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# WHITEHOUSE DEN

OS Grid Reference: NO426397

## Highlights

Lacustrine shales at this locality yield Lower Devonian acanthodians, and arthropod and plant remains. The fish-bearing horizon may have been a source of museum collections made many years ago and labelled 'Tealing'.

## Introduction

This locality near Tealing in Tayside has, over the past few years, been excavated and has revealed sandstones and shales of the Lower Devonian Arbuthnott Group (Armstrong and Paterson, 1970). Situated some 300 m south-east of Lorange Hill, the Den is in a shallow depression, a few metres across and bereft of any thick vegetation. The floor of this little valley is flat and boggy.

## Description

On occasion the shales have yielded small numbers of fish and eurypterid fossils. Plant debris and arthropod trackways were also found (R. Davidson, pers. comm., 1996). Mechanical excavations, as part of a landfill operation, on both sides of the Den were recently (1995) made but those on the west have now been backfilled. Trewin and Davidson (1996) reported a 35 mm thick pale clay band within laminites here, and the enigmatic plant *Parka* and a coprolite containing acanthodian spines were found *in situ*. On the east side of the den the excavation has penetrated to about 10 m below the surface, but no in-situ fish bed has been reported. While it is possible that the local fish bed crops out only on the western side of the Den, the area to the south-west may offer potential for the retrieval of further fossil vertebrates.

### *Fauna*

#### GNATHOSTOMATA

Acanthodii: Climatediformes: Climatediidae

*Brachyacanthus* sp.

?*Euthacanthus* sp.

Acanthodii: Acanthodiformes: Ischnacanthidae

*Ischnacanthus* sp.

ARTHROPODA: Eurypterida

*Pterygotus* sp.

#### PLANTAE

*Parka* sp.

#### TRACE FOSSILS

arthropod trackway

The fish fauna is composed exclusively of acanthodians, genera of which are present in collections made from other localities within the Arbuthnott Group of this region and housed in several museums (Montrose Museum, National Museum of Scotland and the Natural History Museum). *Cephalaspis* has so far not been collected at Whitehouse Den.

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## Interpretation

This site is one of three in the vicinity of Tealing village from which fossil fish now in museum collections may have been obtained in considerable number in the past. The laminites at this and other localities nearby have been interpreted by Trewin and Davidson (1996) as lacustrine deposits formed within the hydrologically open Lake Forfar under a seasonal climatic regime. The lake floor may have been poorly oxygenated and laminite deposition was terminated by the influx of silts and current-rippled sands.

The acanthodian fish fauna indicates an active mid- to upper-water population of small predatory species. The food supply was, presumably, invertebrates, living in or near aquatic or water-margin vegetation. The significance of the ash fall for the lake ecology is not clear, but it may have produced a short episode of toxicity and increased fish mortality.

### *Comparison with other sites*

As stated above, two localities in the neighbourhood of Tealing village have yielded acanthodian fishes from a lithology similar to that at Whitehouse Den. It is probable that all are at the same horizon and include the pale clay noted by Powrie (1864) as common to many fish beds locally. The section at Tillywhandland is now the most completely investigated and was the main source of specimens in laminite lithologies, labelled 'Turin Hill' (Trewin and Davidson, 1996). However, it is not considered that Tillywhandland and Whitehouse fish beds are at the same level in the succession (Armstrong and Peterson, 1970).

## Conclusions

Recent investigation of this site has shown that its conservation value lies in its potential as a source of fossil acanthodians, some of which may be well preserved. It may also yield fossil taxa such as cephalaspids found hitherto at Tillywhandland and other sites not far away.

## Reference list

- Armstrong, M. and Paterson, I.B. (1970) The Lower Old Red Sandstone region. *Institute of Geological Sciences Report 70/12*, HMSO, London.
- Powrie, J. (1864) The Scottish *Pteraspis*. *The Geologist*, **7**, 172.
- Trewin, N.H. and Davidson, R.G. (1996) An Early Devonian lake and its associated biota in the Midland Valley of Scotland. *Transactions of the Royal Society of Edinburgh: Earth Sciences* **86**, 233–46.