
Bryn Glas Quarry

[SH 732 421]

Introduction

The main significance of this site is that it contains one of the finest developments and most accessible exposures of the basal Arenig Garth Grit, a sandstone member that occurs imperpersistently at the base of the Arenig around the Harlech Dome. In many sections it is absent, as for example at Hafotty Ffilltirgerig (see site report), and thus Bryn Glas affords a complementary section to that site. Bryn Glas is also the type locality for the phosphatic pseudofossil '*Bolopora undosa* Lewis', described as a bryozoan by Lewis (1926) but shown by Hofmann (1975) to be an inorganic concretion.

The exposures here assumed more than local importance when Lynas (1973) reported a conformable succession across the Arenig–Tremadoc boundary. Nearly everywhere in North Wales the base of the Arenig lies with clear unconformity on Tremadoc and earlier rocks (see Trwyn-llêch-y-doll and Wîg site reports). Lynas (1973, p. 485) described a gradational contact between the Tremadoc, his Afon Gam Formation (equivalent to the upper Mudstone Member of the Dol-cyn-afon Formation of the British Geological Survey) and the basal Arenig Garth Grit Member of his Carnedd Iago Formation (the Allt Llŷd Formation of the British Geological Survey). This locality accordingly offered a potentially conformable sequence at that level, such as had not been identified elsewhere in North Wales. However, there is no biostratigraphical corroboration for Lynas' claim, and it is now evident that regionally the latest Tremadoc is absent (see below).

Description

Grey slates representing the upper part of the Dol-cyn-afon Formation (Lynas' 'Afon Gam Formation') occupy the ground immediately to the south and west of Bryn Glas Quarry and are well exposed in the western and southern parts of the quarry itself. The base of the Garth Grit Member (Figure 9.4) is marked by the incoming of coarse conglomeratic grits that contain pebbles up to 2–3 cm in diameter. A series of grit units in the basal few metres are in the order of 40 mm thick; each has a sharp lower surface (possibly erosional) and is interbedded with silty and dark-coloured sandy shales. This sequence is overlain by tabular, cross-bedded grey-green quartzites. Traynor (1990) recorded planar and trough cross-bedding and observed bipolar palaeocurrents. Many of the rhyolite pebbles in the basal units are encrusted with '*Bolopora undosa*', which is now known to be a phosphatic oncolitic accretionary structure of chemogenic and/or bacteriogenic origin (Hofmann, 1975). At 70 m thick, the Garth Grit Member here reaches its greatest thickness in the sector east of the Cwm Bowydd Fault (Howells and Smith, 1997, p. 26). All beds dip at 30–34° to the north-east and ENE; they are overlain in the eastern part of the quarry by the Llyfnant Member, which is better seen at Hafotty Ffilltirgerig (see site report).

Interpretation

The Garth Grit Member in general forms a clearly transgressive base to the Arenig and was deposited in turbulent, very shallow marine conditions. Traynor (1990, p.18) interpreted the Garth Grit at this locality as a transgressive tidal deposit, part of a fluviodeltaic system to the east of the Cwm Bowydd Fault that was transporting sandy material southwards into his 'Rhobell Trough' (Traynor 1990, fig.11).

Biostratigraphical evidence of age is lacking but, by association with the overlying Llyfnant Member, is assumed to lie above the base of the Moridunian (see Hafotty Ffilltirgerig). In the Migneint area, Lynas (1973, p. 484) demonstrated the presence of an overstep from west to east by the Garth Grit upon members of the Tremadoc Dol-cyn-afon Formation, but this is of least magnitude in the vicinity of Bryn Glas Quarry. Lynas (1973, p. 484) correlated the Upper Mudstone Member of the Dol-cyn-afon Formation with the fossiliferous Garth Hill Beds at Tremadoc (see site report for Y Garth, Chapter 7), but without biostratigraphical control. From consideration of the Shropshire succession (see site report for Granham's Moor), Fortey and Owens (1992) showed that the latest Tremadoc is absent in North Wales, and there is no

evidence known from Bryn Glas that is contrary to this general conclusion. It is most likely, therefore, that the junction between the Upper Mudstone Member and the Garth Grit Member is paraconformable and masks a hiatus, as described by Traynor (1990, p. 24).

Conclusions

Although the promise of a Tremadoc–Arenig boundary transition at Bryn Glas has not been upheld, the site affords one of the best sections of the Garth Grit Member, a distinctive transgressive sandstone unit that characterizes the unconformable or disconformable base of the Arenig Series in North Wales.

References



(Figure 9.4) Bryn Glas, east of Ffestiniog, looking east over the glaciated plateau of the Migneint (here underlain by Merioneth Series, repeated by faults) towards Arenig. The massive basal Arenig sandstones of the Garth Grit paraconformably overlie silty slate of the Upper Mudstone Member of the Dol-cyn-afon Formation (Tremadoc). The base of the Garth Grit juts out over a shrub that is growing on the top bed of the Dol-cyn-afon Formation. The height of the section is about 3 m. (Photo: A.W.A. Rushton.)