Trecoed–Castle Crab

[SO 053 552]–[SO 051 554]

Introduction

This section is to be found about 4.5 km north of Builth Wells in central Wales. Murchison (1839, 1854) gave only brief mention of the Builth area in his *Silurian System* and also in *Siluria,* though the former work contains cross-sections of the geology hereabouts. The Silurian geology of the area was summarized and the main fossil localities listed in two early memoirs of the Geological Survey (De la Beche, 1846; Phillips, 1848). In the late 19th century, Lapworth (1880a, 1880b) commented on the graptolite faunas of the 'Wenlock Shales' (= Coalbrookdale Formation of the type Wenlock and other areas) at Builth. He regarded most of these shales as being characterized by *Cyrtograptus linnarssoni,* but the *murchisoni* Zone was separated by him here, and elsewhere, for rocks at the base of the Wenlock succession.

At the turn of the 19th century the Builth district figured prominently in the benchmark biostratigraphical works of Elles (1900) and Wood (1900), in which graptolites were used for zonation of Wenlock and Ludlow strata in Wales and the Welsh Borderland. The sequence of graptolite faunas and the biozones identified by these two authors at Builth have been modified elsewhere subsequently. Nonetheless, this faunal sequence provides much of the basis for the present standard biozonal scheme for rocks of Wenlock (in particular) and Ludlow age in the Welsh Basin and other areas in the UK, and also regions abroad.

The Wenlock of the Builth district was studied especially by Elles (1900). She recognized in the 'Wenlock Shales' sequence there, in ascending order, six biozones: *murchisoni, riccartonensis, symmetricus, linnarssoni, rigidus* and *lundgreni.* Additionally, the *ludensis* Biozone, which is now included in the Wenlock, was also recognized in the Builth district by Wood (1900), but it was originally named the *vulgaris* Zone and taken by her and by Elles (1900) to mark the base of the Ludlow Series (for full discussion see Burrington site report and Holland *et al.,* 1969). Further revision of the nomenclature used by Elles (1900) has seen her *symmetricus* and *rigidus* biozones later being termed the *rigidus* and *ellesae* biozones, respectively (see Rickards, 1976). Of the remaining graptolite biozones that make up the standard British sequence, the evidence for the presence in the Builth area (see Bassett, 1993; Harris, 1987; Corfield *et al,* 1992) of the basal Wenlock *centrifugus* Biozone (defined in the Howgill Fells; Rickards, 1976) and the Homerian *nassa* Biozone (type locality Thuringia; Jaeger, 1959) has yet to be published in full.

Following the studies at Builth of Elles and Wood, Straw (1937) mapped and described the Ludlow succession to the south of Builth Wells, then Jones (1947) carried out the first detailed regional geological survey and mapping of the Silurian rocks in the ground to the north and west of the town. Jones separated the Wenlock of the Builth area into upper and lower divisions, the boundary between the two coinciding with that dividing the *rigidus* and *linnarsoni* biozones. Sediments of the upper division differ from those of the lower in being made up of three major slumped horizons which interfinger with normal bedded units. The lower slumped horizon varies from 0–75 m in thickness, the middle one from 0–105 m and the upper one from 10–155 m. In undisturbed strata the total thickness of the Wenlock, including *ludensis* Biozone rocks (Bassett, 1974a), is some 630 m, with the lower division comprising about 155 m of this. In areas where slumped horizons are developed the total thickness can reach up to 900 m.

The Trecoed–Castle Crab site is one of five of Wenlock age from the Builth area in this review, Pen-cerig, Coed-mawr, Dulas Brook and the River Irfon being the other four.' All figure, to different degrees, in the accounts of Elles (1900), Wood (1900) and Jones (1947), and are important for showing various graptolite horizons in the area, which, following Elles' work, was considered the type area in the UK for the Wenlock graptolite succession. This notwithstanding, modern, up-to-date knowledge of the graptolite biostratigraphy and faunas of the Wenlock of the Builth district, together with revision of the lithostratigraphy of these rocks, is now much needed. Harris (1987) has written a thesis that includes such data, and the British Geological Survey are now completing further work on the area. The significance attached to any of the five Builth sites of Wenlock age described in the present JNCC volume will doubtless be modified when the results of these studies are published; also new, important sites may emerge.

The Trecoed–Castle Crab section exposes strata of *centrifugus–murchisoni* Biozone age, at the base of the local Wenlock, and rocks at least up to and including those of the *rigidus* Biozone.

Description

The site is located at the foot of the Carneddau hills, very close to where the Silurian rests on the middle Ordovician of that range. The section itself combines roadside, track, stream and quarry exposures (Figure 4.42).

The Wenlock beds here dip at between 25–35° to the north-west. The local base of the series is formed by the *c.* 50 cm thick Acidaspis Limestone, which lies immediately above the Llandovery Pale Shales, these lying on top of arenites of the Llandovery Trecoed Formation (Ziegler *et al.,* 1968b), the latter in turn resting unconformably on dark shales of Ordovician (Llandeilian) age. According to Jones (1947) there is an unconformity beneath the Acidaspis Limestone, but Hurst *et al.* (1978) found no evidence to support this conclusion. This so-called limestone is a calcareous, rubbly mudstone, and is exposed immediately south of Trecoed, where the road bends at a right-angle. It contains fragmentary shelly fossils, including brachiopods (mostly indeterminate) and cardiolid bivalves. Odontopleurid trilobite material from the Acidaspis Limestone has subsequently (Thomas in Siveter *et al.,* 1989) been referred to *Leonaspis.*

Elles (1900) and Wood (1900) both assigned the Acidaspis Limestone to the *murchisoni* Biozone, but the stratigraphically lower, basal Wenlock *centrifugus* Biozone had not been established at the time they were working. An equivocal, *centrifugus–murchisoni* Biozone age was given for this calcareous unit by Bassett (1993), based on graptolites listed by Elles from the adjacent stream and track at Trecoed. Conodont samples from the limestone yield *Pterospathodus amorphognathoides,* definitive of the *amorphognathoides* Biozone, which spans the Llandovery–Wenlock boundary (R.J. Aldridge, pers. comm.; Mabillard, 1981).

Above the Acidaspis Limestone, in the short track leading to Trecoed and the stream section as far as the bend in the road at Castle Crab, are grey-green mudstones of the Wenlock Shales'. Graptolites from this section indicate the *murchisoni* and *riccartonensis* biozones (Elles, 1990; Siveter *et al.,* 1989; Bassett, 1993), and brachiopods of the *Visbyella trewerna* Community have been recovered from the beginning of the section, 0.5 m above the limestone (Hurst *et al.,* 1978). The succeeding beds of the 'Wenlock Shales' of the small, old quarry to the east of Castle Crab have (Bassett, 1993) yielded a *rigidus* Biozone fauna, including *Cyrtograptus rigidus, Monograptus flemingii, Monograptus antennularius* and *Pristiograptus dubius.* The shelly fossils *Orbiculoidea, Chonetes, Cardiola* and *Orthoceras* have also been recorded (Elles, 1900) from this biozone, from another, small, but now infilled old quarry south-east of Castle Crab, though this faunal list needs updating. Strata of the *linnarssoni* Biozone (= flexilis Biozone of some authors) have been recognized farther downstream (Jones, 1947; Bassett, 1993).

Interpretation

The Trecoed–Castle Crab exposures of Wenlock rocks were of great utility in Elles' (1900) study, and the *murchisoni, riccartonensis* and *rigidus* (= *symmetricus*) biozones she identified there all have Builth as their type locality (Lapworth, 1880a, 1880b; Elles, 1900; Rickards, 1976).

During the whole of the Wenlock Epoch the Builth district was situated between shelf and basin, on the slope area (Bassett, 1974a; Hurst *et al.,* 1978; Holland, 1992). This intermediate position is reflected in both its sediments and fossils: dominantly graptolitic shales or calcareous mudstones, with occasional thin shelly horizons. These two main facies types are exemplified in the present site by, respectively, the bulk of the 'Wenlock Shales' and the Acidaspis Limestone.

The *Visbyella trewerna* Community is the most offshore of the benthic depth-related brachiopod communities identified in rocks of Wenlock age (Calef and Hancock, 1974; Hurst *et ed.,* 1978), it being typical of low energy conditions.

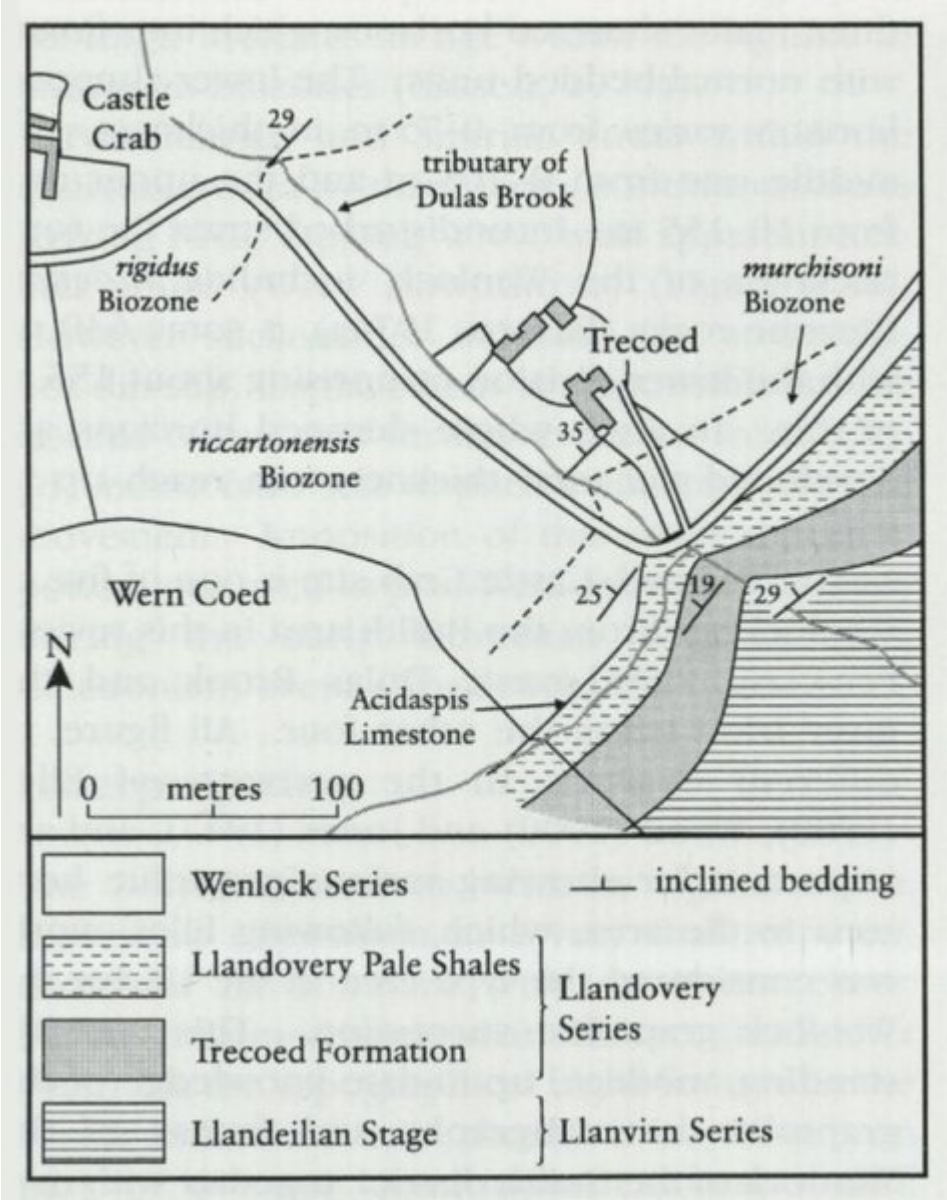
Trecoed–Castle Crab is most closely linked to the other Builth Wenlock sites. In particular it has affinity with Pen-cerig, which is of about the same lower Wenlock age and which also has a mixed graptolite–trilobite fauna. Farther afield it ties in with the Buttington Brickworks site in the Long Mountain to the north-east, which provides an offshore, upper

Llandovery to low Wenlock sequence. The Long Mountain district parallels that of Builth in being part of the slope area throughout Wenlock time.

Conclusions

Trecoed–Castle Crab is an important section for biostratigraphy in the Builth district — the historic type area for the graptolite biozones of the Wenlock Series. At this site there are at least three such biozones, which bracket 'Wenlock Shales' strata of early to mid-Wenlock age. The sediments (shales–mudstones) and fauna (dominantly graptolites) here are, overall, indicative of an offshore, deepish water environment, but the section also contains shelly (trilobite–brachiopod) horizons. Together with all other Builth Wenlock sites, it has palaeogeographical significance because it occupies an intermediate, slope position between shelf and basin. The site is used primarily for research purposes.

References



(Figure 4.42) Geology of the Trecoed–Castle Crab area, Builth district (after Bassett, 1993 and Siveter et al., 1989).