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1. *On a NEW SPECIMEN of the CHIMÆROID FISH, MYRIACANTHUS PARADOXUS, from the LOWER LIAS near LYME REGIS (DORSET).*
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(Read November 22nd, 1905.)

[PLATE I.]

IN 1871 the late Sir Philip Egerton¹ communicated to the Geological Society an account of part of a fossil Chimæroid from the Lower Lias of Lyme Regis, remarkable as exhibiting a peculiar prolongation of the snout like that of the existing *Callorhynchus*. He named the specimen *Ischyodus orthorhinus*. In the following year he described² the somewhat anomalous dentition of a much larger Chimæroid fish from the same formation and locality, and regarded it as representing a previously-unknown genus and species, *Prognathodus Guentheri*. With the aid of additional specimens in 1889, I was able to prove³ that the dorsal fin-spine of the so-called '*Ischyodus orthorhinus*' was identical with an ichthyodorulite which had been named *Myriacanthus granulatus* by Louis Agassiz in 1837⁴; while the dentition of the same fish, when satisfactorily preserved, agreed generically with that known as *Prognathodus*. I therefore

¹ 'On a New Chimæroid Fish from the Lias of Lyme Regis (*Ischyodus orthorhinus*)' Quart. Journ. Geol. Soc. vol. xxvii (1871) pp. 275-78 & pl. xiii.

² 'On *Prognathodus Guentheri*, Egerton, a new Genus of Fossil Fish from the Lias of Lyme Regis' *ibid.* vol. xxviii (1872) pp. 233-36 & pl. viii.

³ 'On the Myriacanthidæ—an Extinct Family of Chimæroid Fishes' Ann. & Mag. Nat. Hist. ser. 6, vol. iv (1889) pp. 275-80; see also 'Catalogue of the Fossil Fishes in the British Museum' pt. ii (1891).

⁴ 'Recherches sur les Poissons fossiles' vol. iii (1837) p. 40 & pl. viii a, fig. 16.

inferred that the larger ichthyodorulite named *Myriacanthus paradoxus* by Agassiz,¹ belonged to the same fish as the larger dentition named *Prognathodus Guentheri*; and in this determination I was confirmed by the discovery of a very similar spine in association with a *Prognathodus*-like dentition in the Lithographic Stone of Bavaria.² The name *Myriacanthus* thus acquired a definite zoological meaning, and no longer denoted a mere ichthyodorulite of doubtful relationships.

Until the present time, however, the spine named *Myriacanthus paradoxus* has not been found in direct association with the dentition described as *Prognathodus Guentheri*. The expected discovery has at last been made, and as the new specimen displays some additional features of interest, it seems worthy of special description. The fossil in question (Pl. I, figs. 1-4) was lately obtained by Mr. S. Curtis from the Lower Lias of Black Ven, and has been acquired by the British Museum (Natural History), which already possesses the specimens previously described. It shows the dorsal fin-spine in direct connection with a mass of decayed cartilage, dermal plates, and teeth; and there can be no doubt that it represents the crushed and partly-scattered remains of a single individual.

Much of the cartilage in the fossil is calcified in small polygonal tesserae, which are especially large and conspicuous on the rostral prolongation (*r*), and were originally mistaken by Egerton for shagreen. Part of the ascending limb of the pectoral arch (*pct*) is distinguishable among the confused remains.

The dental plates are but slightly displaced, and are sufficiently well preserved for identification. The right palatine (*r.pa*) is exposed from the upper attached face, but its thin ascending externo-lateral edge is crushed inwards. Allowance being made for the small distortion, it exhibits the shape and proportions of the corresponding plate already described in the so-called '*Prognathodus Guentheri*.' The left palatine (*l.pa*) is less satisfactorily exposed from its lower or oral face, but exhibits the usual lack of the tritor on an oblique patch in its anterior half.³ One of the vomerine plates (*v*) shows only the inner face by which it was apposed to its fellow of the opposite side. The hinder part of the lower border of the right mandibular dental plate is just visible (*md*), and the displaced presymphysial tooth (*ps*) is well shown from the inner aspect. The latter tooth (Pl. I, fig. 2) tapers rapidly to its inserted end, while its inner face is flattened, marked only by feeble transverse lines of growth, and bordered on each side by a rounded raised rim. In cross-section, the outer part of the tooth shows cancellated structure, and the tritor is confined to a thin inner layer.

¹ 'Recherches sur les Poissons fossiles' vol. iii (1837) p. 38 & pl. vi.

² K. A. von Zittel, 'Handbuch der Paläontologie' vol. iii (1887) pp. 113-14 & fig. 126. See also J. Reiss, Paläontographica, vol. xxiv (1887) p. 21, pl. ii, figs. 9-11 & pl. iii, figs. 1-10.

³ See 'Catalogue of the Fossil Fishes in the British Museum' pt. ii (1891) pl. ii, fig. 1.

The frontal spine or tenaculum (*t*) is only partly shown in left side-view; but it was obviously expanded at the base, and tapered to a point distally. It is relatively small, and its size denotes that the animal to which it belonged was immature.¹ The teeth and fin-spine, indeed, are only about two-thirds as large as those in the larger and best-known examples of the same species. Scattered beneath the anterior half of the tenaculum and farther forwards on the rostrum are numerous small hooklets, which doubtless originally assisted in the prehensile functions of the spine. Each of these hooklets (Pl. I, fig. 3) is a polished recurved point fixed on an expanded base, which is marked by radiating furrows. Very minute hooklets and stellate tubercles of similar shape (fig. 3 *a*) are also visible in a patch on the anterior part of the fossil, and perhaps at the base of the dorsal fin-spine. They have already been noticed in the skin of the allied genus *Chimæropsis* from the Bavarian Lithographic Stone.² It is curious that there are no traces of calcified rings marking the course of sensory canals.

In addition to the frontal spine and hooklets just described, there are also remains of two, or perhaps three, pairs of the tuberculated dermal plates, which have already been noticed in other specimens. The most anterior pair preserved (*i*) is that of which one plate is well shown in the type-specimen of *Prognathodus Guentheri* described by Egerton. The hollow, ridged plate (fig. 4) is ornamented by rows of smooth tubercles which radiate down the sides from the summit; and its ridge is surmounted by large, longitudinally striated spikes, of which only two are exhibited in the new fossil, but of which there are four in a specimen in the Museum of Practical Geology (fig. 5).³ One of a pair of narrow ridged plates is exposed from its attached face farther back in the fossil (*iii*); and this is evidently identical with a plate represented in another specimen in the British Museum.⁴ At the base of the tenaculum there is part of another plate (*ii*), which may be the fellow of that just mentioned, or may belong to an intermediate pair.

The straight dorsal fin-spine, exposed in left side-view (*d.f*), is much crushed, and has accidentally lost nearly all its thorn-shaped denticles; but it is interesting, as displaying for the first time the complete base of insertion. This base is comparatively short, and tapers to a bluntly-pointed lower extremity. The very slender apical part of the spine is almost destitute of tubercles on the sides, but is marked with conspicuous longitudinal striations.

The new fossil thus warrants the conclusion that *Myriacanthus* is a Chimæroid closely similar to the Upper Jurassic *Chimæropsis*, with (i) a median chisel-shaped tooth in front of the lower jaw; (ii) a few tuberculated dermal plates on the head; and (iii) a tuber-

¹ On the growth of the frontal spine in male Chimæroids, see A. Günther, 'Report on the Deep-Sea Fishes,' *Challenger Reports*, vol. xxii (1887) p. 12.

² K. A. von Zittel, 'Handbuch der Paläontologie' vol. iii (1887) p. 113.

³ B. Dean, 'American Geologist' vol. xxxiv (1904) p. 52 & pl. ii, fig. C.

⁴ 'Catalogue of Fossil Fishes' pt. ii (1891) pl. ii, fig. 2.

culated dorsal fin-spine. In these three respects it differs from all other known Chimæroids—even from the comparatively-primitive types which have been discovered during recent years in the Japanese seas.¹ The Myriacanthidæ, in fact, have still no nearer ally than *Callorhynchus*, with which Egerton originally compared his so-called '*Ischyodus orthorhinus*.'

EXPLANATION OF PLATE I.

- Fig. 1. *Myriacanthus paradoxus*, Agassiz; remains of anterior portion of fish, with dorsal fin-spine, one-quarter natural size.—Lower Lias; Black Ven, Lyme Regis. [Brit. Mus. no. P. 10130.] *d.f.*, dorsal fin-spine; *l.pa.*, left palatine dental plate; *md.*, right mandibular dental plate; *pct.*, cartilage of pectoral arch; *ps.*, presymphysial tooth; *r.*, rostral cartilage; *r.pa.*, right palatine dental plate; *t.*, frontal spine or tenaculum; *v.*, vomerine dental plate; i, ii, iii, dermal plates.
2. Presymphysial tooth of the same specimen, inner aspect, natural size.
 3. Dermal hooklets from the rostrum of the same specimen, two being of the natural size, and the cluster (3 *a*) enlarged sixteen times.
 4. Dermal plate i of the same specimen, natural size.
 5. Corresponding dermal plate of another specimen of the same species, natural size. [Museum of Practical Geology, Jermyn Street, no. 1545.]

¹ S. Garman, 'The Chimæroids, especially *Rhinochimæra* & its Allies Bull. Mus. Comp. Zool. Harvard, vol. xli, no. 2 (1904), with fifteen plates.

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MYRIACANTHUS PARADOXUS.