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**The Annals and magazine of natural history; zoology, botany, and geology
being a continuation of the Annals combined with Loudon and
Charlesworth's Magazine of Natural History.**

London, Taylor and Francis, Ltd.

<http://www.biodiversitylibrary.org/bibliography/15774>

6th ser. v. 15 (1895): <http://www.biodiversitylibrary.org/item/54281>

Page(s): Cover, Page 1, Page 2, Page 3, Text

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THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY.

[SIXTH SERIES.]

“..... per litora spargite muscum,
Naiades, et circum vitreos considite fontes:
Pollice virgineo teneros hinc carpite flores:
Floribus et pictum, divæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas;
Ite, recurvato variata corallia trunco
Vellite muscosis e rupibus, et mihi conchas
Ferte, Deæ pelagi, et pingui conchylia succo.”
N. Parthenii Giannettasii Ecl. 1.

No. 85. JANUARY 1895.

I.—*On two Deep-bodied Species of the Clupeoid Genus
Diplomystus.* By A. SMITH WOODWARD, F.L.S.

[Plate I. figs. 1-4.]

SEVERAL of the doubly-armoured herrings of the genus *Diplomystus** are much deepened in the abdominal region; but none are so remarkable in this respect as *D. longicostatus*, from the Cretaceous of Brazil, and a smaller form from the Upper Cretaceous of Mount Lebanon, which seems to have hitherto escaped notice in collections among specimens of the so-called *Platax minor*. An accurate technical description of the former has already been published by Professor Cope †, but a good figure of a typical specimen is still wanted; no notice of the latter has hitherto appeared, and it will therefore be interesting to point out its characters. Good examples of both species are preserved in the British Museum, and form the subject of the following notes.

* E. D. Cope, Bull. U.S. Geol. Surv. Territ. vol. iii. (1877) p. 808.

† E. D. Cope, "A Contribution to the Vertebrate Palæontology of Brazil," Proc. Amer. Phil. Soc. vol. xxiii. (1886) p. 3.

Diplomystus longicostatus, Cope. (Pl. I. fig. 1.)

The type specimen of this species, now in the collection of Professor Cope, Philadelphia, was discovered by Mr. Joseph Mawson, F.G.S., in the Cretaceous of Itacaranha, near Bahia, Brazil. Other fragments were met with at the same time, and some presented to the British Museum* ; but it was not until quite lately that our national collection became enriched by another complete specimen of the fish, discovered by the same indefatigable explorer of the Brazilian Cretaceous. This fossil, which seems to be imperfect in the anterior dorsal region, is shown of the natural size in Pl. I. fig. 1, and partly confirms, partly extends, Cope's original description of the species.

The general form and proportions of the fish are seen to be exactly as already described, while the numbers of the dorsal and anal fin-rays have been correctly given. Now for the first time, however, the pelvic fins are indicated, of very small size, arising opposite the origin of the dorsal, and the pectoral fins are not placed quite so high upon the flank as in the type specimen. The skeleton is obscured in places by a thin film of matrix ; but it is clear that there were about twenty-four abdominal vertebræ, as stated by Cope, while the number of caudals is twelve (not ten). The long ribs extend to the ventral border, and the hindermost five or six pairs are attached to rapidly elongating processes, the ribs shortening in proportion as the latter increase. The neural arches are all fused with the vertebral centra ; but in the anterior caudals the line of union between each neural arch and its spine can be distinguished. There are also traces of intermuscular bones in the dorsal region. The dorsal and anal fins are imperfect, but the slender caudal lobes are especially well shown. The dorsal ridge-scales are also obscured or destroyed and the contour of the back apparently distorted, but the characteristic ventral ridge-scales appear to be more satisfactorily displayed than previously. In the anterior half of the abdomen these scales are of normal size ; but immediately behind the pelvic fins they begin to increase, and the three hindermost scales are relatively gigantic. Each exhibits a long posteriorly directed point, and is apparently smooth.

The new example of *D. longicostatus* thus described was obtained by Mr. Mawson from the beach between Itacaranha and Plataforma ; and to complete our knowledge of the species it now only remains to discover the dentition and the squamation of the flank.

* A. S. Woodward, "Notes on some Vertebrate Fossils from the Province of Bahia, Brazil, collected by Joseph Mawson, Esq., F.G.S.," *Ann. & Mag. Nat. Hist.* [6] vol. ii. (1888) p. 132.

Diplomystus Birdi, sp. n. (Pl. I. figs. 2-4.)

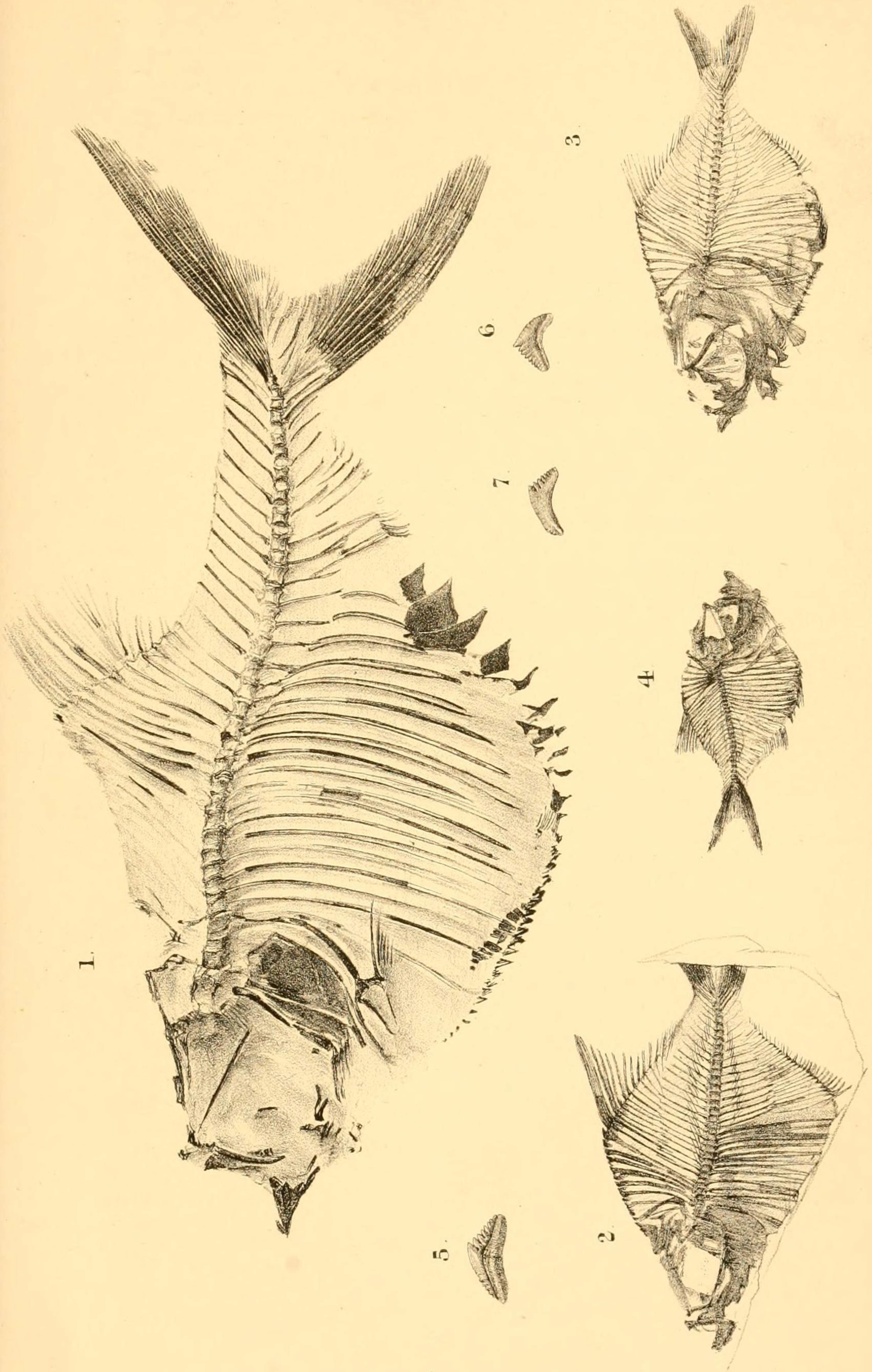
Type.—Nearly complete fish; British Museum.

Sp. Char.—A small deep-bodied species, attaining a length of about 0.06 metre. Dorsal region much elevated, the margin rising to the origin of the dorsal fin, where it is almost angularly bent; caudal region relatively long. Maximum depth of trunk nearly or quite as great as its length from the pectoral arch to the base of the caudal fin; length of head with opercular apparatus equalling about two thirds of the same measurement. Abdominal vertebræ 14 to 16, caudals 18 in number. Dorsal fin arising well in advance of the middle of the back, with about 16 or 18 rays; anal fin not completely behind the dorsal, comprising 25 rays. Dorsal ridge-scales with a prominent median acumination; ventral ridge-scales nearly regular in size, not excessively enlarged, sharply pointed.

Obs. The species thus defined was first observed by the present writer in the collection of the Rev. William Bird, A.M., of Abeih, now in the Museum of the Syrian Protestant College, Beyrout. It may therefore be named *D. Birdi*, in honour of one of the most devoted students of Syrian geology. There are, however, several examples of the fish also in the British Museum, and three of these are shown of the natural size in Plate I. figs. 2-4. The second (fig. 3) is to be regarded as the type specimen. The species seems to have been moderately robust, for the various examples are much distorted by crushing; but the study of a series suggests that the type specimen shows the nearly normal form of the trunk, while the head is better preserved in the original of fig. 2. Figs. 3 and 4 show the small pelvic fins opposed to the origin of the dorsal; and the first has one side of the pectoral arch somewhat displaced backwards. The deeply cleft caudal fin is indicated in figs. 3 and 4. The much-thickened neural spines supporting the dorsal ridge-scales are shown in all the specimens, and intermuscular bones are conspicuous both above and below the vertebral column. The dorsal ridge-scales seem to have been broader than long, with one prominent median point and some apparently also with one or two pairs of lateral denticulations. The squamation of the flanks is shown to have been very thin.

Diplomystus Birdi is most closely related to the associated *D. brevissimus*, but differs in the much deepened form of its trunk and the arched contour of the back.

Formation and Locality. Upper Cretaceous; Hakel, Mount Lebanon.



CRETACEOUS FISHES.