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# Tites Point

[SO 685 042]–[SO 689 046]

## Introduction

This site lies 300–400 m WSW of the breakwater at Tites Point, on the southern foreshore of the Severn Estuary, near Purton, Gloucestershire (Figure 5.54). Full exposure is visible only at low water and varies with the continual movement of deposits of mud. Except for localities in the Mendips, Tites Point represents the most southerly exposure of the Silurian in England. The outcrop, consisting of late Ludlow and early Pridoli age strata (Figure 5.55), is at the northernmost part of the northern strip of two, mostly Silurian areas that make up the Tortworth Inlier.

The geology of the Tortworth Inlier, including its anticlinal fold at Purton, was discussed as early as 1819 in a landmark paper read before the Geological Society by Thomas Weaver (1824), a supporter of the Wenerian School. Curtis (1955a) has noted that this was, 'the first detailed study to be made of any area of Lower Palaeozoic rocks in the British Isles, and was probably the first stratigraphical work on these ancient rocks, for he discussed the fossils and compared them with those of May Hill' (the Silurian inlier just to the north of the River Severn). Later, Murchison demonstrated the presence of Ludlow rocks locally (1839) and Phillips, in a memoir to accompany the one-inch Geological survey map of the area (sheet 35), provided a detailed account of the Lower Palaeozoic rocks, including a map and a description of the Silurian strata of the so-called 'Purton Passage' (1848). Murchison (1839) and Phillips (1848) also noted the occurrence of fish remains in the sequence, as did Huxley and Salter (1856) and Turner (1973); Dineley and Metcalf (1999) reviewed the fish finds from this site.

Cave and White (1971) give the most recent first-hand account of the succession at Tites Point and its correlation with the standard Ludlow–Pridoli sequence of Welsh Borderland areas to the north. Other stratigraphical reviews are in Curtis (1955b, 1967, 1972, 1982), Holland *et al.* (1963) and Cocks *et al.* (1992).

## Description

The Silurian Rocks at Tites Point occur in the core of a small, plunging anticline (Cave and White, 1971; see (Figure 5.54)). In the western part of the foreshore, where the Pridoli conformably succeeds the Ludlow, strata dip west and north-west. In the northern part of the outcrop, the Ludlow dips north and in the east it dips to the east. This sequence of Ludlow and Pridoli series (Figure 5.55) is disrupted and complicated by numerous NNE–SSW trending faults. The succession is difficult to trace laterally for any distance.

The lowest strata observed by Cave and White (1971) consist of 2.13 m of conglomeratic limestones containing the brachiopods *Dayia navicula*, *Protochonetes ludloviensis*, *Sphaerirhynchia wilsoni* and *Whitfieldella canalis* [SO 6886 0458]. The beds are thought to be the correlatives of the Lower Blaisdon Beds of May Hill (Lawson, 1955) and the lower part of the Lower Leintwardine Formation of the central Welsh Borderland. The stratigraphically succeeding beds consist of about 9.1 m of sparsely fossiliferous sandy flagstones with limestone layers near the base (Cave and White, 1971, Bed 1), forming what is considered to be the local upper part of the Lower Leintwardine Formation. These are overlain by mudstones and silty limestones with a shelly fauna including brachiopods and trilobites (Beds 2, 2a, 3; total 2.2 m); these beds are provisionally assigned to the Upper Leintwardine, although the fauna typical of that formation is unknown from Tites Point.

A 10 cm thick conglomerate (Bed 4) is taken as the base of the local Whitcliffe Group, which consists of about 21.8 m of silty mudstones with layers of siltstone and limestone. Macrofossils in the Whitcliffe Group (Beds 4–35) include brachiopods (e.g. *Schizocrania striata*, *Salopina lunata*, *Dayia navicula*, *Protochonetes ludloviensis*), bivalves (e.g. *Nuculites antiquus*, *Goniophora cymbaeformis*, *Fuchsella amydalina*) and nautiloids (*Michelinoceras bullatum*, *Kionoceras angulatum*). The thin limestones often contain concentrations or fragments of conodonts (fauna detailed in Miller, 1995; see also Aldridge, 1985 and Miller and Aldridge, 1993, 1997), horny brachiopods, chitinous worm tubes, fish

denticles and small phosphatic pebbles. Such deposits probably represent the Ludlow age bone beds identified by Phillips (1848). Indeed, Turner (1973) recognized an abundant *Thelodus parvidens* thelodont fauna from the Upper Whitcliffe at Tites Point.

The Whitcliffe beds are overlain by 1.7 m of sandstone, which is considered to be the local equivalent of the Pridoli Downton Castle Sandstone Formation. This in turn is succeeded, in an obscured contact, by soft red mudstones of the Thornbury Beds. Channels in the sandstone cut down into the top Whitcliffe beds, and have associated concentrations of heterostracan and acanthodian fish (*Cyathaspis banksi*, *Onchus* sp.) and plant fragments (*Pachytheca*?) in an horizon indicative of the Ludlow Bone Bed (Cave and White, 1971, p. 244).

## Interpretation

Contrary to inferences made on the basis of the isopachyte evidence (Holland and Lawson 1963), all units of the Ludlow Series in the southern part of the Welsh Borderland, from the May Hill Inlier to Tites Point and the nearby Brookend borehole (Cave and White, 1968; see (Figure 5.47)), thicken southwards (Cave and White, 1971; Cherns, 1988). This may indicate the presence of a minor trough, to the south of the Gorsley topographical high, in the southern part of the Welsh Basin (Curtis, 1972). During the late Ludlow and early Pridoli, Tites Point was a shelf area just north of Pretannia, a probable alluvial plain landmass that bordered the Welsh Basin on its southern flank (see Cope and Bassett, 1987; Siveter *et al.*, 1989, figs 10, 11; Bassett *et al.*, 1992, fig. S5b).

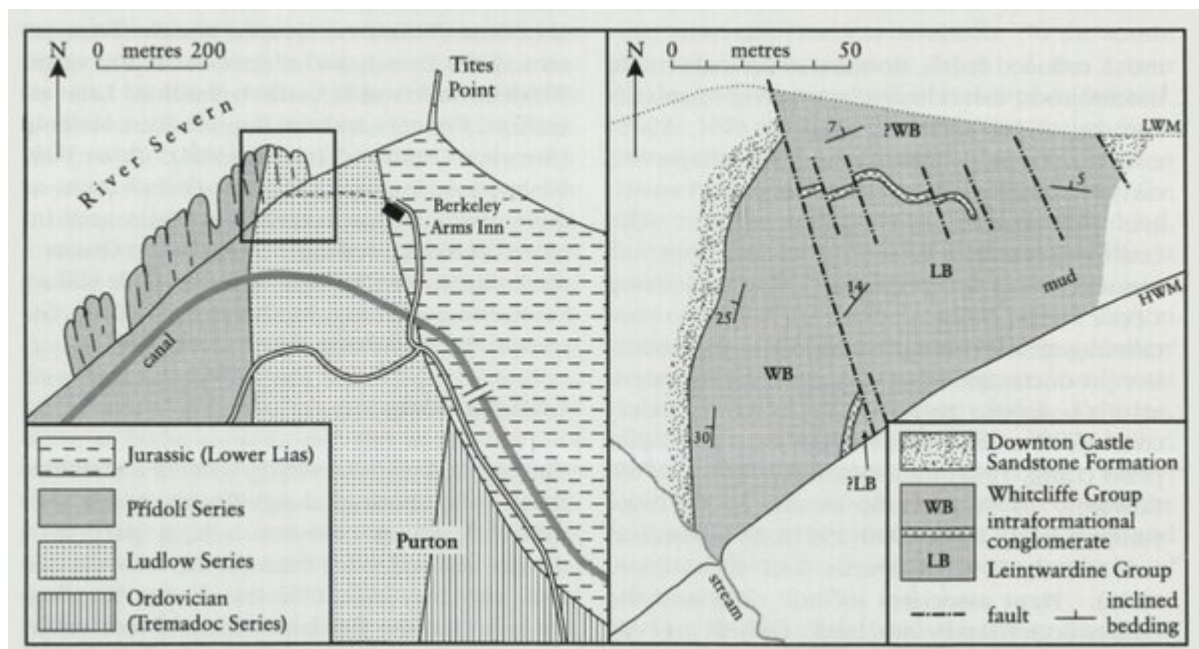
The Ludlow succession represents an invertebrate-rich, shelf sea environment, which is transitional to the shallower, but still marine-influenced conditions of Downton Castle Sandstone times (e.g. see Bassett *et al.*, 1982; Allen, 1985). As in its main outcrop in Shropshire, the local representative of the Ludlow Bone Bed probably represents an organic-rich lag concentrate deposited close to land.

Other GCR sites in the Tortworth Inlier are of Llandovery (Damery Bridge and Cullimore's Quarry) and Wenlock (Brinkmarsh Quarry, and Buckover Road Cutting) age. Tites Point is one of many sites in the Welsh Basin that have a Ludlow–Pridoli sequence (see list under Ludford Lane and Ludford Corner site report).

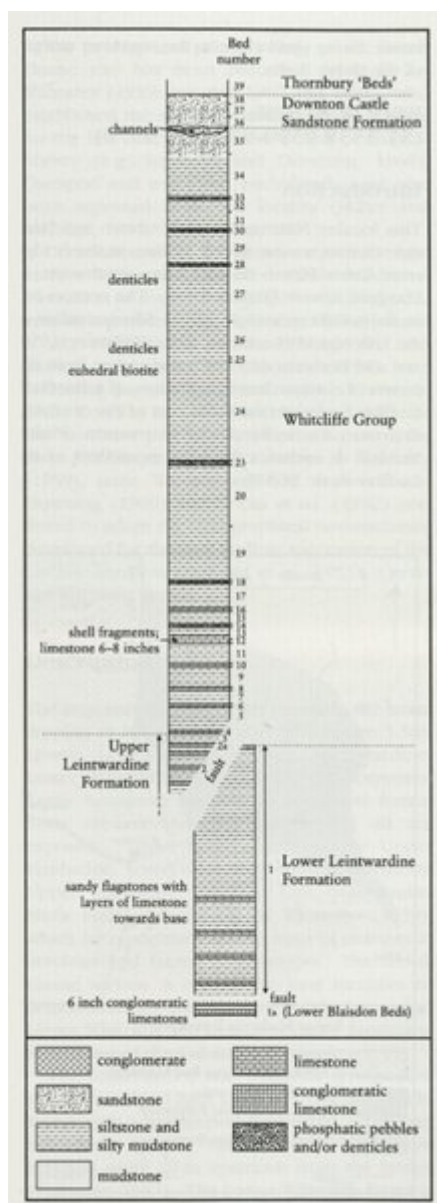
## Conclusions

This locality has historical importance, in the development of studies on Lower Palaeozoic and especially Silurian stratigraphy in Britain. The sequence contains the Ludlow–Pridoli boundary and its faunas include several species of fish. It also has palaeogeographical significance, being sited close to the southern margin of the Welsh Basin.

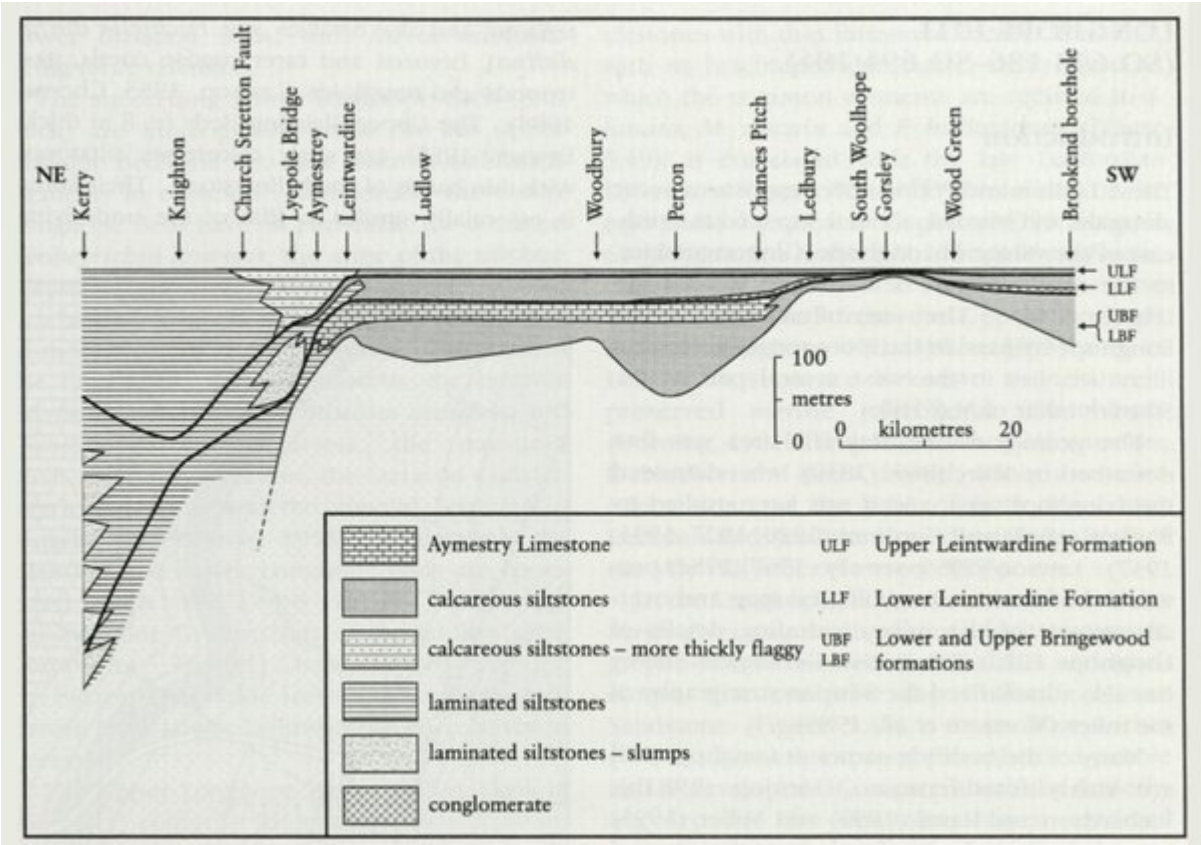
## [References](#)



(Figure 5.54) Sketch maps showing the Silurian geology (upper Ludlow to lower Píídolí) of the foreshore at Tites Point, near Purton, Gloucestershire (after Cave and White, 1971; Curtis, 1982).



(Figure 5.55) The stratigraphy of the Ludlow to early Pridoli series at Tites Point, near Purton, Gloucestershire (after Cave and White, 1971).



(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).