
Craig-y-Cwm, Torfaen

[SO 283 089]

Potential GCR site

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Introduction

Craig-y-cwm lies on the east-facing escarpment of the South Wales Coalfield 3.5 km south-east of Blaenavon (Figure 5.38). It provides the most complete section of the Upper Devonian (Upper Old Red Sandstone) Quartz Conglomerate Group of the eastern part of the South Wales Coalfield. It is also the type locality for the Craig-y-cwm and Garn-gofen formations of the Quartz Conglomerate Group (Barclay, 1989; Lovell, 1978a). Although these formations are not completely exposed, the Wern Watkin Formation, the basal formation of the group, is exposed in its entirety. A similar succession is exposed to the north at Craig-yr-Hafod [SO 2780 0994].

Description

The Quartz Conglomerate Group is 42 m thick at Craig-y-cwm (Figure 5.39). Strahan and Gibson (1900) first gave details of the succession at the site (repeated by Robertson, 1927). Barclay (1975) recognized three units within the group, later formalized as formations by Lovell (1978a), who gave a detailed description of the site and sedimentological interpretations of its constituent formations (summarized by Barclay, 1989). The following account is based largely on Lovell (1978a).

The base of the Wern Watkin Formation rests with no obvious discordance on the Lower Old Red Sandstone Brownstones Formation. The junction is placed where very fine- to fine-grained, ripple cross-laminated, thinly bedded, non-micaceous, non-calcareous, pale greenish sandstones of the Wern Watkin Formation rest on the pinkish brown, micaceous, fine- to medium-grained, friable sandstones of the Brownstones Formation. The latter is leached and weathered to pale green sand immediately below the junction. The Wern Watkin Formation is 19 m thick and comprises mainly pale green-grey to yellow-white, non-micaceous, fine-grained, flat-bedded, quartzitic sandstones (Lovell, 1978a). The sandstones are mainly in tabular sheets ranging from 0.2 m to 0.4 m in thickness, although one bed is 1.2 m thick. Mudstones are uncommon, but two thin beds are present, and intraformational green siltstone clasts occur at some levels. The sandstone sheets show equal amounts of parallel lamination and cross-bedding. Both planar and trough cross-bedding occur. The 1.2 m-thick sandstone can be traced for over 300 m and its bedding characteristics change from a single, planar cross-bed set to a series of superimposed trough cross-beds. Measurements of the cross-bedding give a vector mean towards the northwest, which contrasts with southerly current directions measured at other localities. The top of the formation is marked by a massive calcrete, with the succeeding 5.3 m of beds (probably mudstones at the base of the Craig-y-cwm Formation) unexposed.

The Craig-y-cwm Formation is characterized by the presence of well-rounded, extraformational pebbles that range from 20 mm to 50 mm in long diameter. Quartz pebbles predominate (Figure 5.40) and give the Quartz Conglomerate Group its name. Lovell (1978a) noted also quartzose sandstones, and rare lava and jasper pebbles. Intraformational red and green mudstone, siltstone and calcrete clasts also occur. The conglomerate beds are lenticular and interbedded with pebbly and non-pebbly sandstones. Some intraformational conglomerate lenses containing mudstone, siltstone and calcrete clasts are also present. The quartz conglomerates are framework-supported, with a matrix of greenish grey to white, medium- to coarse-grained sandstone. Red-brown and green mudstone interbeds, some showing incipient calcrete development, are locally present. The formation is about 8 m thick at Craig-y-cwm, with the basal and topmost parts unexposed. The formation shows lateral variability; with the lithologies occurring as lenticular units, but some fining-upward cyclicity is noted, as well as a general fining upwards of the formation. Some scouring and erosion is present beneath the bases of some of the units. The vector mean of palaeocurrents measured by Lovell (1978a) is 148°.

The Garn-gofen Formation consists mainly of greenish grey to white, cross-bedded, strongly micaceous, calcareous sandstones. It is the least exposed part of the section, with unexposed parts probably comprising mudstone or soft sandstone. Lovell (1978a) noted one thick bed of mudstone and one intraformational conglomerate. The sandstones show medium-to large-scale trough and planar cross-bedding. A thin (10 cm) sandstone 3 m below the top of the formation has convolute bedding that can be traced laterally for over 100 m. Palaeocurrents measured by Lovell (1978a) show a bi-modal distribution to the west and north-west, with a vector mean of 254°. The top of the formation is sharply overlain by the basal lag conglomerate of the Avon (Lower Limestone Shale) Group.

Interpretation

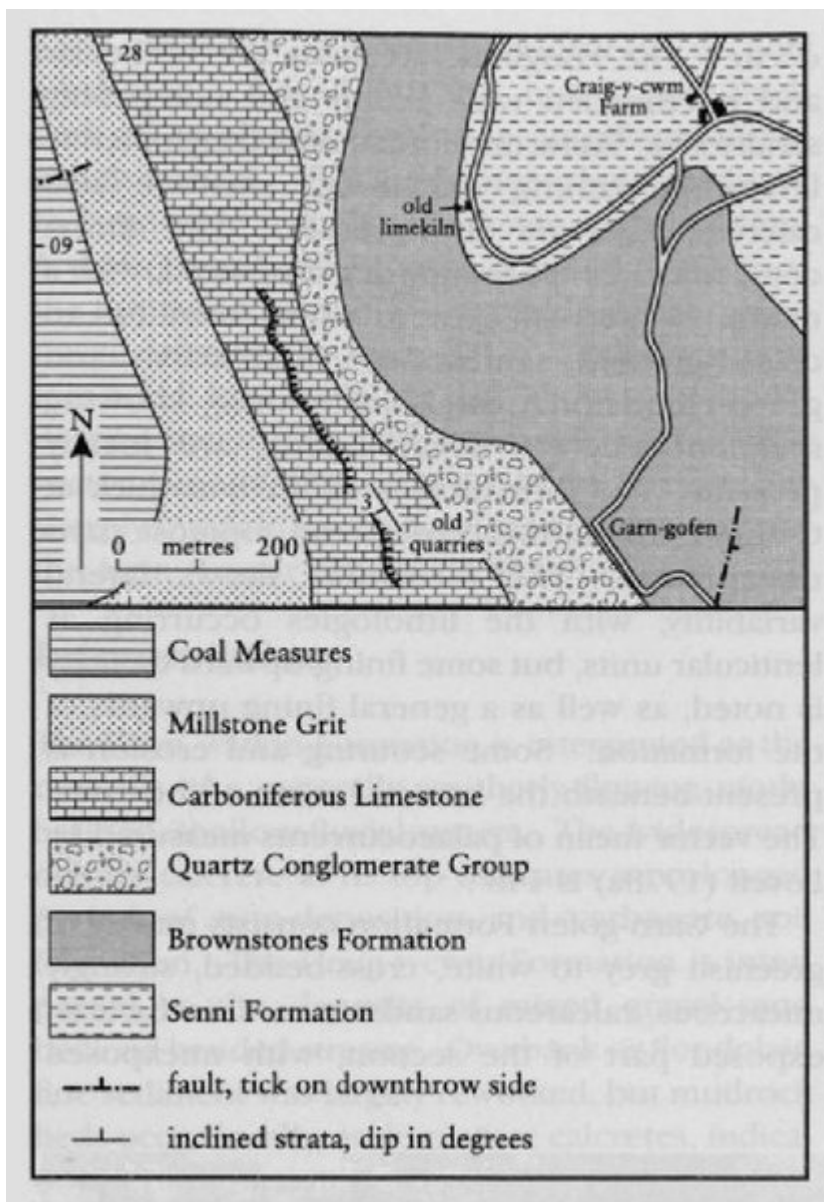
The Wern Watkin Formation is interpreted as the deposits of a generally southerly flowing sandy, braided, shallow fluvial system. The widespread mature calcrete at its top indicates a prolonged period of non-deposition and carbonate soil formation. The Craig-y-cwm Formation is interpreted as the deposits of mixed gravel-sand bedload braided streams. Overbank or floodplain fine sediment was largely reworked, but mudrock beds occur locally, as do mature calcretes, indicating periodic stability. The Garn-gofen Formation is interpreted as the deposits of meandering streams flowing from the north-east, with the abundance of clastic mica, garnet and feldspar indicating a metamorphic rock source.

Regionally, the Quartz Conglomerate Group crops out on the eastern rim of the South Wales Coalfield, extending from about Daren Cilau on the north crop eastwards to the Bloreng, and from there southwards to the Newport area. It also crops out on Pen-Cerrig-Calch and the Sugar Loaf to the north of the coalfield. To the west of Daren Cilau, the basal formation (Wern Watkin Formation) is correlated with the Grey Grits Formation (see Duffryn Crawnon GCR site report, this chapter), the upper two formations being absent. In the Forest of Dean, the Upper Old Red Sandstone is represented by basal quartz conglomerates (the Quartz Conglomerate, probably equivalent to the Craig-y-cwm Formation) and the overlying Tintern Sandstone Formation (probably equivalent to the Garn-gofen Formation). No fish remains have yet been recovered at the site, but fragments such as *Bothriolepis* sp. recovered elsewhere indicate a Late Devonian to Early Carboniferous age (Barclay, 1989).

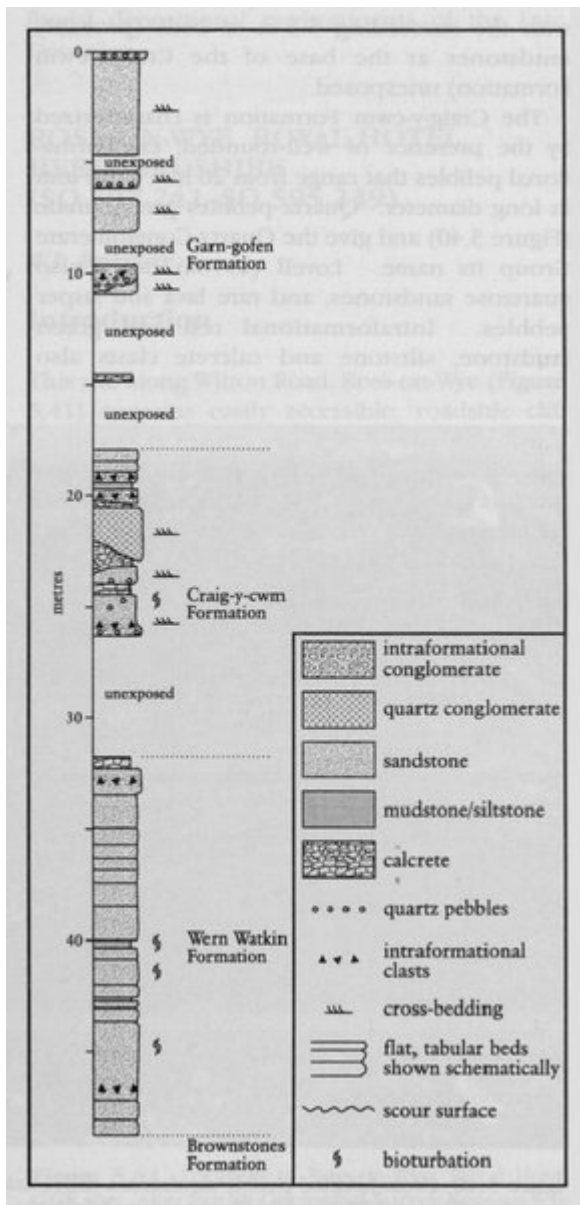
Conclusions

Craig-y-cwm provides an excellent opportunity to examine easily the facies and formations that comprise the Upper Old Red Sandstone Quartz Conglomerate Group of the South Wales Coalfield. It is the type locality for the Craig-y-cwm and Garn-gofen formations, and a reference section for the Wern Watkin Formation. The detailed sedimentological analysis carried out at this site, among others, has led to an increased understanding of the fluvial depositional environments of the Late Devonian.

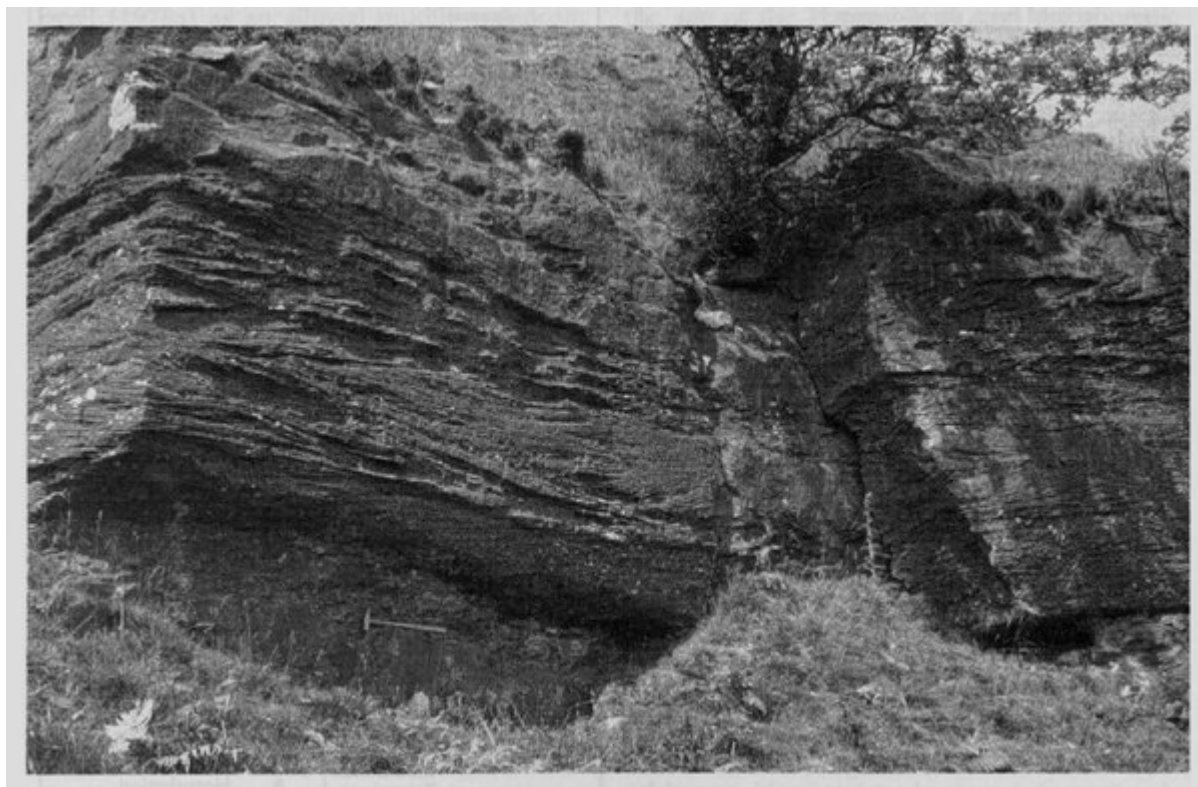
[References](#)



(Figure 5.38) Geological map of Craig-y-cwm potential GCR site. After British Geological Survey 1:10 560 manuscript map SO 20NE (1984).



(Figure 5.39) Graphic log of strata at Craig-y-cwm. After Barclay (1989).



*(Figure 5.40) Cross-bedded pebbly sandstones above calcrete, Craig-y-cwm Formation, Craig-y-cwm. Hammer for scale.
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