



South Wales RIGS Group Site Record RIGS Description

SECTION A

General	South Wales
Site Name: Carreg yr Ogof	File Number: Site_RAW_JRD_25
RIGS Number: 606	Surveyed by: R A Waters and J R Davies
Grid Reference: SN 7780 2140	Date of Visit: October 2010
RIGS Category: Scientific and educational	Date Registered:
Earth Science Category: Stratigraphical, structural, sedimentological, geomorphology	Owner: Unknown Planning Authority: Carmarthenshire County Council
Site Nature: Extensive crags and quarries	Documentation prepared by: Jerry Davies
Unitary Authority: Carmarthenshire County Council	Documentation last revised: 22 nd February 2012
OS 1:50,000 Sheet: 159	Photographic Record: Attached
OS 1:25,000 Explorer Sheet: OL 12	
BGS 1:50,000 Sheet: E212	
<p>RIGS Statement of Interest: The site is part of a network of early Carboniferous sites (RIGS and GCR) in south Wales that, collectively, allow the regional stratigraphy and carbonate sedimentology to be studied. The site forms part of the sub-network of sites for the Dinantian limestone crop that occurs north of the South Wales Coalfield, the so called 'north crop'.</p> <p>The extensive crags and quarries at Careg yr Ogof provide an accessible section through the whole of the north crop Carboniferous Limestone succession. It provides excellent exposures of local Dowlais Limestone Formation Holkerian sequence, and the succeeding Asbian succession that includes the Honeycombed Sandstone and Penderyn Oolite members of the Oxwich Head Limestone Formation. Contacts between all the units are exposed and accessible. Additionally, exposures included in the northern part of the site provide important sections in the underlying, condensed, Upper Old Red Sandstone succession that includes the Plateau Beds and Grey Sandstone formations. Modern karst-related geomorphological features including sink holes and foundered strata are also well seen.</p> <p>The excellent exposure makes it an important site for researchers studying the stratigraphy, sedimentology and structural history of the Carboniferous Limestone of the region. The site will also be of interest to schools and universities for teaching purposes because of its wealth of geological features, but more importantly because of its accessibility and safety.</p>	

Geological setting/context:

Extensive crags and quarries in the vicinity of Careg-yr-Ogof expose the whole of the attenuated central north crop succession of the Carboniferous Pembroke Limestone Group. The exposures here are some of the most northerly in the Carboniferous Limestone of South Wales. The site also includes significant sections in the local Upper Old Red Sandstone of Upper Devonian age (Photograph 1), and also displays the effects of more recent karstic dissolution and collapse.

The exposed Carboniferous succession has been described by Schofield et al. (2009) and augments earlier regional accounts by George (1927). The south to south-eastwards dipping succession comprises:

Oxwich Head Limestone Formation:

Penderyn Oolite Member	c.15m seen
Honeycombed Sandstone Member	c. 5 m
Dowlais Limestone Formation	c.90 m
Cwmyniscoy Mudstone Formation	c. 8 m

At the base of the Carboniferous sequence a poorly exposed and attenuated Cwmyniscoy Mudstone Formation consists of less than 9 m of grey marine mudstones with thin beds of limestone and Courceyan (early Dinantian) in age (e.g. Barclay, 1989). A major non-sequence separates these strata from the overlying Dowlais Limestone Formation (formerly the Cil-yr-ychen Limestone) that contains fossils diagnostic of the much younger Holkerian stage, including the distinctive brachiopod *Davidsonina carbonaria* (Photograph 2). In this area the formation is around 90 m thick, and its base is marked by a thin, but distinctive sequence of dolomitised, orange-weathering, sandy limestones with scattered quartz and lithic pebbles, stromatolitic limestone and a conglomerate of angular limestone clasts (Photograph 3). About 7 m above the base of the formation there is a widely recognised coral bed composed of radiating colonies up to a metre across of *Siphonodendron (Lithostrotion) martini* (Photograph 4). The varied suite of limestones which characterises the remainder of the formation includes dark grey, fine-grained, skeletal and peloidal wackestones, packstones and grainstones with beds rich in algal pisoliths, articulated brachiopods and turreted gastropods, or coquinas of brachiopod valves (Photograph 5); porcellaneous limestones (calcite mudstones) also occur locally. These varied facies were deposited within an extensive shallow lagoon during a slow, but prolonged marine transgression; sheltering barriers lay to the south.

To the south of Carreg-yr-Ogof, the crop of the overlying Honeycombed Sandstone Member, the lowest division of the local Asbian succession, is marked by a prominent slack (Photograph 6), nevertheless, the member's characteristic, brown, carious weathering is clearly visible in intermittent exposures. The distinctive, well sorted, oolitic grainstones of the succeeding Penderyn Oolite Member are well seen throughout the southern part of the site (Photograph 6). Both members are divisions of the Oxwich Head Limestone Formation, a name now used in place of the Penwllt, Mynydd-y-Gareg or Llandyfan limestones of earlier accounts (Waters et al., 2009).

Below the Carboniferous succession, underlying the northern portion of the site, are rocks of Upper Devonian age (Upper Old Red Sandstone). The basal Plateau Beds Formation is the lowest division of the local Upper Old Red Sandstone succession. Red-brown and purple pebbly sandstones and conglomerates dominate in the lower part of this c. 15 m thick sequence (Photograph 7), whereas finer grained, ripple marked, red sandstones are more prevalent towards the top as seen in track-side exposures at [SN 7812 2186]. Cross-stratification within the conglomerates indicates that current flow was from the north, the sequence probably representing a series of braided stream deposits. A marine or possibly tidal setting has been suggested for the upper sandstone facies (Lovell, 1978) which contain fish and marine fossils, including brachiopods and bivalves, indicating a Frasnian to Famennian age (Barclay et al., 1988; and references therein). Less than 5 m of the succeeding Grey Grits Formation are exposed at Carn Gigfran [SN 779 219]. Convolute-bedding in these pebbly, quartzitic sandstones and conglomerates provides evidence of extensive dewatering, perhaps the product of earthquake-induced liquefaction. Evidence that these sandstones were previously worked for millstones is also visible (Photograph 8). The Grey Grits Formation, which rests unconformably on the Plateau Beds, has been interpreted as an alluvial fan facies sourced from the north (Barclay, 1989). The unexposed contact between the Grey Grits and the succeeding Carboniferous succession records a further erosional discontinuity.

Irregular depressions present in the south-eastern side of the site around Waun Ewdel [c. 782 215] comprise sinkholes and areas of founded ground within the crop of the Dowlais Limestone (Photograph 9). These depressions, up to 30m in diameter, are interpreted as the product of karstic dissolution of the underlying limestones and the sites of collapsed caves that have been partially infilled with collapse debris and washed-in soil.

The wealth of features visible at the site and as one of the most northerly sections in the Carboniferous succession of South Wales, the Carreg-yr-Ogof site is unique in the region. It includes one of the most attenuated Courcayan sequences preserved on the north crop and affords unrivalled exposure of succeeding Holkerian and Asbian strata. Regionally important sections in the underlying Upper Old Red Sandstone and the opportunity to study karstic geomorphology further endorse the site as one of the most important for research and teaching purposes in South Wales.

References:

BARCLAY, W J. 1989. *Geology of the South Wales Coalfield, Part II, the country around Abergavenny* (Third edition). Memoir of the British Geological Survey, Sheet 232 (England and Wales). (London: HMSO.).

BARCLAY, W J, TAYLOR, K, and THOMAS, L P. 1988. *Geology of the South Wales Coalfield, Part V, the country around Merthyr Tydfil*. (Third edition). Memoir of the British Geological Survey, Sheet 231 (England and Wales). (London: HMSO.).







GEORGE, T N. 1927. The Carboniferous Limestone (Avonian) succession of a portion of the north crop of the South Wales Coalfield. *Quarterly Journal of the Geological*

Society of London, 83, 38-95.

SCHOFIELD, D I, DAVIES, J R, WATERS, R A, WILBY, P R, WILLIAMS, M and WILSON, D. 2004. Geology of the Builth Wells District – a brief explanation of the geological map. *Sheet Explanation of the British Geological Survey*. 1:50 000 Sheet 196 Builth Wells (England and Wales).

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SECTION B

PRACTICAL CONSIDERATIONS: Please score Accessibility and Safety Red Amber or Green			
Accessibility:			X 
Comment: Accessible by footpaths from both north and south; long walk from nearest vehicular access points			
Safety:			X 
Comment: Remoteness of site poses risk of exposure if visited at times of inclement weather			
Conservation status:			

OWNERSHIP/PLANNING CONTROL: Owner/tenant: Unknown Planning Authority: Carmarthenshire County Council Planning status/constraints/opportunities: Unknown
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CONDITION, USE & MANAGEMENT: Present use: Extensive natural crags and numerous small abandoned quarries Site condition: Excellent Potential threats: Nothing obvious Site Management: Minimal; regular visits to ensure no unforeseen developments

SITE DEVELOPMENT: Potential use (general): Potential use (educational):
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Other comments:

Photographic Record



Photograph 1. General view of northern part of Carreg-yr-Ogof site. Upper Old Red Sandstone units are exposed to the left (north); base of Carboniferous succession underlies peat bogs (centre); lower parts of the Dowlais Limestone Formation form the prominent feature in the foreground and to the right (south)



Photograph 2. Basal Dowlais Limestone Formation: sandy limestones with beds of conglomerate of angular dolomitised limestone clasts



Photograph 3. Colony of *Siphonodendron (Lithostroton) martini* from coral bed near the base of the Dowlais Limestone Formation



Photograph 4. Quarried crags of Dowlais Limestone Formation below the Carreg-yr-Ogof trig point



Photograph 5. Gastropod-rich Dowlais Limestone Formation, disused quarry face, Carreg-yr-Ogof



Photograph 6. Top of Dowlais Limestone Formation (foreground) overlain by slack-forming crop of the Honeycombed Sandstone Member with prominent crags of in the Penderyn Oolite Member beyond, Carreg-yr-Ogof



Photograph 7. Quartz pebble conglomerates of the Plateau Beds Formation in the north of the Carreg-yr-Ogof site



Photograph 8. Coarse, pebbly sandstones in the Grey Grits Formation with evidence in the foreground of working for millstones, Carn Gigfran in the north of the Carreg-yr-Ogof site



Photograph 9. Sink holes and founded ground in the south-east of the Carreg-yr-Ogof site with quarried crags of Dowlais Limestone Formation in the foreground