
Pwlldu Head, Gower, West Glamorgan

[SS 568 863]–[SS 574 870]

Introduction

The Pwlldu Head GCR site includes the cliffs and foreshore from the west side of Pwlldu Head on the south Gower coast [SS 568 863] eastwards and northwards to Pwlldu Bay [SS 574 870]. Strata exposed include the top of the Hunts Bay Oolite (Holkerian) and the lower part of the Oxwich Head Limestone (Asbian). Highlights of the site are its sedimentological features, with a beachrock, karstic surfaces and 'pseudobreccias' particularly well displayed. The most complete description of the Asbian succession at Pwlldu is the account of Thorne (1978).

Description

The upper part of the Hunts Bay Oolite and the contact with the Oxwich Head Limestone are exposed on Pwlldu Head [SS 568 864]. The Hunts Bay Oolite is well bedded and jointed, contrasting with the more massive Oxwich Head Limestone. The contact is a palaeokarstic surface. The upper part of the Hunts Bay Oolite consists of oncoidal, bioclastic and peloidal packstones and grainstones with some thin interbedded mudstones (Scott, 1988) and a rich coral–brachiopod fauna which includes *Palaeosmilia purchisoni*, *Siphonodendron* and *Syringopora*. A diverse foraminiferal assemblage dominated by *Pofarkovella* '*Nibelia*' *nibelis*, *Eostaffella parastruvei* and *Archaediscus stilus* is also recorded from this formation (Strank, 1981).

The Oxwich Head Limestone consists of massive packstones and grainstones punctuated by palaeokarstic surfaces and palaeosol clays, although the latter have often been washed away by marine erosion. One palaeokarstic surface has been exhumed and its potholed structure is excellently exposed on the foreshore. The upper part of the succession is faulted and difficult to place stratigraphically, but around 70 m of the formation can be reliably logged (Ramsay, 1989). The principal features of interest in the section are sedimentological and these are described in detail by Thorne (1978).

Near the base of the Oxwich Head Limestone is a thick cross-bedded grainstone unit. The top of this bed, which lies about 10 m above the base of the formation, is a ridged and grooved erosion surface (Thorne, 1978). Petrographical studies have shown that the upper part of the grainstone contains abundant early diagenetic radial fibrous cement and that both grains and cement are cut through at the erosion surface (Thorne, 1978). This erosion surface is exposed on the foreshore where it can be seen to display up to 70 cm of relief (Thorne, 1978). Above the grainstone, massive, structureless limestones dominate the succession, but there are a number of rubbly weathering horizons containing paler and darker coloured areas much affected by pressure solution and dolomitization. These are the 'pseudobreccias' (Figure 9.22) first described in detail from Gower by Dixon and Vaughan (1911) and further discussed by Thorne (1978). Strank (1981) recorded a diverse foraminiferal assemblage including abundant double-walled palaeotextulariids from the Oxwich Head Limestone at Pwlldu.

Interpretation

On the basis of the foraminiferal faunas, Strank (1981) interpreted the Hunts Bay Oolite at Pwlldu to be of Holkerian age and the Oxwich Head Limestone to be of late Asbian age, with the early Asbian interval apparently not represented. This agrees with the ages of these formations on Gower determined from the macrofaunas (e.g. George *et al.*, 1976).

The top part of the Holkerian sequence at Pwlldu was interpreted as back-barrier deposits by Ramsay (1987) and Scott (1988), with the succession terminated by a prominent erosion surface and capped by a well-developed soil profile. Asbian sedimentation was similar to that in many other shelf areas of the UK, deposition of shallow marine packstones and grainstones being punctuated by episodes of emergence, soil formation and karstification. The cements at the top of the grainstone near the base of the Oxwich Head Limestone have been interpreted as marine precipitates and the

eroded surface as a beachrock horizon (Thorne, 1978).

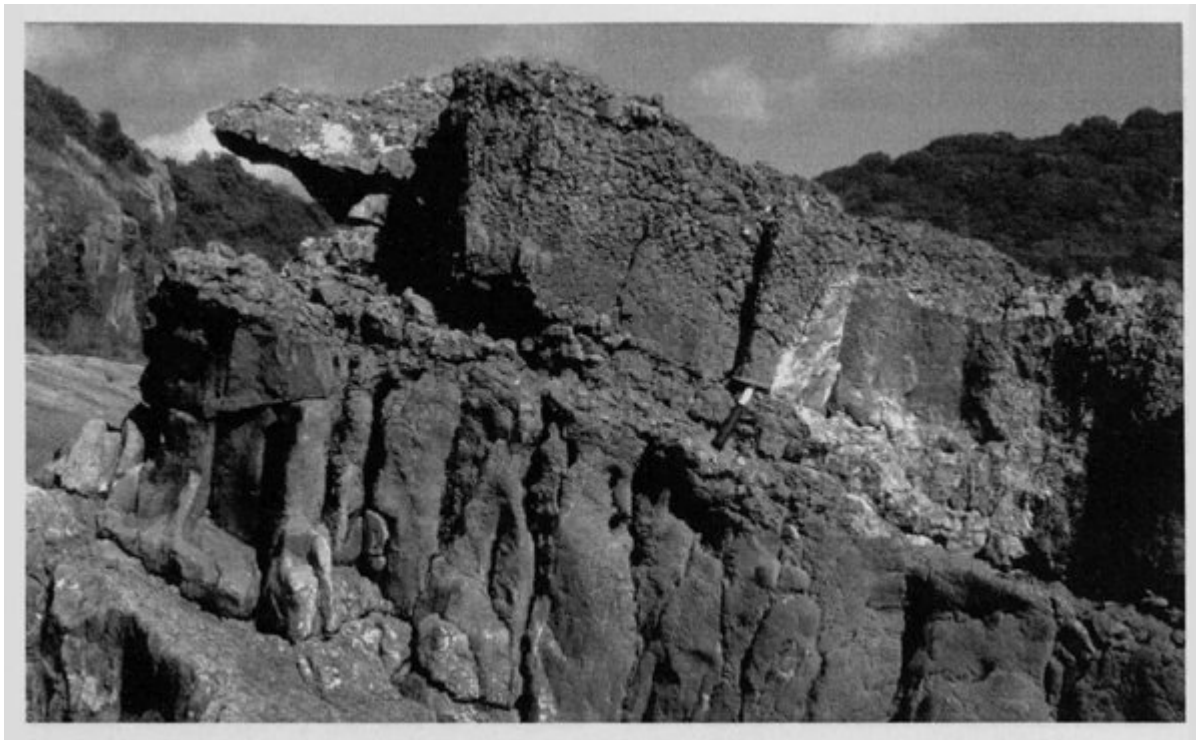
Pwlldu is a key locality for studying the origin of the rubbly weathering beds that characterize many Asbian shelf limestones, the 'pseudo-breccias' of Dixon and Vaughan (1911). In many Asbian successions, such as the Urswick Limestone of south Cumbria and the Eglwyseg Limestone Formation of Llangollen (see Eglwyseg Mountain GCR site report, Chapter 8), these pseudobreccias consist of darker 'clasts' in a paler 'matrix' and have been interpreted in terms of early patchy cementation, the 'clasts' being the areas of early lithification (Horbury, 1987; Solomon, 1989). In some cases, early cementation has enhanced a structure caused by bioturbation. On Gower, these mottled units have, in many cases, been subjected to a greater degree of subsequent diagenesis and are associated with pressure-solution seams and partial dolomitization (Thorne, 1978).

Firstly, pressure solution has led to the development of sutured seams concentrated along the boundaries between 'clasts' and 'matrix', and secondly, coarse, late diagenetic dolomite has formed preferentially along the sutured seams, spreading out to replace the adjacent limestone. This eventually leads to a texture consisting of 'islands' of limestone surrounded by networks of coarse dolomite. These effects are variably developed such that all stages in the process are well seen at Pwlldu, particularly in the upper part of the exposed succession (Thorne, 1978). The overall effect of these processes is to enhance the brecciated appearance of the deposits.

Conclusions

The particular value of this site lies in the spectacular coastal section with sedimentological features clearly seen. Whereas the features indicative of emergence are seen at other localities, they are rarely as well displayed in bedding plane exposures. The diagenetic features that can be studied in the field, including the beachrock and development of pseudobreccias, are better seen here than at any other locality. The site is also valuable stratigraphically, showing the contact between the Holkerian Hunts Bay Oolite and the late Asbian Oxwich Head Limestone, with the early Asbian interval apparently unrepresented.

References



(Figure 9.22) Pseudobreccias in the Oxwich Head Limestone (Asbian) at the Pwlldu Head GCR site. (Photo: P.J. Cossey.)