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# Brofiscin Quarry, Mid Glamorgan

[ST 070 813]

## Introduction

The Brofiscin Quarry GCR site is a disused quarry [ST 070 813], 3 km south-east of Llantrisant. It is the type section for the Courceyan Brofiscin Oolite (Black Rock Limestone Group), a widespread unit in South Wales that represents a shallowing of the early Carboniferous seas. The section begins in the Barry Harbour Limestone, contains the whole of the Brofiscin Oolite and ends in the lower part of the overlying Friars Point Limestone. The Brofiscin Oolite was originally named the 'Candleston Oolite' by George (1933), and the succession in the area was documented by Dixey and Sibly (1918). The most recent descriptions with biostratigraphical data have been provided by Waters and Lawrence (1987) (see also Wilson *et al.*, 1990).

## Description

This is a disused quarry that is commonly stated to have been the site of toxic waste disposal. The quarry floor is very poorly drained and appears to be composed of clay-rich material covering a layer of large oil drums which are leaking. Much of the area is at times flooded with water containing leachate, which may be dangerous, and therefore care should be taken in these areas. Great care should also be taken when approaching the rock faces, as there is a gap between the quarry floor and the vertical faces in some areas. Waters and Lawrence (1987) record a 70 m succession at this locality. At its base is approximately 17 m of the Barry Harbour Limestone, with some oolitic units. Lithologies in this unit consist of dolomitized, fine-grained, laminated and cross-laminated bioclastic limestones, with bryozoans and crinoid remains. The unit has a sharp contact with the overlying Brofiscin Oolite, which is a massive to thickly bedded unit (13.6 m thick) of pale- to dark-grey, well-sorted, oolitic, skeletal grainstones (Figure 9.33) with local planar cross-stratification. A distinctive feature is the localized reddening of the ooids. The unit is heavily dolomitized and contains some chert pods together with crinoid and brachiopod debris. This unit is sharply overlain by approximately 38 m of the Friars Point Limestone, which is composed mainly of dolomitized, muddy bioclastic limestones. There is no evidence of a subaerial surface at the top of the Brofiscin Oolite as occurs in the Gower (Burchette *et al.*, 1990). The lower part of the Friars Point Limestone comprises fine, pale- to dark-grey, laminated and cross-laminated dolostones (c. 5 m) overlain by graded beds of dark bioclastic packstone with mudstone partings and erosive-based, brachiopod-crinoid lags with planar and cross-stratified layers, and hummocky cross-stratification (c. 13 m). The upper part of the unit (c. 20 m) consists of black, foetid, bioturbated and bioclastic packstones–wackestones with shaly interbeds, crinoid lags and a fauna of bryozoans, brachiopods, corals and gastropods.

## Interpretation

Lithostratigraphical correlations equate the Black Rock Limestone Group in the Llantrisant area with the Penmaen Burrows Limestone Group farther west in the Gower Peninsula (see (Figure 9.2), and Three Cliffs Bay and Caswell Bay GCR reports, this chapter). Similarly the Barry Harbour Limestone appears to be the lateral equivalent of the Shipway Limestone, while the Friars Point Limestone correlates broadly with the Tears Point Limestone (see (Figure 9.2)). Conodont studies by Waters and Lawrence (1987) indicate that the Barry Harbour Limestone and the lower part of the Brofiscin Oolite lie within the *Siphonodella*–*Pseudopolygnathus multistriatus* Interzone, whereas the uppermost beds (5–6 m) of the 'Oolite' and lowermost 4–5 m of the Friars Point Limestone fall within the overlying *Ps. multistriatus* Zone. Thus the Brofiscin Oolite is Courceyan in age. The remaining part of the Friars Point Limestone is ascribed to the *Polygnathus mehli* Zone (Waters and Lawrence, 1987).

The nature of the outcrop does not allow any detailed facies analysis beyond the fact that the Brofiscin Oolite marks a regional shallowing phase. The Barry Harbour Limestone, by analogy with coastal outcrops, represents a mid-ramp storm-influenced setting. Shallowing took place allowing ooid generation, but a subsequent transgression brought the

return of deeper offshore, mid-ramp deposition as the Friars Point Limestone. The Brofiscin Oolite thins southwards, and Burchette *et al.* (1990), based mainly on data from the Gower, speculated that the formation was a storm and longshore current-influenced, shoreline-detached sand-body, unlike the barrier-island oolites found at other levels in the local Lower Carboniferous rocks. The unit can be traced southwards into the Yorke Rock Bed, a 3–5 m-thick well-sorted crinoidal grainstone in the Barry area (Waters and Lawrence, 1987). In the Gower, the unit is sharp-based and this might indicate that it represents a forced regressive event rather than a simple highstand shallowing phase, as may well be the case at this site. In both areas, however, the development of a mid-ramp facies immediately above the formation is indicative of a rapid transgressive event.

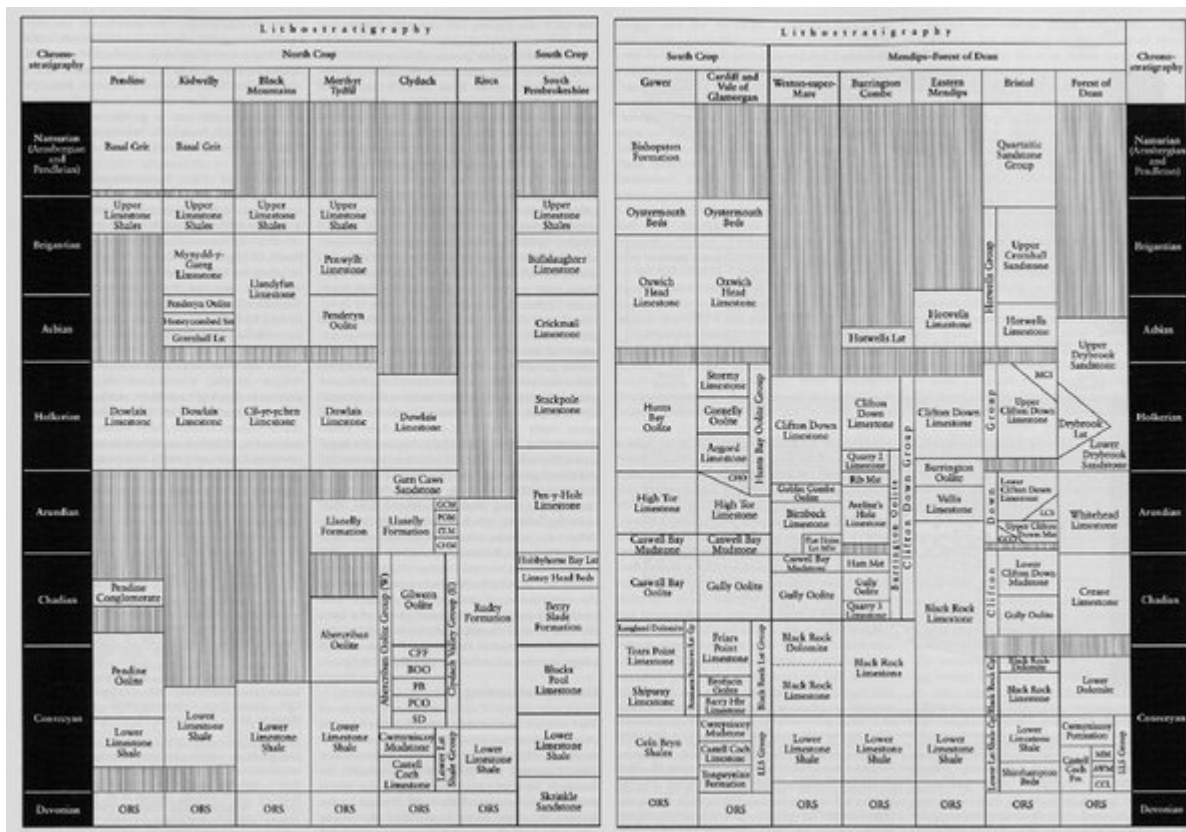
## Conclusions

The site is the type section for the Brofiscin Oolite, an oolitic sand-body of Courceyan age that marks a regional shallowing across the gently dipping carbonate ramp that developed across South Wales in early Carboniferous times.

## References



*(Figure 9.34) General view of Danygraig, Risca, illustrating shallow marine and peritidal deposits of the Rudry Formation. This site forms an important link between the Caswell Bay Mudstone of southern outcrops and the Llanelly Formation of the North Crop. (Photo: P.J. Cossey.)*



(Figure 9.2) Simplified stratigraphical chart illustrating the most widely used lithostratigraphical terms for the Lower Carboniferous sequences in South Wales, the Forest of Dean, Bristol and the Mendips. (SD — Sychnant Dolomite; PCO — Pwll y Cwm Oolite; PB — Pantyddarwen Beds; BOO — Blaen Onnen Oolite; CFF — Coed Ffyddlwn Formation; CHM — Clydach Halt Member; CLM —Cheltenham Limestone Member; POM — Penllwyn Oolite Member; GCM — Gilwern Clay Member; LIS —Lower Limestone Shale; CHO — Cefnryhendy Oolite; CCL — Castell Coch Limestone; AWM — Astridge Wood Member; MM — Mitcheldean Member; GCO — Goblin Combe Oolite; LCS — Lower Cromhall Sandstone; MCS — Middle Cromhall Sandstone.) Areas of vertical ruling indicate non-sequences. Not to scale. Based on information from and after Welch and Trotter (1961), Green and Welch (1965), Institute of Geological Sciences (1973, 1977c), George et al. (1976), Wright (1982b), Whittaker and Green (1983), Burchette (1987), Waters and Lawrence (1987), Barclay et al. (1988), Scott (1988), Barclay (1989), Wilson et al. (1990) and Kellaway and Welch (1993).