

ABERLEMNO QUARRY

OS Grid Reference: NO526551

Highlights

Aberlemno Quarry in Forfarshire is a famous site that has been yielding excellent specimens of osteostracan fishes since the 1860s. It is distinct from Tillywhandland Quarry nearby since the faunas are dominated by the heavily armoured cephalaspids, instead of the free-swimming acanthodians.

Introduction

One of the famous 'Turin Hill' sites yielding Lower Old Red Sandstone fishes, this section lies on the north-east flank of Turin Hill as an elongate entrenchment along the side of a minor road. Fish specimens from Aberlemno Quarry have been reported since the time of Powrie (1869–1870). Armstrong *et al.* (in Friend and Williams, 1978) described the succession in the local exposures of the Dundee Formation, Arbuthnott Group.

Description

The southern side of the quarry is marked by extensive spoil heaps of shale and green mudstones, while the northern side is a 300 m long quarry face through massive red cross-bedded sandstones overlying siltstones and shales. These siltstones and shales are the 'fish bed' and mark the top of the Arbuthnott Group in the Brechin–Forfar area, overlain by sandstones of the Melgund Formation, the lowest formation of the Garvock Group (Armstrong and Paterson, 1970). The other quarry at this horizon in Turin Hill area is Mirestone Quarry, Carsegownie (Armstrong and Paterson, 1970). Armstrong (in Friend and Williams, 1978) gave a section through the quarry (Figure 5.10).

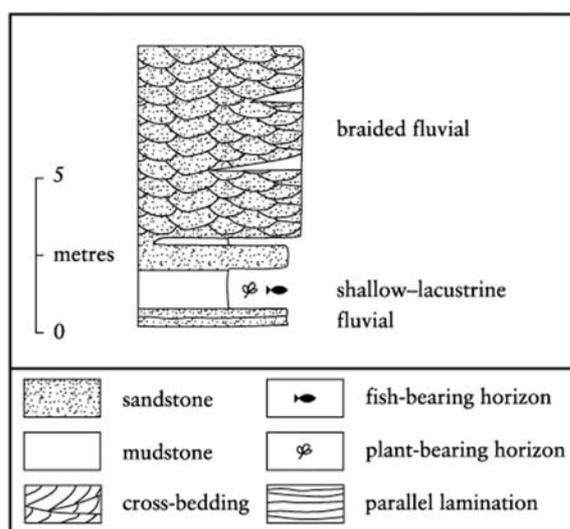


Figure 5.10: Aberlemno Quarry, stratigraphical section (after Armstrong, 1978).

Cephalaspis pagei is the only cephalaspid species referred to Aberlemno Quarry (Henrichsen, 1971). It also occurs at many other sites in the Lower Devonian of Scotland. The cephalaspids collected during the mid-19th century, when quarrying was active, are only localized to 'Turin Hill'. It is likely that Aberlemno is at the same horizon as many of these fossils that have a similar lithology to this quarry, particularly those that occur in sandstone. Other cephalaspids occur in the grey laminated shales, and would not have come from this site, but from the same lithology as that at Tillywhandland Quarry. Acanthodian spines are also known, as is the arthropod *Dictyocaris*.

The plant fossils are well known and the palaeobotany of this site is described by Cleal and Thomas (1995). The *Zosterophyllum* Zone flora here is regarded as the best example anywhere, though other instances occur in South Wales and the Welsh Borders, Spitsbergen, the Czech Republic and Siberia.

Fauna

The exact provenance of many osteostracans present in the collections is not certain, but it is most likely that the following were derived from Aberlemno.

AGNATHA Osteostraci: Cephalaspidiformes: Cephalaspididae

Cephalaspis pagei (Lankester, 1870)

C. cf. *C. pagei*

'*C.*' *powrei* (Lankester, 1870)

'*C.*' *powrei* var. *asper* (Lankester, 1870)

'*C.*' *powrei* var. *brevicornis* Stensiö, 1932

'*C.*' cf. *powrei*

'*C.*' *spinifer* Stensiö, 1932

Interpretation

The Aberlemno section may be interpreted as largely a braided fluvial sequence with a thin intercalation of a shallow lacustrine fish-bearing layer. The upper part of the Arbutnott Group is diachronous and interdigitates with the lower part of the Garvock Group. This means that the Aberlemno fish bed is not the youngest fish bed of the Arbutnott Group as a whole, since Canterland Den (Den of Morphie) lies above it (Armstrong and Paterson, 1970, p. 23). Much of this may have been due to the spread of shallow bodies of lake water. The fauna and flora recorded from the Arbutnott Group (Edwards, 1980; Edwards and Fanning, 1985) suggest a Lochkovian age, and the fishes and eurypterids indicate an age not older than the base of the Dittonian (Westoll, *in* House *et al.*, 1977). Richardson *et al.* (1984) regarded the 'Aberlemno horizon' as falling in the middle subzone of *micromatus–newportensis* Zone of the Lochkov Stage, basal Dittonian of the Welsh Borderland. A radiometric age of 407 ± 6 Ma was determined by Thirlwall (1983) for the lower part of the Arbutnott Group and Richardson *et al.* (1984) calculated from this an age of 410 ± 6 Ma for the base of the Devonian. The age of the Aberlemno fish bed cannot therefore be much less.

Conclusions

The conservation value of Aberlemno Quarry results from it being the best surviving site on Turin Hill where fossil fishes occur in fine sandstone or siltstone, and shales. It is likely that many of the excellent specimens of cephalaspids found in the 19th century came from Aberlemno, but there are problems in identifying particular localities from the older literature. The site exposes the fish-bearing sandstones, and upon excavation could yield more specimens.

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