
ARDMORE - GALLANACH

OS Grid Reference: NM788226, NM793267, NM798267, NM826271

Highlights

The important fish beds in this outcrop occur in association with the Lorne lavas, and the fishes and associated plants give this volcanic sequence a biostratigraphical age. Up to eight species of fishes have been reported, providing a remarkable insight into a fish assemblage at the Silurian–Devonian boundary.

Introduction

The fish beds of the Lorne area, near Oban, Strathclyde, occur as isolated exposures of several flaggy and laminated beds within thick sequences of lavas and conglomerates. The discovery of fossil fishes and plants in 1897 by the Geological Survey was of great stratigraphical importance because their presence dated the Oban lavas as being of Lower Old Red Sandstone age. Four fish sites have been reported in the area: on the island of Kerrera and on the mainland at Gallanach Lodge, Selma Cottage Cliff and Dalintart railway cutting, of which only the first two are extant.

The geology and fish faunas of the area have been described by Geikie (1897), Symes and Traquair (1898), Symes (1898), Pratt (1900), Kynaston and Hill (1908), Lee and Bailey (1925), Stensiö (1932), Tarlo and Gurr (1964) and Tarlo (1967).

Description

The sediments that contain the fishes are dark grey, laminated and partly pyroclastic, and are associated with coarser siltier flags and siltstones with ripple marks and scattered sun cracks. The fish beds are marked at Gallanach and Kerrera by the presence of distinctive flaggy dark grey siltstones with bedding planes covered with rounded, usually cracked, thin dark grey films, possibly of algal origin.

Geikie (1897) reported the discovery by Macconochie of fishes in the Oban area, which were identified by Peach as parts of *Cephalaspis* (Pratt, 1900). Symes (1898), with notes by Traquair, reported the discovery of a new species, *Cephalaspis lornensis*, together with *Mesacanthus* cf. *mitchelli*, *Thelodus* and plant remains from the then newly discovered Gallanach site. In ascending stratigraphical order the four sites are as follows.

1. South shore of the island of Kerrera, south-west of Ardmore: grey flaggy shales, containing two fish beds, one exposed to the south-west of Ardmore, which has produced the majority of specimens, and a second to the east that has also yielded fish remains. The Kerrera site has proved to be important, having yielded a large collection of almost-complete fossils to L.B.H. Tarlo and P. Gurr in the 1960s. Unfortunately, the whereabouts of these specimens is unknown now (1996).
2. Gallanach Lodge: grey fine-grained flags intercalated within conglomerate.
3. Selma Cottage Cliff, near Selma Cottage, Oban: a greenish grey calcareous shale. This site was the original source of cephalaspids to the first collectors, but no longer exists. It is probably the site referred to as Carrick Villa by Traquair (1898b).
4. Dalintart railway cutting: a grey bituminous shale. There are two exposures 250 m apart, north-east of Dalintart Farm, Glen Crutten, 1 mile (1.6 m) E of Oban. A section is given by Kynaston and Hill (1908, p. 71).

Fauna

The fish fauna consists of about eight species of agnathan, acanthodian and placoderms:

AGNATHA Heterostraci: Anaspida

new species of anaspid: South Shore

Thelodonti: Thelodontidae

Thelodus sp.: Gallanach Lodge

Osteostraci: Cephalaspida: Cephalaspidae

'*Cephalaspis*' *lorrensis* Traquair, 1898: all four sites

'*Cephalaspis*' sp. (probable new species): South Shore

(*Gylenaspis maceacheni* Tarlo and Gurr, MS: South Shore and Dalintart railway cutting)

GNATHOSTOMATA

Acanthodii: Acanthodida: Acanthodidae

Mesacanthus cf. *mitchelli*: Gallanach Lodge

PLACODERMI

?arthrodire: South Shore

arctolepid spines: South Shore

The new anaspid is represented by a single unlocated specimen, which Gurr suggests came from the second, eastern fish bed at Ardmore. *Thelodus* was reported by Symes and Traquair (1898), but the original material has been lost (S. Turner, pers. comm., 1982) and no new material has been collected. '*Cephalaspis*' *lorrensis* Traquair, 1898 was described fully by Stensiö (1932). The lectotype is from 'Carrick Villa'. It is a cephalaspid with short cornua, narrow pectoral sinuses and broad interzonal part. *Gylenaspis* is a new species of ateleaspid which awaits description.

The jawed vertebrates from Kerrera are represented by fragmentary remains of an acanthodian compared with *Mesacanthus mitchelli* (Egerton, 1861; Figure 2.20) from the Dundee Formation of Forfarshire (Pragian, early Devonian), and two placoderms, a possible arthrodire and an arctolepid have been reported but not figured.

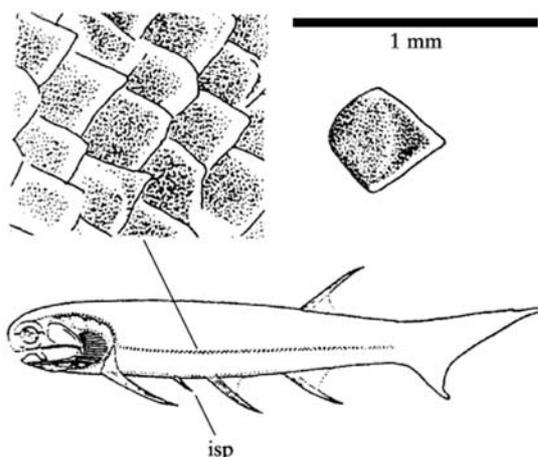


Figure 2.20: *Mesacanthus mitchelli* (Egerton) restoration in lateral view, approximately natural size (after Watson, 1937): isp, intermediate spine; with details of squamation of specimen from Tillywhandland (from Young, 1995).

Interpretation

No age has been defined for the Kerrera beds beyond 'Lower Old Red Sandstone', but this represents a facies that includes beds dated elsewhere as late Silurian and early Devonian. Gurr and Tarlo (1967) and Halstead (1993) gave a Gedinnian (= Lochkovian, earliest Devonian) age for the Kerrera site, based on the *Gylenaspis* that Tarlo listed as the last ateleaspid. However, Halstead (1993, p. 578) did not mention this record later, noting the last ateleaspids as *Hemicyclaspis murchisoni* and *Ateleaspis robustus* from the Píídolí of the Welsh Borders and Norway. Spores from a temporary excavation at the camp site north of Gallanach are of Lower Old Red Sandstone affinity (J.E.A. Marshall, pers. comm., 1982). Plants from the Gallanach fish bed have a Downtonian (Píídolí) appearance (C.J. Cleal, pers. comm.)

Unpublished studies by the late L.B.H. Tarlo and P. Gurr suggested that the beds within which the fossiliferous layers occur show repeated cyclothems, representing subtidal and intertidal sediments, and that the Kerrera deposits were probably laid down in a tidal basin, a regime intimately associated with cycles of volcanic activity from more than one centre and supporting a brackish-water vertebrate fauna.

The age of the Kerrera cephalaspids is critical to understanding the evolution of the group in Europe, since Kerrera and Oban were geographically midway between the Welsh Borders and Spitsbergen, two identified areas of cephalaspid evolution in the Late Silurian–Early Devonian (Dineley, 1973; Janvier, 1985a). Further studies may give some indication of the migration routes for genera between the two areas. The gnathostome remains (if such they are) may also be important, representing some of the oldest recorded placoderms in Britain. Arthrodires occur in the Lower Devonian of the Anglo-Welsh Basin (White, 1961), and are widespread throughout all the Lower Devonian vertebrate provinces of the world (Young, 1981).

Conclusions

The age of the Lorne fish sites is of considerable interest since it coincides with the transition from marginal Ludlow-age sediments to the continental Old Red Sandstone facies, and some of the fish specimens may be among the oldest within their groups. The conservation value lies in the uniqueness of the fauna at the species level and the possibility of establishing the age through further study and excavation of the fish-bearing strata.

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