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# Bryn-Banc Quarry, Llan-mill

[SN 141 145]

## Introduction

The limestones and flags exposed here form part of the 'Narberth Group' of Addison, and until his work in the early 1970s (largely unpublished), they were considered to be wholly of Llandeilian age. In the upper part of the sequence Addison recognized trilobite faunas with taxa common to the Costonian Stage of the Caradoc of south Shropshire (see Coston site report). This section has thereby acquired national importance as one that shows the relationship of the type Llandeilo sequence of South Wales with that of the Caradoc of Shropshire in a continuous succession in the shelly facies. Its significance has been enhanced by more recent work on other groups, such as conodonts and ostracods.

The limestones of the Narberth Group were long quarried in the vicinity of Llan-mill and Lampeter Velfrey (Strahan *et al.*, 1914, p. 32), and a composite succession can be constructed from the numerous disused quarries in the area. Murchison (1839; p. 396) recognized their Llandeilo age, and Strahan *et al.* (1914) also included them within the Llandeilo Series. However, the faunas were little studied until Spjeldnaes (1963) described silicified fossils (trilobites, bryozoans and ostracods) from a slab of limestone from an unspecified locality at Llan-mill. On the basis of the trilobites and unsilicified brachiopods he suggested a late Llanvirn or early Llandeilo age (now Aberiddian–Llandeilian) but noted that the ostracods and bryozoans resembled more those from the Caradoc. Addison (1974) described the geology of the area in detail in an unpublished PhD thesis, although his main conclusions were published as a note in Williams *et al.* (1972, p. 36) and reported in Bassett *et al.* (1974, p. 13), who reproduced Addison's geological map of the area. Addison recognized the presence at Bryn-banc of trilobites like those from the lowest Caradoc Sandstone (Costonian Substage) of south Shropshire. Thus this section affords a critical link between Shropshire and South Wales, and along with other sections nearby (see below) demonstrates in a shelly facies the passage from the classic Llandeilo into the Caradoc, whose base is unconformable in Shropshire.

The importance of Addison's work at Bryn-banc and nearby localities has been emphasized by subsequent work on, for example, the conodonts by Bergström *et al.* (1987) and the ostracods by Jones (1986–1987), and on its potential as a boundary stratotype by Whittington *et al.* (1984), and Fortey *et al.* (1991 and 1995). If the recommendations of the latter are accepted, the base of the Caradoc Series will be drawn formally at the base of the *gracilis* Zone, a level well down in the Llandeilo succession in South Wales. However, Bryn-banc remains the prime candidate to define the base of the Costonian, which, on the recommendations of Fortey *et al.* (1995) becomes the upper substage of the Aurelucian Stage.

## Description

Some 70 m of argillaceous limestones and flags, faulted in places, are exposed at Bryn-banc Quarry and have yielded a diverse fauna of trilobites, brachiopods, ostracods, conodonts and bryozoa. From beds near the top of the sequence, Addison (in Williams *et al.*, 1972; in Bassett *et al.*, 1974) reported the trinucleid trilobite *Costonia elegans* Dean and also other undescribed marroolithine trinucleids that are different from any from the Llandeilo Flags at Llandeilo. *C. elegans* occurs in the Costonian of south Shropshire, whilst an undescribed marroolithine resembles *Marroolithus ventriculatus* Whittard, which occurs in the Costonian Spy Wood Grit in the Shelve area (see site reports for Spy Wood and Aldress dingles). Dr R. Bettley (pers. comm., March 1998) has recovered *Orthograptus apiculatus* Elles and Wood from the upper part of the quarry; he notes that the presence of this species also affords correlation with the Spy Wood Grit and is a good indicator for the top of the *gracilis* Zone (see also Hughes, 1989, p. 67). Further, an undescribed species of *Marroolithoides* from the middle of the Bryn-banc sequence occurs at the top of the Llandeilo Flags at Llandeilo.

Bergström *et al.* (1987) provided data which suggest that the base of the *Amorphognathus tvaerensis* conodont zone lies in the middle to upper part of the Bryn-banc sequence; the position in the evolutionary range of specimens of *Eoplacognathus elongatus* (Bergström) from this locality places them within the lower part of the *Baltognathus variabilis* Subzone, which is coeval with the middle part of the *gracilis* graptolite zone. The ostracods contain species that range

throughout the sequence (e.g. *Gunnaropsis narberthensis* Jones and *Latebina pseudantra* Jones) or are confined to the 'Costonian' part (e.g. *Varilatella (Redacta) coronata* Jones and *Conchoprimitiella papilalata* Jones) (Jones, 1986–1987). Although these species have not been reported outside South Wales, *Piretopsis (Protallinnella) salopiensis* (Harper), which occurs in the Narberth Group at Lampeter Velfrey at the same horizon as that exposed in Bryn-banc, has been recorded from the Costonian Stage in the Shelve and south Shropshire areas.

## Interpretation

Taken together, the trilobite, conodont and ostracod evidence indicates firmly the presence of correlatives of the Costonian Stage at Bryn-banc. Together with nearby sections at Henllan [SN 131 160] and Lampeter Velfrey, Bryn-banc Quarry affords a composite section through the Narberth Group; between them these localities have yielded faunas diagnostic of the Upper Llandeilo Flags at Llandeilo and the lowest Caradoc of Shropshire.

Wherever the base of the Caradoc Series is formally drawn, the Bryn-banc section will remain vital in the regional correlation between successions in South Wales and in Shropshire; it is likely to become the stratotype for the base of the Costonian Substage. Bassett and Hughes (in Fortey *et al.* 1991, p. 17) pointed out that selection of the base of the *tvaerensis* Biozone at Bryn-banc as the base of the Caradoc Series would protect the traditional interpretation of the boundary between the Caradoc and Llandeilo series. Although this is now unlikely to be adopted, following the proposal by Fortey *et al.* (1995) to adopt a lower level for this boundary, Bryn-banc remains an important section for securing the correlations given above.

## Conclusions

Bryn-banc Quarry is nationally valuable because it provides faunas critical for correlating the Aurelucian successions in South Wales and Shropshire and is the principal candidate section for defining the base of the Costonian Substage.

## [References](#)