Capel Horeb Quarry

[SN 8445 3234]

Introduction

The Capel Horeb site is a large disused quarry situated on the north side of the A40, 5.5 km ESE of Llandovery, Carmarthenshire (Figure 6.12), (Figure 6.13). Stratigraphically the quarry is situated towards the top of the Silurian in the steeply dipping Ordovician to Devonian homoclinal sequence on the south-east side of the Towy Lineament. Exposed at this classic and famous site are the marine Ludfordian Upper Roman Camp Formation, unconformably above which the P■ídolí Long Quarry Formation and Raglan Marl Group are seen (Figure 6.14), (Figure 6.15); these beds demonstrate decreasingly marine influence on the sedimentation. The regional overstep of the P■ídolí here has cut out beds that are broadly equivalent to the latest Ludfordian (Upper Whitcliffe Formation) of the Welsh Borderland to the north-east.

The quarry was known to Murchison, who produced a description of the geology of both the quarry and the surrounding area, and included the geological detail on sections (Murchison, 1839, pp. 182, 348, pl. 34, figs 1, 3). He listed faunas from both the Ludlow and P■ídolí parts of the sequence.

This site also appears in Siveter *et al.* (1989); the geology of the general area is to be found in Potter and Price (1965). The floras of this site have particular importance with regard to the evolution of vascular land plants (Edwards and Davies, 1976; Bassett and Edwards, 1982).

Description

The western face of the quarry (Figure 6.14), (Figure 6.15) shows large bedding plane exposures of the Ludfordian Upper Roman Camp Formation, dipping at 60–70° to the ESE. The lithology is predominantly micaceous dark grey siltstones, with interbedded grey laminated mudstones; rippled surfaces are a conspicuous feature. The recorded fauna (Potter and Price, 1965) includes the brachiopods *Microsphaeridiorhynchus nucula, Protochonetes ludloviensis, Salopina lunata, Sphaerirhynchia wilsoni, Dayia navicula* and *Chonetoidea grayi,* the bivalves *Pteronitella retroflexa* and *Modiolopsis* sp., pelmatozoan ossicles and gastropods (*Loxonema* and *Platyschisma*). Trilobites (species of *Dalmanites, Calymene* and *Encrinurus*) and eurypterid fragments occur in the Upper Roman Camp Formation at other localities in the area. A major interest of this formation is the land flora, which at some horizons comprises common fragmentary, dichotomizing Y-axes of the rhyniophytes *Cooksonia* sp. and *Steganotheca striata* (Edwards, 1970); the flora was derived from the nearby land area (Pretannia of Cope and Bassett, 1987) to the south, as was the micaceous component of the sediment. *Cooksonia* in the Ludfordian Upper Roman Camp Formation at the Capel Horeb site is of particular importance; it is the earliest occurrence of a plant with vascular tissue in place, and as such provides unequivocal evidence for the existence of the earliest land plants.

The NNE face of the quarry shows a (lip section of the P■ídolí Series Long Quarry Formation. It is about 20 m in thickness and comprises green-grey, highly micaceous sandstones, with thin intraformational conglomerates. The lowest 7 m are grey carbonaceous siltstones and sandstones, with micaceous sandstones; the brachiopod *Orbiculoidea rugata* has been recorded, as have the same two plant taxa recorded from the Upper Roman Camp Formation below. The upper part of the Long Quarry Formation has lenses crowded with fossils: the gastropods *Loxonema* sp., *Turbocheilus helicites* and *Sellinima? williamsi,* the bivalves *Modiolopsis complanata* and *M. laevis,* rare brachiopods (*Microsphaeridiorhynchus nucula*) and the cephalopod '*Orthoceras'* sp. also occurs. The overlying red beds at the base of the Raglan Marl Group crop out at the top of the east end of the northern quarry face. This group, perhaps more than 600 m thick in this area, shows an alternation of mudstones, siltstones and fine sandstones, with abundant cross-bedding. Although predominantly red in colour, brachiopods and molluscs occur in occasional layers.

The surface of unconformity is not immediately obvious (Figure 6.14), (Figure 6.15); the rocks above and below the unconformity both strike ESE, the older series dipping at about 70°, the younger nearer 60°. The overstep to the west

becomes apparent on further observation, and is most obvious from regional considerations (Potter and Price, 1965).

Interpretation

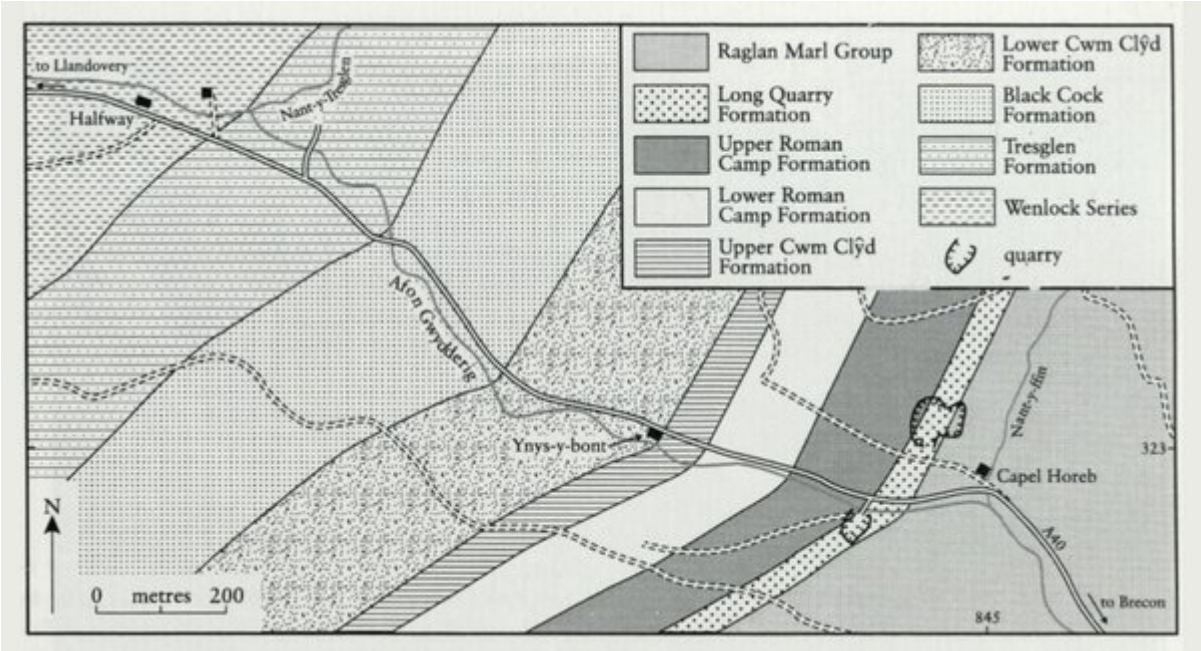
Although the uppermost part of the Ludlow is not present in this area, the sequence as exposed illustrates the decreasing marine influence on the sedimentation. Fossils in the Ludfordian Upper Roman Camp Formation are not common, but the aspect of the fauna, which is dominated by articulate brachiopods, suggests a more marine influence than that of the P■ídolí Long Quarry Formation, where bivalves and gastropods predominate. The flora of both formations is similar; presumably in both cases it has been transported from a not far distant landmass. The evidence provided by the Raglan Marl Group indicates that the environment was perhaps brackish, on an extensive delta top. Fully terrestrial deposition is not indicated until near the top of the group, which although there is no biostratigraphical control is probably near the base of the Devonian above.

Like this Capel Horeb Quarry site, the Sawdde Gorge site 15 km south-west along strike, also has Ludlow strata unconformably overlain by P■ídolí strata. The GCR site at Wernbongham farther to the south-west has rocks of disputed P■ídolí age that overstep a Wenlock Series sequence. All these sites network with the lower Silurian Sawdde Gorge site and other Llandovery and Wenlock sites in the Llandeilo and Llandovery area to give a picture of the position and evolution of the shelf to slope transition of the southern margin of the Welsh Basin during the Silurian.

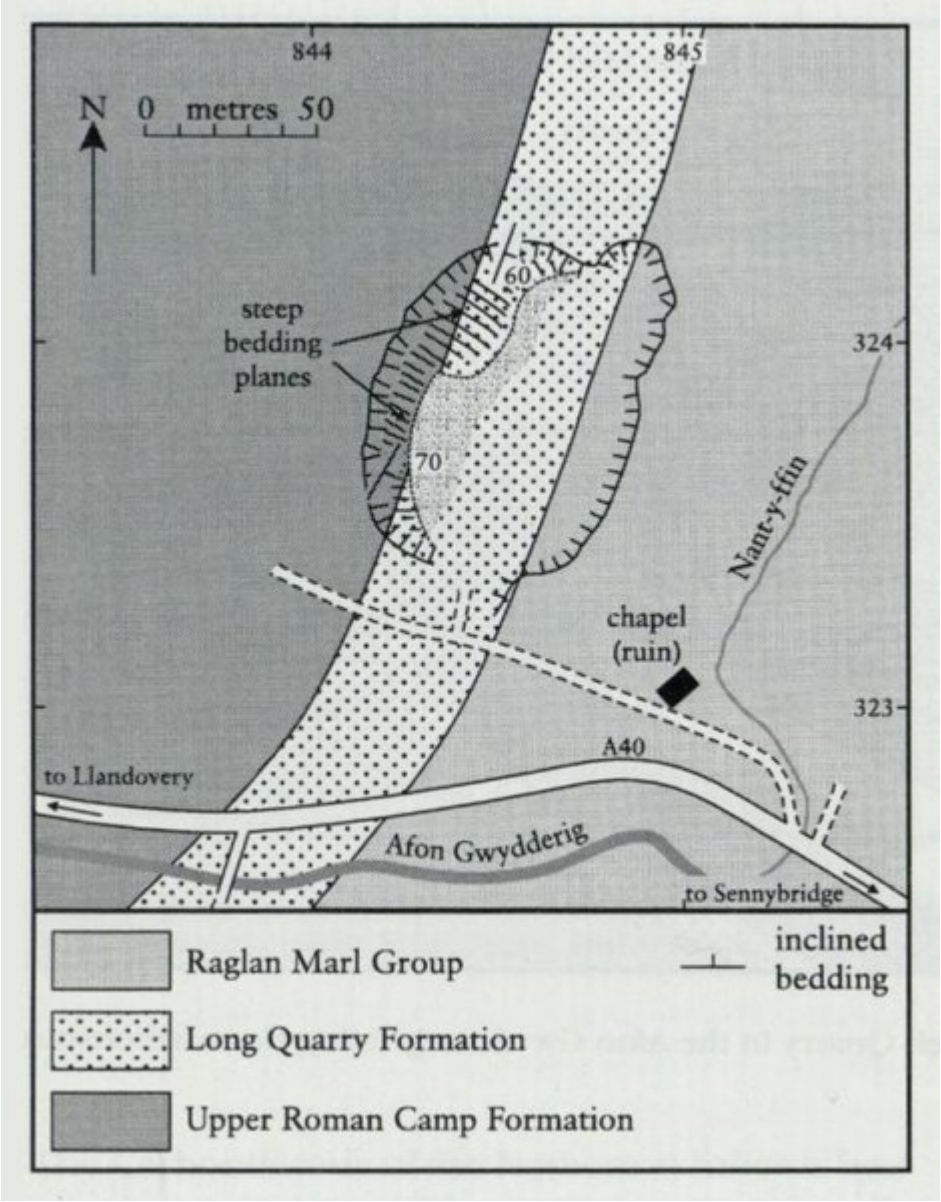
Conclusions

This is another site illustrating part of the marine to reduced marine transition generally illustrated in Ludlow to P■ídolí rocks of the Welsh Borderland. It lies at the western end of a shallow marine dominated shelf which itself lay to the north of the Pretannia landmass (Cope and Bassett, 1987). The site has national and international importance because of its flora. Although the taxon is known from older rocks, specimens of *Cooksonia* sp. from the Ludlow sequence in Capel Horeb Quarry have yielded the earliest undoubted vascular land plant tissue.

References

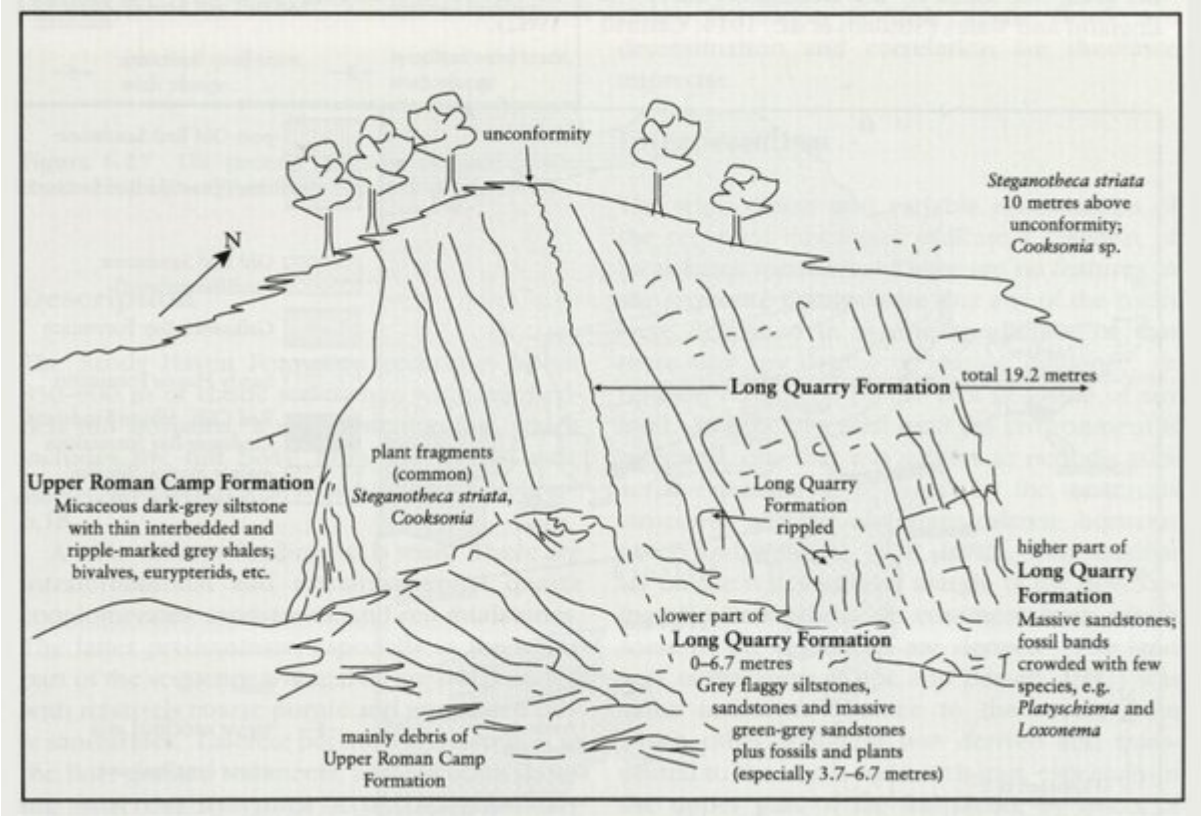


(Figure 6.12) Geology of the general area of Capel Horeb Quarry in the Afon Gwydderig Valley, Carmarthenshire (modified from Potter and Price, 1965, fig. 4).



(Figure 6.13) The geology of Capel Horeb Quarry, Carmarthenshire (modified from Siveter et al., 1989, fig. 93).

(Figure 6.14) Capel Horeb Quarry, Carmarthenshire, looking approximately north (see Figure 6.15). (Photo: P.D. Lane.)



(Figure 6.15) Interpretation of the geology of Capel Horeb Quarry, Carmarthenshire, illustrating the main stratigraphical divisions, and the surface of unconformity (see Figure 6.14); after Edwards and Richardson in Friend and Williams, 1978).