John o'Groats, Caithness

[ND 380 735]

Highlights

The fossil fishes from John o'Groats, Caithness (Highland), are some of the youngest known in the northern Scottish Middle Old Red Sandstone. Specimens are not abundant, but the site has produced excellent specimens of rare forms that are poorly known elsewhere.

Introduction

The John o'Groats Fish Bed crops out on the foreshore 365 m NE of the John o'Groats Hotel (Figure 6.28). The first report of a fossil fish from this site is a record of *Microbrachius dicki* by C.W. Peach (1868). Fossils are said to be difficult to obtain from this locality (Weston, 1948), but complete fishes can be collected, although they do not appear in such rich concentrations here as faunas in the older fish beds of the Caithness Flagstone Groups. An account of the locality is given in Trewin and Hurst (1993).

Description

The fish bed occurs as a thin band within the Last House Formation of the John o'Groats Sandstone Group (Foster, 1972; Donovan *et al.,* 1974) that forms the highest unit of the Middle Devonian in Caithness. The John o'Groats Group is dominated by cross-bedded sandstones, mainly yellow and buff below, reddish above, and which contain channels, evidence of dewatering structures, and grey fissile siltstones with desiccation cracks (Trewin and Hurst, 1993, p. 141).

The John o'Groats Fish Bed is the lowest of three thin silty carbonate laminites. It is faulted by a NE–SW-trending fault with a downthrow of 3.5 m, which displaces the bed north-eastwards on the seaward part of the foreshore (Foster, 1972). A marked notch indicates its outcrop across the foreshore in rocks which dip 20° to the east-north-east. Although scattered unidentifiable fish fragments occur elsewhere, this is the only fish bed within the 610 m of strata that make up the John o'Groats Sandstone Group, and is only exposed at this one locality. Nevertheless, the same fauna can be found in loose blocks on the shore at Gills Bay, where a fish bed presumably lies offshore.

A section at the site, measured by M.A. Rowlands, is as follows.

	Thickness (m)
Red mudstones and coarse siltstones (fluvial)	3
Convoluted siltstone; pink weathering	0.6
Red mudstones, fining upwards Dark grey, lacustrine varved laminite, becomes siltier upwards; rich in fish fragments, scales and coprolites	0.75 0.2
Green-grey mudstone	0.01
Hard light-grey dolostone	0.02
Red and green mudstones	0.04
Dark grey laminated siltstones with dolostone bands	0.37
John o' Groats Fish Bed; light-grey varved laminite, more calcareous at base; scales, fragments, and occasional complete fishes more common in upper part of bed, in siltier and better laminated siltstone	0.25
Convoluted, laminated siltstone with mudcracks and coarse siltstone dyke	0.1
Grey siltstone	0.02

Laminated, calcareous, dark grey siltstone	0.03
Soft bituminous shale	0.07
Dark grey siltstones with subaerial desiccation cracks in upper part, alternating with green mudstones and siltstones	0.08
Alternating red mudstones and thin (*c.* 50 mm), pink siltstones (fluvial)	10 +

The John o'Groats Sandstone Group is confined both above and below by faults representing unknown gaps in the sequence. It contains similar faunas to, and is correlated with, the Eday Group of Orkney (for lithological details, see Astin, 1985), and the gap between it and the underlying Mey Subgroup is assumed to be quite large, because there appears to be a whole faunal zone missing in Caithness that is present in Orkney (the *Asterolepis orcadensis* Zone of Watson, 1935, high in the Rousay Beds).

Fauna

Placodermi: Antiarcha: Microbrachiidae

Microbrachius dicki Traquair, 1888

Placodermi: Arthrodira: Coccosteidae

Watsonosteus fletti (Watson, 1932)

Osteichthyes: Sarcopterygii: Dipterida: Dipteridae

Pentlandia macroptera Traquair, 1889

Osteichthyes: Sarcopterygii: Osteolepiformes: Euthenopteridae

Tristichopterus alatus Egerton, 1861

Dipterus sp.

This locality yielded the type specimens of the very small bothriolepid *Microbrachius dicki,* plus *Pentlandia macroptera,* and *Tristichopterus alatus. Microbrachius* has recently been reported from the Devonian of China (Pan, 1984) and has long been known in the Baltic area Abava Substage.

This faunal assemblage is generally distinctive and specific to the John o'Groats Sandstone Group. Equivalent strata are represented by the Eday Flags in Orkney and the Brindister Flags in Shetland, which both contain similar faunas. The assemblage represents Faunal Zone 7 of Donovan *et al.* (1974), the top of the Middle Devonian sequence, and dated as mid- to late Givetian in age.

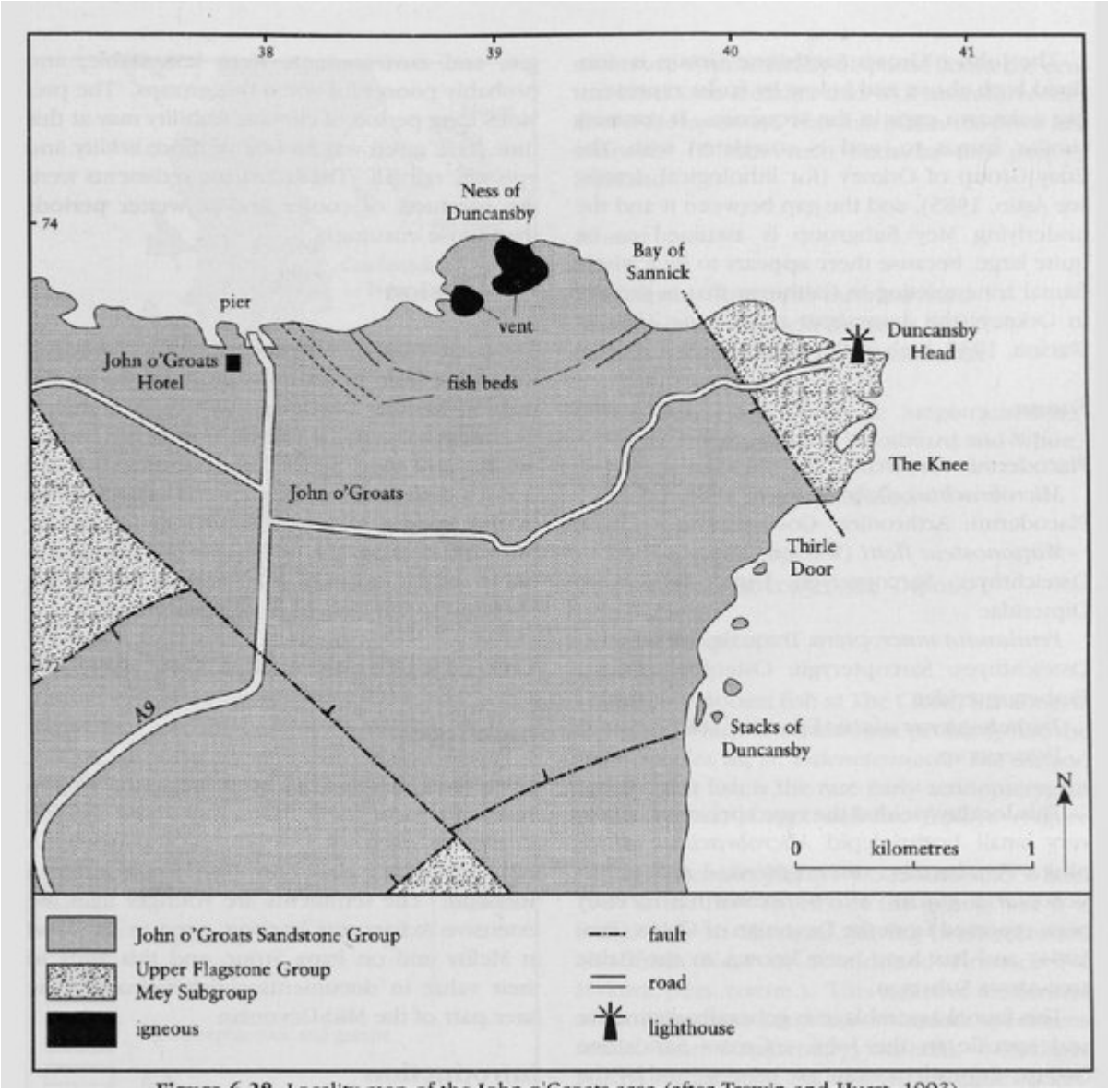
Interpretation

The lithological sequence has been interpreted as representing a low-angle broad alluvial fan with shallow channels, transgressed periodically by lake waters wherein lived the fish communities. The fauna from the fish bed consists of five species, fewer than in older fish beds of the Orcadian Basin. This may relate to the fact that the strata high in the Middle Devonian sequences are more fluvial than lacustrine in ori gin, and environments were less stable, and probably poorer for some fish groups. The previous long period of climatic stability may at this time have given way to one of more aridity and episodic rainfall. The lacustrine sediments were the products of cooler and/or wetter periods than those ensuing.

Conclusion

The John o'Groats Fish Bed derives its conservation value from its status as the best site for the highest Middle Devonian fish zone fauna in Caithness. The site is coastal, and hence continues to yield specimens. The fish fauna is more restricted than those encountered lower down in the Middle Old Red Sandstone sequence, probably because the sediments are mainly fluvial in origin, rather than lacustrine; the fish are confined to the lacustrine phases.

References



(Figure 6.28) Locality map of the John o'Groats area (after Trewin and Hurst, 15)93).