

Note on a find of a crossopterygian head (Pisces), upper Westphalian D, Sydney Coalfield, Nova Scotia, Canada

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Although documented palaeontologic collections from the Carboniferous System in Nova Scotia and New Brunswick, Canada, date back at least to 1840, only some scales and bones of megalichthiid crossopterygian fish are described and figured (Gardiner, 1966, p. 86). The newly discovered find of a nearly complete crossopterygian head with adjoining scales in life position is significant as few Late Carboniferous crossopterygians are known and this specimen is well preserved.

The fossil came from a ca. 20 cm thick stromatolitic limestone band, representing a brackish ephemeral palaeolake during a time of non-peat deposition in the Sydney Basin (Vasey and Zodrow, 1983). Stratigraphically, the algal limestone is located about 10 m above the Harbour Seam (Zodrow, 1985, Text-Fig. 1), in the upper part of the *Linopteris obliqua* floral zone (Zodrow and Vasey, 1986, Fig. 18). The strata of this section are homotaxial with the upper Westphalian D stage (Zodrow and Cleal, 1985, Fig. 5), or approximately 300 million years old (Forster and Warrington, 1985).

A limestone slab of ca. 70 cm length contains the fossil fish which consists of the head and adjoining articulate scales showing a lateral line and fins. After preparation, the dorsal side of the

fish head is approximately 13 cm long and only slightly flattened laterally. Only a few frontal teeth are preserved, they are small (3-5 mm long) and conic in shape. The scales are rhomboid in outline and are up to 2.5 cm long and 1.8 cm wide, and much of the external surface is covered by shiny cosmine. The cosmine is missing around the scale margins, from which it is separated by a distinct groove (Fig. 1).

Crossopterygian heads are well known and even *Megalichthys* is now well described (Jarvik, 1966; Bjerring, 1972; Schultze, 1974).

This new find shows clearly that two articulations are present. The articulation between the ethmosphenoid and otico-occipital divisions of the skull are represented as '1' in Figure 2a, and '2' is the connection between the head and the trunk. Further, the gill flaps are oblong in shape and large, about 6 cm long and 4 cm wide.

Assignment to a species is not possible. The specimen could be referred to the Subfamily Megalichthyinae, cf. *Megalichthys* sp., if the specimen can be shown to lack apineal foramen, and if it has a complex articulation between the dermal parietal and the frontal shields, and a medial branch running from the intertem-

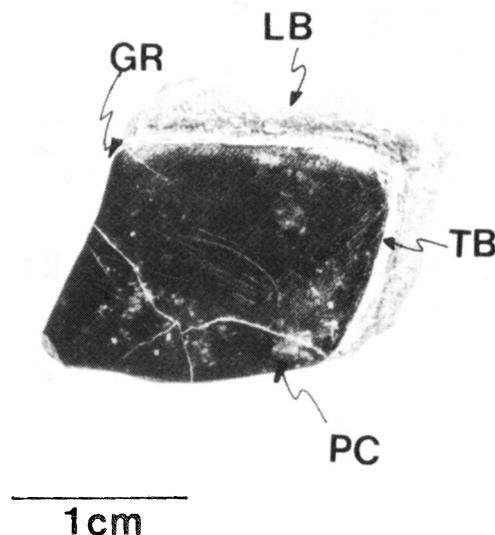
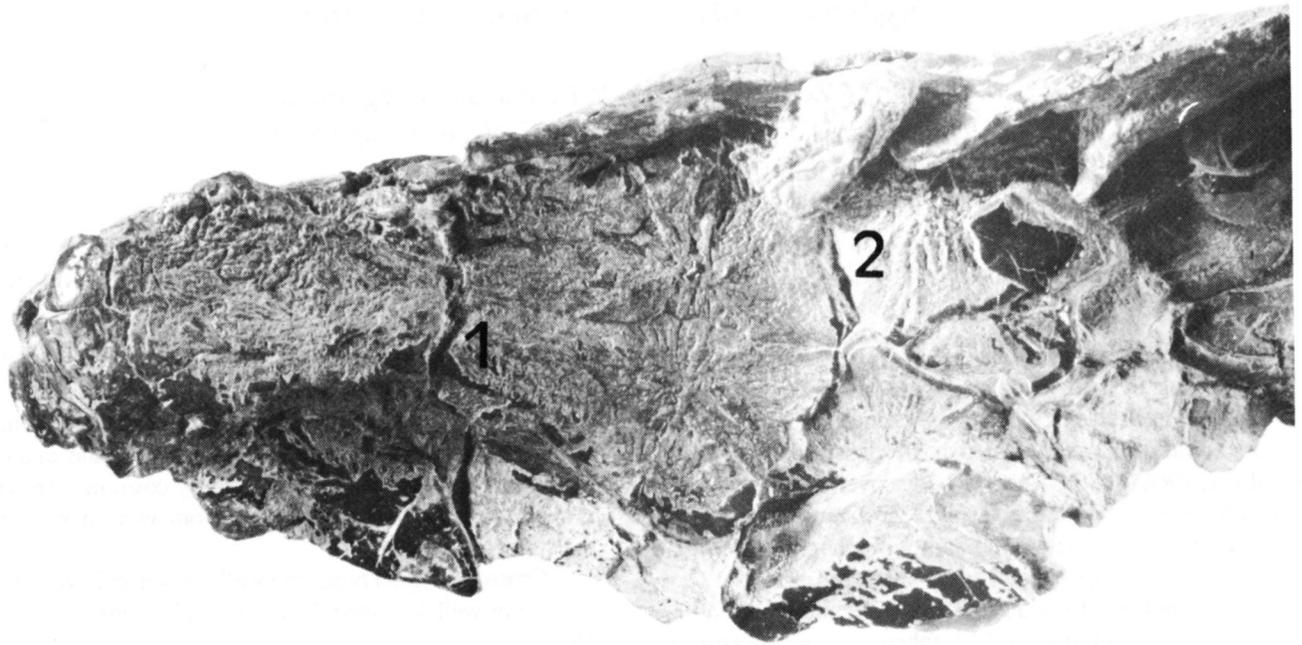
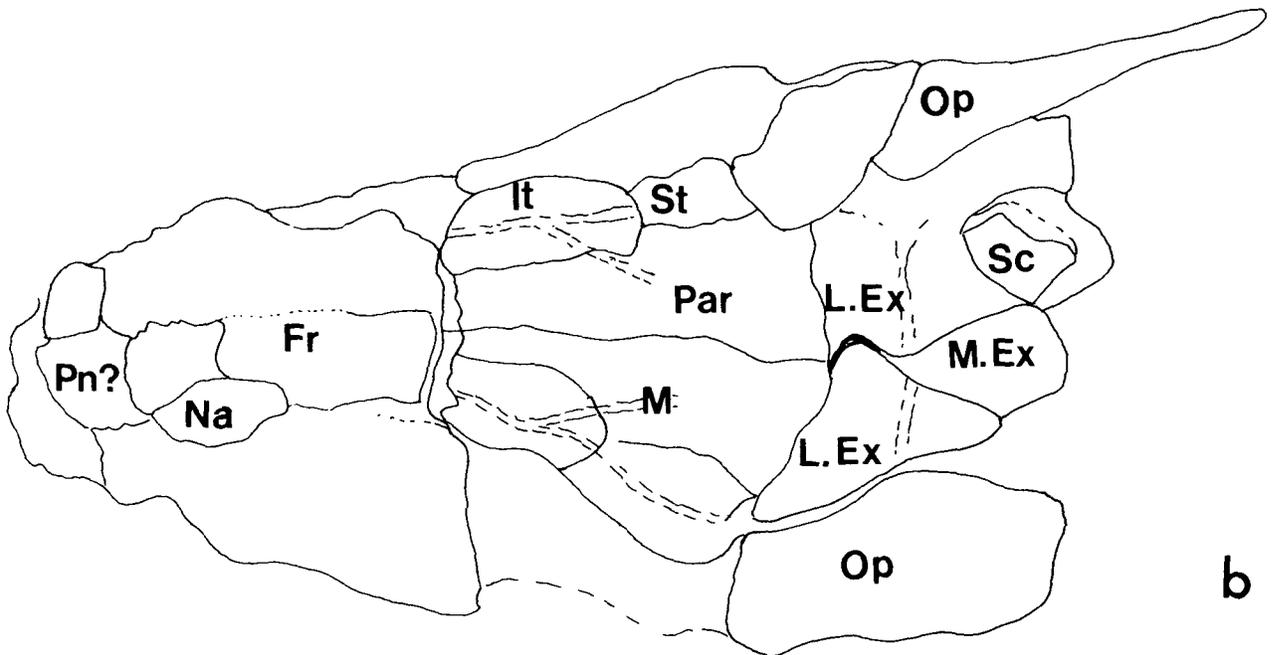


Fig. 1. External surface of a scale detached from the dorsal part of the specimen; GR - groove, LB - lamellar bone, TB - trabecular bone, PC - porous cosmine.



NMC 40606

a



b

Fig. 2. (a) Crossopterygian head, dorsal view of the specimen NMC 40606; Sydney Coalfield, Nova Scotia, Canada; 1 articulation between ethmosphenoid and otico-occipital divisions of the head, and 2 articulation between parietal shield and extrascapulars. Slightly smaller than natural size. (b) Overlay of Figure 2 showing Fr - frontal, It - intertemporal, L.Ex - lateral extrascapular, M - medial branch of lateral-line canal into parietal, M.Ex - median extrascapular, Na - nasal, Op - opercular, Par - parietal shield, Pn - postrostrals, Sc - *in situ* scale, St - supratemporal.

poral into the centre of the parietal (Bjerring, 1972). Two contacting lateral extrascapulars are noted (Fig. 2b) which are present in some *Megalichthys*. Exclusion from *Ectosteorhachis* is as yet not ruled out either (Long, 1985). The specimen is now being fully studied to clarify these and some other questions and results will be communicated in a future publication.

The fossil was discovered by the junior authors and bears the catalogue number NMC 40606 of the National Museum of Natural Sciences, Paleobiology Division, Ottawa, Canada. Financial assistance by the Museum and technical help with the MS, especially Figure 2b, by Dr. J.A. Long are gratefully acknowledged.

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