



South Wales RIGS Group Site Record RIGS Description

SECTION A

General	South Wales
Site Name: Y Garn Goch	File Number: Site_dis_3
RIGS Number: 642	Surveyed by: D I Schofield
Grid Reference: SN 6889 2425	Date of Visit: 2010
RIGS Category: Scientific, aesthetic	Date Registered: Owner: ?CADW Planning Authority: Carmarthenshire County Council
Earth Science Category: Stratigraphical, historical	
Site Nature: Craggs on hill	Documentation prepared by: D I Schofield
Unitary Authority: Carmarthenshire County Council	Documentation last revised: 23 rd February 2012
OS 1:50,000 Sheet: 160	Photographic Record: Attached
OS 1:25,000 Explorer Sheet: OL12	
BGS 1:50,000 Sheet: E212	
RIGS Statement of Interest:	
<p>The site forms part of a scheduled ancient monument and is underlain by sandstones of the Ffairfach Grit Formation, part of a succession of sediments of Middle Ordovician age (deposited between around 470 to 560 million years ago) that are unique in the geological record of the UK and record a snapshot of environmental conditions at that time that are critical for the scientific understanding of Lower Palaeozoic geography and evolution of southern Britain. The formation itself is of historic interest, being first recognised as important by the seminal British geologist Sir Roderick Impy Murchison in his treatise 'The Silurian System' published in 1839, and forms the lower part of the former British type area (stratotype) of the Llandeilo Epoch (Williams, 1953).</p> <p>A near-complete section through the formation is preserved in railway cuttings at Ffairfach (Williams et al., 1983) and has already been designated a GCR site (Rushton et al., 1999). However, access to this locality is limited and potentially hazardous; hence this locality provides a more accessible alternative for studying the formation.</p>	

Geological setting/context:

The site is underlain by rocks of Middle Ordovician age that form part of the historical stratotype area for the Llandeilo Epoch in British Stratigraphy. The significance of these rocks, largely exposed within the Carn Goch Anticline and complex faulted syncline underlying Dynefor Park, was first recognised by Murchison in *'The Silurian System'* (1839). Subsequent work undertaken during the survey of the Ammanford district to the south by the Geological Survey of England and Wales (Strahan et al., 1907) established a stratigraphic framework for the area that was adopted by Williams (1953) in his seminal account of the geology of the Llandeilo area.

The type Llandeilo comprises a unique sedimentary succession deposited in shallow marine to near shore environments. It overlies earlier Ordovician offshore sediments and passes up into the thick, Late Ordovician to Early Silurian basinal succession that forms the main part of the lower Palaeozoic Welsh Basin. Recognition of this succession, entrained as it is within fault strands of the Welsh Borderland Fault System, has been critical in understanding the palaeoenvironmental and palaeogeographic evolution of the region. Subsequent studies from the type sections in Dynefor Park and the Ffairfach railway cuttings have largely focussed on biostratigraphy and palaeoecology (e.g. Williams et al., 1981; Wilcox & Lockley, 1981; Bergström et al., 1987). Largely as a result of the detailed study at these localities, the Ffairfach Railway cuttings and Dynefor Park have been established as GCR sites and as such are described in detail by Owens in Rushton et al. (1999).

Following the stratigraphy of BGS (2008) and Schofield et al. (2009) the general succession in the area comprises a lower Abergwilli Formation of anoxic and oxic facies mustones, overlain conformably by massive arkosic sandstone of the Ffairfach Grit Formation locally containing rhyolite and felsic tuff of the Coed Duon Formation in its upper part, in turn passing up into interbedded sandstone mudstone and limestone of the Llandeilo Flags Formation. The Carn Goch site is underlain by sandstone of the Ffairfach Grit Formation and is presented as a more readily accessible alternative to the sections exposed in the Ffairfach railway cuttings.

Carn Goch itself comprises an approximately NE to SW-elongate ridge rising ca. 236m aod. It is capped by the ramparts of an ancient hill fort –themselves constructed from blocks of the underlying Ffairfach Grit, and is a scheduled ancient monument. The outcrop is scattered around the flanks and top of the hill and preserve typical exposures of the Ffairfach Grit Formation. These include pale grey, thin to thick-bedded, medium to coarse-grained arkosic sandstone and pebbly sandstone with local, crude normal grading and poorly developed cross-stratification in some outcrops. The formation also includes massive, structureless, medium to coarse-grained arkosic sandstone with irregular, probably diagenetic 'pseudobedding' which has imparted a flaggy appearance to the rock.

The grits were probably deposited from hyperconcentrated flows and contain a sparse reworked trilobite and brachiopod fauna of Aberiidian age (*Didymograptus murchisoni* graptolite Biozone; Williams et al., 1983) that indicate derivation from an adjacent shelf that may also have included feldspar eroded from a locally emergent volcanic source. Schofield et al. (2009) interpreted this, as well as lateral and vertical continuity with shelf facies as indicative of deposition in an intrashelf environment,

and possibly confinement in a fault generated topographic hollow.

The hill is dissected by a NE to SW trending fault that passes through a prominent col between the two summits occupied by y Gaer Fach (the little fort) and y Gaer Fawr (the big fort) which makes up a strand of the Welsh Borderland Fault System linked to other faults that pass through the low ground to the north and south of Carn Goch.

References:

BERGSTRÖM, SM, RHODES, FHT and LINDSTRÖM, M. 1987. Conodont biostratigraphy of the Llanvirn-Llandeilo and Llandeilo-Caradoc series boundaries in the Ordovician System of Wales and the Welsh Broderland. In *Conodonts: Investigative Techniques and Applications*. (ed. R Austin) Ellis Horwood, Chichester, pp 294-315.

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RUSHTON, A W A, OWEN, A W, OWENS, R M, and PRIGMORE, J K. 1999. *British Cambrian to Ordovician Stratigraphy*. Geological Conservation Review Series, 18. (Peterborough: Nature Conservancy Council).

SCHOFIELD, DI, DAVIES, JR, JONES, NS, LESLIE, AB, WATERS, RA, WILLIAMS, M, WILSON, D, VENUS, J and HILLIER, RD. 2009. Geology of the Llandovery district –a brief explanation of the geological map. Sheet explanation of the British Geological Survey. 1:50 000 Sheet 212 Llandovery(England and Wales).

STRAHAN, A, CANTRILL, T C, DIXON, E E L, and Thomas, H H. 1907. Geology of the South Wales Coalfield, Part VII, the country around Ammanford. *Memoir of the Geological Survey of England and Wales*, Sheet 230 (England and Wales). (London: HMSO).

WILCOX, C J, and LOCKLEY, M G. 1981. A reassessment of facies and faunas in the type Llandeilo (Ordovician), Wales. *Palaeogeography, Palaeoclimatology, Palaeoecology*, Vol. 34, 285-314.

WILLIAMS, A. 1953. The geology of the Llandeilo district, Carmarthenshire. *Quarterly Journal of the Geological Society, London*, Vol. 108, 177-205.

WILLIAMS, A, LOCKLEY, M G, and HURST, J M. 1981. Benthic Palaeocommunities represented in the Ffairfâch Group and coeval Ordovician successions of Wales. *Palaeontology*, Vol. 24, 661-694.

SECTION B

PRACTICAL CONSIDERATIONS:

Please score Accessibility and Safety Red Amber or Green

Accessibility:



Comment: parking is provided for access to the ancient monument. Although there are few specific footpaths apart from one passing N-S across the site toward the village of Bethlehem, the area is designated as 'Access Land' on Ordnance Survey mapping.

Safety:



Comment: although not accessed on paths, no specific safety issues other than trip slip hazard associated with jumbled boulders are identified

Conservation status:

Scheduled ancient monument

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: ?CADW

Planning Authority: Carmarthenshire County Council

Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT:

Present use: None

Site condition: Steep slopes largely bracken covered in summer with rocky and uneven ground

Potential threats: None as the site is a scheduled ancient monument

Site Management: None required

SITE DEVELOPMENT:

Potential use (general): Provides a readily accessible locality at which to view this formation

Potential use (educational): as the rock from the site was utilised for building the hill fort it provides a good opportunity to illustrate the relationship between geology, geomorphology and ancient land use.

Other comments:

The site lies within the Brecon Beacons National Park and Fforest Fawr Geopark.

Photographic Record



Thinly bedded medium grained arkosic sandstone from SE flank of Carn Goch



Pseudo-bedded coarse grained arkosic sandstone from SE flank of Carn Goch



Pseudo-bedded coarse grained arkosic sandstone from SE flank of Carn Goch



View of y Gaer fawr with y Gaer fach to the right of photo looking from the northeast.