
DOLEBURY WARREN - a geological excursion

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Dolebury Warren is a National Trust property situated on the northern slopes of the Mendip Hills and is notable for the imposing Iron Age hill and farmed rabbit warren. Today, it provides a wonderful mixture of limestone loving plants and hill slopes which attract a wide range of butterflies and other insects. There is also the bonus of superb views in all directions, particularly to the limestone outcrop of Steep Holm in the Bristol Channel around to the distant hills of the Forest of Dean and the north-east Somerset part of Mendip.

The reserve is managed by Avon Wildlife Trust which, through the Bath Geological Society, requested this geological overview.

General description

The Dolebury Warren reserve and Iron Age fort are situated on the northern limb of the Carboniferous Limestone (Dinantian) outcrop of the Mendip Hills, which, at the highest point of the reserve, are 185 metres (600 feet) above sea level at the eastern end of the fort. The northern side of the reserve is well wooded, opening out as the top is approached into thick bracken and gorse. This gives way, inside the fencing of the reserve, to a grass slope with frequent small trees and patches of scrub. On the northern slope, there are loose limestone blocks but nowhere is it possible to study the rocks in situ.

The embankment of the fort is composed of huge numbers of loose blocks of limestone, consolidated by soil and low vegetation. Between the two ramparts of the fort, on the eastern limb, mounds of limestone blocks lie on the surface. Within the ramparts, at the eastern end and just below the highest point, are exposed three bedding planes of Carboniferous Limestone in an east/west strike (direction), dipping steeply to the north.

Along the southern limb of the reserve, just south of the footpath on the single rampart section, the land drops away at an increasingly steepening angle, to almost vertical in many places. Along this slope, Carboniferous Limestone is exposed, showing the bedding planes through the sparse soil and vegetation.

South of the south-eastern corner of the ramparts, a shallow amphitheatre-like face, exposing many beds in the sequence stretches for about 100 metres to the east. At the eastern end, a bluff stands out from the general surface, with ledges and weathered faces. At the western end, the same beds are found as two red (due to iron staining) bluffs.

West of the area, described above, the beds outcrop along the slope. However, the steepness of the exposures make access difficult and dangerous.



*Photograph one: Dolebury Warren,
Excavation/exposure on south side, middle of ramparts*

Approximately halfway along the southern rampart, (*photograph one*), an area of vertically bedded limestone, possibly an old working, gives a relatively safe and accessible exposure. Indeed, because of the steepness of the rest of the outcrop, removal of vegetation and cleaning from this short exposure would provide a valuable site for geological study without compromising the SSSI status of the reserve.

The Geology

Examination of the Geological Survey map - the Bristol District Special Sheet shows that Dolebury Warren has been firmly placed in the Carboniferous Limestone Series. The reserve contains two beds of the sequence - the later Burrington Oolite to the north succeeding the Black Rock Limestone to the south, with the strike of the bedding planes lying east/west, almost following the central footpath through the fort. The Burrington Oolite is only exposed near the summit as three, short 'wall-like' beds just inside the eastern end of the ramparts.

To the south of the central footpath lies the Black Rock Limestone. It is this formation which is exposed, along the south face of the reserve, and in the bluffs at each end of the 'amphitheatre'

just south-east of the fort, (*photograph two*). The Black Rock Limestone shows typical examples of the fossils such as corals (*Palaeosmilia*, *Caninia*) brachiopods (*Productus sp.*) abundant crinoid ossicles and trace fossils (burrows) and many examples can be picked up from the loose rock on the surface without touching the exposed rock. Most are finely weathered out while, in certain beds, silicified fossils, particularly crinoid stems and ossicles are dominant. One particular bed is very cherty, and appears as an almost white horizon across the face of the slope, (*photograph two*).

In the bluff at the eastern end, three veins of haematite (iron ore) are weathered out, (*photograph three*). One is on the northerly face of the bluff while the other two can be seen cutting the limestone approximately one metre to the south. At the west end of the 'amphitheatre', the same beds produce two further 'red' bluffs, with haematite veins, one showing weathered goethite crystals (another form of iron ore) and the suspicion of a metallic lustre, probably galena (lead ore).

In the small exposure, or old working, just south of the footpath along the south rampart, (approximately 100 metres west of the south east corner) finely weathered, silicified fossil material can be seen. Crinoids are particularly abundant but corals (*Caninia sp.*) are also evident, (*photograph four*). The loose material at the bottom of the exposure provides ample opportunity for finding fossils and studying the nature of the Black Rock Limestone.

Map

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*Photograph two: Dolebury Warren, 'Amphitheatre-like' scarp, SE of corner of ramparts.
Bluff at E end. Note chert band top/middle of scarp*



Photograph three: Dolebury Warren, Eastern Bluff, maps mark point of haematite veins

At the west end of the reserve, beside the footpath up from the car park at Dolebury Bottom (map reference ST446588), access can be gained to a small exposure of the Black Rock Limestone which exhibits well weathered, vertical faces, as well as loose scree which provides collectable specimens of the fossils seen in the rock faces, such as corals, crinoid material, brachiopods and large trace fossils (burrows).



*Photograph four: Dolebury Warren,
Middle of ramparts south side, Coral Caninia sp.*

Health and Safety, and Environmental considerations

The south slope of the reserve is steep, particularly where the rock is best exposed and is not safe or accessible. The small exposure on the south side can be examined safely, particularly if it were cleaned of vegetation. Here, the steep slope immediately to the south remains an ever present danger, and parties would have to be supervised. Stout footwear is essential to provide good grip on the grassy slopes.

The area is an SSSI so no hammering is permitted so goggles, and, because the exposure is shallow, hard hats, are not advised. Similarly, the small exposures alongside the western footpath up from Dolebury Bottom provide suitable sites but safety, particularly stout footwear with good grip, is of importance.

Clearly, as the area is an SSSI, conservation issues are the highest priority so any access to the rock exposures must be evaluated with respect to preserving the wildlife. However, the reserve provides an excellent area to study the wide range of 'lime-loving' plants and insects, particularly the butterflies that frequent the hills from May to late August. In a couple of very limited sites, 'acid-loving' plants (heather) can be seen where pockets of soil protect them the underlying limestone, probably where swallets (entrances to potholes) have been filled with later sediments.

References

Green, G W 1992 *British Regional Geology - Bristol and Gloucester Region* British Geological Survey.
Geological Survey map - Bristol District (special sheet, solid and drift)