



South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Upper Cefn Cerig Road & Farm Section	File Number: Site_RAW_JRD_12
RIGS Number: 649	Surveyed by: J R Davies & R A Waters
Grid Reference: SN 7747 3234 to 7750 3229	Date of Visit: September 2010
RIGS Category: Scientific, historical	Date Registered: Owner: part Cefn Cerig Farm
Earth Science Category: Stratigraphical, Palaeontological, Historical, Sedimentological	Planning Authority: Carmarthenshire County Council & Brecon Beacons National Park
Site Nature: Road and farm cuttings	Documentation prepared by: J R 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: OL12	
BGS 1:50,000 Sheet: E212	
<p>RIGS Statement of Interest: This site forms part of a network of early Silurian (Llandovery) sites (RIGS and GCR) in the international type area for the Llandovery Series. Collectively, these sites represent the key sections in the local geology that underpin its international importance and demonstrate the findings of recent discoveries.</p> <p>The Upper Cefn Cerig Road section overlaps the Fron Road Site of Aldridge et al. (2000) and the forms world reference section for the basal Telychian (late Llandovery) Stage of Cocks et al. (1984). However, the interpretations of these earlier accounts have recently been fundamentally revised in the light of recent work (Davies et al., 2010). New fossil discoveries, including microfossils, demonstrate that slumping and sliding during the mid Silurian (Wenlock) removed or displaced large portions of the local Telychian stratigraphy. In upper parts of the section, disturbed late Llandovery rocks are interlayered with slices of Wenlock strata. A key fossil assemblage used to define the Telychian stage came from this disturbed succession and its relevance is undermined.</p> <p>These observations were used to question the suitability of the Telychian Statotype as well as the criteria used to erect the stage boundary. Hence, it is important that this site is conserved to allow these findings to be tested and the section to be re-evaluated further. The site has been key to the recognition of Wenlock submarine sliding and disturbance in the Llandovery area and in allowing its scale and timing to be assessed.</p>	

Geological setting/context: Cocks et al. (1984, figures 64 to 67) erected the international stratotype for the highest stage of the Llandovery series – the Telychian - in a quarry to the west of the Cefn Cerig Road (also known as Fron Road), to the east of Llandovery. The quarry is excavated in rocks of the Wormwood Formation, a unit comprising bioturbated, but well bedded sandstones and muddy sandstones with shelly layers and lenses. The stage boundary was taken immediately above a fossiliferous rottenstone level (Cocks et al.'s locality 162) which yielded the highest specimens of the key brachiopod taxa *Stricklandia lens progressa* and *Eocoelia intermedia*. Closely underlying levels within the Wormwood Formation (localities 159 & 161) provided acritarch assemblages indicative of the 3b (*estillis*) Biozone (Hill & Dorning, 1984). Roadside cuttings to the south provided the type exposures in strata which Cocks et al. (1984) named the Cerig Formation. This division, widely mapped in mid Wales (e.g. Schofield et al., 2004; Barclay et al., 2005), typically comprises green, burrow-mottled mudstones. From the Cefn Cerig exposures (locality 163), Cocks et al. (1984) recovered a fauna which they cited as diagnostic of the Telychian Stage which included the first appearances of *S. laevis* and *E. curtisi*.

Recently cleaned cuttings on both side of the road have re-exposed the strata that lie to the south of the stratotype quarry section and provided additional exposures described by Davies et al. (2010) (Photos 1 to 3). The new sections (Figure 1) on the east side of the road expose the contact between the Wormwood Formation, in which bedding dips steeply to the south-east, and the succession of strata that lies stratigraphically up-sequence to the south. The contact is a vertical plane which cross cuts the bedding in the Wormwood Formation (Photograph 2). To the south of the contact are vertically bedded, finely laminated, brown-weathering mudstones, but with intervals in which the bedding is disturbed or destroyed. Immediately south of the contact these mudstones contain chitinozoans including abundant *A. longicollis* and *C. proboscifera*, which, together with other taxa, range into the Wenlock Series. 5 m south of the contact the laminated mudstones contain graptolites diagnostic of the *riccartonensis* Biozone including *M. cf. riccartonensis*. Both the lithology and biostratigraphy confirm that this laminated unit is Builth Mudstones Formation.

On the west side of the road, the laminated mudstones are succeeded to the south by a chaotic succession in which muddy sandstones, burrow-mottled mudstones and laminated mudstones are juxtaposed against one another (Figure 1; Photo. 3). Contacts are cross-cutting and curvilinear; bedding is highly variable, discontinuous and locally tightly folded. It was from shell-rich lenses within this mélange, from a level they assumed to be in the Cerig Formation, that Cocks et al. (1984; locality 163) obtained their diagnostic 'Telychian' fauna. However, a sample from this exposure has yielded the mid Wenlock chitinozoan *Eisenackitina ithoniensis* (Davies et al., 2010).

To the east, sections in a small triangular paddock by the entrance to Cefn Cerig Farm (Photo. 4) expose the contact between this mélange and a succeeding succession which includes units of disturbed green mudstone, with contorted thin sandstone beds, and further units of brown-weathering laminated Builth Mudstones. The southernmost Builth Mudstones unit contains graptolites, including cf. *Pristiograptus dubius* s.l., possibly of mid Wenlock age (Davies et al., 2010).

Davies et al. (2010) viewed the strata exposed to the south of the Wormwood Formation contact as a succession of interlayered slides, slumps and debrites. The

basal contact and the contacts between the overlying units are interpreted as cross-cutting slide planes. The graptolitic laminated mudstone units are viewed as dislocated slices of Builth Mudstones. The central mélangé clearly contains lithologies of more than one formation and of widely differing age. Davies et al. (2010) considered it possible that its muddy sandstone units may be derived from the underlying Wormwood Formation, but are associated with lithologies of mid Wenlock age as the products of debris flows. The stratigraphically overlying units display obvious evidence of further slump/slide-related disturbance.

Davies et al. (2010) also interpreted some of the green mudstone units exposed in the southern part of the section as disturbed Cerig Formation, but overall the lithological succession is clearly neither typical of that division, nor appropriate as a type locality. They proposed a new type section in Crychan Forest (see RIGS RAW_JRD_10).

The Cefn Cerig section exposes key contacts and has provided essential biostratigraphical data to underpin a radical new interpretation of the late Llandovery succession in the Llandovery area. Davies et al. (2010) showed that upper parts of the Llandovery succession were disturbed, dislocated and in places largely removed during a period of intra-Wenlock syndepositional sliding. The Cefn Cerig graptolite discoveries suggest this period of disturbance and down slope movement affected strata of *riccartonensis* Biozone age. Sections elsewhere indicate that this disturbed succession was draped by laminated Builth Mudstones of *dubius* Biozone age and the southernmost exposures in the Cefn Cerig paddock may be part of this drape succession (Davies et al., 2010). Critically, shelly fossils previously cited as important in the context of the location and definition of the Telychian Stage stratotype (Cocks et al.'s locality 163) are shown also to have come from this disturbed succession and their stratigraphical significance in this key section is fatally undermined.

References:

ALDRIDGE, R J 2000. The Llandovery Series. 69-180 *in* British Silurian Stratigraphy. ALDRIDGE, R J, SIVETER, DAVID J, SIVETER, DEREK J, LANE, P D, PALMER, D and WOODCOCK, N H. (editors). *Geological Conservation Review Series*, No 19. (Peterborough: Joint Nature Conservation Committee).

BARCLAY, W J, DAVIES, J R, HUMPAGE, A J, WATERS, R A, WILBY, P R, WILLIAMS, M and WILSON, D. 2005. Geology of the Brecon district. *Sheet explanation of the British Geological Survey*. Sheet 213 (England and Wales).







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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HILL, PJ and DORNING, KJ. 1984. Acritarchs. 174-176 *in* The Llandovery Series of the type area. COCKS, L R M, WOODCOCK, N H, RICKARDS, R B, TEMPLE, J T, and LANE, P D, (editors). *Bulletin of the British Museum (Natural History) Geology*, 38.

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).

SECTION B

PRACTICAL CONSIDERATIONS: Please score Accessibility and Safety Red Amber or Green			
Accessibility:			X 
Comment: No accessibility issues except permission from farmer for paddock section			
Safety:		X 	
Comment: Narrow country lane with exposures on blind bend			
Conservation status: There are no known conservation designations of this RIGS			

OWNERSHIP/PLANNING CONTROL: Owner/tenant: The farm paddock at the southern end of the section is owned by Cefn Cerig Farm Planning Authority: Carmarthenshire and Brecon Beacons National Park Planning status/constraints/opportunities: There are no known planning constraints or opportunities
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CONDITION, USE & MANAGEMENT: Present use: Road cutting and farm cutting Site condition: Good – all key contacts and fossil localities are currently visible and accessible Potential threats: Prone to become overgrown Site Management: Requires growth of vegetation to be controlled if critical contacts are to remain visible and access to key fossil localities maintained. However, clearing immediately prior to periods of study remains a viable, if time consuming option
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SITE DEVELOPMENT: Potential use (general): this site has considerable value to the international researchers into Silurian stratigraphy. Potential use (educational):
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Other comments:

Photographic Record



Photograph 1. Cefn Cerig (Fron) road section looking north; cutting on right (east) exposes the contact with the Wormwood Formation (see Photograph 2)



Photograph 2. Cefn Cerig road section; vertical slide plane (arrowed above shaft of right hand hammer) truncating inclined bedding in Wormwood Formation (left) with Wenlock Builth Mudstones to right.



Photograph 3. Exposures on the west side of the Cefn Cerig (Fron) road section in melange; includes locality 163 of Cocks et al. (1984).



Photograph 4. Cefn Cerig Farm paddock; exposures on right are in Builth Mudstones Formation and yield *dubius* Biozone graptolites

Annotated Sketch

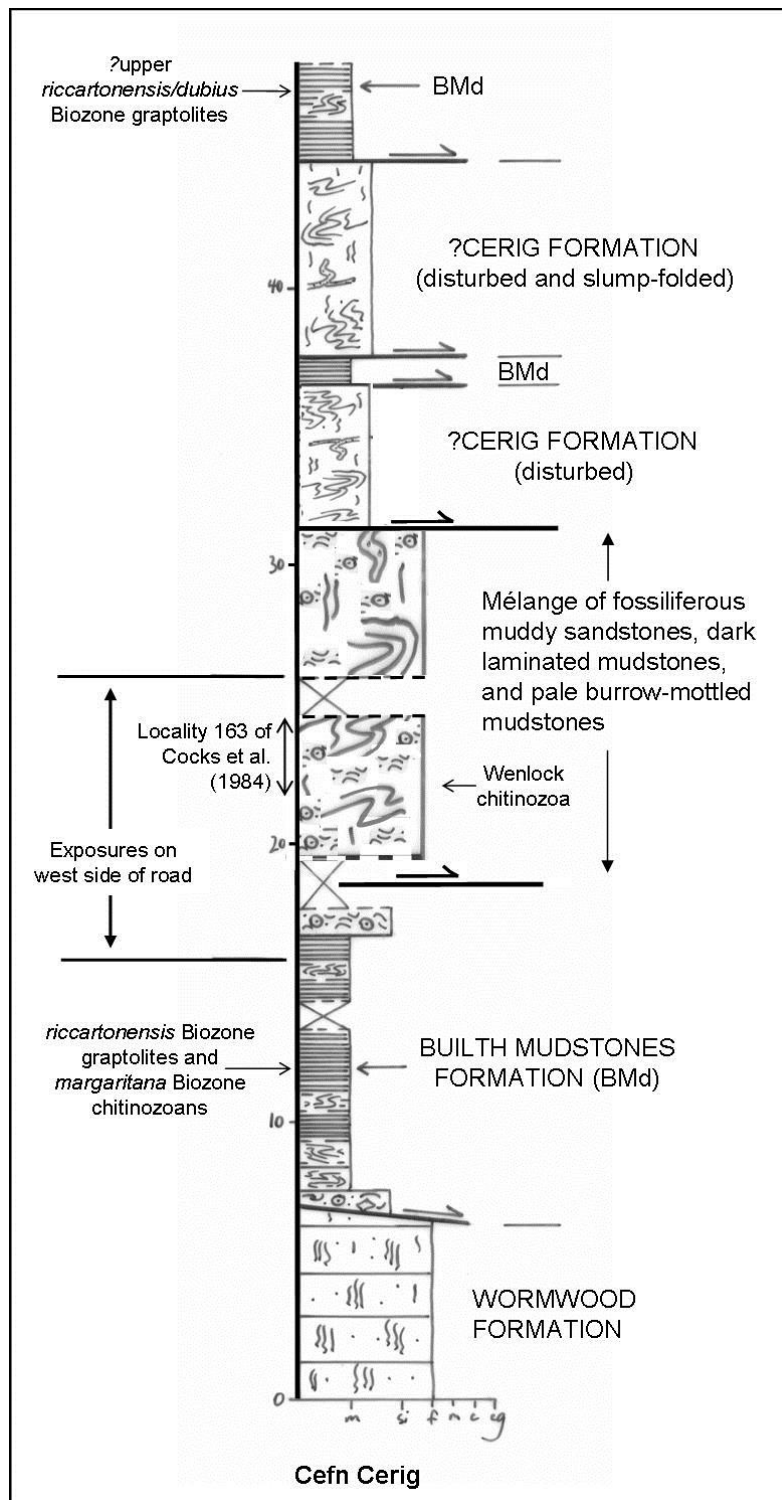


Figure 1. Modified field log of the upper part of the Cefn Cerig (Fron) road section; base of section is 22.5 m above the base Telychian boundary stratotype (see Cocks et al., 1984, figure 67).