
Y Garth

[SH 595 393]

Introduction

The hill known as Y Garth is the type locality for the highest division (Upper Mudstone Member) of the Tremadoc Series in the type area around Tremadog. The rocks contain faunas of the *Angelina sedgwickii* Zone and provide a reference section for the correlation of the youngest Tremadoc (Migneintian) rocks in Wales.

Y Garth was known to early collectors (Salter, 1866b, p. 252), and many museums have specimens of *Angelina sedgwickii* from there. The Tremadog area was studied by Fearnside (1910), who mapped six subdivisions within the 'Tremadoc Slates', of which his highest division, the 'Garth Hill Beds', is found at Y Garth. The site was described by Fearnside and Davies (1944), who stated that the 'famous collecting ground, the slabs along the Glaslyn river frontage north of Y Garth, has been cleared and almost devastated by collectors'. The Tremadog area was resurveyed by Howells and Smith (1997) and the term 'Garth Hill Beds' rejected, the division being informally designated the 'Upper Mudstone Member' of the Dol-cyn-afon Formation. In the Porthmadog area the member is up to 60 m thick beneath the basal Arenig unconformity. Detailed sedimentological information is contained in Prigmore (1994).

Description

The mudstones exposed on the hillside at Y Garth dip north or north-east at about 40° (Figure 7.8) and show a cleavage that dips more steeply to the north-west. The best exposures are in Y Garth quarry, where the mudstones are intruded by a dolerite sill. Some 5–10 m of mudstones are exposed; in part they are strongly affected by contact metamorphism, which highlights the structures in the mudstones.

The rocks generally consist of dark-grey, structureless, mottled, silty micaceous mudstones. Usually, bioturbation is intense and no internal structure is preserved, but occasional beds are well laminated. At intervals there are pyritous siltstone and fine sandstone laminae that cause the rock to weather with a ribbed appearance. The siltstones often show wavy and lenticular bedding, and sandstone lenses may preserve cross-lamination, parallel lamination and wave-ripple structures. Trace fossils include horizontal and sub-horizontal sandstone-filled burrows up to 5 mm across, and rare, coarse-filled vertical burrows disrupting the coarser horizons. Large cone-in-cone carbonate concretions are associated with the sandstones.

The mudstones contain lingulellid brachiopods, rare mollusca, and trilobites, among which *Angelina sedgwickii* Salter, *Peltocare olenoides* (Salter) and *Niobina davidis* Lake are the main constituents; it is the type locality for the two former species. Further faunal details can be found in Fearnside and Davies (1944) and Howells and Smith (1997). Specimens are tectonically distorted and are suitable for the study of tectonic strain (Rushton and Smith, 1993).

Interpretation

The bioturbation, intense in places, indicates normal oxygenation, and wave-ripples in the sandstones indicate that they were formed above wave base. The preservation of vertical burrows in some sandstones may indicate fairly energetic environments. Although olenids commonly indicate dysaerobic conditions characterized by weakly bioturbated textures, the dominance of the olenid trilobite *Angelina* suggests that it could thrive in relatively well-oxygenated water.

Upper Tremadoc sediments in this area are relatively coarse and show significant facies and thickness changes, which indicate fault-controlled deposition in grabens and half-grabens with south-east-facing palaeoslopes (Howells and Smith, 1997). The *Angelina*-bearing beds are developed where fault-controlled highs occurred in the coarser beds below. They thus represent restricted, possibly lagoonal, shallow-water conditions that are thought to represent the culmination of an upwardly shallowing trend. *Angelina sedgwickii* has been found in part of the upward-shallowing sequence of the

Habberley Formation (Fortey and Owens, 1992) of the Welsh Borderland (see site report for Granham's Moor).

Conclusions

The hillside of Y Garth provides a stratigraphical reference for the highest Tremadoc rocks in the historical type area. The strata were deposited in fairly shallow water, possibly lagoons, and contain *Angelina sedgwickii* and other fossils, possibly adapted to a high-stress environment, yet of value for correlation. The site has been subject to over-collection of fossils, and its future conservation is a matter of importance.

References



(Figure 7.8) Y Garth Quarry, west of Penrhyndeudraeth, seen from the west. The quarry exploits a dolerite intrusion into the Upper Mudstone Member (or 'Garth Hill Beds') of the Dol-cyn-afon Formation. The Upper Mudstone dips north (to the left), making weak features on the wooded hillside between the quarry and river (Afon Glaslyn). (Photo: Cambridge University Collection of Air Photographs, 70Kn EN59: copyright reserved.)