
Cwm Clyd Quarry (Garth Bank Quarry)

[SN 946 509]

Introduction

Strata of latest Ordovician and earliest Silurian age are exposed to the north-west of the village of Garth, 30 km north-east of Llandovery. The first geological map of the area was produced by officers of the Geological Survey in 1850, who demonstrated the presence of lower Llandovery rocks on Garth Bank. The area has subsequently been remapped by Andrew (1925a), by Williams and Wright (1981) and by the British Geological Survey (Davies *et al.*, 1997). Andrew (1925a) applied the lithostratigraphical scheme of letters he developed jointly with O.T. Jones, which were used by the latter in the type Llandovery area (Jones, 1925, 1949). Williams and Wright (1981) subsequently introduced formal lithostratigraphical names for the succession in the Garth area: the Wenallt Formation, the Cwm Clyd Formation and the Garth Bank Formation (Figure 3.30).

The Wenallt Formation, of Ashgill age but excluding the highest Hirnantian, comprises siltstones, sandstones and mudstones. The upper unit of this formation, named the Speckly Sandstone Member by Williams and Wright (1981) has a *Hirnantia* shelly fauna, and this is probably the level from which Andrew (1925a) reported *Glyptograptus cf. persculptus*. The lower part of the Cwm Clyd Formation has yielded *Eostropheodonta hirnantensis*, indicative of a Hirnantian age. The lower boundary of this unit is unconformable in the south of the area, where the Wenallt Formation is cut out completely, but becomes transitional when traced northwards (Williams and Wright, 1981). The Garth Bank Formation comprises strongly bioturbated siltstones and mudstones, but skeletal fossils have not been found. Sandstones and mudstones overlying the Garth Bank Formation have yielded brachiopods of Rhuddanian age.

Cwm Clyd Quarry is situated on the northwest end of Garth Bank, in the southern part of the area (Figure 3.29). It provides an important exposure of the unconformity between Rawtheyan (Ashgill) siltstones and the Cwm Clyd Formation, with the Wenallt Formation unrepresented. This unconformity is close to the Ordovician-Silurian boundary, which appears to be transitional in the Llandovery type area (see the report for the Reach Track GCR site). The break in deposition displayed at Cwm Clyd Quarry is, therefore, of regional stratigraphical, palaeogeographical and tectonic significance.

Description

The most recent descriptions of the rocks in Cwm Clyd Quarry were given by Williams and Wright (1981). The lowest beds exposed are dark-grey bioturbated sandy and muddy siltstones, with pyritous nodules towards the top. These siltstones have produced a diverse shelly fauna, several species of which were illustrated by Williams and Wright (1981, fig. 2). The dominant fossils are the trilobite *Sphaerocoryphe thomsoni* and plectambonitacean brachiopods. Some of the brachiopods suggest assignment to the deep-water *Foliomena* benthic association, and the presence of the trilobites *Tretaspis cf. seticornis* and *Lonchodomas aff. portlocki* indicates a mid- to late Rawtheyan age.

The Cwm Clyd Formation in the quarry is 15 m thick, although elsewhere it varies from 11 to 51 m. The base of the formation has been re-exposed by clearing work in February 2000 Q. Davies pers. comm.), although an unconformable base was inferred from biostratigraphy and local mapping by Williams and Wright (1981); these authors reported an exposure of the unconformable junction with Rawtheyan siltstones in a roadside cutting north-east of Dol-Derwen farm [SN 949 515].

In the quarry, the Cwm Clyd Formation comprises medium- to coarse-grained, buff-weathering, blue-grey sandstones displaying trough ripple sets. Small pebbles of quartz, chert and rhyolite up to 1 cm in size occur sporadically, and there are a very small number of clay clasts. Body fossils have not been reported, but Andrew (1925a) recorded the presence of 'worm-tracks'. In nearby Garth House Quarry [SN 943 499] the formation is considerably more conglomeratic (Andrew, 1925a).

Interpretation

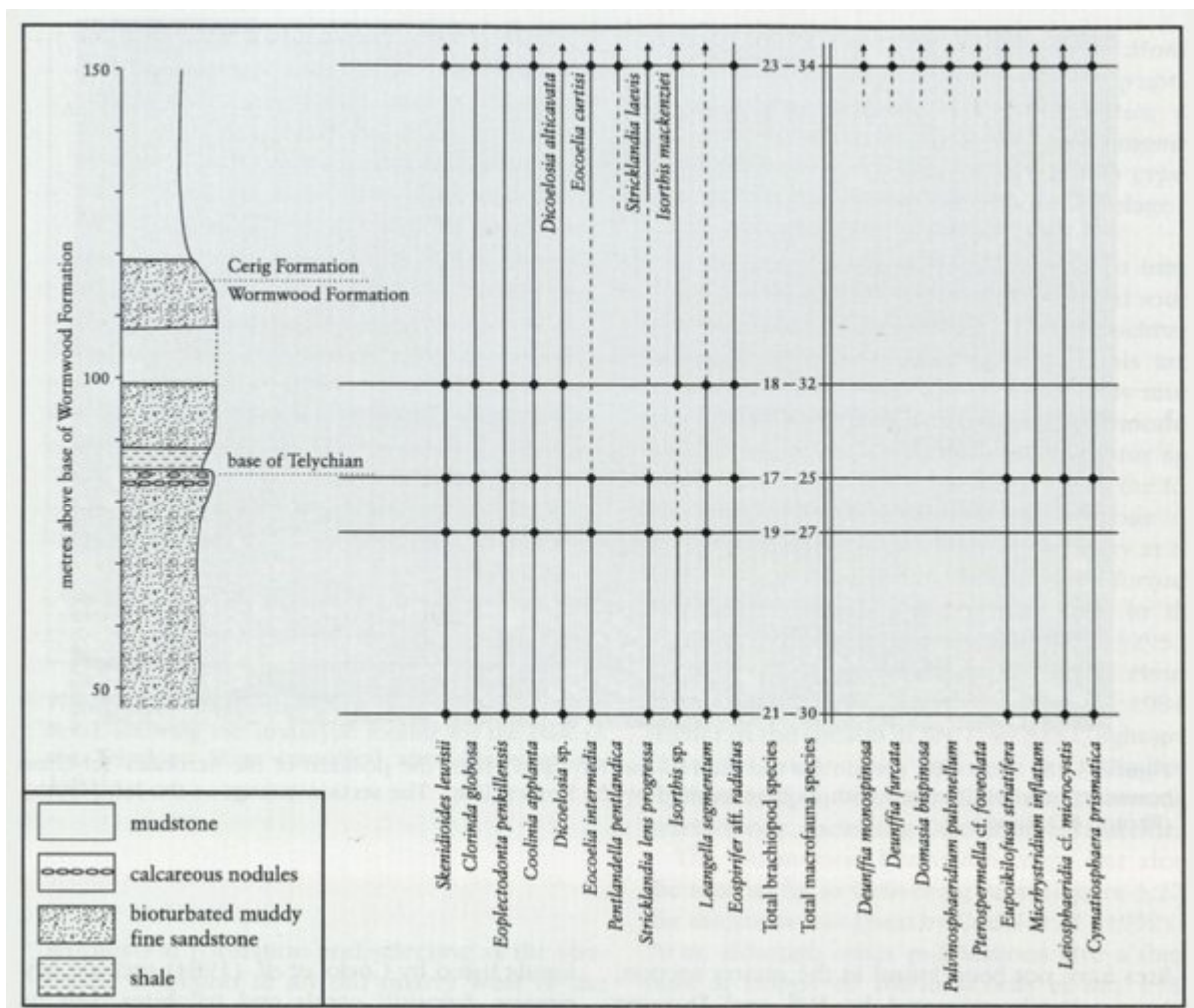
The rocks and fossils show that late Ordovician and early Silurian sedimentation in the Garth area took place in a shelf sea, contiguous with the Llandovery area to the south-west. The localized nature of the late Ordovician unconformity is evidence of differential local uplift or subsidence at this time, coincident with the Hirnantian glacio-eustatic shallowing. Williams and Wright (1981) concluded that this uplift was an expression of cross-folding superimposed on the emergent structural lineament of the Towy Anticline. An anticline uplifting to the south of the Garth area plunging WNW would explain the increasing completeness of the sequence northwards and the variability of sedimentation in the Cwm Clyd Formation.

The first post-glacial transgressive deposits of the Cwm Clyd Formation are of latest Hirnantian age, from the record of *E. himantensis* in beds in the north of the area; the base of the Silurian may occur within the formation. The Cwm Clyd Formation was interpreted by Woollands (in Williams and Wright, 1981) as representing a deltaic channel, but the conglomerates and grits of Garth House and Cwm Clyd quarries were viewed by Williams and Wright (1981) as foreshore deposits derived from the uplifted area to the south. The transition to the finer-grained strata of the Garth Bank Formation would then represent a falling off in the supply of terrigenous material as the uplift ceased.

Conclusions

This quarry shows typical late Ordovician (Rawtheyan) offshore shelf sediments unconformably overlain by latest Ordovician (late Hirnantian) and Silurian pebbly sandstones. This unconformity diminishes and disappears as it is traced northwards, suggesting an area of active uplift to the south during the late Ordovician. The locality is therefore important in displaying the results of this local tectonic activity and in the interpretation of the nature of the earliest Silurian sedimentation in this part of the Welsh Basin.

[References](#)



(Figure 3.29) Distribution of selected brachiopod and acritarch species across the Aeronian–Telychian boundary in the Fron Road section (after Cocks et al., 1984).