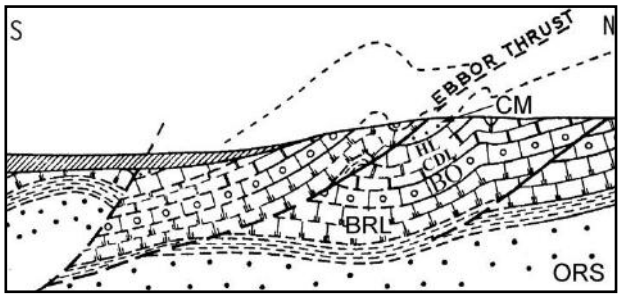

Fig. 3: Modified images from 1965. Geology of the country around Wells and Cheddar. Memoir of the British Geological Survey).

On crossing the road and entering the land owned by David Scarth we made our way down to an old overgrown quarry (shown as an adit on an 1871 published map). Here the Ebbor thrust is clearly exposed. The strike of the thrust was measured as 120/300 degrees, with a dip of about 45 degrees. Limestones occur to the south (in the hanging wall) and coal measure sandstones to the north (in the footwall). (Fig. 4) The limestones immediately adjacent to the thrust have undergone low-grade alteration and a thin band known as Ebbor Marble can be found.

Fig. 4: Doug demonstration the position of the Ebbor Thrust

Then we walked back to the Deer Leap carpark through the fields on the east side of the road. Working our way up to older rocks ''down through the stratigraphy'', we

noted the outcrop of sandstone, now attributed to the coal measures and the area of boggy ground where a small stream flows over the coal measure shales. Finally reaching the higher ground of the Carboniferous limestone. A pleasant picnic lunch was eaten on the benches near the car park.

After lunch we drove a little way down the road to the NT Ebbor gorge car park and made our way into the woods, then following the stream, to the location of an abandoned mineshaft. Doug explained how in 1871 the shaft was sunk to 36m in depth in the search for coal. It may be presumed that the reddish sandstone we had seen earlier, had been mis-identified as Triassic in age or the presence of carbonaceous shales had misled the investors. A contemporary account by the geologists' Bristow and Woodward describes the folly of the event *''The sinking of this shaft under such manifestly hopeless conditions shows a want of knowledge of the elements of geology and coal-mining that could scarcely be supposed to exist at the present day on the part of persons likely to embark in a search for coal within five miles of a Cathedral City"* (Geological Magazine, V8 November 1871, pp. 500-505)

We then drove into Wookey Hole and made our way to the garden of David Scarth. His house is set in an old quarry and the Triassic Sandstone quarry walls form the boundary of his garden. This was the perfect place for a group photo (Fig. 5).

Fig. 5: Group Photo, Bath Geological Society participants.

The sandstones have a slight westerly dip, they are very thick bedded and laterally persistent. They probably represent stream flood deposits during the Triassic. Some thinner bedded units were recognised as more nodular and probably represent a palaeo-soils. Of special interest is a small normal fault in the east side of the quarry, this has a strike of 030/210 degrees and a throw of about 1m down to the west. It is called 'Doug's Fault' as it goes under Doug's house! Fortunately, there has been no recent movement on it.

During the final part of trip, we walked east across the fields following the Triassic, past its onlap point, until we came again onto the Carboniferous limestone where there is a large disused quarry and lime kiln. The Carboniferous limestone here is the Burrington Oolite Formation. The massive nature of the limestone means that bedding planes are quite difficult to identify, and the group spent some time identifying candidate bedding surfaces. There are also a number of mineral bands, about 30cm wide, with symmetric banding, the veins have grown in thickness by opening and closing along the vein fracture and progressive depositing minerals on the growth surface (Fig. 7).

Fig 6: Doug demonstrates the throw on 'Doug's Fault'

Fig, 7: Symmetric banding within a mineral vein

The group returned to Wookey Hole, having enjoyed wonderful weather and a great day learning about the rocks of the Mendips. We thanked Doug and David for a very informative and enjoyable field trip.

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Making thin sections at home

by Jonathan Slack

Last year I wrote an article for this journal entitled "Fun with thin sections". As all readers of this journal will know, thin sections of rocks enable identification of the constituent minerals and are often also very beautiful. At that time they were made for me by Robert Gill of Geosec. I did not believe that it would be possible for an amateur to make them at home because of the complex equipment I thought would be required. However, as a result of the Covid pandemic, Robert Gill was unable to continue processing customers' own specimens. This meant that if I wanted any more sections, I should have to grasp the nettle and have a go myself.