

A NEW FISH SPINE FROM THE PENNSYLVANIAN OF OHIO

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The species described below increases to two the number of species of the ichthyodorulite genus *Ctenacanthus* recorded from the Pennsylvanian rocks of Ohio, the other species being *C. marshi* Newberry, 1873.

Genus *Ctenacanthus* Agassiz, 1837

Ctenacanthus lamborni Wells, n. sp.

(Plate I, Figures 1-6.)

Description.—Based upon an imperfect spine, measuring 9.2 cm. in length, anteroposterior diameter 11 mm. at the outer end, 26 mm. at the inner end. Transverse diameter 11 mm. Inserted portion and distal end not retained. Radius of curvature of anterior edge, 17 cm. Pulp cavity at outer end nearly cylindrical, 1 mm. in diameter; at inner end compressed, 5 mm. by 12 mm., with posterior surface virtually flat. Anterior edge with a single continuous smooth rounded costa, 2 mm. across, 1.5 mm. high, the sides of which bear obsolescent tubercles. Posterior face nearly flat with closely spaced linear strips separated by rows of fine pores, its lateral margins rounded, 1.5 mm. higher than the face, and marked by well-developed rows of hooked denticles that represent a diminished extension of the lateral costae. Lateral surfaces ornamented with closely-spaced longitudinal costae that may be divided into two sets, anterior and posterior. The total number of costae ranges from 25-26 on the inner end to 17-18 on the outer, with 21 midway between, the increase in number proximally being due to bifurcation. The anterior set or group of costae consists of 9-10 large costae concentric with the outer curvature, 0.5-0.75 mm. thick, pectinated by transverse tubercles of which 6-9 occur in a space of 5 mm. The tubercles are further pectinated by rounded ridges transverse to their long axes. The posterior set is formed by 8-15 narrower costae, 0.2-0.5 mm. thick, concentric with the posterior curvature, pectinated by irregularly fluted tubercles of which 5-6 occur in a space of 5 mm. The most posterior of the costae of this set spiral gently over the margin where their tubercles are hook-shaped.

Occurrence and Material.—Ames limestone, Cornsmaugh group, Upper Pennsylvanian, east central part of Section 22, 0.75 miles east of Claysville, Guernsey County, Ohio. One specimen, collected by R. E. Lamborn (O. S. U. Geol. Mus. No. 19501).

Remarks.—When collected the spine was almost wholly enclosed in a small block of limestone, from which it was freed by etching with acetic acid. It is imperfect and lacks the proximal and distal portions, but is so clearly distinguished by its form and sculpture that it should easily be recognized when collected in the future.

Three other species of *Ctenacanthus* have been described from the Pennsylvanian of this country: *C. amblyxiphias* Eastman (1903, p. 186, pl. 2, figs. 22, 23; non Cope, 1891, p. 449, pl. 23, figs. 3a-c, nec Branson, 1916, p. 654, pl. 2, fig. 25, text fig. 5) from the Missourian group (Atchison shales) of Nebraska; *C. buttersi* St. John and Worthen (1883, p. 240, pl. 22, fig. 2) from the "shales over Coal No. 5" in Illinois; and *C. marshi* Newberry (1873, p. 326, pl. 36, figs. 3-3b) from near Zanesville, Ohio. Of these, *C. marshi* is marked by coarse, seemingly smooth and unornamented lateral costae; the others have finer, ornamented costae. *C. buttersi* has different proportions—larger radius of curvature and triangular cross-section with the posterior width nearly equal to the height, and strongly tuberculated rather than smooth anterior costa on the cutwater edge.

C. amblyxiphias was originally described from the Permian of Texas by Cope (1891). Later Hussakof re-figured Cope's type, repeated his description but added nothing further (1911, p. 161, pl. 30, figs. 6-6a). In the meantime Eastman (1903) referred two fragmentary spines from the Missourian of Nebraska to the species, but gave no description of them. Branson identified the

species among the fish remains of the Embar formation (Permian) of Wyoming, and indicated that his specimens differed from Cope's in two respects: different ornamentation and no diminution of the costae posteriorly. However, study of Branson's figures suggests that there is a diminution in costal width posteriorly. As to the difference in ornamentation, it is unfortunate that he did not specify what that difference was, for his figures fail to show any, not being sufficiently enlarged.

C. lamborni, on the basis of Cope's description and figures and Hussakof's figure, has a costal arrangement and ornamentation like that of *C. amblyxiphias*, but they differ considerably in their cross-sectional proportions, as indicated by the following analysis:

	Transverse Posterior Diameter	Antero- Posterior Diameter	Ratio	Tubercles per 5 mm. on Larger Costae
<i>C. amblyxiphias</i> (Cope's descr.).....	17 mm.	28 mm.	1 : 1.64
<i>C. amblyxiphias</i> (Hussakof's fig.).....	15	28	1 : 1.93	6
<i>C. amblyxiphias</i> (Eastman's fig.).....	5-8
<i>C. amblyxiphias</i> (Branson's reduced fig.).....	4.5	11	1 : 2.44
<i>C. lamborni</i> n. sp. (proximal).....	11	26	1 : 2.34	6-9
<i>C. lamborni</i> n. sp. (distal).....	6	15.5	1 : 2.6	

Eastman's *C. amblyxiphias* at present cannot be definitely placed until more data on its proportions be obtained, but it may be suggested that it is not the same as the Permian *C. amblyxiphias* but either closely allied to or even identical with *C. lamborni*.

REFERENCES

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4. **Hussakof, L.** 1911. *The Permian fishes of North America.* In: E. C. Case, Revision of the amphibia and pisces of the Permian of North America. Carnegie Inst. Wash., Pub. 146, 155-175, pls. 26-32, figs. 53-56.
5. **Newberry, J. S.** 1873. *Descriptions of fossil fishes.* Geol. Surv. Ohio, Rep., Vol. 1, Geol. and Palaeont., Pt. 2, Palaeont., 247-355, pls. 24-40, 1 fig.
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EXPLANATION OF PLATE I

Ctenacanthus lamborni Wells, n. sp.

(All figures are of the holotype, O. S. U. 19501.)

- 1, 2, 3. Anterior, lateral, and posterior aspects, $\times 1$.
4. Outline of cross-section of spine at end of preserved proximal portion, $\times 1$.
- 5, 6. Surface ornamentation of lateral costae, $\times 6$. In upper quarter of both figures are the larger costae of the anterior group with their strongly compressed, pectinated, transverse tuberculations; in the lower three-quarters are narrower costae of the posterior group with the tubercles losing their regularity posteriorly and becoming subconical.

