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# Brewin's Canal

[SO 9365 8765]–[SO 9355 8737]

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## Introduction

This GCR site lies next to Saltwells Local Nature Reserve. Situated adjacent to Lodge Farm Reservoir, about 2.5 km SSW of Dudley in the West Midlands (Figure 6.9), the site consists of several sections: those on both sides of the cutting of the Dudley Canal at Brewin's Bridge [SO 9365 8765], just north of the reservoir; outcrops now mostly overgrown, along strike immediately west of the road on the west flank of the reservoir ([SO 9365 8765]–[SO 9355 8740]); and further exposures along strike in a former tramway cutting [SO 9355 8737] at the western extremity of the reservoir. The Silurian rocks are of late Ludlow and Pridoli age (Figure 6.10) — a part of the Silurian sequence that is rarely seen in central England.

The sections are on the eastern limb of the Netherton Anticline, a pericline that plunges to the north and south. Ludfordian beds occupy the centre of the fold and Pridoli of Old Red Sandstone facies lies on the outer part of the limbs. The whole structure forms an inlier surrounded by Middle Coal Measure strata, the latter being well exposed at Saltwells (otherwise known as Doultons) Clayfield just south of Lodge Farm Reservoir.

The unpublished map made by H.B. Whittington in 1936 is the most detailed map of the Netherton Anticline (Figure 6.9). The geology of this GCR site was elucidated by King and Lewis (1912) and later by the British Geological Survey (Whitehead and Eastwood, 1927; Whitehead and Pocock, 1947). Ball (1951) correlated the Ludlow to 'Downton' sequence of Turner's Hill and Gornal, some 3 km north-west of Dudley, with that at Brewin's Canal (Saltwells). Conodont, ostracod and thelodont microfossils have also been reported from the Silurian of the Brewin's Canal site (Turner, 1973; Aldridge, 1985; Siveter, 1989; Hansch *et al.*, 1991; Miller, 1995; Miller and Aldridge, 1993, 1997). The site, together with nearby Coal Measure localities at Saltwells, also feature in Geologists' Association (Hardie, 1971) and Black Country Geological Society (Cutler, 1981) excursion guides.

## Description

On the east limb of the Netherton Anticline rocks dip generally at about 25° NNE. About 5 m of Ludlow Series rocks, which belong to the upper part of the Upper Whitcliffe Formation, are recorded in a strike section in the old tramway cutting (Whitehead and Pocock, 1947; (Figure 6.10)), the site of a former mineral railway that connected Saltwells Clayfield with the Dudley Canal at Brewin's Bridge. The rocks consist of grey, sandy, calcareous siltstones with nodular limestone horizons and yield a shelly macrofauna dominated by the brachiopods *Protochonetes ludloviensis* and *Microsphaeridiorhynchus nucula*. Richly abundant conodont faunas have been recovered from limestone nodules (Aldridge, 1985; Miller 1995; Miller and Aldridge, 1993, 1997): *Panderodus serratus*, *Coryssognathus dubius*, *Ozarkodina excavata* and *Ozarkodina confluens* are common; *Panderodus recurvatus*, *Ozarkodina remscheidensis eosteinhornensis* and *Walliserodus cf. santclairi* also occur.

The basal Pridoli Ludlow Bone Bed Member and the lowest strata of other, overlying, parts of the Downton Castle Sandstone Formation are also present in the tramway section (0.32 m total thickness seen; Miller, 1995), in which the Ludlow–Pridoli contact is displaced by several small dip faults. The Ludlow Bone Bed Member never exceeds 50 mm in thickness and is of typical aspect. It is an accumulation of phosphatic vertebrate remains: dermal plates of the agnathan fish *Thelodus parvidens* and *Loganellia ludloviensis* are relatively common (Turner, 1973) and there are also fragmentary remains of acanthodian scales, and brachiopods such as *Lingula* and *Orbiculoidea*. The Downton Castle Sandstone Formation in the Trackway has also yielded *C. dubius* and *O. confluens* conodont elements (Miller, 1995) and the only known specimen from central England of the biostratigraphically important (lower Pridoli) ostracod species *Frostiella cf. groenvalliana* (Siveter, 1989; Hansch *et al.*, 1991). Neither the Ludlow Series nor basal part of the Downton

Castle Sandstone Formation crop out at Brewin's Bridge itself, being cut out by a combination of faulting and a dolerite intrusion (Figure 6.9).

The yellow and buff massive sandstones and sandy mudstones of the Downton Castle Sandstone Formation also occur in the now largely degraded strike section immediately west of the road on the west flank of the reservoir. That stretch of ground, from just north of the tramway section to coeval outcrops on the south side of the canal cutting west of Brewin's Bridge, contains in total a few tens of metres of the formation, from which lingulid brachiopods, bivalves (*Modiolopsis*) and plant (*Pachytheca*) and eurypterid arthropod (*Eurypterus*, *Pterygotus*) fragments have been recovered (Whitehead and Pocock, 1947).

The north bank of the canal cutting at Brewin's Bridge contains the top 10 m of the Downton Castle Sandstone Formation and is there conformably overlain by about 13 m of Temeside Shales Formation and about 4.5 m of Ledbury Formation Cited 'Downtonian' of Whitehead and Pocock, 1947) strata (Figure 6.11). The Temeside Shales Formation comprises a multicoloured section of mostly purple and green marls; sandstones and shales are also well represented. The fauna in all but the top few centimetres is restricted to *Lingula cornea* and *Onchus* sp., the former being common at some horizons. In the uppermost 0.4 m of the Temeside Shales Formation micaceous purple and green mudstones have yielded both these taxa and the fish *Hemicyclospis* cf. *murchisoni* (Whitehead and Pocock, 1947). The exposure of the Ledbury Formation, which is interrupted by the bridge abutment, consists of about 4.5 m of purple and green mudstones and subsidiary sandstones containing rare fragments of *Lingula*.

Immediately east of Brewin's Bridge, on both the northern and southern banks of the canal, the Ledbury Formation is overlain with only slight angular unconformity by the basal conglomerate and sandstones of the Westphalian Coal Measures. The small intrusion exposed just west of Brewin's Bridge, on the south side of the canal, is also of possible Carboniferous age.

The Carboniferous of the Netherton Inlier is best examined in the old workings at Saltwells Clayfield, which has all the rock types typical of the Productive Coal Measures: coal, fireclay, ganister, carbonaceous shale, ironstone and sandstone.

## Interpretation

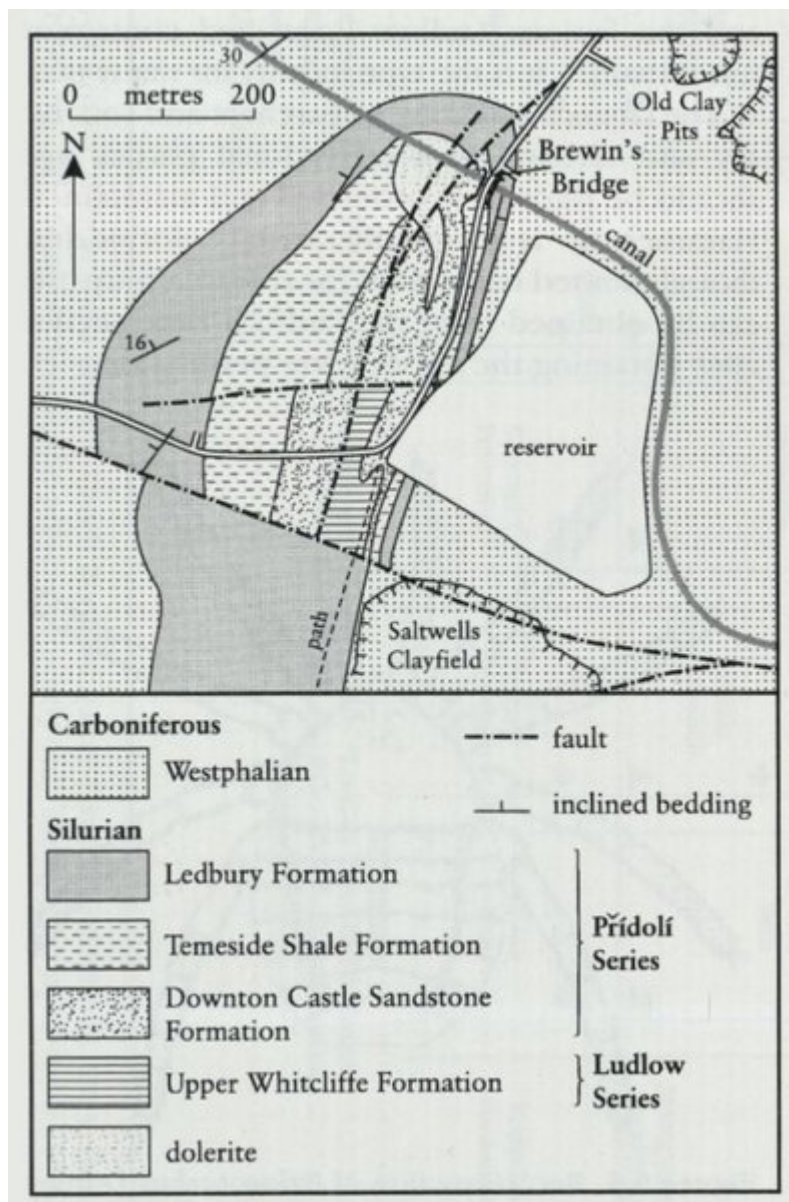
This sequence accumulated on the central part of the Midland Platform, the shelf area that formed the eastern border to the Welsh Basin (Siveter *et al.*, 1989, fig. 11; Bassett *et al.*, 1992, figs S5b, S8b, S9). The late Ludlow to Pridoli sediments, fauna and flora here record the shallow marine to non-marine transition that represented the final demise of this basin (see, for example, Allen and Tarlo, 1963; Allen, 1974, 1985; Bassett *et al.*, 1982; Miller, 1995). Uplift and folding of the Silurian and then deposition and erosion of Devonian sediments preceded burial by late Carboniferous deposits. Post-Carboniferous tectonic activity (Hercynian orogeny) produced further folds and faults in the area.

Netherton is one of several north–south aligned Silurian inliers in the West Midlands. As at Brewin's Canal, the GCR site at Turner's Hill, just north of Dudley, also contains a Ludlow to Pridoli sequence. These are just two of many GCR sites in the Welsh Basin that contain strata across that series boundary (for full list see the Ludford Lane and Ludford Corner site report). Brewin's Canal and Turner's Hill, together with the Wenlock sites at Hay Head Quarries and Daw End near Walsall and Wren's Nest near Dudley, all of which are in central England, provide the network of evidence for the proximal part of the Midland Platform.

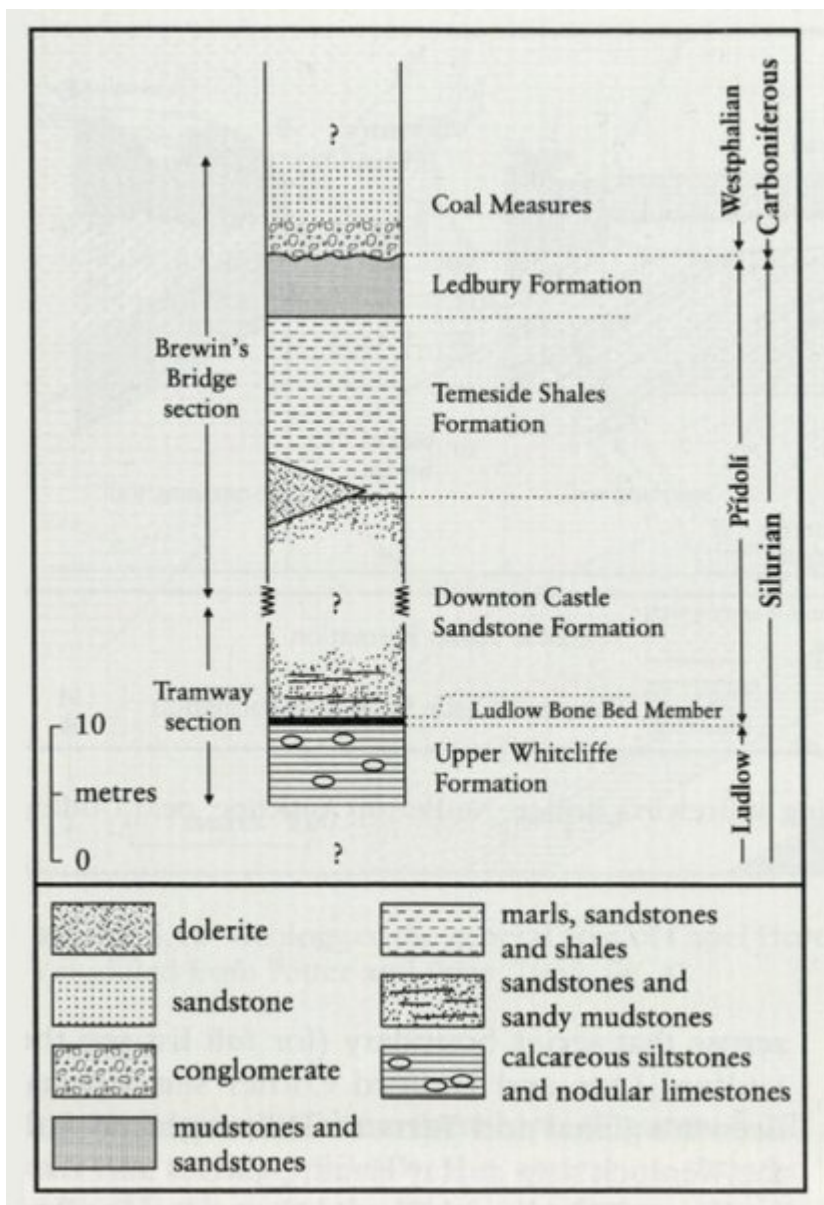
## Conclusions

This site has stratigraphical, palaeogeographical and palaeoenvironmental significance and, therefore, should be conserved. It is one of only a few localities that display a Ludlow–Pridoli boundary sequence (including the Ludlow Bone Bed Member) within central England. The environments represented are of a proximal setting and record the terminal stages in the depositional history of the Welsh Basin. Brewin's Canal is also noteworthy in exhibiting the nature of the Carboniferous–Silurian contact in the West Midlands.

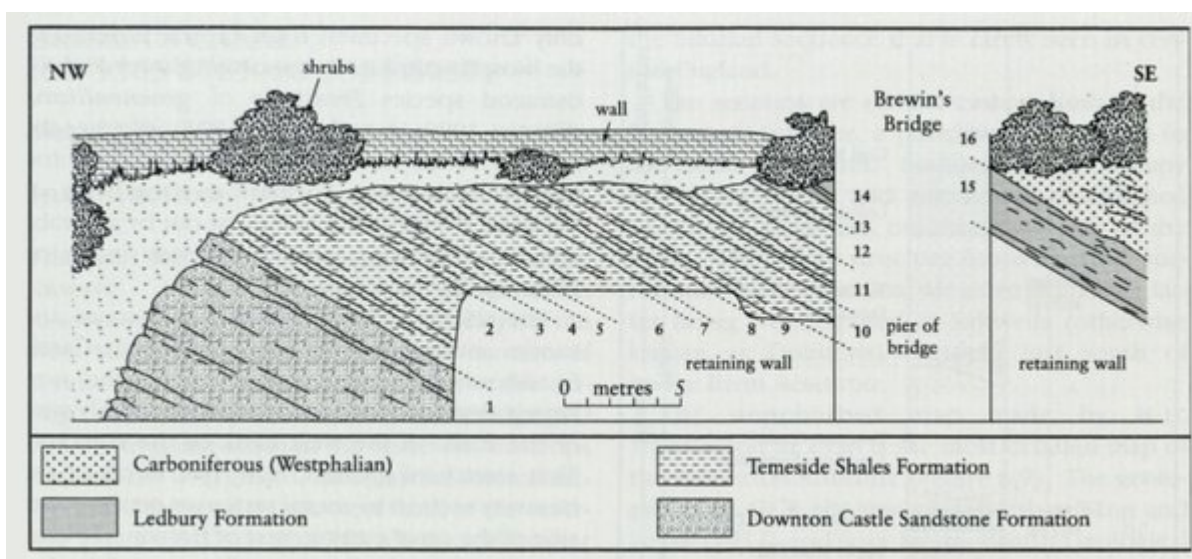
## References



(Figure 6.9) Geology of the Netherton Anticline, near Dudley, West Midlands (based on an unpublished 1936 map by H.B. Whittington and after Hardie, 1971).



(Figure 6.10) Generalized composite section of the Silurian and Carboniferous rocks at Brewin's Bridge and in the tramway cutting (see text for thicknesses), Netherton Anticline, near Dudley, West Midlands.



(Figure 6.11) Section in the north bank of the canal cutting at Brewin's Bridge, Netherton Anticline, near Dudley, West Midlands (after Whitehead and Pocock, 1947).