The Toutties

[NO 881 866]

Highlights

The Toutties has yielded many good fish specimens from the Cowie Harbour Fish Bed. This Grampian site is important because the age may be latest Silurian (although that is controversial), and this represents one of the few British fish faunas of that age outside the Anglo-Welsh Borderland region.

Introduction

The Cowie Harbour Fish Bed crops out on the foreshore just south of the old harbour jetty to the north of Stonehaven, within rocks called 'The Toutties' (Figure 2.17). The geology of the site has been described by Campbell (1911, 1912b), Denison (1956), Armstrong and Paterson (1970) and Armstrong *et al.* (1978), and the fish fauna by Traquair (1912), Campbell (1913), Westoll (1945), White (1946, 1950a), Ritchie (1960, 1964) and Janvier (1981).

Description

In this vicinity Late Silurian strata rest unconformably on the much older (Cambrian age) Highland Boundary Group, which has been highly folded. The fish bed lies within the vertical Silurian strata and is faulted out at the southern end of the outcrop where the bed disappears under the low-tide mark in Cowie Harbour. Armstrong and Paterson (1970) divided the Upper Silurian 'Downtonian' Stonehaven Group into the lower Cowie Formation (730 m thick) with the fish bed in its upper part, and the overlying Carron Formation (820 m thick). The fish bed occurs in a sequence of alternating grey sandstones and shales, with brown, grey and red cross-bedded fluvial sandstones below and above (Figure 2.18).

The Cowie (Harbour) Fish Bed (also called the *Dictyocaris* Band or Member) was first described by Campbell (1911). Fossils had been collected for the Geological Survey by Macconochie in 1881, but the first agnathan fossils were not found until 1912, when a fish spine was discovered in a grey mudstone rich in the arthropod *Dictyocaris.* Cephalaspids also were found in a reddish sandy mudstone below this grey bed (Campbell, 1912a, 1912b).

Fauna

The recorded fish fauna from the Cowie Harbour Fish Bed includes an anaspid, a het-erostracan and a cephalaspid.

AGNATHA

Anaspida: Birkeniiformes: Birkeniidae

Birkenia sp.

Osteostraci: Ateleaspidiformes: ?Ateleaspididae

Hemiteleaspis heintzi Westoll

Heterostraci: Phialaspidiformes:

Traquairaspididae

Traquairaspis campbelli (Traquair, 1913)

The anaspid is represented by possible scutes of *Birkenia* recorded by Campbell (1913). Ritchie (1960, 1964) also reported the discovery of an anaspid which, with its well-developed lateral fin folds, resembles the Norwegian genera *Pharyngolepis* and *Pterygolepis.*

Some of the remains noted by Campbell (1912) were regarded by Traquair (1912) as cephalaspid scutes and plates. Westoll (1945) described a new genus and species of hemicyclaspid *Hemiteleaspis heintzi,* based on the impression of a single, incomplete head shield plus several separate scales from Cowie Harbour. Scales were also found, in association with *Dictyocaris* at nearby Tewel Burn. Westoll (1945) considered that *Hemiteleaspis* was intermediate in form between the cephalaspids *Aceraspis* (which Westoll considered to be ?latest Ludlow in age) from Rudstangen, Norway, and *Hemicyclaspis* from the Downtonian (P■ídolí) of the Welsh Borders and Jeloy, Norway. Janvier (1981, p. 131) regarded the hemicyclaspids as successive outgroups of the derived cornuate Osteostraci, with *Ateleaspis* from Slot Burn (q.v.) as the most primitive, followed *by Aceraspis* and *Hirella,* then *Hemiteleaspis* and finally *Hemicyclaspis* (Figure 3.14).

Traquair (1912) named a new species of heterostracan from the Cowie Harbour Fish Bed as *Cyathaspis campbelli.* When White (1946) described *Phialaspis pococki* from the P■ídolí of Shropshire, he erected the subspecies, *P. pococki cowiensis* based on plates from Cowie Harbour, but he later (White, 1950a) showed that these were actually ventral discs of *Cyathaspis campbelli,* which he assigned to the new genus *Traquairaspis* (Figure 2.19). This is the type species of the genus which until recently contained *Phialaspis,* a genus which is common in the Welsh Borders. Tarrant (1991) removed all the Welsh Borders species to *Phialaspis* and the new genus *Toombsaspis,* leaving *T. campbelli* as the sole species of *Traquairaspis.* It may be related to *Rimasventeraspis angusta* (Denison, 1963) from the P■ídolí of Yukon, Canada, these two species forming the Family Traquairaspididae, according to Tarrant (1991).

In recent years traquairaspids have been recorded from the Downtonian (P■ídolí) of the Mackenzie Mountains, Northwest Territories, Canada (Dineley and Loeffler, 1976) and the Peel Sound Formation and other units in the Central Arctic Islands (Dineley, 1990; Elliot, 1984). Talimaa (1995) also reports them from the Silurian and Lower Devonian of Timan–Pechova in northern Russia.

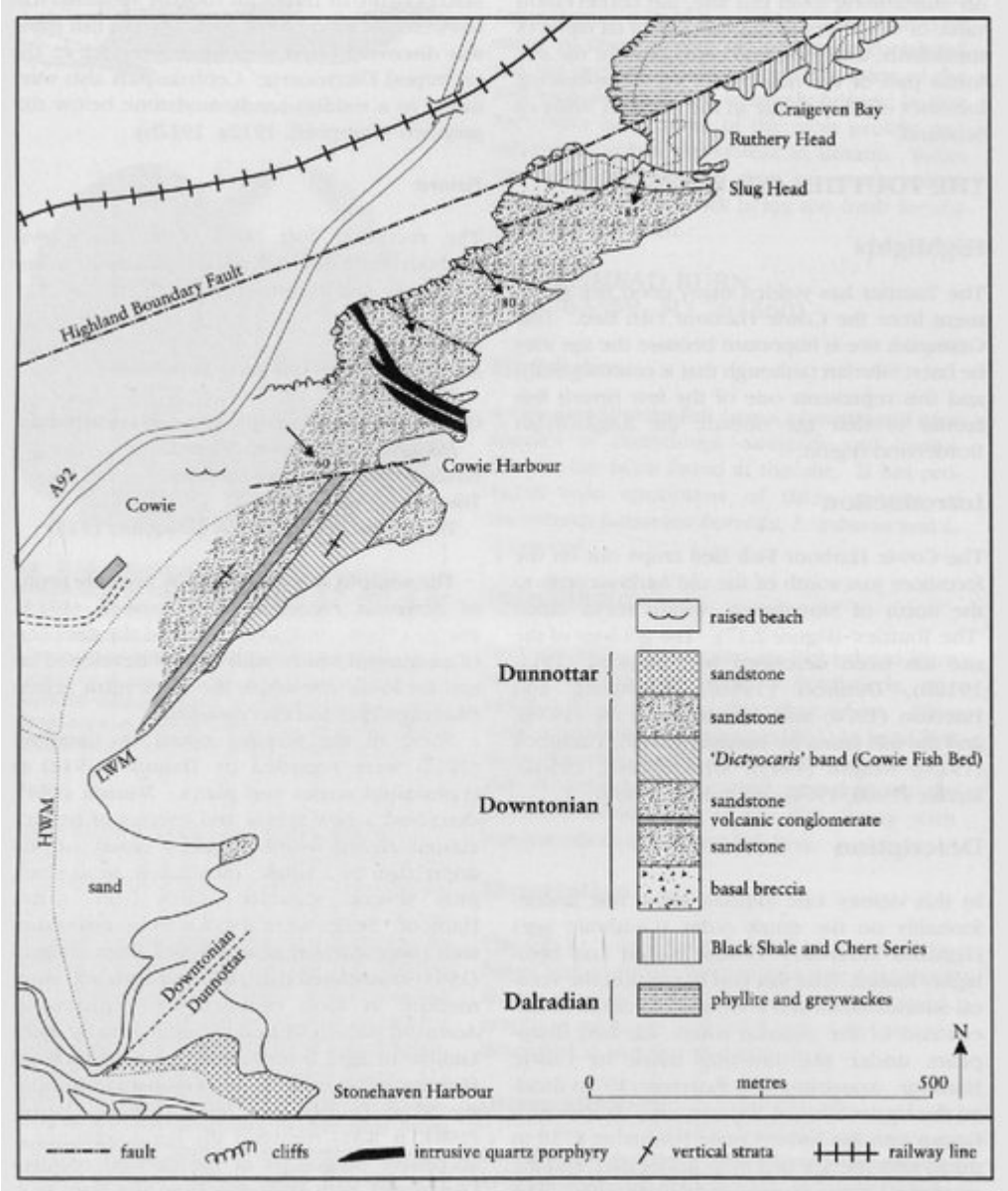
Interpretation

The 60 m or more of grey sandstones and shales containing the Cowie Harbour Fish Bed are interpreted as a fluvio-lacustrine floodplain complex (Armstrong *et al.,* 1978). This is the only section in Scotland that may contain Downtonian (P■ídolí) rocks (Denison, 1956; Westoll, 1977), although that is still uncertain (Cocks *et al.,* 1992). If Wellman and Richardson (1993) are correct in asserting that there is evidence of a Wenlock age for the Dictyocaris Beds, then *Traquairaspis campbelli* is substantially older than had previously been thought. Consequently this heterostracan is thereby more of an age with those from the Canadian Arctic Cape Phillips Formation and Cape Storm Formation (Dineley, 1990). The vertebrate assemblage may be regarded as non-marine (Boucot and Janis, 1983).

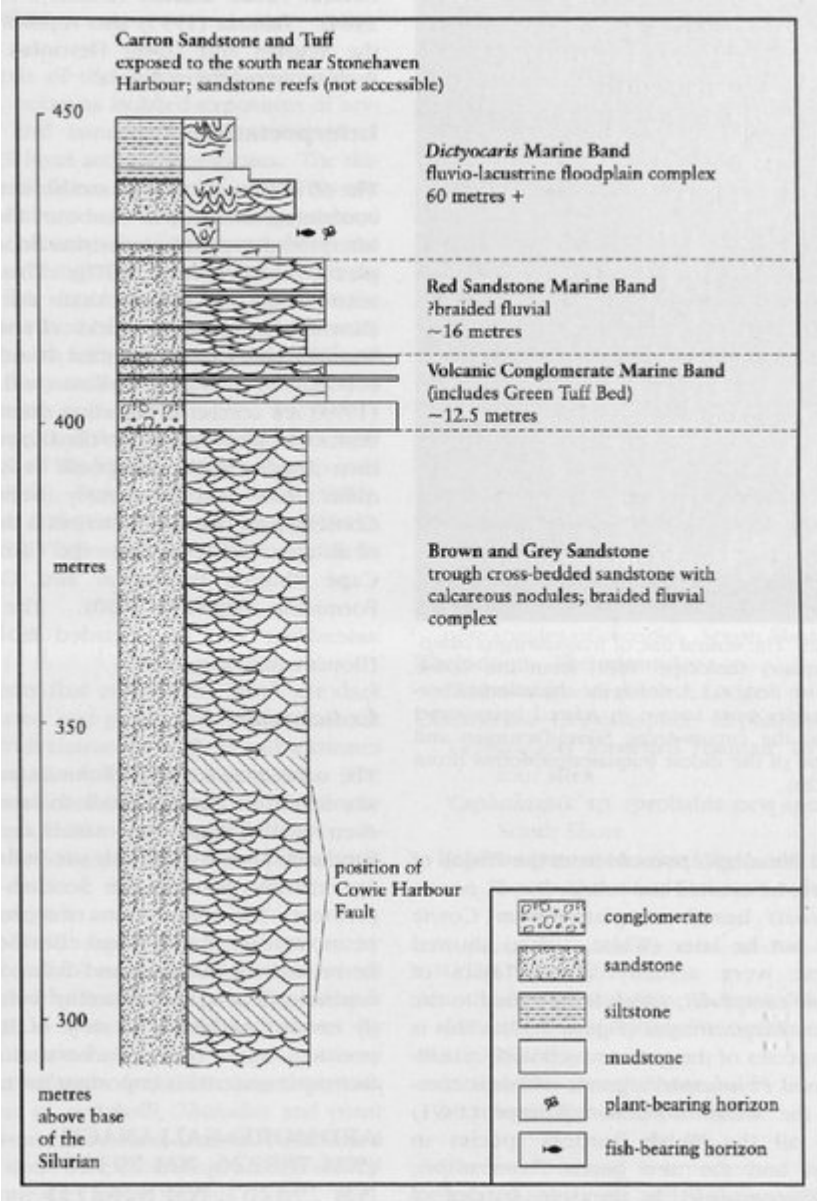
Conclusion

The conservation value of this as an important site lies in its ?late Wenlock to late Ludlow or even basal P■ídolí age, which is unique for Scotland. Also, it is the only site in Britain of that age that is part of the Scottish–Baltic fish province. The unique fauna of cephalaspids and heterostracans is not found elsewhere but may be related to Canadian and Baltic forms. Any further collecting at this locality would necessarily involve problems in view of its foreshore position, but a better understanding of *Traquairaspis* material is important for taxonomy.

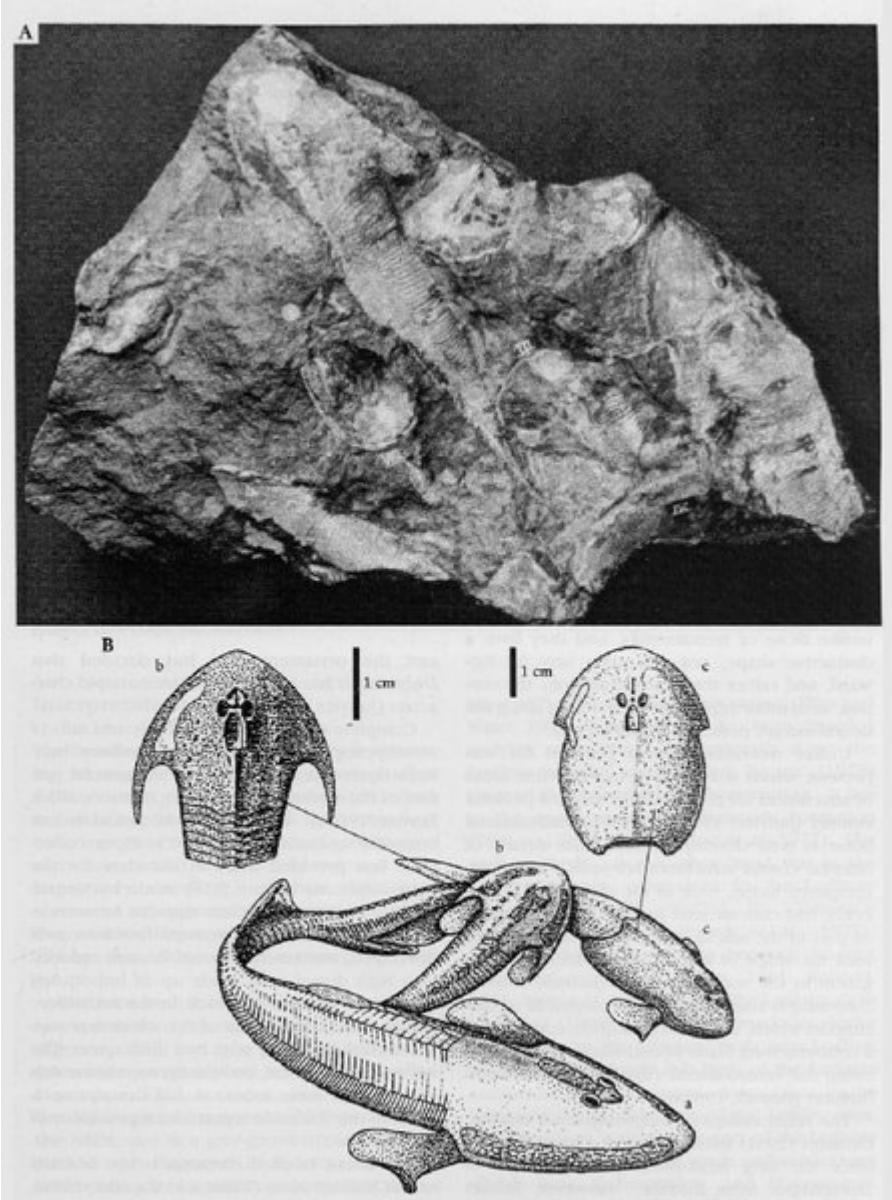
References



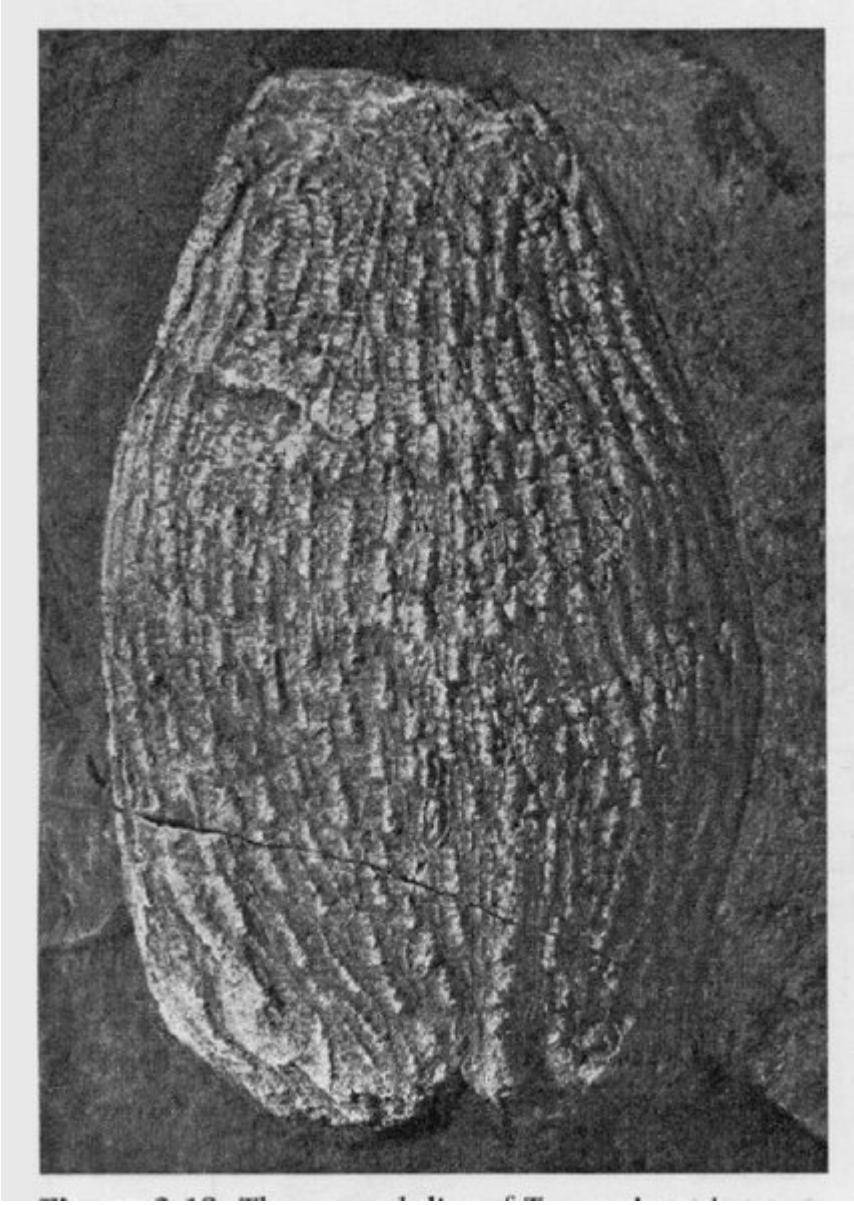
(Figure 2.17) Geological sketch-map of the coast to the north of Stonehaven (after McGregor, 1978); The Toutties is the area of foreshore south of Cowie Harbour.



(Figure 2.18) Stratigraphical log of the uppermost part of the Downtonian at The Toutties (after MacGregor, 1968).



(Figure 3.14) Osteostracans from the Ledbury cutting. (A) Hemicyclaspis murchisoni Egerton in rare preservation, one of many such slabs collected over 100 years ago, c. x 0.25, (photograph courtesy The Natural History Museum,London, T05398/A). (B) Restoration of vertebrates found at Ledbury: a, Hemicyclaspis murchisoni; b, Auchenaspis egertoni Lankester; c, Didymaspis grindrodi Lankester (from Blieck and Janvier, in press).



(Figure 2.19) The ventral disc of Traquairaspis campbelli (Traquair) (holotype, RSM) from the Cowie Harbour Fish Bed, x 1.3. It has the characteristic serrated tubercles now known in related heterostraci throughout the circum-Arctic Siluro-Devonian and may be one of the oldest traquairaspidiforms (from Kiaer, 1932b).