



South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Candleston Quarry	File Number: Site_RAW_JRD_49
RIGS Number: 622	Surveyed by: RA Waters & JR Davies
Grid Reference: SS 8726 7754	Date of Visit: October 2010
RIGS Category: Scientific, historical	Date Registered:
Earth Science Category: Stratigraphic, sedimentological, mineralogical	Owner: Candleston Farm Planning Authority: Bridgend County Borough Council
Site Nature: Disused quarry	Documentation prepared by: Jerry Davies
Unitary Authority: Bridgend County Borough Council	Documentation last revised: 22 nd February 2012
OS 1:50,000 Sheet: 170	Photographic Record:
OS 1:25,000 Explorer Sheet: 151	
BGS 1:50,000 Sheet: E262 (Bridgend)	
<p>RIGS Statement of Interest: This forms part of a network of key sites (RIGS & GCR) which collectively allow the evolution and facies development of the lower Carboniferous (Dinantian) carbonate ramp/platform in South Wales to be studied and which also includes sites of historical and educational interest.</p> <p>Candleston Quarry provides an accessible section in the westernmost outcrop of the Brofiscin Oolite (Candleston Oolite of George, 1933) in the Vale of Glamorgan which marks a widespread shoaling event within the Blackrock Limestone Subgroup of the Pembroke Limestone Group. Conodonts obtained from the locality confirm an upper Courceyan age. In the Candleston area, locally dolomitised non-oolitic limestones are interbedded with the more typical well sorted ooid grainstones that dominate the Brofiscin Oolite succession elsewhere, but well seen planar and cross lamination present throughout testify to accumulation in shallow, wave agitated waters.</p> <p>The section is additionally significant in exposing the unconformable contact between the Carboniferous Limestone and mineralised Jurassic marginal facies represented by pale, oyster-bearing limestones, breccias and conglomerates with void filling calcite, barite and galena. These Jurassic rocks infill fissures in the underlying oolite.</p> <p>Candleston Quarry is historically significant as the site where George (1933) first recognised the presence of a major oolite unit within the lower part of the local Carboniferous Limestone succession and it continues to provide an important reference section for the Brofiscin Oolite in the western part of the Vale.</p>	

Geological setting/context:

The Brofiscin Oolite Formation of the Cardiff district (Waters & Lawrence, 1987) and east crop marks a significant shoaling event within the Blackrock Limestone Subgroup of the Pembroke Limestone Group in South Wales. An equivalent oolite unit is recognised in Gower and in Pembrokeshire (Waters et al., 2009), and in the west of the Vale of Glamorgan it is represented by the now renamed Candleston Oolite of George (1933) for which Candleston Quarry was the de facto type section.

The section which is accessed via footpaths from Candleston Castle exposes the upper 8 m of the Brofiscin Oolite (Figures 1 & 2); bedding dips shallowly to the north-east. The lower 4.5 m comprise variably dolomitised fine grained packstones in which planar and cross-lamination is well seen on the weathered quarry faces. The overlying beds are more typical of the formation elsewhere and comprise pale to medium grey, well sorted, ooid grainstones in which many of the individual ooids have reddened cores. Low-angle cross-stratification is present in this upper portion of the exposure. Scattered disarticulated brachiopod valves present throughout the section include those of *Rugosochonetes vaughani*. The packstone parts of the section are known from nearby exposures to be underlain by further oolitic units and therefore to record a local and/or temporary abandonment of oolite deposition in the Candleston area. This may record a local deepening, even though tractional sedimentary structures throughout the section testify to sustained shallow water, wave influenced deposition.

Conodonts obtained from the section include the forms *Bispathodus aculeatus aculeatus*, *B. aculeatus plumulus*, *Polygnaythus communis communis*, *Pseudopolygnathus multistriatus* and *Spathognathodus bultyncki*. Collectively these species are consistent with a *Pseudopolygnathus multistriatus* Biozone age within the upper part of the Tournaisian Series and the Courceyan Stage (unpublished BGS reports). They confirm that that Candleston Oolite exposures correlate with the Brofiscin Oolite of the western Vale of Glamorgan (Water & Lawrence, 1987).

The Candleston Quarry section is additionally significant in exposing the unconformity between the local Dinantian limestone succession and overlying Jurassic marginal facies (Wilson et al., 1990) (Figure 2). Above a down-cutting surface and infilling small fissures are 2 m of horizontally bedded, cream coloured shelly limestones with coquinas of broken oyster valves, including specimens of *Gryphaea*. Lenses of breccia and conglomerate composed of angular to rounded, commonly dolomitised clasts of Carboniferous limestone display evidence of hydrothermal mineralisation (Figure 3). Calcite and barite infill former voids, as well as fissures and joints in the underlying oolite, and host small crystals of galena. Such mineralisation is widely observed in the Vale of Glamorgan marginal facies adjacent to the Jurassic unconformity and has been assessed by Fletcher (1988).

Candleston Quarry was the historical type section for the former Candleston Oolite and continues to provide an important reference section in the Brofiscin Oolite in the western part of the Vale of Glamorgan allowing comparison with the sections in its type area further east, but also with correlative oolite units in Gower and Pembrokeshire. Its exposure of the Jurassic unconformity and overlying mineralised marginal facies adds to the value of the site and its importance for conservation.

References:

FLETCHER, CJN. 1988. Tidal erosion, solution cavities and exhalative mineralisation associated with the Jurassic unconformity at Ogmore, South Glamorgan. *Proceedings of the geologist's Association*, 99, 1-14.







GEORGE, TN. 1933. The Carboniferous Limestone Series in the west of the Vale of Glamorgan. *Quarterly Journal of the Geological Society of London*, 89, 221-271.

WATERS, CN, WATERS, RA, BARCLAY, WJ AND DAVIES, JR. 2009. A lithostratigraphical framework for the Carboniferous successions of southern Great Britain (Onshore). *British Geological Survey Research Report*, RR/09/01.

WATERS, RA AND LAWRENCE, DJD. 1988. The geology of the South Wales Coalfield, Part III, the country around Cardiff. *Memoir of the British Geological Survey*, Sheet 263 (England and Wales).

WILSON, D, DAVIES, JR, FLETCHER, CJN AND SMITH, M. 1990. The geology of the South Wales Coalfield, Part VI, the country around Bridgend. *Memoir of the British Geological Survey*, Sheet 261 and 262 (England and Wales).

SECTION B

PRACTICAL CONSIDERATIONS: Please score Accessibility and Safety Red Amber or Green			
Accessibility:			X 
Comment: Easily accessible via footpath from Candleston Castle			
Safety:			X 
Comment: Low quarry faces present no obstacle to examination of the section			
Conservation status: There are no known conservation designations of this RIGS			

OWNERSHIP/PLANNING CONTROL: Owner/tenant: Candleston Farm Planning Authority: Bridgend County Borough Council Planning status/constraints/opportunities: There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT: Present use: Disused quarry Site condition: Generally good Potential threats: Becoming overgrown on in filled Site Management: Monitor vegetation and cut back as and when necessary
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SITE DEVELOPMENT: Potential use (general): Potential use (educational):
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Other comments:

Photographic Record



Figure 1. General view of Candleston Quarry looking north-west



Figure 2. Brofiscin Oolite in Candleston Quarry and Jurassic unconformity (dashed line) and overlying marginal facies



Figure 3. Close-up of the Jurassic unconformity and overlying mineralised marginal facies breccia with blade-like barites crystals in Candleston Quarry