Wistanstow

[SO 4257 8534]

Potential GCR site

Introduction

A river cliff exposure on the left bank of the River Onny, WSW of Wistanstow and 350 m north-west of the Cheney Longville footbridge (Figure 3.4), exposes Hughley Shales of Telychian age resting unconformably on Onny Shales of Caradoc (Ordovician) age (Figure 3.8). The unconformity here is subtle, as the discordance in dip between the two formations is small (18°SE as against 22°SE) and the lithologies of the two units are similar. The unconformable relationship was first recognized by Salter and Aveline (1854), who realized its importance in separating two units that had been combined by Murchison (1839) in the formation he termed the 'Caradoc sandstone'. Salter and Aveline (1854) substantiated the scale of the unconformity by documenting the different fossils in the two shales and confirmed earlier observations of the continuity of the Hughley Shales (assigned by them to the 'Pentamerus limestone') with the overlying Wenlock shale. They provided a brief description and sketch of the locality (Salter and Aveline, 1854, pp. 69–70), which was followed by a fuller description by Salter in 1868. Further information has been added by, among others, Cobbold (1900), Whittard (1928) and Greig *et al.* (1968). Whittard (1928, pp. 747–52) proved a particularly full description, with a revised drawing and comprehensive faunal list.

This classic locality is of historical importance in demonstrating the relationship between strata now referred to the Ordovician and Silurian systems, and is also important in helping to illustrate the pattern of development of the Llandovery transgression in the Church Stretton area.

Description

The state of this exposure varies because of erosion and slipping. Whittard (1928) recorded a conglomeratic limestone at the base of the Hughley Shales, observable in 1925 in the river bed, but it is not certain that the same limestone has been recognized subsequently. From Whittard's description this band is 2.5 cm thick and contains green and blue mudstone pellets, a few pebbles derived from the Longmyndian, abundant broken shells and other calcareous fragments. The fossils include fragments derived from the underlying Ordovician strata and numerous broken shells of *Pentamerus oblongus.*

Above the unconformity about 10 m of Hughley Shales are exposed, comprising greenish to purple shales, bands of micaceous fine sandstone up to 20 cm thick and a few impersistent thin limestones. At the unconformity, the successive Telychian beds overlap each other to the north-west (Whittard, 1928; Greig *et al.,* 1968). Some 2 m above the unconformity, Whittard (1928) recorded a 1 m interval of tectonically disturbed strata, bounded by two horizons that Cobbold (1900) had referred to as 'dirt-planes'.

The shales contain a diverse fauna of brachiopods, trilobites and ostracods. Whittard's (1928) list includes the brachiopods *Lingula symondsi, Dicoelosia biloba, Atrypa reticularis, Schuchertella applanata, Dalmanella elegantula, Leptaena rhomboidalis, Brachyprion fletcheri, Skenidioides lewisii, Barrandella* aff. *undata, Cyrtia exporrecta, Streptis grayi, Eospirifer radiatus* and species of *Plectambonites* and *Meristella,* although these identifications are in need of some revision. Whittard also recorded several trilobite genera, including *Acidaspis, Illaenus, Encrinurus, Cheirurus, Calymene, Phacopidella* and *Dalmanites,* graptolites, beyrichiacean ostracods, and the cephalopod *Dawsonoceras annulatum.* Conodont samples have yielded poorly preserved elements, including *Pterospathodus celloni* and *Astropentagnathus irregularis* (Aldridge and Smith, 1985), indicating a horizon low in the *P. celloni* Biozone.

Ziegler *et al.* (1968b) considered that graptolites from this locality indicated the *turriculatus* Biozone and that the brachiopods were typical of the *Clorinda* benthic community.

Interpretation

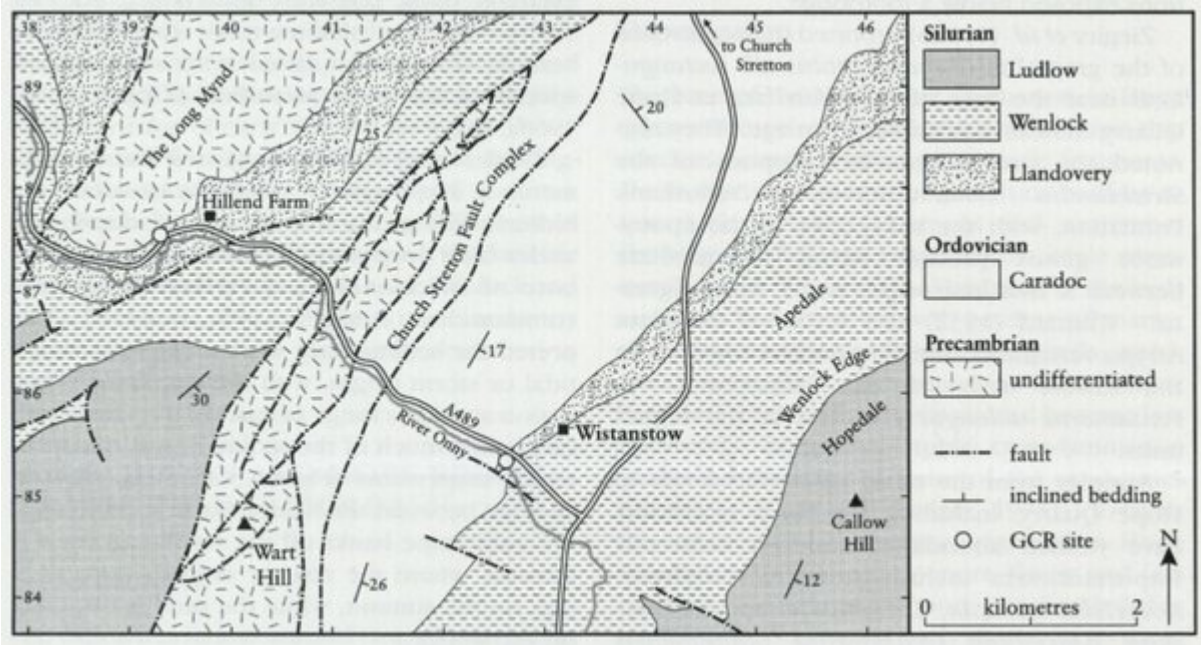
The eastward transgression of the Llandovery sea from the Welsh Basin onto the western margin of the Midland Platform reached the south Shropshire area in the Aeronian, with initial deposition of sandstones and conglomerates, followed by mudstones and argillaceous shelly limestones of the Pentamerus Beds. Further deepening led to deposition of the fine-grained Hughley Shales (= Purple Shales of some authors), which outcrop in the Wenlock Edge and Church Stretton areas of south Shropshire. The Hughley Shales are not well exposed south and east of the Long Mynd, although they are present in four boreholes drilled in the region by the British Geological Survey in 1961 (see Cocks and Rickards, 1969). The greatest thickness, 184 m, is seen in the Eaton Farm Borehole [SO 3723 8978] although this figure may be affected by faulting (Ziegler *et al.,* 1968b); in this borehole the Hughley Shales rest unconformably on Precambrian rocks of the Western Longmyndian. In the Hamperley Borehole [SO 4217 8912] the Hughley Shales are only 49 m thick and rest conformably on Pentamerus Beds (Greig *et al*.,1968; Cocks and Rickards, 1969). These boreholes, together with the exposures at Wistanstow and Hillend Farm, show that the Llandovery unconformity regionally oversteps the underlying Precambrian and Ordovician strata, and that the Hughley Shales overlap the Pentamerus Beds in places to lie directly upon the older rocks.

This is the only surface exposure in the south Shropshire area where the Hughley Shales can be seen to rest directly on pre-Silurian strata. Elsewhere, for example near the GCR site at Hillend Farm, it is the Pentamerus Beds that lie on the pre-Silurian, so the unconformity at Wistanstow indicates that here the Hughley Shales have overlapped the Pentamerus Beds to rest on Ordovician sediments. Whittard (1928) regarded the presence of broken specimens of *P. oblongus* in the basal conglomeratic limestone as evidence that local Pentamerus Beds were partly denuded during initial deposition of the Hughley Shales; this brachiopod is very abundant in the Pentamerus Beds of the region but is otherwise absent from the Hughley Shales. The presence of a relatively deep water *Clorinda* benthic community in the basal beds of the Hughley Shales suggests that there was not a shallowing event at this time, but that the first beds were deposited in deeper water than obtained during deposition of the Pentamerus Beds. It is probable that local conditions were tectonically controlled, as the Wistanstow section lies close to the line of the Church Stretton Fault Complex.

Conclusions

This is an important site for geological and historical reasons. Geologically, it displays the important regional unconformity between the Silurian and older strata, and more specificially it shows that the unconformity in the south Shropshire region displays both overstep and overlap. From this, it provides key evidence for the pattern of eastward transgression of the Llandovery marine facies across the Midland Platform. Historically, the recognition of the unconformity by Salter and Aveline (1854) proved of major importance in distinguishing rocks subsequently accommodated in two separate geological systems, the Ordovician and the Silurian.

References



(Figure 3.4) Geological map of the area to the south-east of the Long Mynd, Shropshire, showing the sites at Hillend Farm and Wistanstow (modified after Siveter et al., 1989).

(Figure 3.8) The unconformity between Onny Shales of Caradoc age and the Hughley Shales of Llandovery age in the bank of the River Onny at Wistanstow; the Hughley Shales are exposed in the upper third of the river cliff, dipping at a lower angle than the Onny Shales. (Photo: R. J. Aldridge.)