
Perton Road and Quarry

[SO 5951 3990]–[SO 5970 4040]

Introduction

The Perton Lane locality of many published accounts consists of laneside and disused quarry exposures extending for about 0.5 km immediately south of Perton hamlet, Herefordshire, in the south-central Welsh Borderland (Figure 4.10), (Figure 5.51). The locality is in the northernmost part of the periclinal Silurian inlier of Woolhope and contains late Ludlow and earliest Pridoli age rocks. Southwards, beyond the formal limits of the site itself, the section continues in early Ludlow outcrops. The site has been independently selected for the GCR for its palaeobotany (Perton Lane Section, Cleal and Thomas, 1995) and arthropods (Perton Lane, Jarzembowski *et al.*, in prep.). Access to much of the site requires special permission from the landowners.

The most recent study of the stratigraphy and faunas of the inlier and locality is by Squirrell and Tucker (1960; see also 1967, 1982). Earlier accounts elucidating the local Silurian geology include those by Murchison (1839), Phillips (1848), Strickland (1853), Brodie (1871), Gardiner (1927) and Pocock (1930). Earp and Haim (1971) published a modified version of Squirrell and Tucker's geological map of the inlier. Correlation of the Woolhope sequence with the standard Silurian is reviewed in Cocks *et al.* (1971, 1992) and Butler *et al.* (1997) drew the extent of the Woolhope Basin based on subsurface mapping.

The abundant, well-preserved fossils at Perton Lane have attracted many specialist studies. Amongst them are papers documenting eurypterids (Brodie, 1871; Kjellesvig-Waering, 1951, 1961), microfaunas (Aldridge, 1985; Miller and Aldridge, 1993, 1997; Miller, 1995), shelly macrofaunas (Watkins, 1978a, 1979; Watkins and Aithie, 1980; Cherns, 1988) and micro- and macrofloras (Brodie, 1871; Lang, 1937; Richardson and Lister, 1969; Edwards, 1979; Edwards *et al.*, 1979, 1996; Dorning, 1981b; Fanning *et al.*, 1988, 1990, 1991a, 1991b; Burgess and Edwards, 1988; Richardson and Rasul, 1990; Edwards and Richardson, 1996; see also review by Cleal and Thomas, 1995).

Perton Lane is the longest, largely continuous section through the late Silurian of the Woolhope Inlier and it includes the Ludlow–Pridoli series boundary. As Phillips remarked (1848, p. 175), 'At Perton... the sides of the valley offer an intelligible section from the Aymestry limestone to the Old Red.' Its fossil assemblages include world famous collections of early land plants.

Description

The Ludlow of the Woolhope Inlier consists of eight stratigraphical units, each based on faunal and, to a lesser degree, lithological distinctions (Squirrell and Tucker, 1960). The divisions reach maximum thickness in the north crop, at Perton, where they young and dip 15°–20° to the north (Figure 5.51). Rich and diverse macrofaunas, for which Watkins (1979) has recognized at least seven shelly benthic associations, occur throughout the Ludlow at Perton. They include corals, bryozoans, crinoids, bivalves, gastropods, cephalopods, graptolites, trilobites and especially brachiopods.

The disused Perton Quarry [SO 5954 3995]; (Figure 5.52), at the southern end of the site, exposes the uppermost Upper Sleaves Oak Beds below the lower part of the Lower Bodenham Beds. These divisions are correlated with the Upper Bringewood Formation (latest Gorstian) and Lower Leintwardine Formation (earliest Ludfordian) of Shropshire. To the south of Perton Quarry, towards Tower Hill, the sequence continues through early Ludlow and into Wenlock rocks.

In the Perton area the Upper Sleaves Oak Beds are 32 m thick, predominantly olive-blue, nodular argillaceous limestones with thin interbeds of silty mudstones and some bentonite bands. At Perton Quarry the Upper Sleaves Oak Beds consist of various calcilutite and biocal-carenite facies with very diverse shelly faunas (Watkins and Aithie, 1980), especially corals, crinoids and brachiopods such as *Kirkidium knightii*, *Protochonetes ludloviensis*, *Atrypa reticularis*, and species of *Gypidula*, *Leptaena* and *Strophonella*. The Lower Bodenham Beds (c. 40 m thick in the area), logged in detail

by Cherns (1988), are mostly fine siltstones and thin, shelly and argillaceous limestones containing, particularly in their lower part, fossil-bearing, calcareous siltstone intraformational conglomerates. They contain the bryozoans *Ptilodictya* and *Orbignyella* and about 20 brachiopod species such as *Shagamella ludloviensis* and *Shaleria ornatella*. The trilobite *Alcymene puellaris* (see Siveter, 1983), the brachiopod *Salopina lunata*, and the worm tube *Serpuloides longissimus* are introduced into the Ludlow sequence in the Lower Bodenham Beds.

On the east side of the lane north of Perton Quarry Squirrell and Tucker (1960, 1967, 1982) recorded sequences showing: the 4.5 m thick Upper Bodenham Beds [SO 5963 4018] and their junction with both the Lower Bodenham Beds below and the overlying Lower Perton Beds; a fairly continuous, 100 m exposure of Lower Perton Beds (c. 30 m thick) to its junction with the 15 m thick Upper Perton Beds [SO 5969 4031]; and the junction between the latter unit and the overlying basal Pridoli Rushall Beds, in the small quarry [SO 5970 4040] on the corner of the lane immediately south of Perton hamlet.

The thinly bedded, calcareous siltstones of the Upper Bodenham Beds contain a thin pebbly bed, trilobites, the biozonal graptolite *Saetograptus leintwardinensis* and the brachiopods *Leptaena depressa*, *Atrypa reticularis* and especially *Shaleria ornatella*. To the south, the adjacent uppermost 7.5 m of the Lower Bodenham Beds yield the brachiopods *Isorthis*, *Dayia* and *Sphaerirybnchia*. The Perton beds are also fossiliferous though, in general, are less diverse than older units of the Ludlow. The Upper Perton Beds consist of fairly well-bedded, calcareous and argillaceous siltstones and have a broadly similar fauna to the more argillaceous and generally poorly bedded Lower Perton Beds. Conodonts occur in all the upper Ludlow units at Perton, especially the uppermost Perton beds (Squirrell and Tucker, 1960; Aldridge, 1985; Miller and Aldridge, 1993, 1997; Miller, 1995). The Upper Bodenham, Lower Perton and Upper Perton beds are correlated with the Ludfordian Lower Leintwardine and Lower and Upper Whitcliffe formations respectively of Shropshire.

The Rushall Beds here are fine-grained siltstones and mudstones and massive sandstones. Compared to the Ludlow strata this unit has a much reduced fauna, dominated by inarticulate brachiopods, fish remains, eurypterid fragments (Brodie, 1871; Kjellesvig-Waering, 1951, 1961) and ostracods, which include the diagnostic early Pridoli *Frostiella groenvalliana* and associates (see Siveter, 1989; Miller, 1995). The Ludlow Bone Bed is missing as such, but fish remains occur in pockets in the underlying Upper Perton Beds. The Rushall Beds also contain fragmentary land plants and their reproductive products, and have yielded the type material of *Cooksonia pertoni* (Figure 5.53), widely considered as the most primitive known vascular plant (Lang, 1937; Richardson and Lister, 1969; Edwards, 1979; Edwards *et al.*, 1979, 1996; Fanning *et al.*, 1988, 1990, 1991a, b; Richardson and Rasul, 1990; Edwards and Richardson, 1996). Plant associates include *Caia* and the enigmatic *Actinophylum*, both of which are only known from this locality (see Cleal and Thomas, 1995).

Interpretation

In the upper Silurian this locality was sited on the Midland Platform, which formed the east and south-eastern flank of the Welsh Basin (Siveter *et al.*, 1989, figs 10, 11; Bassett *et al.*, 1992, figs S5a, S5b, S8b). The rocks and fossils of Perton imply an overall regressive sequence, from the relatively shallow, open marine shelf deposits of the Ludlow to a more restricted and ultimately land influenced, alluvial plains environment in the Pridoli (e.g. see Bassett *et al.*, 1982; Allen, 1985). The middle Ludlow calcareous silts and carbonates of Perton accumulated in a sheltered area behind the higher energy shelf edge zone to the west (Watkins and Aithie, 1980; Cherns, 1988; (Figure 5.47)). Compared to Ludlow–Pridoli sequences in the basin proper that at Perton is not very thick; nevertheless, it represents the thickest succession of that age from anywhere in the Woolhope Inlier or the Gorsley and May Hill inliers to the south (Squirrell and Tucker, 1960). Perton was apparently positioned just to the north-west of the Gorsley topographical high and therefore in somewhat deeper shelf waters (Cherns, 1988).

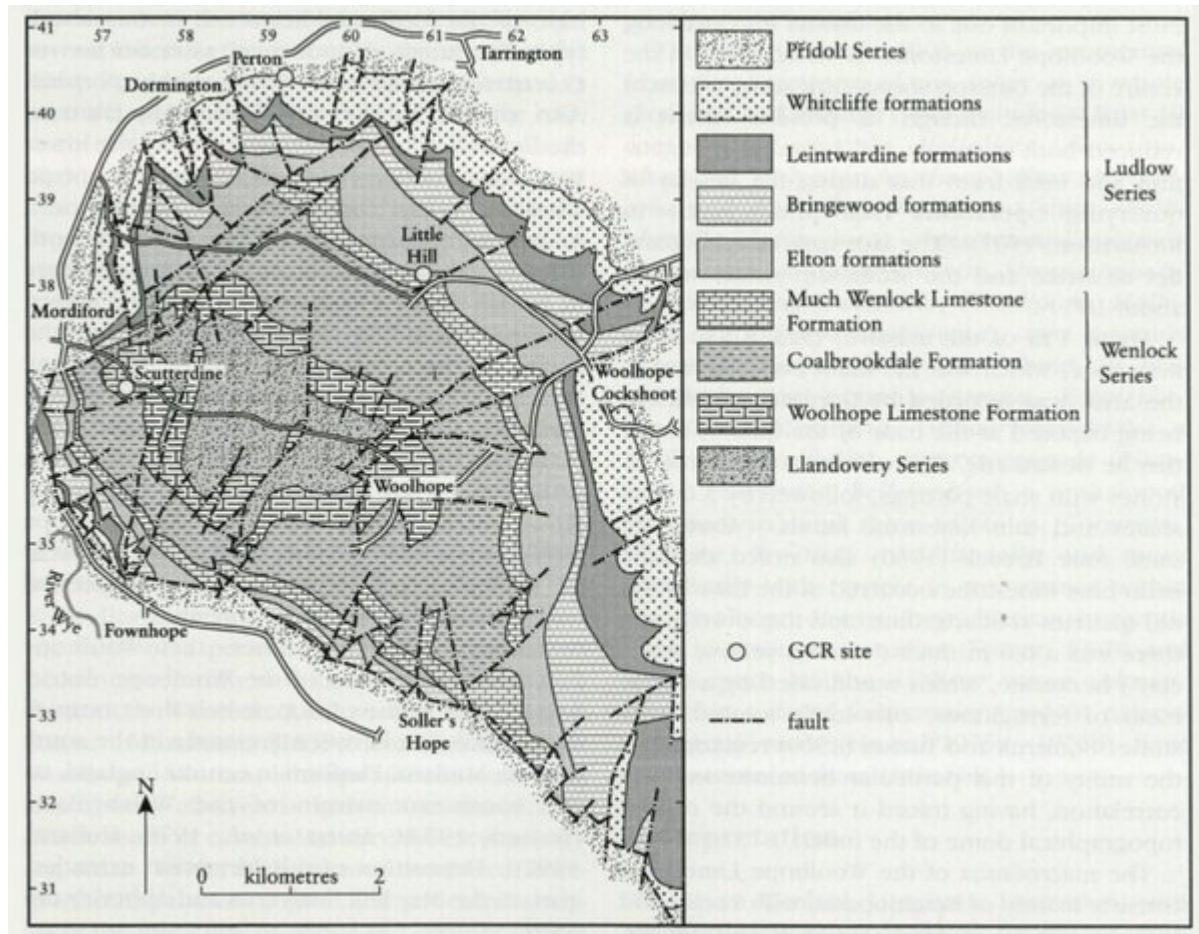
This is the only GCR site that contains a Ludlow–Pridoli boundary sequence in the Woolhope Inlier. Comparable shelf sections occur at Welsh Borderland sites at May Hill (Longhope Hill and Wood Green), Gorsley (Linton Quarry), Usk (Brook House), the Abberleys (Woodbury Quarry) and the Tortworth area (Tites Point), and elsewhere in the central Welsh Borderland at Ludlow (Ludford Lane and Ludford Corner) and the English West Midlands (Brewin's Canal and Turner's Hill). Other Welsh Basin sites displaying Ludlow–Pridoli rocks are the Sawdde Gorge in southern Wales and, in

a more basinward setting, Lower Wallop Quarry, in the Long Mountain in Shropshire. Little Hill and Scutterdine Quarry are the two Wenlock GCR sites in the Woolhope Inlier.

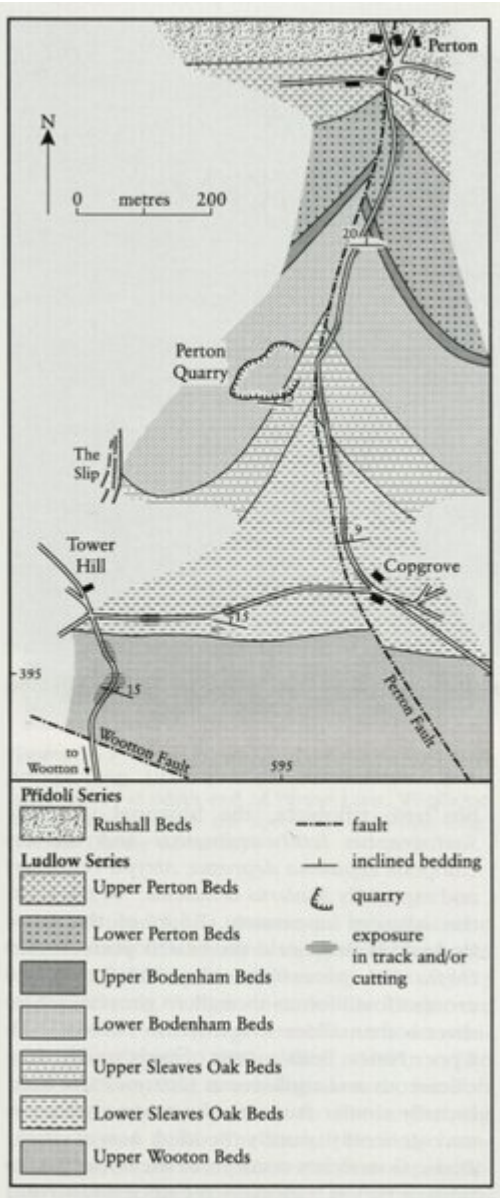
Conclusions

This site has regional stratigraphical and international palaeontological significance and is also a valued teaching resource. It is part of an unequalled sequence through the entire Ludlow and into the Pridoli Series of the Woolhope Inlier and is the fundamental reference section for the Lower and Upper Perton beds of the Inlier. Fossils are abundant and it is the type locality for many species of micro- and macrofauna and flora. It is internationally renowned for its important early plant remains. High value should be placed on conserving the site.

References



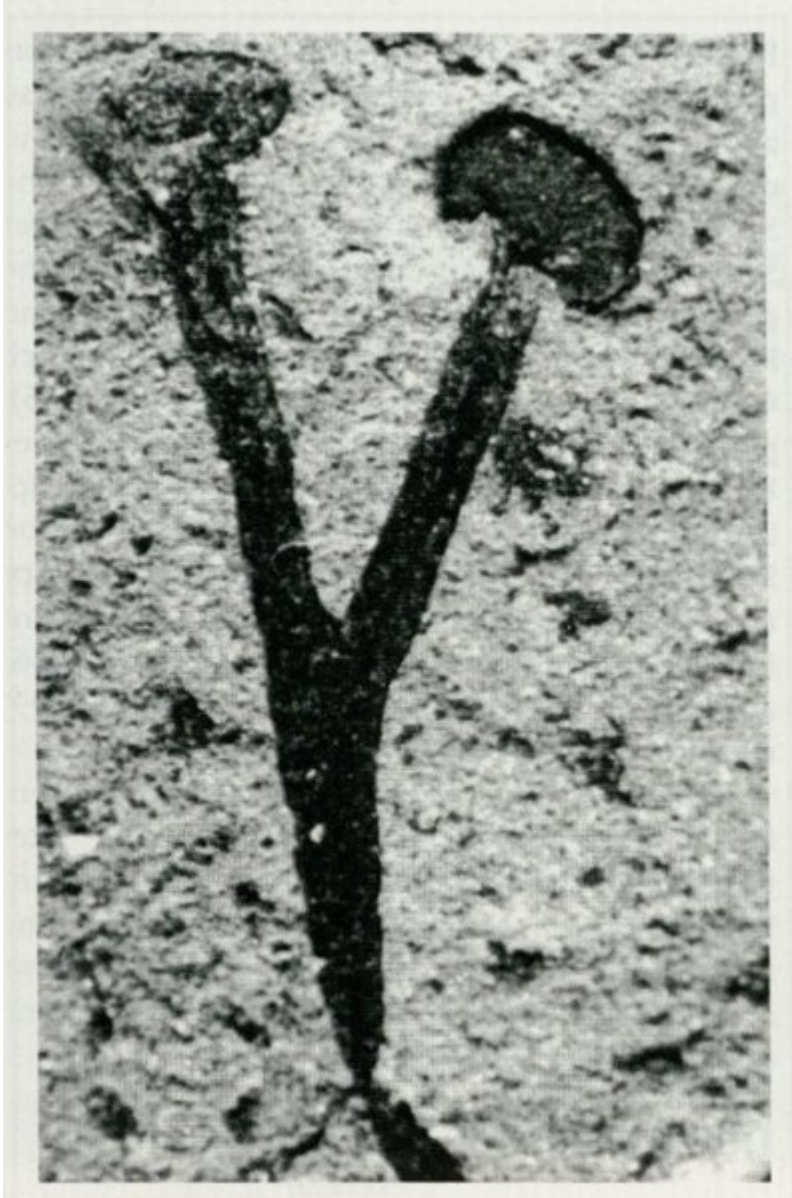
(Figure 4.10) Location of Scutterdine Quarry and Little Hill quarries, and geology of the Woolhope Inlier, southern Welsh Borderland (after Squirrell and Tucker, 1960; and Earp and Haim, 1971).



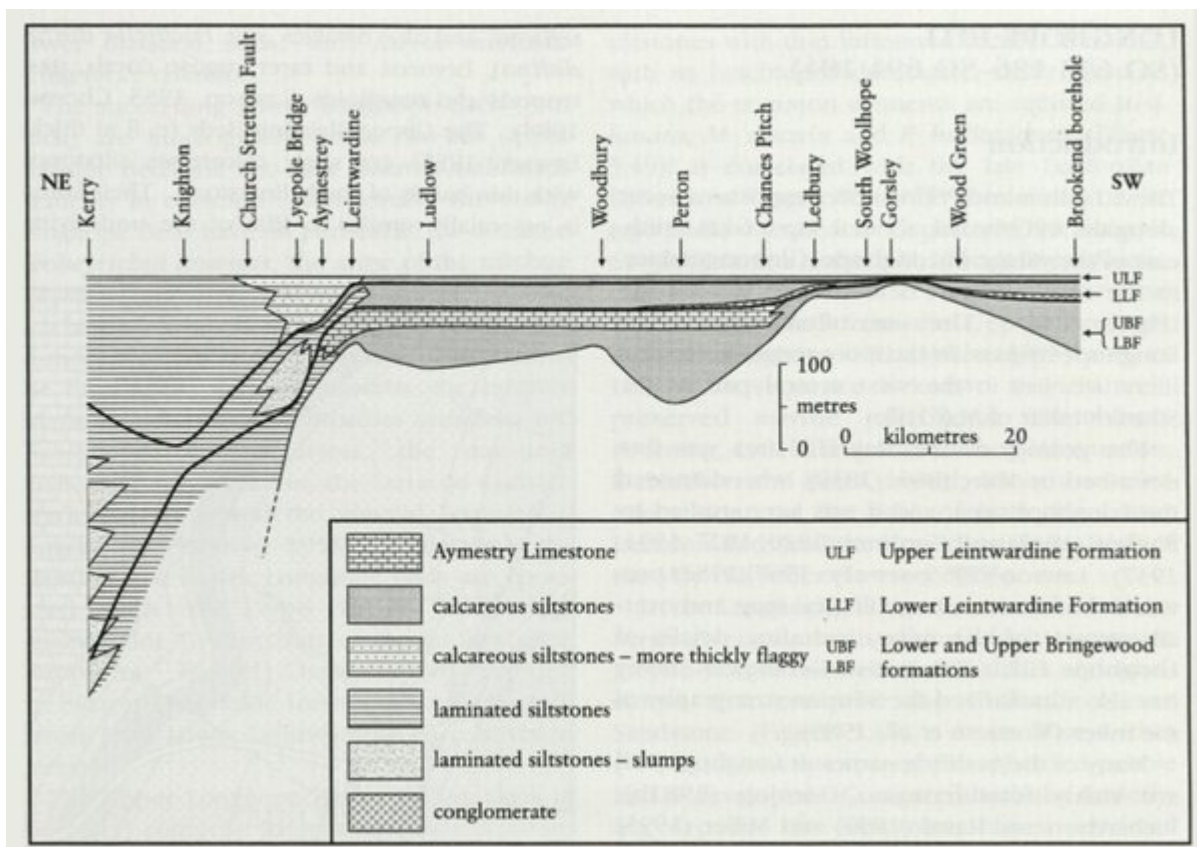
(Figure 5.51) The geology of the area south of Perton, Woolhope Inlier, Herefordshire (after Squirrell and Tucker, 1960).



(Figure 5.52) Upper Sleaves Oak Beds and Lower Bodenham Beds, Perton Quarry, Woolhope Inlier, Herefordshire.
(Photo: David J. Siveter.)



(Figure 5.53) The early vascular land plant *Cooksonia pertoni* Lang, 1937, from the Pridoli Rushall Beds, small quarry at north end of Perton Lane, Woolhope Inlier, Herefordshire; the specimen is 15 mm long. (Photo: Dianne Edwards.)



(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).