Temeside, Ludlow

[SO 520 742]

Highlights

This Shropshire site has yielded a rich fauna of hemicyclaspids and acanthodians from an early example of a typical Old Red Sandstone fish-bearing channel. *Hemicyclaspis murchisoni* is well represented in collections from here, which is probably the type locality.

Introduction

On the right bank of the Teme, opposite the site of the Old Paper Mill in Ludlow, is found the earliest known typical fish-bearing channel fill in the Welsh Borders. This type of bed-form occurs commonly in the upper part of the Downtonian and Dittonian, but this is the only example known in the lower P■ídolí and therefore the faunal assemblage contained within it is important. The specimens are thought to represent species that inhabited tidal areas, as the earliest channels were probably swept by erosive currents or tides. Many new specimens have been discovered here during recent excavations. Fossils occurred throughout the channel infill and were mainly hemicyclaspids and acanthodians, plus fragments of plant and arthropod.

The local geology was described several times prior to Elles and Slater (1906), Lightbody (1869) and Antia (1981). The site has been known to palaeontologists for 140 years, and reference to the fish fauna has been made by Egerton (1857), Murchison (1853), Roberts (1865), Lankester (1870), Woodward (1891a), Kiaer (1931), Stensiö (1932), White (1950a), Allen and Tarlo (1963), and Janvier (1985b).

Description

The Temeside Shale Formation succeeds the Downton Castle Sandstone Formation at Ludlow, but the junction is not seen there. The section along the River Teme shows the Lower Temeside Shale Formation, then a gap, probably representing a considerable thickness of shales (Elles and Slater, 1906), followed by the section described below. It exposes about 6 m of the upper part of the Temeside Shales within which are several 'beds' containing fish remains, in particular the fish-bearing channel that has recently been fully repeated by rockfalls, which was previously thought to be a planar bed, and named the 'Temeside Bone-Bed' (Elles and Slater, 1906; (Figure 3.16)).

Murchison (1854) first drew attention to a fish-bearing locality on the river Teme at Ludlow. Egerton (1857) reported the discovery of 'scanty' fossil fish material by Lightbody at the Ludlow railway cutting and from 'a grit bed below the Paper Mills on the Teme at Ludlow' (i.e. Temeside) which together yielded fossils he described as acanthodian spines and jaws, and *Hemicyclaspis murchisoni* Egerton. Symonds (1859a) first described the Temeside section, but the Ludlow railway cutting yielded better material and Temeside appears to have been neglected in favour of the former. It was not mentioned by Roberts (1861), who compared the railway cutting at Ludlow to the newly discovered cutting at Ledbury.

In a long footnote on these new sites Murchison (1853), regarded the Temeside fish bed as being above the Ludlow railway cutting fish bed, but not yielding '*Trochus helicites*'as does the railway cutting bed. Interestingly, Murchison also described the section here on the right bank of the River Teme as having a heavy cover of drift and gravel, so perhaps the exposure was much poorer in the past and thus received little attention from collectors.

Elles and Slater (1906) gave a vertical section (Figure 3.16), but denoted the channel as a grit bed, with an overlying 'Temeside-Bone-Bed' containing large fragments of bone and fish spines. They did not describe the palaeontology. Recent examination showed that the fishes were not contained in a planar bed, such as is seen at similar horizons in the Downton Gorge area, but that the source is an infilled channel cut into the underlying silts. Antia (1981) measured the section and sampled the fauna throughout. He drew the Temeside Bone Bed as a laterally impersistent bed (= a

'shoestring').

Fauna

AGNATHA

Osteostraci: Thyestiformes: Thyestiidae

Auchenaspis ?salteri Egerton, 1857

Osteostraci: Ateleaspidiformes: Ateleaspididae

Hemicyclaspis murchisoni Egerton, 1857

H. lightbodii (Lankester, 1870)

GNATHOSTOMATA

Acanthodii: Ischnacanthiformes: Ischacanthidae

Plectrodus mirabilis Agassiz (in Murchison, 1839)

Plectrodus sp.

Acanthodii: Acanthodiformes: Acanthodidae

Onchus spp.

Onchus murchisoni Agassiz, 1837

Ischnacanthids indet.

Based on collections made in 1984 by M.A. Rowlands, the faunal assemblage consists mainly of vertebrate fragments and whole shields of *Hemicyclaspis* sp., together with acanthodian spines and scales, and rarer jaws. Also occurring are *Lingula cornea* (not *in situ*), occasional large pieces of *Prototaxites,* and some large plates of *Pterygotus* sp.. *Auchenaspis ?salteri* is much rarer with only a few fragments found. Acanthodian spines and jaws are common here, indicating several species of ischnacanthid and one climatiid. The taxa recorded include the osteostracans *Hemicyclaspis murchisoni, Hemicyclaspis lightbodii, ?Hemicyclaspis* sp., *Auchenaspis ?salteri, Plectrodus mirabilis* Agassiz, 1839 and *Plectrodus* sp., together with acanthodians including two or three species of ischnacanthid jaws, *Onchus* spp., climatiid spines and pectoral plates. For comparison, the railway cutting yielded *Plectrodus* sp., *Onchus murchisoni, Lingula cornea, Beyrichia kloedeni* (these four also found in the lower bone bed), plus *Hemicyclaspis* (*Cephalaspis ornatus*) *Hemicyclaspis murchisoni* var. *ludlowiensis, Auchenaspis salteri, Pterygotus anglicus* and *Eurypterus pygmaeus.*

Hemicyclaspis murchisoni has a distinct cornual angle and rounded rostra' angle. The sclerotic ring consists of a continuous circular piece of bone. It had a continuous superficial layer, and the mucous canal system (except posteriorly) is enclosed. Egerton (1857) named the species from a specimen collected opposite the Paper Mill, Temeside. He erected two species, *Cephalaspis murchisoni* from the Paper Mill, and *C. ornatus* from Ludlow railway cutting. Lankester (1870) showed that they were both *C. ornatus,* being preserved differently, and showing an ornament of 'clenticles', whilst those from Temeside were preserved as thin decalcified films within the sandstone. Recently collected material from Temeside contains both forms, both being jumbled together within the poorly sorted channel deposits. It appears that the ventral rims and ventral surface of the cornua were thick and heavily ornamented, whereas the dorsal surface was probably of thinner bone, and was likely to be crushed and demineralized during preservation. *H. murchisoni* is recorded from several lower Downtonian sites in the Welsh Borders, and is also found in Norway (Kiaer, 1931) and Somerset Island, Arctic Canada (Dineley, 1968). The genus *Hemicyclaspis* ranges from Lower Ludlow to the Downton Group, and is regarded as an index fossil for the lowest part of the Downton Group (White, 1950a).

Hemicyclaspis lightbodii was established on a fragmentary ventral rim by Lankester (1870), who found it impossible to decide to which subgenus of *Cephalaspis* it belonged. It has a more pronounced rostra' angle than *H. murchisoni.* The superficial layer is present only in the tubercles which form the ornamentation. Some of those tubercles are hooked. The mucous canal system forms an open network on the surface of the shield. The type locality is Ludlow railway cutting (in a grey-green mudstone with *Lingula cornea* and arthropod cuticle), and the species is also known from the Paper Mill, Temeside (NHM specimen).

The genus *Auchenaspis* was founded by Egerton (1857) for *A. salteri* from Ludlow railway cutting. Lankester (1870) added a second species, *A. egertoni,* from Ledbury (q.v.). *Auchenaspis salteri* was previously only recorded from Ludlow railway cutting. Excavations at Temeside by M.A. Rowlands yielded several rare headshields with short abdominal regions, possibly of this species. The species is small, the headshield being only about 12 mm in medial length, which is smaller than that of *A. egertoni,* and it has shorter cornua.

Acanthodian material is very common, occurring as disarticulated jaws and spines. The jaws are of *Ischnacanthus* type, and the spines are also of a more advanced acanthodian than is represented in the underlying Ludlow Bone Bed. This site thus yields some of the forerunners of Devonian species, possibly because of similarities of facies and habitat. Lightbody collected from Temeside portions of jaws which resembled *Plectrodus mirabilis* (Egerton, 1857). The new collection from the site includes several species of acanthodian, at least four of ischnacanthid and one climatiid, represented by well-preserved plates and ornamented spines.

The acanthodian specimens from Temeside suggest that there may have been two species of *Plectrodus.* A tubercled jaw bearing both large and small teeth is typical of *Plectrodus mirabilis* Agassiz, 1839. Another jaw, also with tubercles, bears larger laterally compressed teeth of one size only. *Plectrodus mirabilis* was first described from the Ludlow Bone Bed of Ludford Lane (q.v.). *Plectrodus* sp. is recorded from slightly higher beds (Temeside Shale Formation) at three sites where osteostracans were prolific, Ludlow railway cutting (Egerton, 1857), Ledbury tunnel (Piper, 1898) and Temeside. Material from Temeside and from Ludlow railway cutting contains plentiful spines and pieces of bone of ischnacanthids and '*Onchus*' together with the osteostracans. The assemblage differs somewhat from that at Ledbury (q.v.), where acanthodians seem to have been rarer.

Other much larger ischnacanthid jaws, up to 60 mm long, abound and represent at least three types. Slender ischnacanthid spines are the most common form of spine and also several different forms of '*Onchus*'spine occur. Climatiids are represented by ornamented spines and shoulder girdles. The ornament is similar in all this material, so it is from a single species of climatiid. There are many small fragments of acanthodian at this site, including many scales and (so far) indeterminate material.

Interpretation

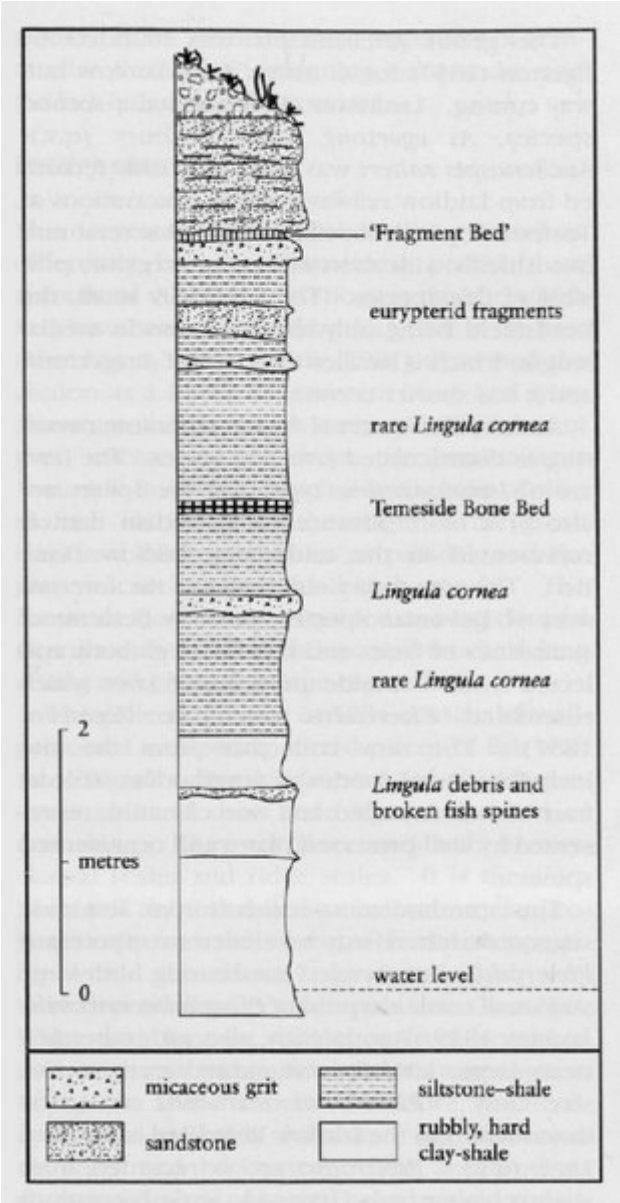
This occurrence of fossil fish has been described differently by several workers, probably on account of differing conditions at the site which may have been obscured by thick drift in the past (Murchison, 1853). Antia (1981) described the section as a lower impersistent bone bed lying above green clays, which is separated by a bed of grey micaceous grit from the impersistent Temeside Bone Bed, which is at the base of olive shales. He interprets the origin of the green clays and olive grey-shales as paludal, and the grey micaceous grit as beach sands. The Temeside Bone Bed is regarded as a lag channel deposited in back-beach lagoonal muds, during a long and gradual marine regression.

The collection made in 1984 consists of well-preserved and poorly sorted pieces of fish with rare *Lingula. Hemicyclaspis* head shields predominate, and show little sign of abrasion or reworking. They are associated with hemicy-claspid scales and ridge scales. It is therefore likely that they inhabited waters not very far geographically from their eventual burial site, possibly within the channel system in which they were deposited (cf. cephalaspids from Cwm Mill; White and Toombs, 1983), or from reworked soft sediments within this brackish-water system of lagoons and channels. Therefore, the hemicyclaspids probably inhabited brackish-water channels and backwaters. The acanthodians show indications of having been transported for longer or more thoroughly water-sorted, in that the fossils consist of isolated jaws, and are not associated with scales in the same manner as the hemicyclaspid fossils. They represent large fishes, up to 30 cm long, which occupied marine waters, possibly entering river systems to feed or breed.

Conclusion

The Temeside site has experienced recent improvement in exposure and its conservation value results from the production of an important early P■ídolí fauna of fishes, particularly of acanthodians and osteostracan agnathans. The osteostracan *Hemicyclaspis* is particularly well represented: this site is the type locality for one species, and is a source of other varieties and species of the genus. Recent collecting indicates the continuing potential of the site.

References



(Figure 3.16) Stratigraphical section at Temeside. (After Elles and Slater, 1906).