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# Aymestrey Quarries

[SO 4248 6547]–[SO 4210 6553]

## Introduction

This series of disused quarry and associated pathside exposures occurs between Beechenbank Wood and the nearby Riverside (formerly the Crown) Inn at the A4110 road bridge over the River Lugg at Aymestrey, Herefordshire (Figure 5.34). The main quarry is sometimes referred to as Rockhall Quarry (e.g., Cleal and Thomas, 1995). The outcrops lie at the western end of the southern limb of the Ludlow Anticline and form a contiguous geographical and stratigraphical link with the type Ludlow Series (Holland *et al.*, 1963). Gently dipping Bringewood Group (Gorstian Stage) and Leintwardine Group (Ludfordian Stage) strata are present. The excellent, type exposures of the 'Aymestry Limestone' (Upper Bringewood Formation of modern usage) complement those of similar age at GCR sites Mocktree Quarries near Leintwardine in the north-western part of the Ludlow Anticline and View Edge, 8 km to the north, near Craven Arms.

Aymestrey was one of the earliest documented areas of the British Silurian, being featured by Murchison (1833, 1834, 1939) and Lyell (1841). As Murchison indicated (1839, p. 201), elucidation of the local geology owed much to his friend the Rev. T.T. Lewis of Aymestrey. Alexander (1936) included the region on her map of 'the Aymestry Limestone of the main outcrop', but gave no further information. Following Newell's (1966) lithological and palaeoecological studies on the Aymestrey Quarries, Lawson (1973b) provided the first detailed account of their geology, facies and palaeoenvironmental interpretation. The geology of Aymestrey Quarries was also summarized in the field excursions of Lawson (1960) and Siveter *et al.* (1989, locality 3.9).

Other analyses of the palaeontology of the Aymestrey Quarries and contiguous paths include those on the Upper Bringewood Formation (Watkins and Aithie, 1980) and Leintwardine Group (Cherns, 1988) faunas, chitinozoans (Sutherland, 1994), microfloras (Elliott, 1995; see also Dorning, 1981b) and conodonts (Donoghue and Elliott, unpublished, see below). The locality has also yielded the marine alga *Inopinatella lawsoni* Elliott, 1971, the only example of a non-calcified dasyclad known from the Palaeozoic worldwide (see Cleal and Thomas, 1995).

## Description

Marked east-west facies changes of the Upper Bringewood beds occur over a distance of a few hundred metres in the Beechenbank sector of the Aymestrey area (Lawson, 1973b; see (Figure 5.34), (Figure 5.35)). Stratigraphically the section begins at Crown Cliff [SO 4248 6547], where the lower part of the pathside exposure displays about 10.5 m of the Lower and Upper Bringewood formations. Here shaly and flaggy calcareous siltstones, with a few bands of calcareous nodules, show an upward increase in carbonate content. The dominant macrofauna in the Lower Bringewood strata are brachiopods, including *Aegiria grayi*, *Atrypa reticularis*, *Shagamella ludloviensis* and *Sphaerirhynchia wilsoni*, together with the trilobite *Dalmanites*. The base of the Upper Bringewood Formation is drawn at the first appearance of *Favosites* tabulate coral colonies and of several bands of the large pentamerid brachiopod *Kirkidium knightii*.

The so-called Main Quarry ([SO 4234 6548]; (Figure 5.36)), about 40 m west of Crown Cliff, is the type locality for Murchison's (1833, 1834, 1839) Aymestry Limestone (Upper Bringewood Formation). Here the unit consists of nodular silty limestones containing three palaeoecological assemblages, which are perhaps arranged in two to three cycles, each of which reflects an increase in energy conditions (Newell, 1966; Lawson, 1973b). The relatively sparsely fossiliferous parts of the sequence have *Atrypa*–*Strophonella* assemblages, which possibly accumulated in relatively quiet water conditions. Tabulate coral colonies, often in growth position, developed within photic depths and perhaps under higher energy conditions. Bands of mainly disarticulated *K knightii*, associated with *Favosites*, indicate increased turbulence. The upper part of the Upper Bringewood Formation has yielded the important biozonal conodont *Polygnathoides siluricus* (unpublished collections of P.C.J. Donoghue and R.E. Elliott, University of Leicester). The east to west reduction in height of the face of the Main Quarry (12 m to only 3 m) reflects the lateral facies change of the Upper Bringewood Formation, as it gets less calcareous and more silty to the west.

The sharp and often irregular contact between the Upper Bringewood limestones and the overlying, partly laminated, flaggy Lower Leintwardine Formation siltstones is traceable westwards for 120 m along the face of the Main Quarry. About 3 m below the top of the limestones there is a distinctive shale band. The Leintwardine siltstones have ENE–WSW scour channels and contain the basal Ludfordian biozonal graptolite *Saetograptus leintwardinensis* and prolific shelly faunas, including the brachiopods *Dayia navicula*, *Isorthis orbicularis*, *Microsphaeridiorhynchus nucula*, *Shagamella Ludloviensis* and *Sphaerirhynchia wilsoni*. The sharp lithological, faunal and physical nature of the contact with the underlying Upper Bringewood does not preclude the possibility of an erosive break and possible channelling at this level as at nearby Leintwardine and Wigmore Rolls (Lawson, 1973b; Whitaker, 1962, 1994).

West of the Main Quarry are three small quarries [SO 4220 6550]; [SO 4214 6552]; and [SO 4210 6553], the easternmost of which exposes only the Lower Leintwardine Formation. At the two other quarries, both of which have Upper Bringewood and Lower Leintwardine formations, the Bringewood limestone is comparatively muddy and yields shell debris. West of the westernmost quarry, which has about 4.5 m of Lower Leintwardine strata above 2.5 m of Upper Bringewood Formation, the limestone is not seen again. Evidence provided by a change of slope and from now overgrown small excavations along the riverside path strongly suggests a lateral passage of the limestone into siltstones from its base upwards (Lawson, 1973b).

Apart from a small quarry [SO 4234 6544], which exposes the Upper Leintwardine Formation, little outcrop remains of the section along Bengry Forestry Track, which was excavated in 1965–1966 across Beechenbank Wood above the Main Quarry. This track once exposed a virtually continuous, richly fossiliferous sequence from the Upper Elton Formation to the Upper Leintwardine Formation. The palynomorph assemblages of the Leintwardine Group of Bengry Track and of some of the quarries at Aymestrey have been detailed by Elliott (1995).

## Interpretation

In mid-Ludlow times Aymestrey was situated at the western edge of the Midland Platform shelf area, on the eastern margin of the Welsh Basin (Siveter *et al.*, 1989, fig. 10; Bassett *et al.*, 1992, figs S4b, S5a; (Figure 5.47)). Relatively minor lithological, faunal and thickness variations of the Ludlow successions westwards, across the Ludlow Anticline towards Aymestrey and Leintwardine, in part reflect a proximal to distal transect across this shelf.

The facies at Aymestrey and their westward lateral changes signal a palaeogeographical position at the hinge between shelf and basin (Lawson, 1973b; see also Holland and Lawson, 1963, fig. 16; Cherns, 1988, text-fig. 14a). Here the Much Wenlock Limestone Formation becomes an alternation of carbonates and mudstones; the Upper Elton and the Bringewood beds become thinner (due to erosion on a ridge at the hinge?); the Leintwardine Group thickens, shows slumping, and has faunas of more basinal affinity; the Whitcliffe Group also thickens but consists essentially of shallow-water deposits; and, most notably, the Upper Bringewood carbonates change rapidly into siltstones. The *Kirkidium* banks and biocalcarenites of the Upper Bringewood beds at Aymestrey accumulated in a narrow, relatively high energy shelf-edge zone (Facies 5 of Watkins and Aithie, 1980; see also Aymestrey Limestone facies of Cherns, 1988). A water depth of less than 30 m is suggested by the presence of the alga *Inopinatella lawsoni* in a shale in these limestones [SO 4214 6552].

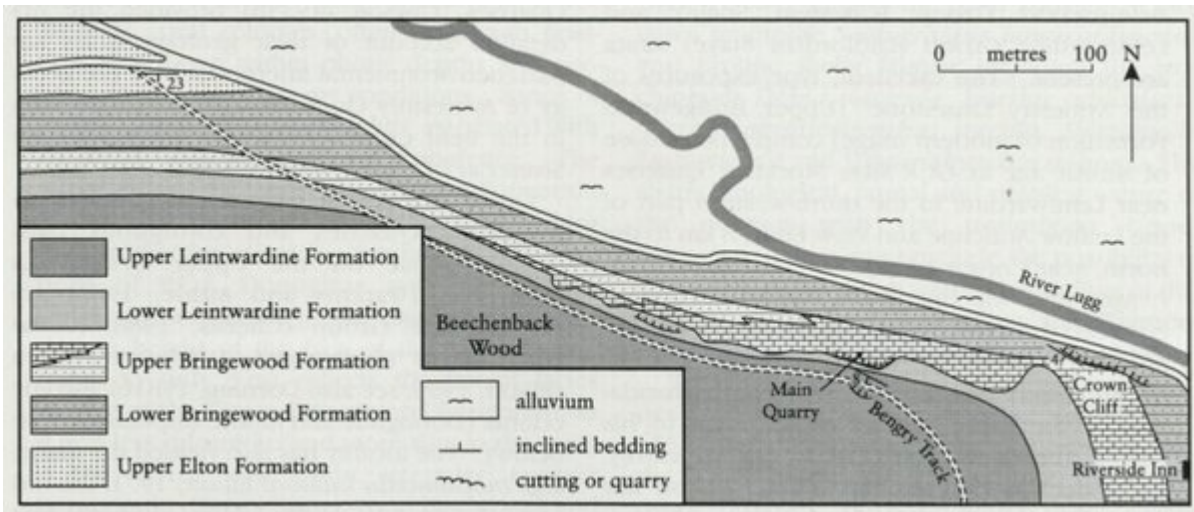
Other GCR sites on the same flank of the Welsh Basin that also have Bringewood and/or Leintwardine strata and are of shelf aspect occur at Wigmore Road, Goggin Road, the Whitcliffe, Deepwood and Deer Park Road in the Ludlow Anticline, Mocktree Quarries and Bow Bridge in the Downton Syncline, View Edge near Craven Arms, Turner's Hill in the West Midlands and Woodbury Quarry, Perton Road, Wood Green and Linton Quarry in the southern Welsh Borderland inliers. This stratigraphical interval is also present at the Sawdde Gorge in south Wales, but mostly in a more basin margin setting.

## Conclusions

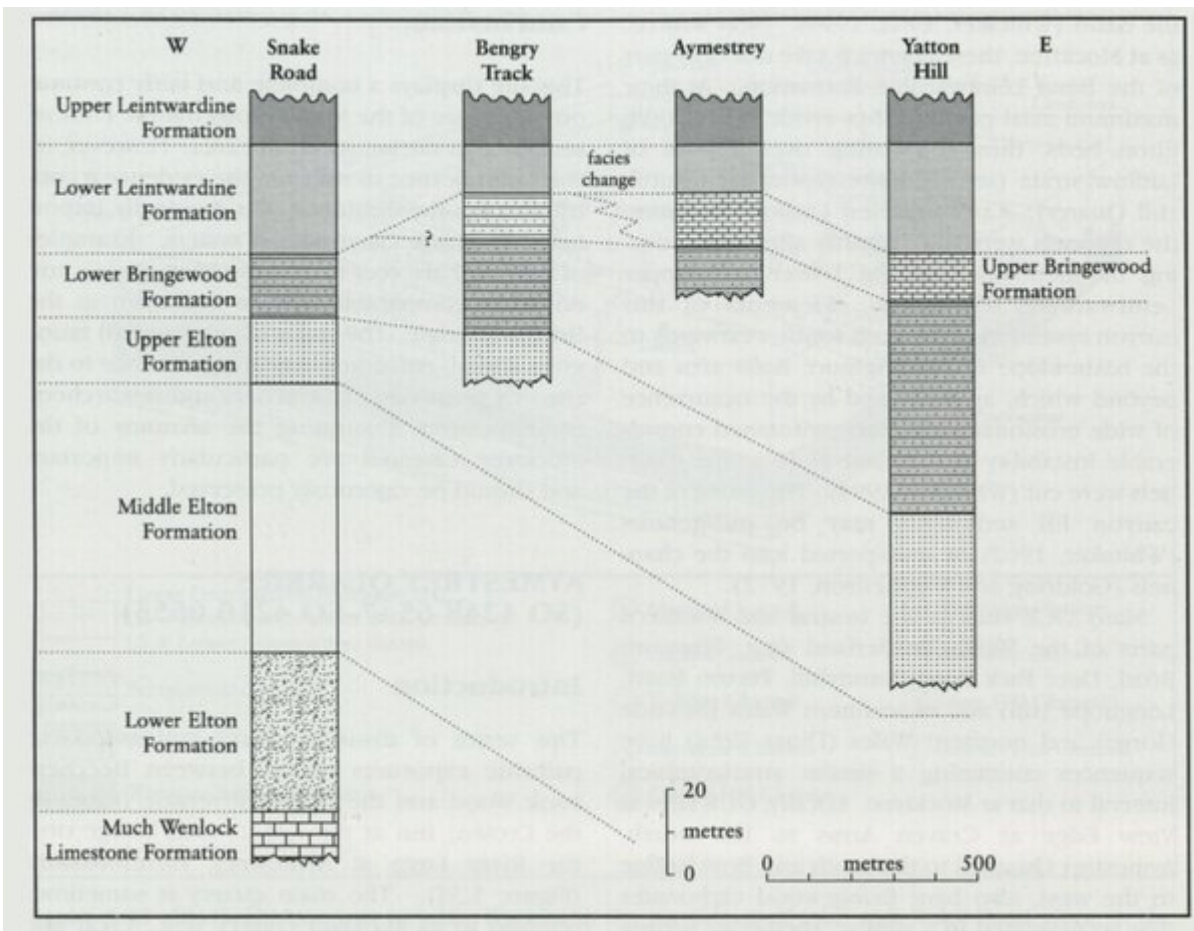
This internationally known, frequently visited site has historical, stratigraphical, palaeontological and palaeogeographical importance. It features in some of the earliest geological literature about the Silurian System; it contains the type sections

for the 'Aymestry Limestone' of former usage; its rich, dominantly shelly biota includes a globally unique occurrence of an early non-vascular marine plant; and its facies patterns indicates that it was a pivotal, shelf edge locality. A high conservation value should be given to this site.

## References



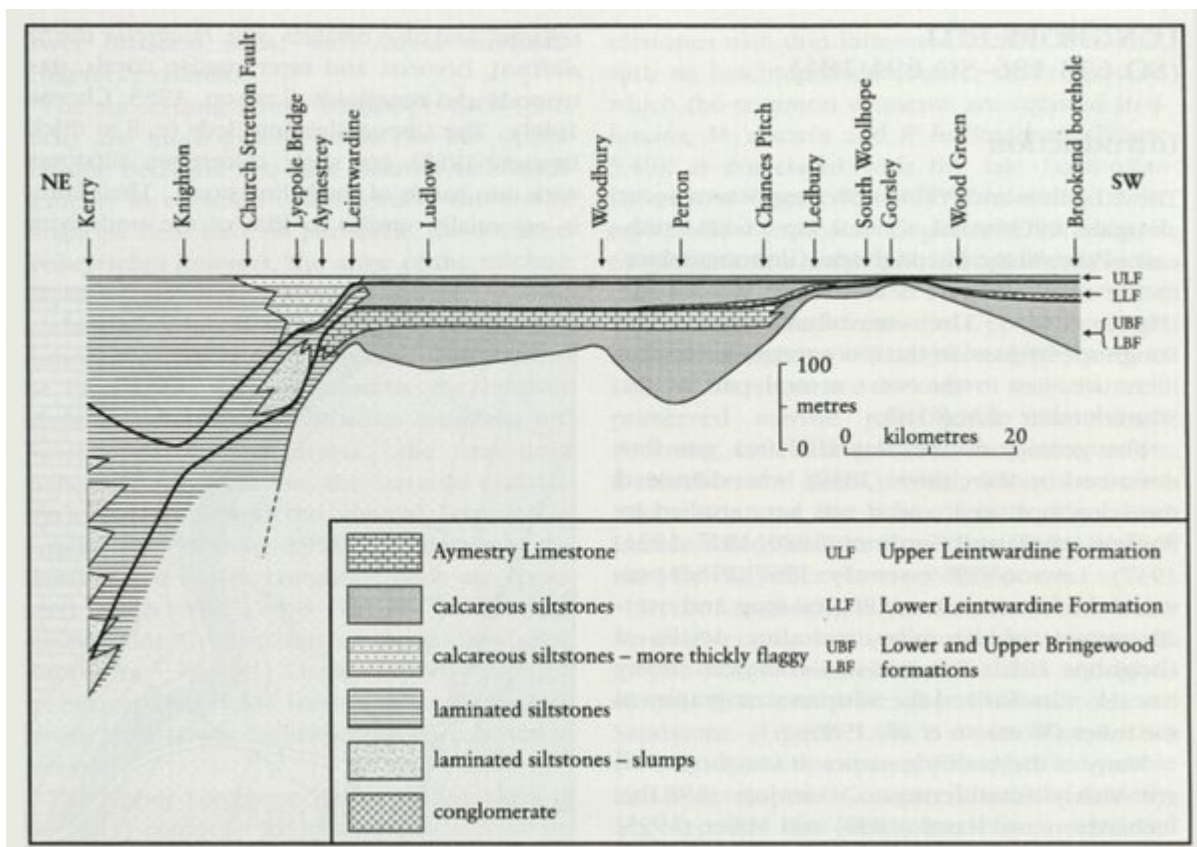
(Figure 5.34) The geology of Aymestry Quarries, Beechenbank Wood, Aymestry, Herefordshire (after Lawson, 1973b; modified from Siveter et al., 1989).



(Figure 5.35) Comparative vertical sections in the Aymestry area, to show east-west changes in facies and thickness of the Upper Bringewood Formation (after Lawson 1973b; modified from Siveter et al., 1989).



*(Figure 5.36) The Main Quarry at Aymestrey, Herefordshire, exposing limestones of the Upper Bringewood Formation and, near the top of the section, the flaggy calcareous siltstones of the overlying Lower Leintwardine Formation. (Photo: David J. Siveter.)*



(Figure 5.47) The concept of the 'Gorsley topographical high' of the Welsh Basin, as illustrated in the facies and thickness variations of the Leintwardine Group (early Ludfordian Stage) in a general south-west to north-east transect from the region of the Brookend Borehole, Gloucestershire, to Kerry, Powys (after Chernes, 1988).