

South Wales RIGS Group Site Record RIGS Description

SECTION A

General	South Wales
Site Name: Pant Mawr Quarry, South Cornelly	File Number: Site_RAW_JRD_45
RIGS Number: 619	Surveyed by: RA Waters & JR Davies
Grid Reference: SS 8261 8017 to 8269 8035	Date of Visit: December 2010
RIGS Category: Scientific	Date Registered:
Earth Science Category: Stratigraphy	
Site Nature: Abandoned quarry face	Owner: Tarmac Ltd Planning Authority: Bridgend County Borough Council
Unitary Authority: Bridgend County Borough Council	Documentation prepared by: Jerry Davies
OS 1:50,000 Sheet: 170	Documentation last revised: 1 st February 2011
OS 1:25,000 Explorer Sheet: 151	Photographic Record: Attached
BGS 1:50,000 Sheet: E262	
<p>RIGS Statement of Interest: This site forms part of a network of key localities (RIGS & GCR) which collectively illustrate the evolution and facies development of the lower Carboniferous (Dinantian) carbonate ramp/platform in South Wales and includes sites of historical and educational interest. Pant Mawr Quarry forms part of a sub-network of sites located to the south of the South Wales Coalfield, the so called south crop and is important as the type section of the Pant Mawr Sandstone Member; and as a locality where the Holkerian/Asbian boundary has been confirmed by microfossil dating.</p> <p>At the site, the Pant Mawr Sandstone Member overlies the Holkerian Stormy Limestone Formation and forms the basal division of the Asbian Oxwich Head Limestone Formation. The age of the member has been confirmed by microfossils; it is thought to correlate with the north crop Honeycombed Sandstone Member of the Penderyn Oolite Formation as seen in Welsh Quarry (Site RAW_JRD_50), the Upper Drybrook Sandstone of the Chepstow area, and with the Middle Cromhall Sandstone of the Bristol district and, therefore, to record a widespread episode of quartz sand deposition in Asbian times (Wilson et al., 1990). The irregular upper surface of the Stormy Limestone and overlying red and green clay exposed at Pant Mawr Quarry testify to a period of emergence, karstification and soil accumulation prior to the deposition of the sandstone member under the shallow marine conditions subsequently introduced by a rising sea level.</p>	

Geological setting/context:

The presence of a distinctive calcareous sandstone unit in the upper part the Carboniferous Limestone succession of the north crop has long been recognised. The unit's characteristic pitted appearance when weathered accounts for its name – the Honeycomb (or Honeycombed) Sandstone. This was widely acknowledged as a marker 'bed' that overlay limestones of *Seminula* Biozone (Holkerian Stage) age and was succeeded by beds of lower *Dibunophyllum* (D1) Biozone (Asbian Stage) age (George, 1974; George et al., 1976). Sandstone units occur at this same stratigraphical level in the Chepstow district (Upper Drybrook Sandstone) and near Bristol (Middle Cromhall Sandstone). The presence of a coeval sandstone in the Vale of Glamorgan south crop succession at the base of the Oxwich head Limestone Formation was first established during BGS mapping of the complex of limestone quarries in the South Cornelly area of the Bridgend district (Wilson et al., 1990). There, it formed an important stratigraphical marker – the Pant Mawr Sandstone Member - that allowed the local geology in this structurally complex, but economically important area to be elucidated. Its existence demonstrated how widespread sand deposition was at, or around, the onset of the Asbian Stage in South Wales and beyond. This event, and the phase of cyclical platformal sedimentation that it introduced, coincided with the onset of a protracted Carboniferous glacial epoch and reflect the global changes in climate and sea level this caused.

The member was first recognised in the accessible western faces of Pant Mawr Quarry (Photos 1- 4). This locality was subsequently established as its type section. Access is via the footpath from South Cornelly (Photo. 1), traversing left (north) across flattened quarry spoil to the visible abandoned quarry faces. The section is in two parts: the sandstone member is exposed in the upper part of the western face (Photo 2), but it is the main N-S face that is the type section (Photos 3 & 4). A small E-W fault which downthrows to the south separates the two sections (Photo. 5). In both parts, skeletal grainstones below the sandstone unit form the upper part of the Stormy Limestone Formation. These limestones contain Holkerian foraminifera, including *Nibelia nibelis*, *Brunsia* sp., *Eostaffella parastruvei* and *Globendothyra* sp., typical of the Holkerian and earliest Asbian. The rubbly top of the Stormy Limestone is an irregular pitted surface overlain by 0.3 m-thick red and green clay bed with corroded blocks of the underlying limestone (Photo. 2). These features are consistent with emergence, karstification and soil accumulation. The sandstone unit itself is 3.6m-thick and varies between calcareous quartz sandstone and sandy limestone. The basal 0.75 m comprises variably dolomitised sandy packstone with shell and coral fragments. Middle parts of the member are fine-grained cross-stratified calcareous sandstones with traces of burrowing and evidence of wave reworking. The uppermost 0.8m-thick bed of the member grades upwards from calcareous sandstone into sandy, coarse-grained, intraclast-rich oolitic grainstone with lenses of disarticulated and inverted brachiopod valves. The basal bed of the member contains the Asbian foraminifera *Bibradya inflata*.

The most northern part of the section preserves 4.5m of skeletal intraclast ooid packstones and grainstones which intervene between the sandstone member and the next palaeokarstic surface the hummocky form of which is draped by red mudstone paleosol. The sandstone together with these limestones comprise the first cycle of the Oxwich Head Limestone.

The Pant Mawr Sandstone Member records transgressive marine reworking of quartz sand spread across the emergent carbonate platform during a preceding glacially induced marine regression. The overlying limestones and karstified surface record upward shoaling culminating in emergence in response to the next sea-level fall. This pattern of upwards shoaling cycles capped by emergent surfaces with associated soils and alteration features (see Lock's Common RIGS) is a feature of the Oxwich Head Limestone in South Wales and Asbian successions more widely (Davies et al., 2007). This pattern reflects deposition on a mature low gradient platform which was repeatedly exposed to karstic processes and soil formation during periods of glacial advance and the associated falls in sea level. Pant Mawr Quarry therefore provides a critical, dated section through strata which mark the onset of this phase of glacially influenced platformal deposition.

References:

GEORGE, T N. 1974. Lower Carboniferous rocks in Wales. 85-115 in T R OWEN (editor): *The Upper Palaeozoic and pot Palaeozoic rocks of Wales*, Cardiff: University of Wales Press.

GEORGE, T N, JOHNSON, GAL, MITCHELL, M, PRENTICE, J E, RAMSBOTTOM, W H C, SEVASTOPULO, GD and WILSON, RB. 1976. A correlation of Dinantian rocks in the British Isles. *Special Report of the Geological Society of London*, No. 7.

WILSON, D, DAVIES, J R, FLETCHER, C J N 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: Abandoned limestone quarry accessible from nearby footpath from South Cornelly, but requiring a scramble over quarry spoil and recently planted small trees and shrubs

Safety:

X

Comment: Section is a steep disused quarry face; quarry spoil tips and vegetation provide physical obstructions which need to be negotiated with care

Conservation status:

There are no known conservation designations of this RIGS

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Tarmac Ltd

Planning Authority: Bridgend County Borough Council

Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT:

Present use: Disused limestone quarry

Site condition: Partially obscured by newly planted trees and shrubs

Potential threats: Continued growth of trees and shrubs will soon make the section inaccessible

Site Management: Newly planted trees and shrubs need to be removed from key parts of the section

SITE DEVELOPMENT:

Potential use (general): This site is of value as a type section in s Wales stratigraphy and has potential use for academic study.

Potential use (educational):

Other comments:

Photographic Record



Photograph 1. Access to Pant Mawr Quarry section: to the left of the stone block



Photograph 2. Western part of Pant Mawr Quarry, showing the Pant Mawr Sandstone Member in the upper part of the face overlying Stormy Limestone Formation; access to the main section is behind the spoil tips



Photograph 2. Western part of Pant Mawr Quarry, showing the Pant Mawr Sandstone Member in the upper part of the face overlying Stormy Limestone Formation; access to the main section is behind the spoil tips

Photograph 4. Close up of the base of the overhanging base



of the Pant Mawr Sandstone Member



Photograph 5. Small E-W fault downthrowing Pant Mawr Sandstone Member to the south (left) against Stormy Limestone Formation to north (right), Pant Mawr Quarry