Allt Pen-y-Coed

[SN 4425 1823]–[SN 4446 1803]

Introduction

This is the most complete section through the Cwmffr■d Member of the Carmarthen Formation, and its base is defined formally here at the top of the underlying Pibwr Member. A succession of stratigraphically significant trilobite faunas show changes that are interpreted as being related to increasing water depth and decreasing oxygenation upwards through the succession.

Mentioned briefly by Cantrill and Thomas (in Strahan *et al.,* 1909, p. 7) in their description of the *Peltura punctata* Beds, supposedly of Tremadoc age, this section was discussed in detail by Fortey and Owens (1978, p. 234), who mapped the succession and figured the characteristic trilobite fauna; they recognized the two lower members of the Carmarthen Formation, which are particularly well-exposed here. It is the only section that shows well the upward passage from the Pibwr Member into the Cwmffri■d Member and is thus one of the key localities in the interpretation of the stratigraphy and palaeoenvironments of the early Arenig in South Wales.

Description

Allt Pen-y-Coed is a steep-sided wooded dingle that runs parallel to a minor road a short distance to the south of the A48 trunk road 0.8 km WSW of Nant-y-Caws. The section is some 320 m long, with more or less continuous exposure (Figure 8.6). The succession youngs to the south-east, dipping generally south to south-east at 60–70° (Fortey and Owens, 1978, fig. 5, p. 235). In the northern part of the section the upper part of the Pibwr Member crops out as a monotonous series of black, well-bedded mudstones, in beds 5–15 cm thick, weathering to show an iridescent dark purplish or umber film. Asaphid trilobites (*Merlinia selwynii* (Salter)) are the commonest fossils; nuculoid bivalves, very common in the lower part of the Pibwr Member at Glan Pibwr (see site report), are present here, but become progressively rarer up the succession. Rare olenid (*Bienvillia praecalva* Fortey and Owens) and trinucleid (*Myttonia* cf. *fearnsidesi* Whittington) trilobites also occur.

Approximately midway along the section the mudstones of the Pibwr Member give way to the sequence of alternating turbidites and shales of the Cwmffritd Member; its base is drawn formally at the base of the lowest turbidite exposed in Allt Pen-y-Coed at [SN 4437 1809]. The turbidites vary from a few centimetres to over a metre thick and are generally separated by an equal or slightly greater thickness of dark-grey or black mudstones or shales. The turbidites are generally well-graded, with quartz and feldspar clasts in a dark siliceous matrix. Towards the mid part of the Cwmffr■d Member the turbidites increase greatly in thickness (up to 2 m) at the expense of the shales and in Allt Pen-y-Coed give rise to a series of waterfalls where the stream runs through a steep-sided gorge. Fossils are confined to the shales and mudstones and include *Bienvillia praecalva* (in greater abundance than in the Pibwr Member), *Merlinia rhyakos* Fortey and Owens (common) and a rare olenid *Hypermecaspis venerabilis* Fortey and Owens, for which this is the type locality.

Interpretation

Fortey and Owens (1978) presented evidence for an upwardly deepening sequence in the lower Arenig of the Carmarthen district, on the basis of changing lithologies and faunas. The Pibwr Member contains what they termed the Raphiophorid community, including trilobites of low convexity with a high ratio of ventral surface area/volume (e.g. *Merlinia*) or with long genal spines (*Myttonia*) *:* these and the associated infaunal bivalves show adaptations to soft-surface sediments.

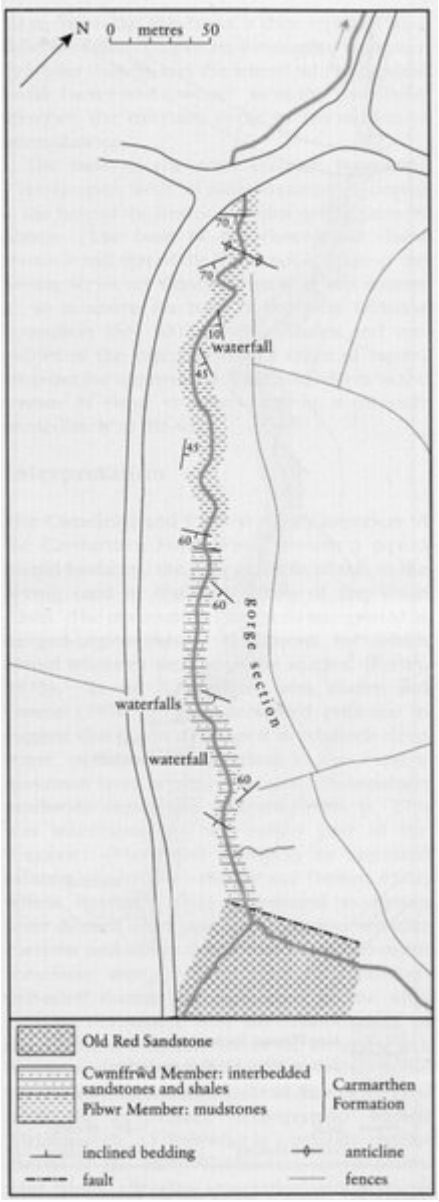
High in the Pibwr Member, at Allt Pen-y-Coed, small numbers of the first olenids (*Bienvillia praecalva*) appear, but in the overlying Cwinffr■d Member these become dominant; this trilobite has been interpreted as being adapted to oxygen-poor

and relatively deep water and characterizes the Olenid Community.

Conclusions

With its long sections through part of the Arenig Carmarthen Formation, Allt Pen-y-Coed demonstrates the zones and local environmental changes during the early Arenig. It is a key section for interpreting the biostratigraphy and facies distribution and is a locality that shows well the olenid biofacies, whose occurrence in the Arenig is limited to this part of the Welsh Basin.

References



(Figure 8.6) Allt Pen-y-coed stream section, exposing the basal stratotype of the Cwmffr■rd Member, the middle member of the Carmarthen Formation, after Fortey and Owens (1978, fig. 5).