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A NEW DICTYOPYGID FROM THE CAVE SANDSTONE OF LESOTHO, SOUTHERN AFRICA

by

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INTRODUCTION

The Lower Triassic of South Africa has yielded an array of early dictyopygids (Brough, 1931, 1936) yet none of those advanced dictyopygids so characteristic of the Upper Triassic of North America (Schaeffer, 1967) has so far been recorded from the African continent. The geographical distribution of the dictyopygids appears to be a discontinuous one with the Lower Triassic forms coming mainly from South Africa, the Middle Triassic ones from Australia and the Upper Triassic forms from North America. It is thus surprising to find a seemingly advanced dictyopygid in the rather unfossiliferous Cave Sandstone of Lesotho.

The Cave Sandstone, where it is developed in southern Africa, is a fine-grained feldspathic sandstone, varying in thickness from 200 to 1 000 feet (61 m to 300 m). Although spread over an enormous area it is remarkably uniform in character, consisting of fine, rounded grains, typical of aeolian deposition. This together with its friable texture and pink colouration is indicative of the widespread desert conditions which must have prevailed during its formation. Lithologically the Cave Sandstone is somewhat similar to the underlying Red Beds but unlike the Red Beds it is relatively unfossiliferous. In the Lower Zone of the Cave Sandstone, however, reptile remains are more common and include two crocodiles, six prosauropod dinosaurs, one ornithischian dinosaur and two therapsids (Haughton, 1929; Haughton and Brink, 1954; Anderson and Anderson, 1970). The only other recorded vertebrates are the fishes *Semionotus capensis* Woodward (1888) and *Helichthys*(?) sp. Haughton (1924). *Semionotus capensis* occurs quite commonly throughout the Cave Sandstone whereas Haughton's *Helichthys* is known from one specimen only. This specimen (Haughton, 1924) collected near Siberia, Cape Province, came from the shale band near the base of the Cave Sandstone. It is clearly synonymous with *Daedalichthys higginsi* Brough (1931) from Bekker's Kraal which in turn is synonymous with *Dictyopyge formosa* Broom (1909) also from Bekker's Kraal. Thus Haughton's *Helichthys* should correctly be referred to as *Daedalichthys formosa* (Broom). Further Bekker's Kraal forms the Lower part of the *Cynognathus* zone in the Orange Free State and as such is Scythian in age (Lower Scythian probably, Hutchinson, 1972). Pending a thorough revision of these fish, it is likely that *D. formosa* is found ranging from the L. Triassic *Cynognathus* zone to the base of the Cave Sandstone. The associated invertebrates, a few insects and the crustacean *Estheria draperi* do not throw any light on the problem at present.

SYSTEMATIC DESCRIPTION

Order REDFIELDIIFORMES *sensu* GARDINER, 1967
Family Dictyopygidae Hay, 1889
Genus *Endemichthys* nov.

DIAGNOSIS. Dictyopygid in which the trunk tapers sharply towards a narrow caudal peduncle; both the dorsal and anal fins are inserted posteriorly, the former originating behind the latter. Dorsal fin with 19 rays, anal fin with 30 rays, pelvic with not more than 7 rays. Scales rhomboid, smooth and disposed in the posterior region of the trunk in such a manner that the longitudinal scale rows run backwards and upwards. Enlarged median ridge scales confined to the caudal peduncle. Lateral line indistinct in at least the posterior region of the trunk.

ETYMOLOGY. From Greek endēmos, "native to this place".

TYPE AND ONLY SPECIES. *Endemichthys likhoeli* nov.

Endemichthys likhoeli nov.

DIAGNOSIS. As for genus; only species.

ETYMOLOGY. Species name refers to the locality, Mount Likhoeli.

HOLOTYPE. Specimen consisting of the hind region of the trunk including the dorsal, anal and impression of right pelvic fins, from the Upper Triassic Cave Sandstone of Mount Likhoeli, Lesotho. The holotype is in the collection of University College, London, catalogue number U.C.10,000.

MATERIAL. No material other than the holotype is known.

REMARKS. This description is based upon a specimen collected by Dr. K. A. Kermack and Mrs. F. Mussett of University College, London during an expedition to Lesotho in 1963. We are grateful to Dr. Kermack for permission to describe this material.

The specimen was found lying on a Cave

Sandstone plateau (elevation, 1 737 m) at the base of the north-western tip of Mount Likhoeli, 5 km. south by south-east of Mafeteng, Mafeteng District, Lesotho. The horizon from which the fish came is unknown, but clearly it must have originated from within the massive Cave Sandstone band which forms a cap to many of the peaks in western Lesotho.

DESCRIPTION. The specimen is 73 mm long. Characteristically the rounded body tapers sharply posterior to the origin of the dorsal and anal fins and the dorsal profile is steeper than the ventral. The caudal peduncle is narrow and equivalent to less than one third of the estimated maximum depth of the body.

The dorsal fin consists of nineteen rays of which the anterior four are unbranched. All rays are closely articulated throughout their length and the posterior rays are somewhat stouter than those anteriorly. Preceding the fin are five basal fulcra which form a series continuous with fringing fulcra borne upon the leading edges of the anterior four fin rays.

The longer based anal fin originates anterior to the level of the dorsal fin and consists of thirty rays preceded by four basal fulcra. Like the rays in the dorsal fin those found posteriorly are recognisably stouter than those anteriorly. The first five anal fin rays are unbranched and at least the first four bear fringing fulcra.

A poor impression is all that remains of the right pelvic fin which appears to be composed of seven rays of which the posterior two are branched.

Over much of the body the scales are thick and rhomboidal but those near the caudal peduncle are polygonal in outline. Postero-dorsally there are three irregular ural scales and they indicate the position of the hinge line. The surface of each scale is generally smooth save for a few randomly

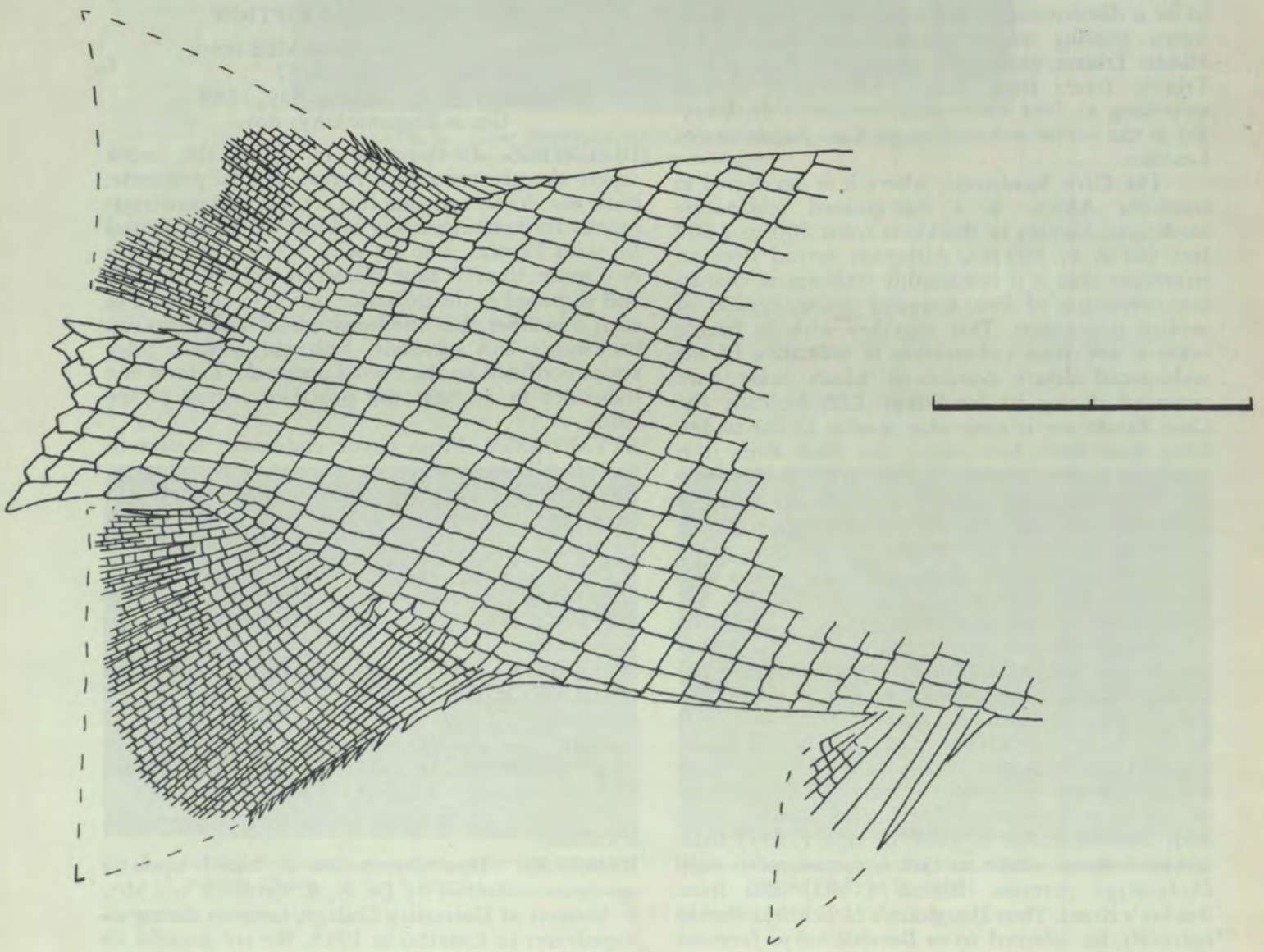

Fig. 1.
Endemichthys likhoelei gen. et sp. nov., restoration of holotype in right lateral view. Scale 20 mm.

distributed pits. Scales found anterior to the dorsal and anal fins show very fine indentations along the posterior margin. There appear to be six minute indentations per scale. Those scales near the caudal peduncle also show indentations but here they are confined to the postero-ventral angle of each scale. The longitudinal scale rows pass upward and backward towards the tail, an orientation which is unusual among chondrosteans, but one that is also seen in the dictyopygid *Cionichthys greeni* Schaeffer from the Upper Triassic of Texas.

Along the bases of the dorsal and anal fins the scales are very small and it is difficult to identify their exact nature and distribution. Enlarged ridge scales are present both above and below the caudal peduncle. The transverse scale row immediately anterior to the anal fin is composed of twenty-one scales; this number decreases to six, plus the median ridge scales, at the level of the caudal peduncle.

DISCUSSION

The fin form, scale shape and distribution indicate that *Endemichthys* should be referred to the Order Redfieldiiformes as a member of the only contained family Dictyopygidae (= Redfieldiidae *sensu* Schaeffer, 1967). Dictyopygids are known only from the Triassic and are believed to have been entirely restricted to fresh-water. Schaeffer (1967, p. 335) points out that, with one or two exceptions, the distribution of the dictyopygids is restricted to different continents for each of the major subdivisions of the Triassic. Thus those from South Africa are Lower Triassic, those from Australia are Middle Triassic, while dictyopygids from North America are Upper Triassic in age. It is therefore of interest, although not altogether surprising, that *Endemichthys* is found in Upper Triassic strata of southern Africa.

Endemichthys is poorly known and detailed comparison with other dictyopygids is difficult; however a few brief notes are in order. *Endemichthys* differs from the Lower Triassic dictyopygids of South Africa (e.g. *Helichthys, Atopocephala* and *Daedalichthys*) in showing posteriorly placed median fins, with the anal fin inserted anteriorly to the dorsal, the relatively high number of anal fin rays and an apparent lack of a lateral line in at least the posterior region of the body. These points of distinction are, on the other hand, points of similarity with the dictyopygids described by Schaeffer (1967) from the Upper Triassic of the western United States. Indeed *Endemichthys* closely resembles *Cionichthys* Schaeffer. In both genera the scales are approximately isodiametric and the longitudinal scale rows towards the caudal fin run upwards and backwards. *Endemichthys* also resembles *Cionichthys* in that the body is sharply tapered posteriorly, although the tapering is more pronounced in *Endemichthys*.

Endemichthys then appears to be an advanced dictyopygid, similar to *Cionichthys*, and the Cave Sandstone may be correlated with the Chinle Formation of North America. As such the Cave Sandstone is probably of Carnian-Norian age.

In conclusion we now have from southern Africa an early redfieldiid in the form of *Ischnolepis bancrofti* Haughton from the Upper Permian (? Sythian) of Zambia and a late member of the same group in *Endemichthys* from the Upper Trias of Lesotho.

REFERENCES

ANDERSON, H. M. and ANDERSON, J. M. (1970). A preliminary review of the biostratigraphy of the Uppermost Permian, Triassic and Lowermost Jurassic of Gondwanaland. *Palaeont. afr.*, 13, Supplement: 22 pp. and charts.

BROOM, R. (1909). The fossil fishes of the Upper Karroo beds of South Africa. *Ann. S. Afr. Mus.*, 7, 251–269, pls. 12, 13.

BROUGH, J. (1931). On fossil fishes from the Karroo System, and some general considerations on the bony fishes of the Triassic Period. *Proc. Zool. Soc. Lond.*, 1931, 235–296.

——— (1936). On the evolution of bony fishes during the Triassic Period. *Biol. Rev.*, 11, 385–405.

GARDINER, B. G. (1967). Further notes on palaeoniscoid fishes with a classification of the Chondrostei. *Bull. Br. Mus. nat. Hist. (Geol.)*, 14, 5, 143–206, 24 figs., 3 pls.

HAUGHTON, S. H. (1924). The fauna and stratigraphy of the Stormberg Series. *Ann. S. Afr. Mus.*, 12, 323–495, 55 figs.

——— (1929). Report on fossil remains from Glen Curragh Farm, Nyamandhlovu District, Southern Rhodesia. *Proc. Rhod. Sci. Ass.*, 29, 8–9, 1 pl.

HAY, O. P. (1889). On some changes in the names, generic and specific, of certain fossil fishes. *Am. Nat.* Lancaster, 33, 394, 783–792.

HUTCHINSON, P. (1972). A revision of the redfieldiiform and perleidiform fishes from the Triassic of Bekker's Kraal (South Africa) and Brookvale (New South Wales). *Bull. Br. Mus. nat. Hist. (Geol.)*, 22, 6, In press.

SCHAEFFER, B. (1967). Late Triassic fishes from the Western United States. *Bull. Am. Mus. nat. Hist.*, New York, 135, 285–342, 19 figs., 23 pls.

WOODWARD, A. S. (1888). On two new lepidotoid ganoids from the early Mesozoic deposits of Orange Free State, South Africa. *Quart. J. Geol. Soc. Lond.*, 44, 138–143, pl. 6.