

LYDNEY

OS Grid Reference: SO652017

Highlights

The cliffs and foreshore at this Gloucestershire site expose a section from Upper Píídolí (Upper Silurian) to Lower Devonian. Late Silurian (Raglan Marl Formation) vertebrates occur at several horizons. Two important Lower Devonian fish beds occur in a section along the foreshore of the River Severn, together with several other fish-bearing horizons. The section includes the type locality of *Sabrinacanthus* Miles (1973).

Introduction

As seen along the foreshore and low cliffs immediately north of the entrance to Lydney Docks, the sequence passes from the intertidal Downtonian Raglan Marl Group (Píídolí) strata to mainly fluvial (Lower Ditton) St. Maughan's Group sediments. The fishes contained within the successive fish beds differ, and show a change from one faunal assemblage in the Downton sediments to another in the higher horizons. The geology of the section has been described by Welch and Trotter (1961), Allen and Tarlo (1963), Allen (1964, 1973, 1974), and fishes from this site have been considered by Miles (1973) and Denison (1979; Figure 3.19).

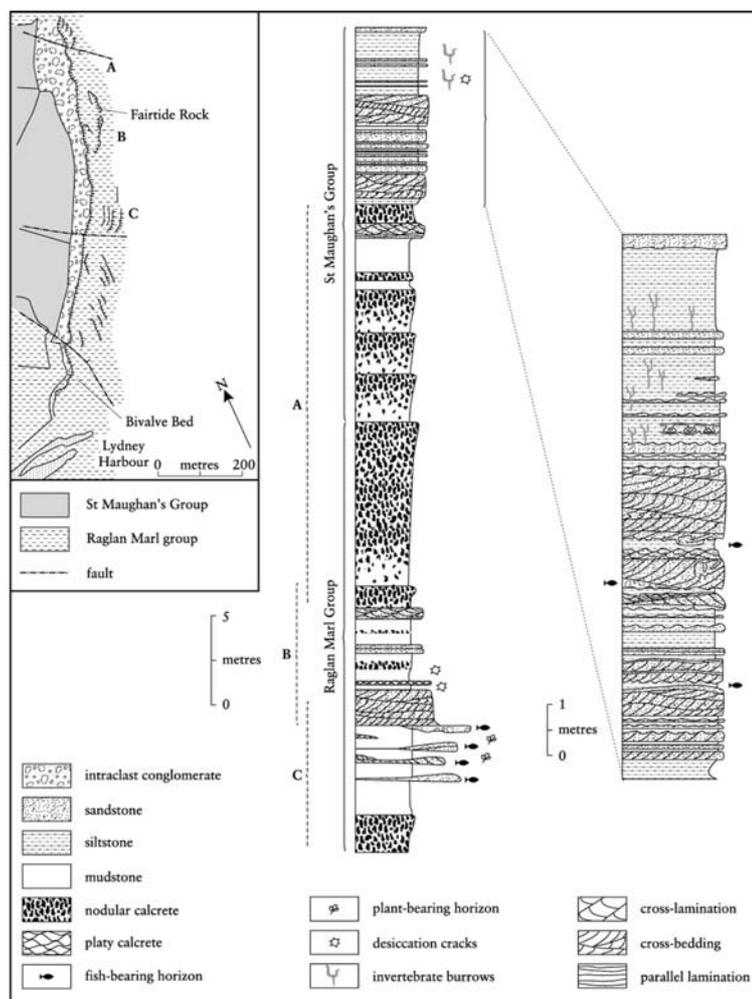


Figure 3.19: Sketch map and section of the outcrop at the cliffs and foreshore at Lydney (after Allen, 1978).

Description

The section exposed along the shore at Lydney passes from the mainly intertidal Raglan Marl Group (equivalent to the Ledbury Formation farther north) to the mainly fluvial St Maughan's Group. The top of the Raglan Marl Group extends at about cliff-top level from Cliff Farm north-eastwards along the river, and is well exposed, but to the south of Cliff Farm faulting lowers this horizon to the foreshore (Welch and Trotter, 1961), and St Maughan's Group is seen above in the cliff and inner foreshore. The lowest fish bed is the Fish Conglomerate (= Intraclast conglomerate on Figure 3.19), which is at the base of the exposed section (Welch and Trotter, 1961). Above this, in the upper part of the Raglan Marls, fish remains occur together with bivalve molluscs in the red marls (Allen, 1973).

The boundary between the Raglan Marl Group to St Maughan's Group is marked by the development of pedogenic carbonates, equivalent of the main 'Psammosteus' Limestones of the Clee Hills area. The top of the Raglan Marl Group was taken as the base of this band of calcrete (Welch and Trotter, 1961), but the top of this bed forms a more consistent, regular plane and may be a better marker horizon (see Figure 3.19). It is rather a sharp transition, and the development of the major and persistent facies is shown in a section given by Allen (1974, p. 184). It represents the formation of a calcareous soil in semi-arid or arid conditions, possibly on a floodplain during periods of meagre sedimentation. Above this, and in the basal St Maughan's Group, is a cyclothem, interpreted as tidal, which is overlain by fluvial sediments derived from the north (Allen, 1964, pp. 174–80). This part of the section is figured by Allen (1964, 1971). Several beds within this section also yield fish remains, mostly as small fragments.

The Basal Fish Conglomerate contains frequent fragmentary remains, plus plates and spines of *Cephalaspis* sp., pteraspids (recorded as *Pteraspis* including *P. cf. stensioi* by Welch and Trotter, 1961), *Tesseraspis*, *Sabrinacanthus arcuatus* and acanthodian spines.

Above this, in red marls at the top of the Raglan Marl Group, plates of *Traquairaspis symondsi* were found (Tarrant, 1991). This is just beneath the main 'Psammosteus' Limestone, as is the bed described by Allen (1973) which contained bivalve molluscs and 'fish remains', but which could not be found during recent site examinations since it was possibly hidden under river mud. (Although *T. symondsi* is a zonal fossil for the uppermost Píidolí, it is discussed under the Devil's Hole site heading where the section passes across the Píidolí–Ludlovian boundary (Downtonian–Dittonian).) Allen's bivalve bed contains fragments of cephalaspids and cyathaspids, as well as the bivalve *Modiolopsis complanata* var. *trimpleyensis*, and it may represent a marine incursion into a sequence of predominantly estuarine and fluvial sediments.

The higher fish beds in the St Maughan's Group, and the Basal Fish Conglomerate, are typical of Welsh Borders fish beds, with fish fragments contained within lenticular conglomerates at the base of sandstone units, and within pebbly and clay intraclast-bearing sandstones, which have usually been interpreted as point-bar gravels. The fish-bearing units have yielded *Protopteraspis leathensis*, *Traquairaspis*, *Tesseraspis*, *Anglaspis* and *Corvaspis*, acanthodian remains and a *Turinia pagei* thelodont assemblage (S. Turner, pers. comm., 1980).

Sabrinacanthus arcuatus (Agassiz, 1837) is a climatiid acanthodian, known only from disarticulated specimens of pectoral girdle and spines from the Basal Fish Conglomerate (Figure 3.20). The holotype of *Onchus arcuatus* from 'Bromyard' (Agassiz, 1833–45, p. 7; Miles, 1973, p. 170) is lost. The new genus *Sabrinacanthus*, described by Miles (1973), was therefore based on a series of five specimens from Lydney which showed articulated parts of the shoulder girdle. These, as in all climatiids, are strengthened ventrally by the development of dermal plates and spines, called the pinnal region. *Sabrinacanthus* has a pair of large compound pinnal plates, which laterally give rise to a pair of pectoral spines plus several other smaller spines. These were fused, immovable and ornamented with noded ribs. The scapulocoracoid was narrow and well developed (Miles, 1973; Denison, 1979).

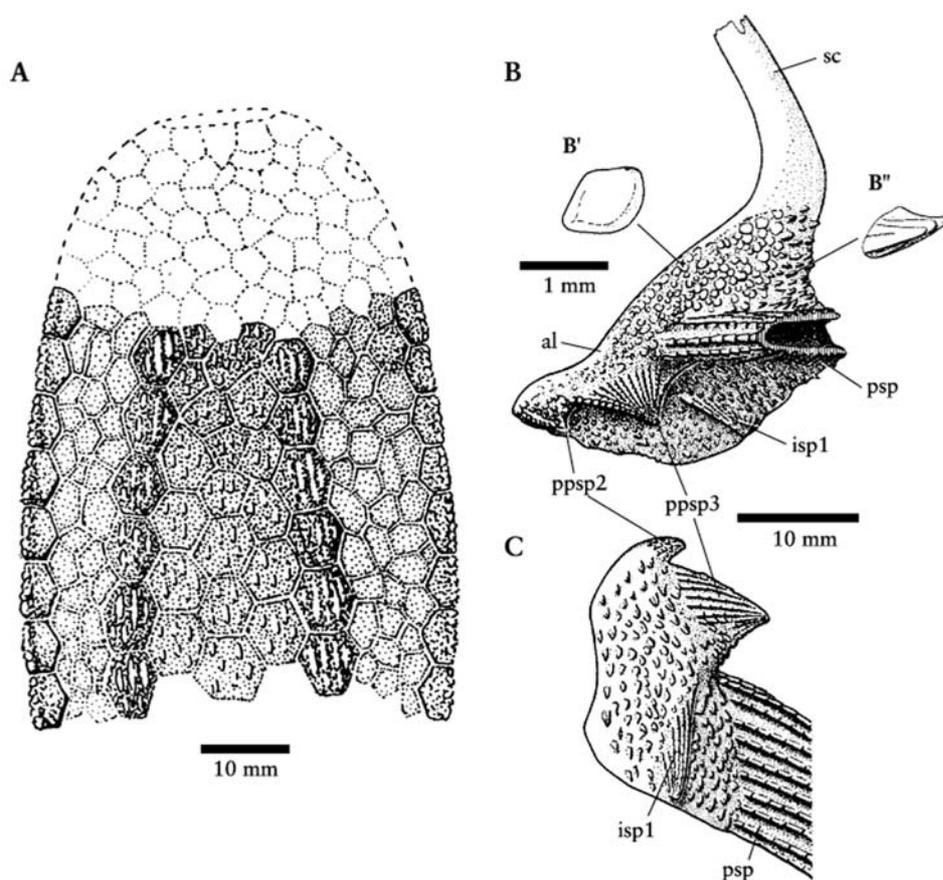


Figure 3.20: Vertebrate fragments from Lydney. (A) *Tesseractis tessellata* Wills, tesserae scattered at many horizons; (B) *Sabrinacanthus*: (B'), (B'') details of ornamentation; al, ascending lamina; isp1 first intermediate spine; psp, pectoral spine; ppsp2, 3, paired pectoral spines; sc, scapula. (B) after Miles (1973).

Fauna

AGNATHA Heterostraci: Tesseractisidae

Tesseractis tessellata Wills, 1935

Heterostraci: Cyathaspididae

Anglaspis mcculloughi (Woodward, 1891a) Heterostraci: Corvaspididae

Corvaspis kingi Woodward, 1935

Heterostraci: Pteraspididae

Protopteraspis leathensis (White, 1950)

Thelodonti: Thelodonta: Turiniidae

Turinia pagei (Powrie, 1870)

GNATHOSTOMATA Acanthodii: Climatiformes: Climatidae

Sabrinacanthus arcuatus Miles, 1973

Acanthodii *incertae sedis*

?*Onchus murchisoni* Agassiz, 1837

Interpretation

The sequence of fish-bearing rocks and associated strata in the cliffs of the River Severn at Lydney documents the faunal changes that took place in response to environmental changes around the time of deposition of the main '*Psammosteus*' Limestone. This major development of impersistent limestone generally accompanies a change in fauna everywhere across the Welsh Borders, and forms a good marker horizon. For the most part the fossil fish debris above and below the limestone is in beds which are referred to as fluvial channel infills or point-bar gravels (e.g. Ball and Dineley, 1961; Allen and Tarlo, 1963; Allen *et al.*, 1968. However, at Lydney the bivalve bed represents a (?) marine incursion into a sequence of predominantly estuarine and fluvial sediments (Allen, 1973), which is highly unusual for fish beds of this age in the Welsh Borders. Recent discoveries at Gardener's Bank, Shropshire of cf. *Tra-quairaspis symondsii* in a basal Ditton Group deposit overlying shallow siltstones with *Modiolopsis* sp. and eurypterids illustrate a similar species, at a similar period of time, in a similar, anomalous preservational environment (M.A. Rowlands and P. Tarrant collections, 1992–1993, SMLU).

Conclusions

The conservation of the Lydney sections results from having produced a sequence of vertebrate faunas, including specimens of the unusual acanthodian *Sabrinacanthus*, and evidence for an interplay of typical freshwater conditions and a marine incursion. The section is usually obscured by river muds and gravels on the foreshore, but can be seen in the cliffs, where it is accessible and fossiliferous. Further collecting is possible.

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