
Banwy River

[SJ 1330 1042]–[SJ 1340 1011]

Potential GCR Site

Introduction

This site is located 3.5 km south-west of Meifod and 10 km WNW of Welshpool, Powys. The Meifod area was visited by Sedgwick in the 1830s and 1840s, sometimes together with Salter. In the mid-19th century, the Lower Palaeozoic strata hereabouts provided material for the working collections of the latter author and also those of M'Coy. It was not until King's (1928) account of the regional geology of the area that the upper Ordovician and lower Silurian rocks there were described in any detail. The Silurian ('Valentian' and 'Salopian') succession was divided by him into five lithostratigraphical divisions which, from oldest to youngest, he referred to as the V1–3, the VS passage beds and the banded mudstones units.

The Llandovery–Wenlock sequence of the Banwy River section (Figure 3.35), (Figure 3.36) has very recently been re-investigated by Loydell and Cave (1996). Fairly continuous exposure is present through the uppermost part of the Blue Silty Mudstones and the whole of the Tarannon Shales Formation (respectively, the V2 and V3 divisions of King, 1928), both of late Llandovery age, and into the lower part of the Nant-ysgollon Shales Formation (mainly 'Salopian' of King, 1928), of latest Llandovery to early Wenlock age. In terms of graptolites, of which over 8000 were collected by Loydell and Cave, these rock units here span the *turriculatus* to *riccartonensis* biozones. The base of the Wenlock, taken to be the base of the *centrifugus* Biozone, occurs near the base of the Nant-ysgollon Shales Formation, within the newly established (Loydell and Cave, 1996) Banwy Mudstone Member (the VS division of King, 1928).

The graptolite succession Loydell and Cave (1996) identified at this site is a more refined one than those hitherto recognized for rocks of a similar age elsewhere in Britain. This enables fine correlation of the upper Llandovery–lower Wenlock strata of this mid-Wales region with sections in mainland Europe, for example ones in Bohemia and Scandinavia.

Description and interpretation of the Llandovery rocks and fossils of the Banwy River site are given in Chapter 3 of this volume.

Description

The Banwy Member is 36 m thick and has a sharp base. It comprises mostly bioturbated, hard, medium grey silty mudstones, with some thin (< 30 cm) sandstones and layers (< 10 cm thick) having bundles of dark grey graptolitic laminae. Certain horizons show calcareous concretions, which in general are less than 20 cm in diameter, though at the top of the unit, drawn at level C (Figure 3.35), (Figure 3.36), they are a metre or more across. The top boundary of the member was somewhat arbitrarily placed, as the upper part of the unit is gradational lithologically into the overlying part of the Nant-ysgollon Shales Formation. From two metres below this boundary (in the *centrifugus* Biozone), to up to 14 m above it (in the *murchisoni* Biozone), burrowed horizons give way to hemipelagites. A thin bentonite layer occurs near the top of the member. The Nant-ysgollon Shales Formation as a whole is dominated by greyish black graptolitic laminated hemipelagites, which are often interbedded with thin bands of paler grey turbiditic mudstone.

Except for the top metre, the upper 20 m of the Banwy Member are made up of disturbed beds. These beds show no internal disruption but at their base they lie with marked discordance on the strata below, this discordant relationship being taken to represent a slide plane (Loydell and Cave, 1996). The rocks both immediately above and beneath this plane belong to the latest Llandovery *insectus* Biozone, so that probably only a small thickness of strata has been lost due to movement along it.

The Llandovery–Wenlock boundary was presumed (Loydell and Cave, 1996) to lie in the unfossiliferous 3 m interval of beds between the strata determined as belonging to the *insectus* and the *centrifugus* biozones. The incoming of *C. centrifugus* into the faunal succession is important in differentiating basal Wenlock from upper Telychian strata, as is *Mediograptus inconspicuus*, which appears about midway through the *centrifugus* Biozone and continues into the *murchisoni* Biozone (Figure 4.51). *Monoclimacis shottoni* is apparently restricted to the lower three-quarters of the *centrifugus* Biozone.

The lowest *murchisoni* Biozone faunas are similar to those of the *centrifugus* Biozone but *C. murchisoni* and two monoclimacid species make their appearance. A change takes place within the first metre of the *murchisoni* Biozone, *Monoclimacis adunca* occurring abundantly and overlapping in range with '*Monograptus*' *radotinensis* that comes in slightly higher. Both the latter species are absent from the upper part of the biozone, which in comparison with the lower part is characterized also by the absence of *Retiolites* and *C. centrifugus*, the rarity of *Mediograptus* and *Monoclimacis geinitzi*, and the relative abundance of *Monoclimacis kettneri*. Towards the top of the biozone, *Monograptus sensu stricto* becomes the dominant form rather than *Monoclimacis*, and graptolite diversity decreases.

The base of the *firmus* Biozone is marked by the incoming of the eponymous species, *Monograptus firmus*, with *Pristiograptus dubius*, a very long ranging species, being the only other new element in this biozone.

The highest graptolitic horizons of the Banwy section occur some 110 m above the base of the *firmus* Biozone. They yield a graptolite fauna that remains to be investigated fully but which presently indicates a mid-late Sheinwoodian age. The base of the *riccartonensis* Biozone is thought to lie within 15 m above the base of the *firmus* Biozone and the former biozone as a whole is probably represented in the section by a substantial thickness of rocks.

Small brachiopods are dispersed throughout the sequence; they occur particularly in the Banwy Member. The upper part of the *murchisoni* Biozone has an horizon containing decalcified crinoids. Otherwise, shelly fossils are rare. Chitinozoans and acritarchs are known, but await detailed assessment.

Interpretation

Loydell and Cave's (1996) account of the graptolite biostratigraphy of the Banwy section represents the first time that the *firmus* Biozone has been recognized in Britain. The presence of *P. dubius* in the same biozone marks the earliest occurrence of this species. Correlation with Bornholm and Bohemia is enabled largely through the biozonal index species.

The Banwy area lay close to the basin margin during early to mid-Wenlock times (Loydell and Cave, 1996). Disruption of the strata in the section suggests, at times, slope failure. To the west, in the deeper basin, thick sequences of turbidites were being deposited (see the Penstrowed Quarry site report); to the east, on the shelf, lay areas covered by carbonate mud (the sediments comprising the Buildwas site, for example).

The change through the Banwy Mudstone Member from burrowed silty mudstones to laminated hemipelagites reflects a switch in bottom water oxicity from the dominantly oxic conditions under which the Tarannon Shales were formed to the anoxic conditions that prevailed during the deposition of the Nant-ysgollon Shales.

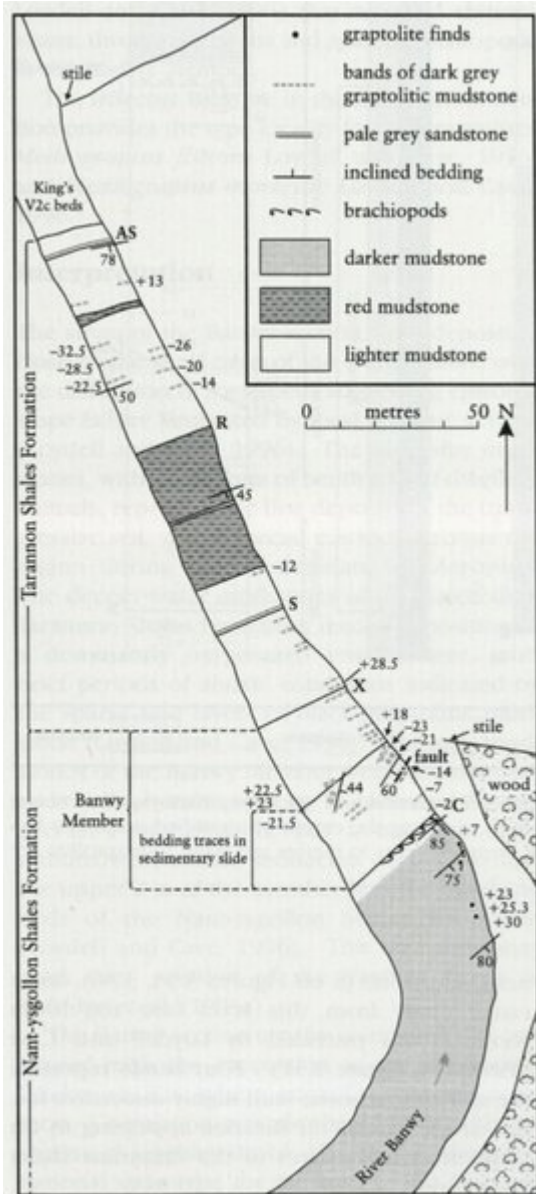
Sites in the GCR network with late Llandovery -early/mid-Wenlock age rocks, which may variously be linked to the Banwy river site, include Buttington Brickworks in the nearby Long Mountain; Trecoed–Castle Crab in the Builth area; the Sawdde Gorge section, south-central Wales; and most importantly Hughley Brook in the type Wenlock area. Chitinozoans and acritarchs, possibly bentonite horizons also, may enable correlation of the Banwy section with that at Hughley Brook (Loydell and Cave, 1996), the designated international stratotype for the base of the Wenlock Series.

Conclusions

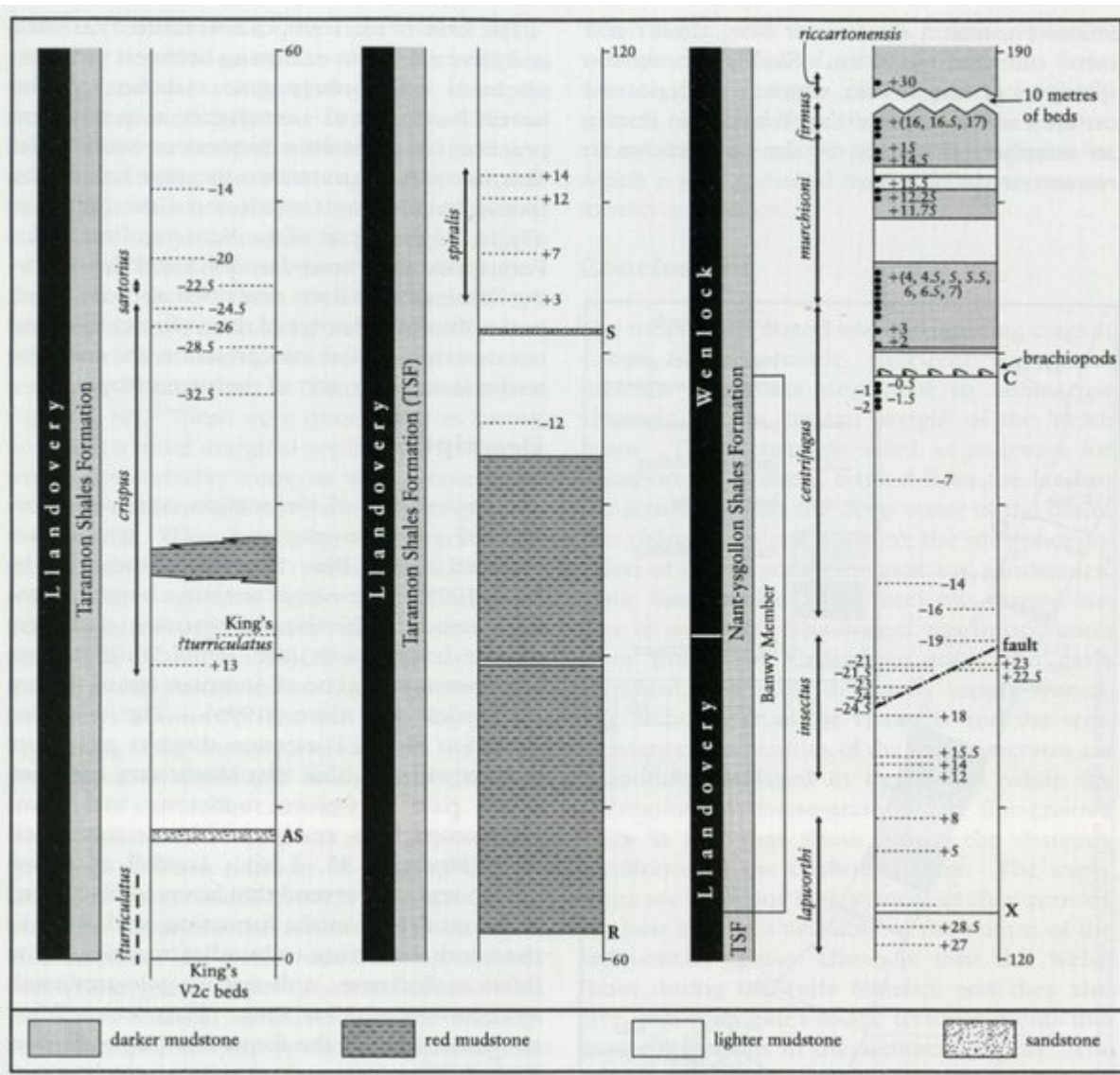
The Banwy River site exposes upper Llandovery through to lower Wenlock (Sheinwoodian) strata that have yielded several thousand graptolites belonging to 12 biozones. This represents the most refined sequence of graptolite faunas

known from rocks of this age from anywhere in Britain. Most importantly, it yields graptolites across the Llandovery–Wenlock boundary interval. The *firmus* Biozone has been recognized for the first time in Britain in the lower Wenlock part of the succession. The site enables high resolution correlation with sections in continental Europe. The lower Wenlock sediments were deposited just off the shelf edge, on the upper part of the slope area, and were subject to episodic, slide-inducing tectonic activity.

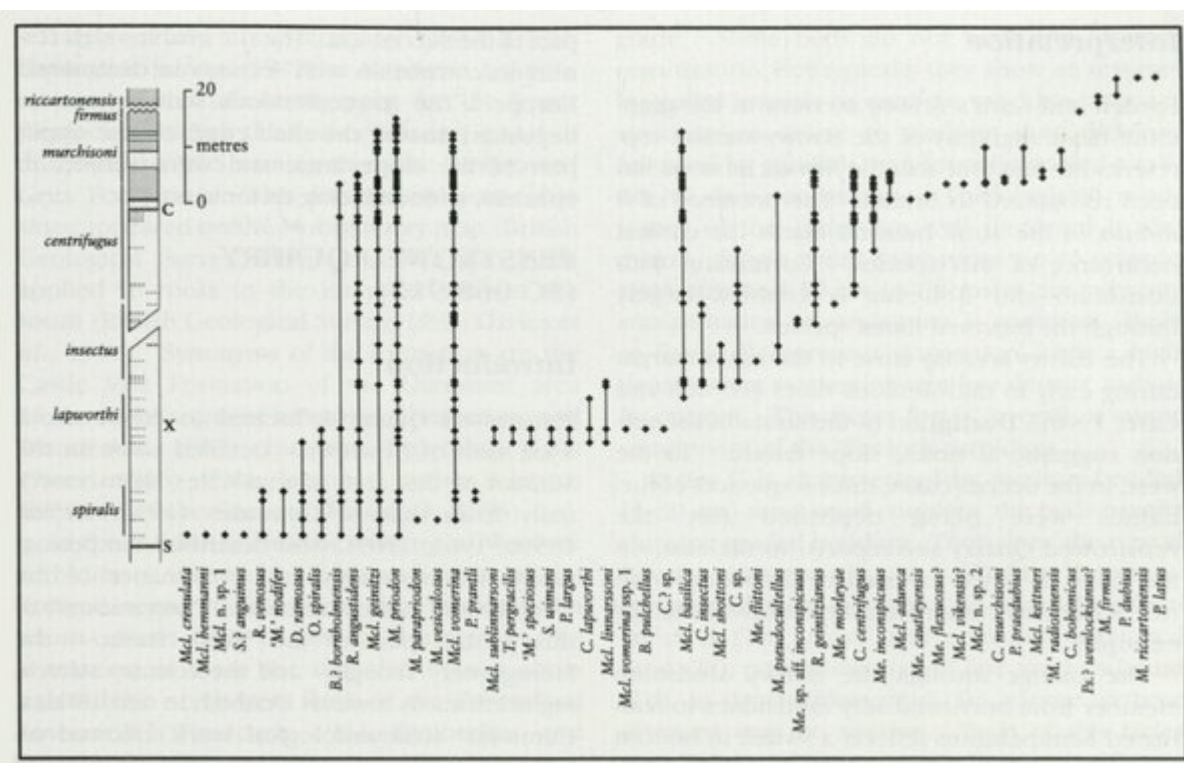
References



(Figure 3.35) Geological sketch map of the Banwy River section (after Loydell and Cave, 1996). The letters represent marker horizons from which measurements in metres are taken to graptolitic levels.



(Figure 3.36) Measured section through the Tarannon Shales Formation and the lower Nant-ysgollon Shales Formation in the Banwy River (after Loydell and Cave, 1996), showing the extent of identified graptolite biozones. The letters represent marker horizons from which measurements in metres are taken to graptolitic levels.



(Figure 4.51) Range chart of graptolite species from the Banwy River section, Meifod area, Powys, from the *spiralis* Biozone (Telychian) to the *riccartonensis* Biozone (Sheinwoodian). The gap in the section indicates the position of a slide (within the *insectus* Biozone) (after Loydell and Cave, 1996).