A NOTE ON THE BODY SCALING OF PTERICHTHYODES.

By

C. FORSTER-COOPER
(Cambridge).

With 2 figures and plate II.

The Mid-Devonian flagstone quarry of Achenarras in Caithness at the north of Scotland has long been known and celebrated as the only place where *Palaeospondylus* occurs. There is, however, in addition to this form a considerable and, on the whole, a well preserved fauna of other fishes including representatives of the genera *Dipterus*, *Osteolepis*, *Holoptychius*, *Cheirolepis*, *Diplacanthus*, *Mesacanthus*, *Cheiracanthus*, *Homosteus*, *Coccosteus and Pterichthyodes (Pterichthys)*. The quarry was opened for work in 1874 and its fauna first described by TRAQUAIR in 1890 (1) and again in 1894 (2). No further investigations seem to have been made until three years ago when the present writer made an expedition to the place and, by the kindness of Colonel MURRAY-THRIEPLAND the owner of the property, was allowed to re-open the quarry and continue work during the season of 1931 and the two following years. By this means a considerable collection of the fauna of the place has been got together which is now in process of development and preparation and will be described in detail at some later date.

The object of the present preliminary notice is to call attention to a detail in the structure of the tail region in *Pterichthyodes* which seems to have escaped notice. As is the case generally in the various specimens from Achenarras these fishes, except for being crushed flat, are often complete and well preserved. This flattening while it makes the interpretation of the carapace difficult has the advantage, on the contrary, of showing up the tail region rather

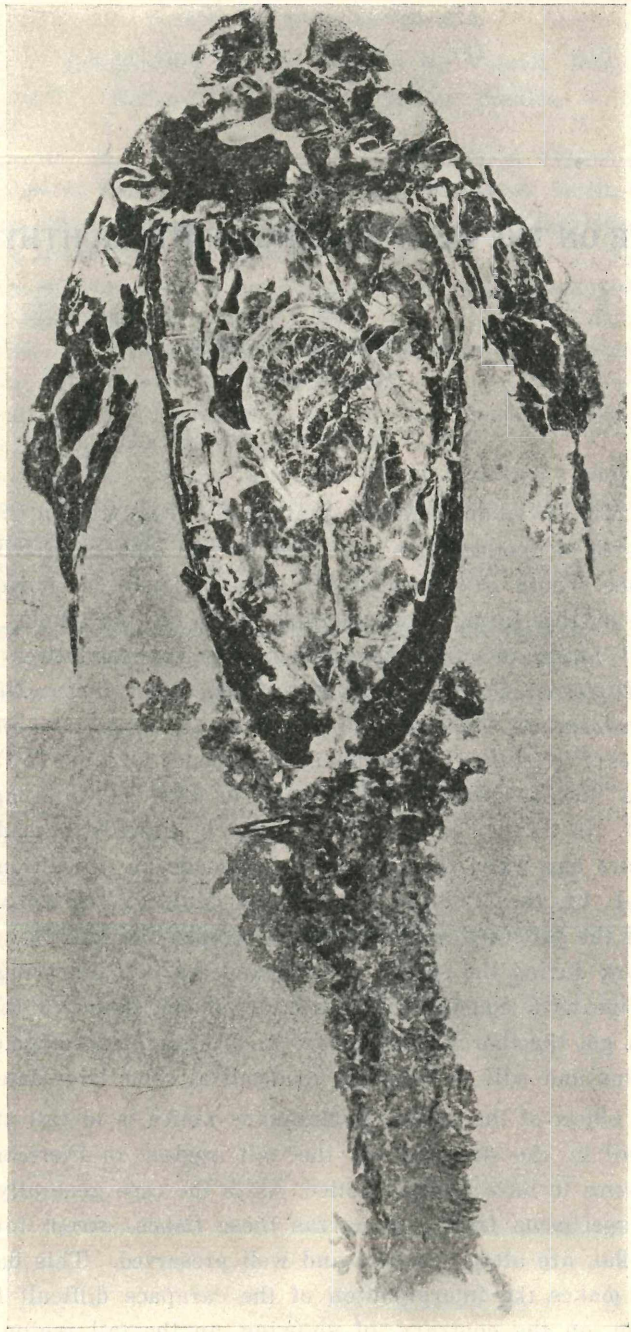

Fig. 1. *Pterichthyodes milleri,* somewhat reduced.

well. There is no intention in the present paper of discussing the question of the different species of *Pterichthyodes* which may be represented at Achenarras, a question which must wait until the numerous examples have been further prepared and examined. TRAQUAIR has already recorded his opinion that there is only one, *P. milleri*, and that the different forms are sexual (3).

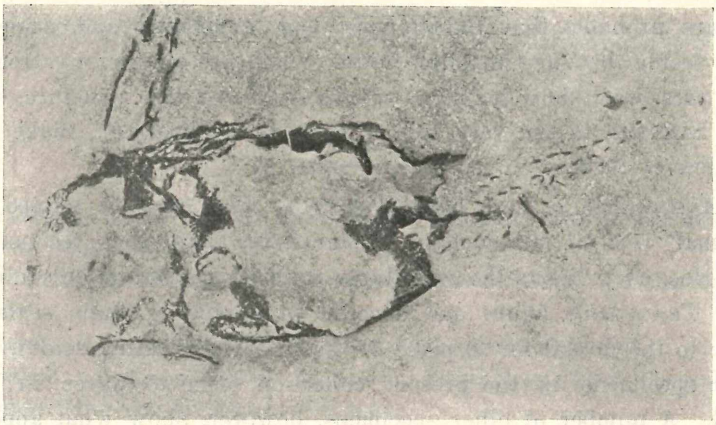

Fig. 2. *Pterichthyodes cancriformis*, natural size.

From a preliminary examination of some fifty specimens it seems clear that there are two forms at least of *Pterichthyodes* present with different types of protective structures on the trunk.

The tail region of members of the Asterolepidae generally is not well known. TRAQUAIR in his diagnosis of the group as a whole (Palaeont. Soc. 1894 p. 70, The fishes of the old Red Sandstone) states that "the tail, where known, is covered with bony scales, and provided with one dorsal and a completely heterocercal caudal fin" and for *P. milleri*, in particular, in describing a specimen from Achenarras (loc. cit. p. 99), he says that "the proportions of body to tail are well exhibited, we note here the arrangement of the scales on the side in longitudinal rows, the dorsal fin with its enlarged scales on the anterior margin, and the narrow oblique fulcra on the upper border of the caudal body prolongation . . .". There is no further mention of scales in the rest of his

account though attention must be called to his restoration, in side view (loc. cit. fig. 36) of *P. milleri* where cycloid scales are shown on the body and on some of them, on the anterior middle part of the body, with small longitudinal lines drawn on them forming four irregular rows. There is no account in the paper to explain what is meant by these or whether spines or perhaps lateral line organs are meant.

Of the tail structure of other forms we are ignorant though it appears probable that *Bothriolepis* had a smooth and scaleless skin, seeing that the Canadian forms, which are otherwise extremely well preserved, show no signs whatever of any tail structure. Nor does STENSIÖ, in his very full account of the group ([4]), make any mention of them.

A specimen is here figured showing what may be termed the "normal" type of tail such as is shown in TRAQUAIR's reconstruction (loc. cit.). It has the same large rounded scales and only differs from TRAQUAIR's figure and account in having a single scale or spine to the dorsal fin in place of the three imbricating scales. The other specimens in the present collection seem to agree in this point. A number of other specimens, however, show what appears to be an entirely different arrangement. No scales are visible but, instead, a series of small elongated lines which can only be described as representing spines. In some cases these markings have the appearance of pits which may mark the points where the spines have been torn out and removed on the counterpart of the fossil.

A reference to AGASSIZ (Poissons fossiles du vieux grés rouge 1844/45, Plate I, fig. 4) shows such a specimen with the name *P. cancriformis*. In his description of this species (loc. cit. text page 17) he makes no reference to the tail and it natural perhaps that from a single and rather poor specimen this point should have escaped notice. The number of specimens, however, from Achenarras that have this particular appearance seems to show that it is a real and not an accidental feature.

This difference in the character of the tail appears sufficient to distinguish the two forms as different species, and AGASSIZ's name *P. cancriformis* is suggested for the spine tailed form, the type being his figure. In the British Museum Catalogue of fossil fishes *P. cancriformis* is placed as a synonym of *P. productus* (Ag).

The latter species, however, may be but a sexual form of *P. milleri*, and has the tail of that species.

Whether there is here sufficient evidence to make a generic separation must remain in doubt until the material has been examined further.

References.

1. TRAQUAIR, R. H. On the fossil fishes found at Achenarras quarry. Ann. Mag. Nat. Hist. 1890.
2. TRAQUAIR, R. H. Achenarras revisited. Proc. R. Phys. Soc. Edinburgh 1894.
3. TRAQUAIR, R. H. The Asterolepidae. Palaeontogr. Soc. 1904.
4. STENSIÖ, E. A:son. Upper Devonian Vertebrates from Greenland. Meddelelser om Gronland 1931.

Explanation of plate.

Plate II:

Fig. 1: *Pterichthyodes cancriformis*, almost natural size.

Fig. 2: *Pterichthyodes cancriformis* the tail region enlarged showing lines of pits.

Fig. 3: *Pterichthyodes cancriformis*, almost natural size showing the lines of spines.

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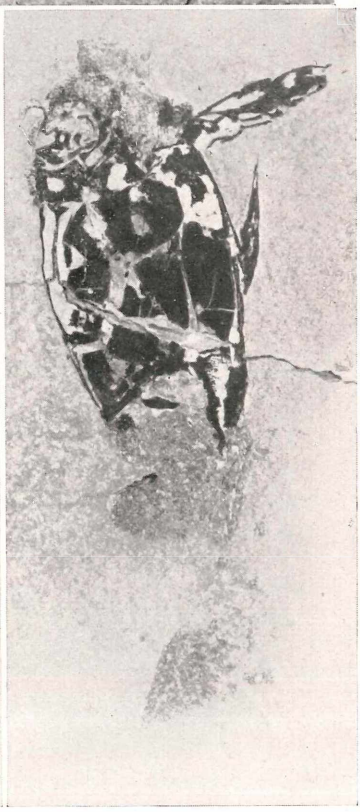

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