Woodbury Quarry

[SO 7430 6370]

Introduction

Woodbury Quarry lies about 1 km ENE of the hamlet of Shelsley Beachamp, Worcestershire. The Ludow and basal P■ídolí strata here form part of the Abberley Hills, which are essentially a northerly continuation of the Silurian of the Malvern Hills and the contiguous area around Ledbury to the west.

Murchison (1839) and then Phillips (1848) gave the primary accounts of the Silurian geology of the Malvern and Abberley Hills. A 'Woodbury Hill' is mentioned in Murchison's account (1839, p. 410) of the 'Ludlow rocks in the Abberley Hills'. Groom (1899, 1900, 1910) also added significantly to our understanding of the local Silurian. Following the work of Holland *et al.* (1963) on the type Ludlow Series of Shropshire, Phipps and Reeve (1967, 1969) made what continues to be the standard study of the Silurian stratigraphy and structural geology of the Malvems and Abberley area.

The maps and overview of Phipps and Reeve lacked details of the stratigraphy of Woodbury Quarry itself. Such data was furnished in the British Geological Survey Droitwich Memoir (Mitchell *et al.,* 1961), which records the entire sequence, and by Watkins and Aithie (1980), Cherns (1988) and especially by Watkins (1978a, 1979), in their research on Ludlow facies and faunal communities of the Welsh Basin. Accounts of microfossils from Woodbury Quarry are few and stratigraphically selective (e.g. Turner, 1973; Siveter 1978, 1980; see also Miller, 1995).

The various papers of Aithie, Cherns and Watkins (see above) adopted a nomenclature for the divisions of the Ludlow that was closely based on the type sequence rather than the more generalized and localized scheme of Mitchell *et al.* (1961) and Phipps and Reeve (1967). The difficulty that Phipps and Reeve noted in correlating parts of the local Ludlow with the Shropshire sequence was apparently misplaced (see White *et al.,* 1984; Worssam *et al.,* 1989; Cocks *et al.,* 1992).

Woodbury Quarry provides the finest exposed sequence of upper Silurian strata in the Abberley Hills and is the only GCR Silurian site in that district.

Description

Mitchell *et al.* (1961, pp. 45, 46) logged about 124 m of fossiliferous Ludlow to basal P■ídolí rocks in Woodbury Quarry (Figure 5.44). The beds are overturned and dip east 70–80° (Phipps and Reeve 1969). Bentonite bands occur throughout.

Macrofaunal elements are common and are dominated by shelly fossils, especially brachiopods. Trilobites, cephalopods, bivalves, crinoids, bryozoa, gastropods and corals are the other components. The facies and associated faunal distributions are detailed in Mitchell *et al.* (1961), Watkins (1979, figs 1, 17, 25, *pl.* 4) and Cherns (1988, text-figs 2b, 10). For each stratigraphical unit of the Ludlow at Woodbury Quarry, Watkins (1979) recognized a separate benthic faunal association, namely the *Mesopholidostrophia laevigata, Sphaerirhynchia wilsoni, Atrypa reticularis/coral, Shaleria ornatella* and *Protochonetes ludloviensis* associations. Of the microfossils present ostracods (Siveter, 1979, 1980), acritarchs and conodonts occur in varying abundances but the relevant studies are mostly unpublished.

The oldest strata that Mitchell *et al.* (1961) recorded from the quarry belong to what Phipps and Reeve (1967) termed the Lower Ludlow Formation, which is a correlative of the Elton Group of Shropshire (Cocks *et al.,* 1992). They consist of buff, bioturbated mudstones and shales, with nodular limestone bands and occasional bentonites. Stratigraphically above is the late Gorstian age Aymestry Limestone Formation, consisting in its lower part of mostly thinly bedded, nodular limestones, together with shales and siltstones and, in its upper part, much thicker and in places massively bedded carbonates. The latter are correlated with the Upper Bringewood Formation of Shropshire.

Above the Aymestry Limestone at Woodbury Quarry are what Mitchell *et al.* (1961) called the Upper Ludlow Shales. Phipps and Reeve (1967) recognized three members in their corresponding division, namely the Upper Ludlow Formation, which spans the entire Ludfordian Stage. The Mocktree Member and the younger, *S. ornatella*-rich Woodbury Shale Member (for which Woodbury Quarry is the type section) are quite fossiliferous calcareous siltstones and shaly mudstones with limestone beds (more prevalent in the older member) and occasional conglomerates (see Cherns, 1988). These two members combined are correlatives of the Leintwardine Group of Shropshire. The Whitcliffe Flags Member, consisting essentially of flaggy calcareous silstones, is coeval with the type Whitcliffe Group (Cocks *et al.,* 1992). Mitchell *et al.* (1961) recorded about 1.6 m of 'Downton' strata at the top of the Woodbury Quarry succession. These assumed P■ídolí age deposits consist of greenish-grey sandstone and shale containing inarticulate brachiopods and black carbonaceous and phosphatic debris and an exposure of the Ludlow Bone Bed (Mitchell *et al.,* 1961). Turner (1973) records several thelodont fish genera from these P■ídolí sediments, including *Thelodus* and *Logania.*

Interpretation

These deposits accumulated on the Midland Platform on the south-eastern flank of the Welsh Basin (see Siveter *et al.,* 1989, figs 10, 11; Bassett *et al.,* 1992, figs S5a, S5b, S8b). The Ludlow Series reflects shallow-water marine sedimentation. During the time of deposition of its middle Ludlow carbonates and calcareous elastics the locality was sited on the relatively sheltered, back barrier, inner part of the shelf (Watkins and Aithie, 1980, fig. 15; Cherns,1988, text-fig. 14a; (Figure 5.47)). The much more faunally restricted fish and plant-bearing P■ídolí sandstones bear evidence of the late Silurian regressive event which, as the remnant Welsh Basin finally silted up, established marine influenced mudflats and later terrestrial conditions over central England and Wales (see Bassett *et al.,* 1982; Allen, 1985).

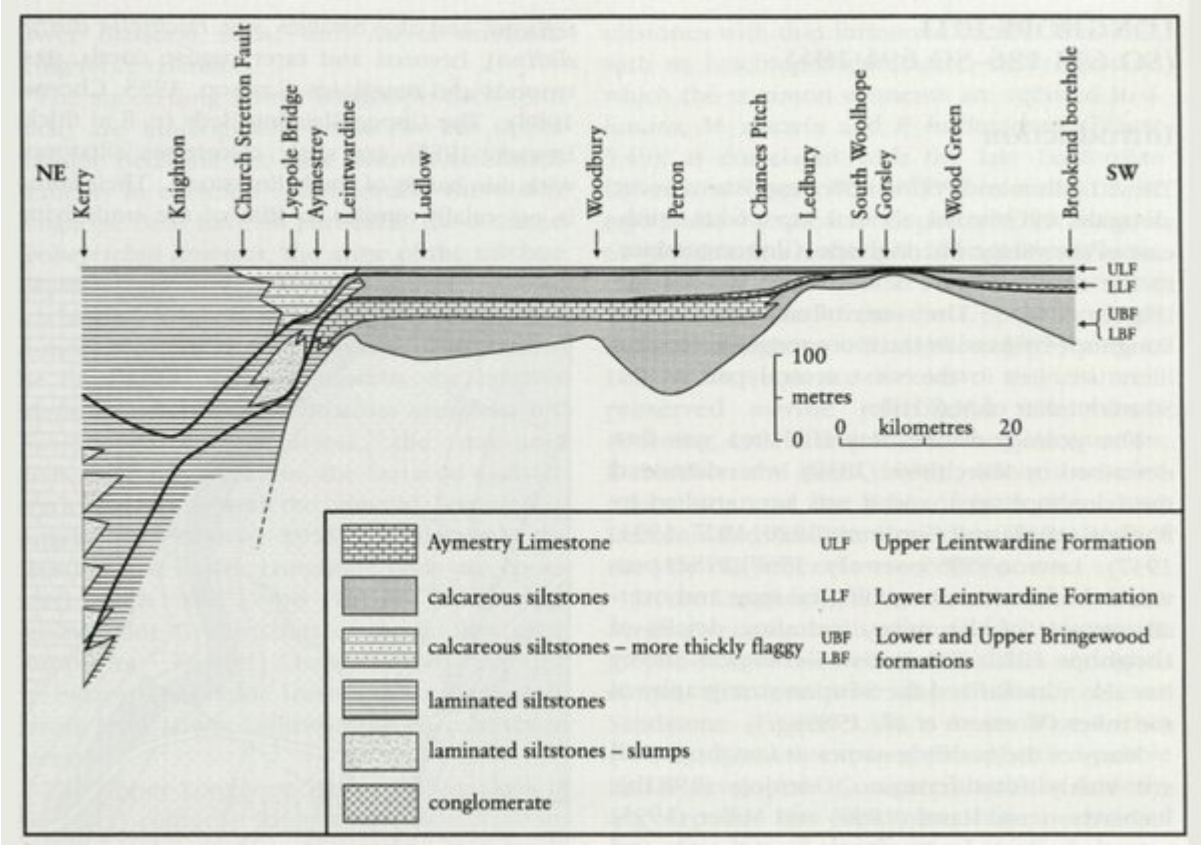
Woodbury Quarry is one of many Welsh Borderland sites in the GCR network that shows Ludlow shelf facies succeeded by the overlying P■ídolí Series (see list under Perton Road and Quarry). Gullet Quarry (Llandovery Series) in the Malverns and Gurney's Quarry (Wenlock and Ludlow Series) in the adjacent Ledbury area are the only other GCR sites in the Malvern, Abberley and Ledbury Hills region.

Conclusions

This site is the most stratigraphically complete section of the Ludlow to P■ídolí series of the Abberley, Malvern and Ledbury region. It provides the standard reference sequence for a local stratigraphical unit of the Ludlow Series and is the type locality for a number of macro- and microfossils. Woodbury Quarry is cited in many research papers and, not least because of its excellent exposures, has good potential for use in teaching.

References

(Figure 5.44) Ludlow Series (Bringewood, Leintwardine and Whitcliffe groups) to basal P■ídolí Series, Woodbury Quarry, Abberley Hills, Worcestershire; the strata young from right to left, are overturned to the east and dip 70°–80°. (Composite photo: David J. Siveter, 1970.)



(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 Cherns, 1988).