

South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Penlan Quarry, Penlantelych Farm	File Number: Site_RAW_JRD_57
RIGS Number: 651	Surveyed by: RA Waters & JR Davies
Grid Reference: SN 7846 3338	Date of Visit: September 2010
RIGS Category: Scientific, educational	Date Registered: Owner: paddock Cefn Cerig Farm
Earth Science Category: Stratigraphy, structure, palaeontology	Planning Authority: Carmarthenshire County Council & Brecon Beacons National Park
Site Nature: Roadside cuttings and farm paddock exposures	Documentation prepared by: RA Waters & JR Davies
Unitary Authority: Carmarthenshire County Council & Brecon Beacons National Park	Documentation last revised: 31 st January 2011
OS 1:50,000 Sheet: 146	Photographic Record: Attached
OS 1:25,000 Explorer Sheet: OL 12	
BGS 1:50,000 Sheet: E212	
<p>RIGS Statement of Interest: This site forms part of a network of early Silurian sites (RIGS and GCR) in the type area for the Llandovery Series. Collectively, these sites represent the key sections in the local geology that underpin its international importance and demonstrate significant new discoveries.</p> <p>Penlan Quarry is a historically important fossil locality (Jones, 1925) and provides an accessible, well exposed section in the Ydw Member of the Wormwood Formation which permits the sedimentary and faunal features of this division to be examined in detail. Thin sandstone beds, interbedded with grey mudstones, have sharp bases commonly overlain by shell rich levels with abundant pentamerid brachiopod valves. The upper parts of the beds typically display the effects of burrowing immediately following deposition and are gradational with the overlying mudstone. These beds record erosion followed by deposition during major storms. Thicker, more massive sandy mudstone units record the effects of more prolonged borrowing and the thorough mixing of the original sand and mud layers.</p> <p>The Ydw Member is typically poorly exposed in the type Llandovery area and the Penlan Quarry site provides perhaps the best and most accessible section in this important division. Extensive collecting of the shelly fossils present at the site has been undertaken (see Jones, 1925). Sedimentary features visible in the quarry provide good evidence of the depositional processes, particularly the impacts of storms and borrowing, during this interval within the succession. The site also affords excellent views of the adjacent geology and its influence on the local landscape.</p>	

Geological setting/context:

The disused quarry west of the track to Penlantelych Farm, referred to as Penlan Quarry by Jones (1925) and earlier authors, was an important site for 19th century fossil collectors and Jones documents the collections and faunas reported from here. The succession of overturned, west-dipping, but eastward younging mudstones and fossiliferous sandstones exposed at the site (Photo 1) has gained additional importance following the BGS work on the type Llandovery succession (BGS, 2008; Schofield et al., 2009; Davies et al., 2010 and in press) and recognition of the Ydw Member at the base of the otherwise sandstone-dominated Wormwood Formation. Penlan Quarry provides the best accessible section in this otherwise poorly exposed member, the base of which records a significant deepening event and is an important surface of overstep within the Llandovery area. It also marks the entry of stratigraphically important *sedgwickii* Biozone graptolites and shows this to occur at much higher level in the locally succession than previously believed (e.g. Cocks et al., 1984).

Penlan Quarry exposes and allows detailed examination of the sedimentary facies that occupy the upper parts of the Ydw Member, and of the rich shelly fauna they contain. Much of the section comprises grey silty mudstones with thin, tabular fine-grained sandstone beds (Photo 2). The bases of these sandstone units, characteristically sharp and erosional, are commonly overlain by thin coquinas of disarticulated and abraded brachiopod valves (Photo 3). The distinctive taxon *Pentamerus oblongus* is particularly abundant in these layers, but species of *Leangella* and *Stricklandia* are also reported to be common within an extensive faunal list. Upper, shell-free levels of the sandstone beds display tractional sedimentary structures including planar- and cross-lamination, but the effects of burrowing (bioturbation) shortly after deposition are also widely seen. The sandstones are the product of high energy, probably storm events that scoured the sea bed and reworked the local shelly biota, before depositing entrained sand. Following these events, burrowing organisms re-colonised the sea floor during quiescent periods of deposition.

Thicker bedded facies present in the section, composed of sandy mudstone and muddy sandstone lacking tractional structures and with dispersed shell remains, record periods of sustained bioturbation and more extensive mixing of the original sand/mud layers.

The Penlan Quarry site also affords excellent views of the adjacent geology and its control on the local landscape (Davies et al., 2010). Looking west, the prominent ridge formed by late Hirnantian facies including the Cwmcigrnlyn and Garth House formations is clearly visible on the outskirts of Llandovery town. In the slopes below the quarry, in the succession that stratigraphically underlies the Ydw Member, ridge features formed by coarsening-upwards sequences (progrades) in the Cefnigarreg Sandstone and Rhydings formation are well seen. Above the quarry to the east, forming sandstone-dominated parts of the Wormwood formation form the main Penlantelych ridge. Disturbed Wenlock and Ludlow strata occupy the ground to the east that rises steadily towards Old Red Sandstone uplands.

References:

- BRITISH GEOLOGICAL SURVEY. 2008. *Llandovery. England and Wales Sheet 212. Bedrock and Superficial Deposits, 1: 50 000*. British Geological Survey: Nottingham.
- COCKS, L R M, WOODCOCK N H, RICKARDS R B, TEMPLE, J T and LANE P D. 1984. The Llandovery Series of the Type Area. *Bulletin of the British Museum (Natural History), Geology Series* Vol. 38, 131-182.
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- DAVIES, J R, MOLYNEUX, SG, WATERS, R A, WILLIAMS, M, ZALASIEWICZ, J A, VANDENBROUCKE, T R A , SCHOFIELD, D I AND WILSON, D. In press. A revised sedimentary and biostratigraphical architecture for the Type Llandovery area, Central Wales. *Geological Magazine*
- JONES, O T. 1925. The geology of the Llandovery district. Part I: The southern area. *Quarterly Journal of the Geological Society of London*, 81, 344-388.
- SCHOFIELD D I, DAVIES J R, JONES N S, LESLIE A B, WATERS R A, 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)*.

SECTION B

PRACTICAL CONSIDERATIONS:

Please score Accessibility and Safety Red Amber or Green

Accessibility:



X

Comment: Access on foot through gate; access may periodically be affected by farming operations

Safety:



X

Comment: Disused quarry section; little risk of rock fall, but some steep faces and narrow ledges. Need to be aware of farming operations including movement of animals and use of chemicals

Conservation status:

There are no known conservation designations of this RIGS

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Penlantelych Farm

Planning Authority: Carmarthenshire County Council

Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT:

Present use: Abandoned farm quarry

Site condition: Good; some vegetation obscures lower levels of section

Potential threats: May become overgrown; risk of infill by farmer

Site Management: Needs be maintained in present condition and infill prevented

SITE DEVELOPMENT:

Potential use (general):

Potential use (educational): Good site to see overturned strata and way-up criteria (sharp bases to sandstone beds, basal coquinas, grading); good exposures of storm event beds; fossiliferous; good views of local geology

Other comments:

Photographic Record



Photograph 1. Penlan Quarry, Penlantelych Farm; beds dip to the west, but young east



Photograph 2. Thinly interbedded mudstones and sandstones, Ydw Member, Penlan Quarry



Photograph 3. Brachiopod coquinas, Ydw Member, Penlan Quarry