

## SPITTAL QUARRY

OS Grid Reference: ND171541

### Highlights

Spittal Quarry (north-east Caithness, Highland) has produced an important assemblage of fossil fishes of Mid-Devonian age. The fishes are younger than those from Achanarras, and represent a key assemblage for dating. The site produced the first specimens of the placoderm *Dickosteus threiplandi*, as well as rare specimens of the large osteostracan *Cephalaspis magnifica*, a group that is otherwise poorly known from rocks of this age (Figure 6.24).

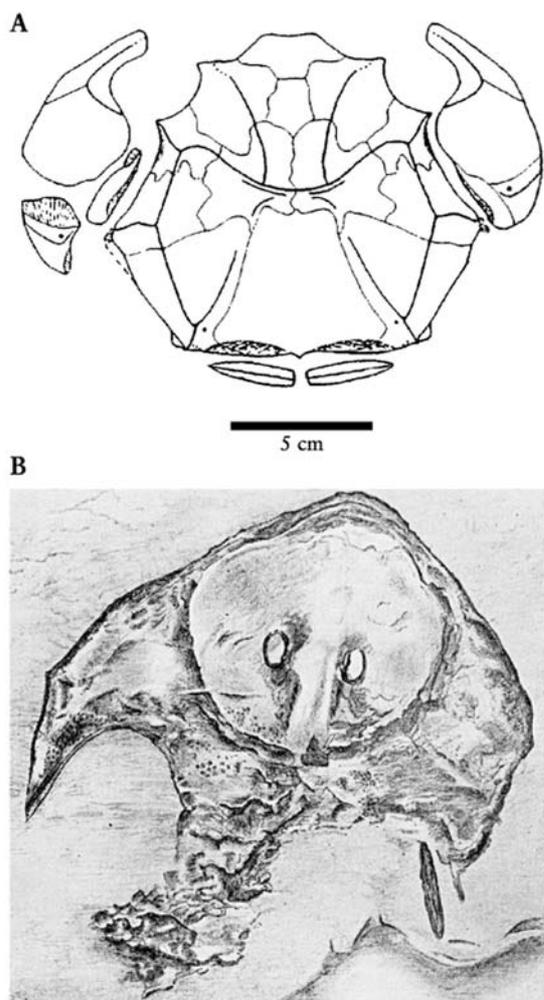


Figure 6.24: (A) The coccosteid arthrodire *Dickosteus threiplandi* Miles and Westoll; outline of the skull roof and cheek bones laid out in a single plane, based on the holotype RSM 1962.4, (after Miles and Westoll, 1963). (B) *Cephalaspis magnifica* Traquair, cephalic shield in ventral view at  $\times 0.23$ .

### Introduction

Spittal Quarry exposes lacustrine dolomitic laminites of Givetian age. Fossils are very rare at Spittal, and specimens were found only because of the long phase of over 100 years of quarrying by hand that has turned up occasional fossils. The quarry has been worked for paving slabs since the 1850s (Traquair, 1893), and latterly for luxury objects such as fireplaces and coffee tables. It is still operating. The locality is one of those described in the field guide by Trewin and Hurst (1993).

### Description

The strata consist of alternations of dolomitic laminites and fine-grained grey sandstones, of the Latheron Subgroup of the Upper Caithness Flagstone Group and represents beds of 'Faunal Zone 4' (Donovan *et al.*, 1974). The term 'Spittal Beds' was used by Miles and Westoll (1963) for all the Caithness equivalents of the Upper Stromness Flagstones of Orkney, which overlie the Achanarras horizon, but this was rejected by Donovan *et al.* (1974) because the relationships to underlying beds are uncertain at Spittal or other inland quarries.

The few fossils that have come from this site are extremely well preserved. They include plants and fishes, with plant material being rather more common than fish. The fine state of preservation of the fishes allows detailed study of their morphology, which lends them disproportionate importance in anatomical and systematic studies. Fishes from Spittal are housed in the RSM and NHM.

## Fauna

The fossil fishes from Spittal Quarry include the following taxa:

AGNATHA Osteostraci: Cephalaspidiformes: Cephalaspididae

*Cephalaspis magnifica* Traquair, 1893

GNATHOSTOMATA Placodermi: Arthrodira: Homosteidae

*Homosteus milleri* Traquair, 1888

Placodermi: Arthrodira: Coccosteidae

*Dickosteus threiplandi* Miles and Westoll,

1963

Osteichthyes: Sarcopterygii: Dipterida: Dipteriidae

*Dipterus* sp.

## Interpretation

The type specimen of *Dickosteus threiplandi* is a well-preserved and articulated fossil, which is unusual for this type of placoderm. The specimens of *Cephalaspis magnifica* are rarely complete, and in most all that remains are isolated headshields, scattered fragments or bony scales resulting from the break-up of the dead fishes prior to burial.

*Cephalaspis magnifica* (Figure 6.24B) is a species unique to this quarry, where only two specimens have been found, the first in 1893 (Traquair, 1893) and the second, half a century later. These two specimens are the only known cephalaspid from the Middle Devonian, and the only cephalaspid in Orcadian Lake sediments. They are also the largest cephalaspid (c. 350 mm wide headshield compared with a 'normal' range of 40–80 mm). The species is important in bridging a time gap between cephalaspids of the Lower and the Upper Devonian.

*Dickosteus threiplandi* (Figure 6.24A) is the only species of the genus, and Spittal is the type locality. The fossil was named after Robert Dick (the famous Thurso baker and pioneer geologist), and Major P.W. Murray-Threipland, who discovered the type specimen in 1956 (Miles and Westoll, 1963). *Dickosteus* was over 0.5 m long, which is half as long again as *Coccosteus*. It is the diagnostic fossil for 'Faunal Zone 4' of Donovan *et al.* (1974), and in Caithness is found at the following localities: Spittal, Banniskirk, Stonegun, Amster, Shalmstry, Achscrabster, Forss Hill, Scrabster, Holburn Head and Brims, and in the Stromness Flagstones in Orkney.

Specimens of *Dipterus* from Spittal are usually large individuals. *Dipterus* occurs at many Caithness Flagstone localities. A probable new, and as yet undescribed species of *Dipterus* is also represented in the collection from Spittal.

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In 1976 a fish bed was exposed in the base of the quarry. It contained *Dipterus*, and was a true fish laminite. It is possible that this was the top of the Achanarras horizon below. Spittal Quarry is separated from Achanarras Quarry by 2 km of peat- and drift-covered land with no exposure, and the stratigraphical relationship between the two quarries is very uncertain.

## Conclusions

The rare fishes from Spittal Quarry, which confer its conservation value, are important for four reasons: (1) their good quality of preservation, (2) the presence of *Dickosteus threiplandi* and other fishes characteristic of Fish Zone 4 of Donovan *et al.* (1974), (3) the fact that Spittal Quarry is the type locality of *D. threiplandi*, and (4) the presence of *Cephalaspis magnifica*, the only known cephalaspid from the Orcadian Basin, and the only one from the Middle Devonian.

## Reference list

- Donovan, R.N., Foster, R.J. and Westoll, T.S. (1974) A stratigraphical revision of the Old Red Sandstone of North-eastern Caithness. *Transactions of the Royal Society of Edinburgh: Earth Sciences*, **69**, 167–201.
- Miles, R.S. and Westoll, T.S. (1963) Two new genera of Coccosteid Arthrodira from the Middle Old Red Sandstone of Scotland, and their stratigraphical distribution. *Transactions of the Royal Society of Edinburgh*, **65**, 179–216.
- Traquair, R.H. (1893) On the discovery of *Cephalaspis* in the Caithness Flags. *Annals of Scottish Natural History*, **2**, 206–7.
- Trewin, N.H. and Hurst, A. (eds) (1993) *Excursion Guide to the Geology of Eastern Sutherland and Caithness*. Scottish Academic Press for the Geological Societies of Aberdeen and Glasgow, Edinburgh, 123–66.