

**Article XI.**—DESCRIPTIONS OF FOUR NEW PALÆOZOIC FISHES  
FROM NORTH AMERICA.

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PLATE XLVII.

Of the four species described in this paper, one is an Arthrodire, belonging to the genus *Dinomylostoma*, and is the second species of this remarkable genus to be made known. The second is a fish spine with extraordinarily large denticles, which show the very unusual feature of gradually increasing, instead of decreasing in size, distalward; this species is placed provisionally in the genus *Apateacanthus*. The third and fourth species are diminutive representatives of the genus *Stethacanthus*, occurring in small nodules from the Waverly formation of Kentucky.

The types of all four species are preserved in the American Museum of Natural History.

***Dinomylostoma eastmani* n. sp.**

Plate XLVII, Fig. 7.

*Type*.—Right mandible in matrix, showing outer aspect. No. 7932 Amer. Mus.

Anterior portion of mandible resembling that of *Dinichthys* in general proportions, and rising anteriorly into a cusp or point, which is not, however, a distinct "tooth" as in *Dinichthys*. Functional surface, a long, narrow grinding area, broadest at about its first third, and gradually narrowing backward. Greatest width of tritoral area contained about  $2\frac{1}{2}$  times in depth of the mandible measured at middle of tritoral area. Anterior portion of mandible, when viewed from above, convex on outer face, and gently curving inward toward symphysis to meet the opposite ramus.

*Horizon and locality*.—New Albany shale, or Genesee "black slate" (Upper Devonian); near Louisville, Kentucky.

The genus *Dinomylostoma* Eastman<sup>1</sup> is remarkable among Arthrodires for having a mandible with a narrow grinding functional edge that fulfills almost the ideal requirements in a transition stage between the cutting

<sup>1</sup> Bull. Mus. Compar. Zool., L, 1906, p. 23.

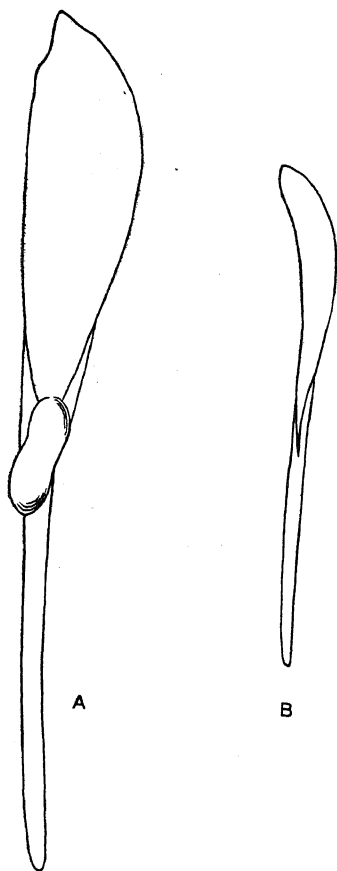


Fig. 1. Oral views of the right mandibles of A, *Dinomylostoma beecheri* Eastman; B, *D. eastmani*, n. sp.  $\times$  about  $\frac{1}{2}$ .

type of mandible of *Dinichthys* and the heavy, knob-like grinding element of *Mylostoma*. Hitherto *Dinomylostoma* has been known by only a single species, *D. beecheri* Eastman. From this the newly described species differs in its smaller size, the relatively narrower tritoral area, and the lesser depth of the anterior portion of the mandible, in outer view. In *D. beecheri* the width of the tritoral area is four-fifths the depth of the outer face, measured at the middle of the functional portion of the blade; in *D. eastmani* it is only about one third. As far as width of the tritoral area is concerned, the new species is therefore even closer to *Dinichthys* than is the type species; it is, in fact, intermediate between *Dinichthys* and the previously known species of *Dinomylostoma*. If we were to arrange a series of stages between *Dinichthys* and the Arthroires with a grinding dentition, upon mandibles alone, and with the species now known, the series would read:

1, *Dinichthys*; 2, *Dinomylostoma eastmani*; 3, *Dinomylostoma beecheri*; 4, *Mylostoma*.

The species is named for Prof. Charles R. Eastman of the Carnegie Museum, Pittsburgh, in appreciation of his extensive and very valuable contributions to our knowledge of the palæozoic fishes of North America.

*Measurements of Mandibles of Dinomylostoma.*

	<i>D. eastmani</i> n. sp.	<i>D. beecheri</i> Eastman. <sup>1</sup>
Length (as far as preserved),	103 mm.	180 mm.
Length of tritoral area	60 “ <sup>2</sup>	108 “
Width of tritoral area (at about its middle)	8 “	24 “
Depth of outer face, at middle of anterior portion of mandible	22 “	30 “

***Apateacanthus peculiaris* n. sp.**

## Plate XLVII, Figs. 4, 5, 6.

*Cotypes*.—Three imperfect spines. Two in the Newberry collection (Amer. Mus. Nos. 413 and 873), and one in the New York State Museum, Albany, N. Y.<sup>3</sup>

Spine small (the largest of the three cotypes, 72 mm.), laterally much compressed, with little or no arcuation. Denticles along posterior margin remarkably large, and progressively increasing, instead of decreasing in size, distalward; most distal denticle higher than the width of spine at level of its base; denticles pointing directly backward, not downward, *i. e.*, their axes at right angles to axis of spine; spaces between contiguous denticles much smaller than width of denticles. Sides of spine ornamented with delicate longitudinal striations; no stellate denticles visible in any of the specimens.

*Horizon and locality*.—Onondaga (Lower Middle Devonian); Franklin, Delaware County, New York.

This remarkable spine differs from all other ichthyodorulites in its unusually large denticles, which increase instead of decrease distalward, and yet are set on the margin of an elongated spine of normal, ctenacanth form. If not for these denticles the spine would pass for an imperfectly-preserved *Ctenacanthus* or allied genus. Denticles which increase in size distalward occur in a few forms — *Cyrtacanthus dentatus*,<sup>4</sup> for instance — but in

<sup>1</sup> Measurements taken from a cast (Amer. Mus. No. 7996) of the right mandible belonging to the type specimen, the original of which is preserved in the Museum of Comparative Zoölogy at Harvard.

<sup>2</sup> Estimated.

<sup>3</sup> This specimen belongs to a small collection of Devonian fish remains kindly lent me for study, some time ago, by Director John M. Clarke of the New York State Museum.

<sup>4</sup> J. S. Newberry, Rept. Geol. Surv. Ohio, Palæont., I, 1873, p. 307, pl. 29, fig. 5.

these forms they are confined to the distal extremity only, and the spine



itself is not straight, but curved and of the kind usually regarded as head spines, from their resemblance to the frontal "claspers" of modern *Chimæroids*. With such spines the present species apparently has no relation. It may better, perhaps, be compared with the unique spine, *Apateacanthus vetustus* (Clarke),<sup>1</sup> which it resembles in three features—the very large posterior denticles, the great lateral compression, and the ornamentation of fine longitudinal striations. It may therefore, provisionally at least, be referred to *Apateacanthus*, rather than to a new genus.

From *Apateacanthus vetustus* the new species is distinguished, (1) by the fact that its denticles are at right angles to the axis of the spine instead of pointing downward, and (2) by the relatively greater size of the distal-most denticles.

***Stethacanthus humilis* n. sp.**

Plate XLVII, Figs. 1, 2.

Fig. 2. *Apateacanthus peculiaris*, n. sp. Reconstruction of spine based on the three cotypes, figured in Plate XLVII, Figs. 4, 5, 6. About natural size.

*Type*.—Impression of a small spine in half of a nodule. Height (slightly restored), 17 mm.; total width, 22 mm.; origin of shoulder to posterior tip of spine, 4 mm. Newberry collection, No. 5077 Amer. Mus. (Plate XLVII, Fig. 2).

Spine small, broader than high, its height about three fourths the total width. Vertical margin only slightly more than at right angles to basal line. Concave margin rising from shoulder, at first very gently, then rather abruptly, in a concave line to the apex. Shoulder situated far back, the portion of spine back of it about one fifth the width of the entire spine. Sides incised with lines of various lengths, some anastomosing, and slanting upward more or less toward the apex.

*Horizon and locality*.—Waverlyan; Knob Lick and Junction City, Kentucky.

This diminutive species of *Stethacanthus* is apparently distinct from any yet on record. It is represented by three specimens in hand—the two figured ones (including the type), from Knob Lick, Ky., and a third (Amer. Mus. No. 7933), consisting of a small spine and both halves of the nodule in which it was found, collected by me at Junction City, Ky. The species

<sup>1</sup> A good description of this spine and an excellent figure are given by Eastman in N. Y. State Mus. Mem., 10, 1907, p. 81, pl. 3, fig. 5.

apparently grew somewhat larger, as is shown by a specimen figured by Eastman in 1903,<sup>1</sup> from the Waverly sandstone of Calhoun County, Michigan, which belongs to the present species.

*S. humilis* may be distinguished from *S. depressus* (St. John and Worthen), (1) by the greater development of the basal portion of the spine, the vertical margin being almost at right angles to the basal line, instead of sloping backward steeply so as to merge with it, and (2) by the more backward position of the shoulder, which, also, rises more abruptly than in *S. depressus*. From other species it is readily distinguished by its size and form.

### ***Stethacanthus exilis* n. sp.**

#### Plate XLVII, Fig. 3.

*Type*.— Impression of a small spine, in half of a nodule. Height (slightly restored), 21 mm.; total width, 19 mm.; origin of shoulder to posterior tip of spine, 4 mm. Newberry collection, No. 5076 Amer. Mus.

Spine small, somewhat higher than wide, and with prominent shoulder. Vertical margin at right angles to basal line, which is convex downward. Concave margin much excavated, rising in a steep curve toward apex, so that spine appears narrow and subulate. Portion of spine behind origin of shoulder, about one fifth the total width of spine. Sides ornamented with incised lines of various lengths, rising obliquely towards the apex.

*Horizon and locality*.— Waverlyan; Knob Lick and Junction City, Kentucky.

Of this species there are two specimens in hand — the type, which is from Knob Lick, Ky., and an impression in half of a nodule of a somewhat larger specimen (No. 7934, Amer. Mus.) collected by me at Junction City, Ky. The species resembles *Stethacanthus erectus* Eastman,<sup>2</sup> from the Kinderhook limestone of Iowa, which it also approaches in size, but it is distinguished by the less subulate form of the apical portion of the spine, by the lesser excavation of the curved margin, and by the shorter distance between the shoulder and the posterior extremity of the spine.

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<sup>1</sup> Bull. Mus. Compar. Zool., XXXIX, p. 216, fig. 15. The specimen is there referred to *Stethacanthus depressus* (St. John and Worthen), with which species, however, it does not agree as I have been able to see on comparison with a small spine which is unquestionably *S. depressus*, preserved in the museum of the Buffalo Society of Natural Sciences.

<sup>2</sup> Bull. Mus. Compar. Zool., XXXIX, 1903, p. 217, pl. iii, fig. 29.

## EXPLANATION OF PLATE XLVII.

Figs. 1, 2. *Stethacanthus humilis* n. sp. Impressions of two small spines in halves of nodules,  $\times 1\frac{1}{3}$ . Original of Fig. 2, the type. No. 5077 Amer. Mus.

Waverlyan; Knob Lick, Ky.

Fig. 3. *Stethacanthus exilis* n. sp. Impression of a small spine in half of a nodule; natural size. Type. No. 5076 Amer. Mus.

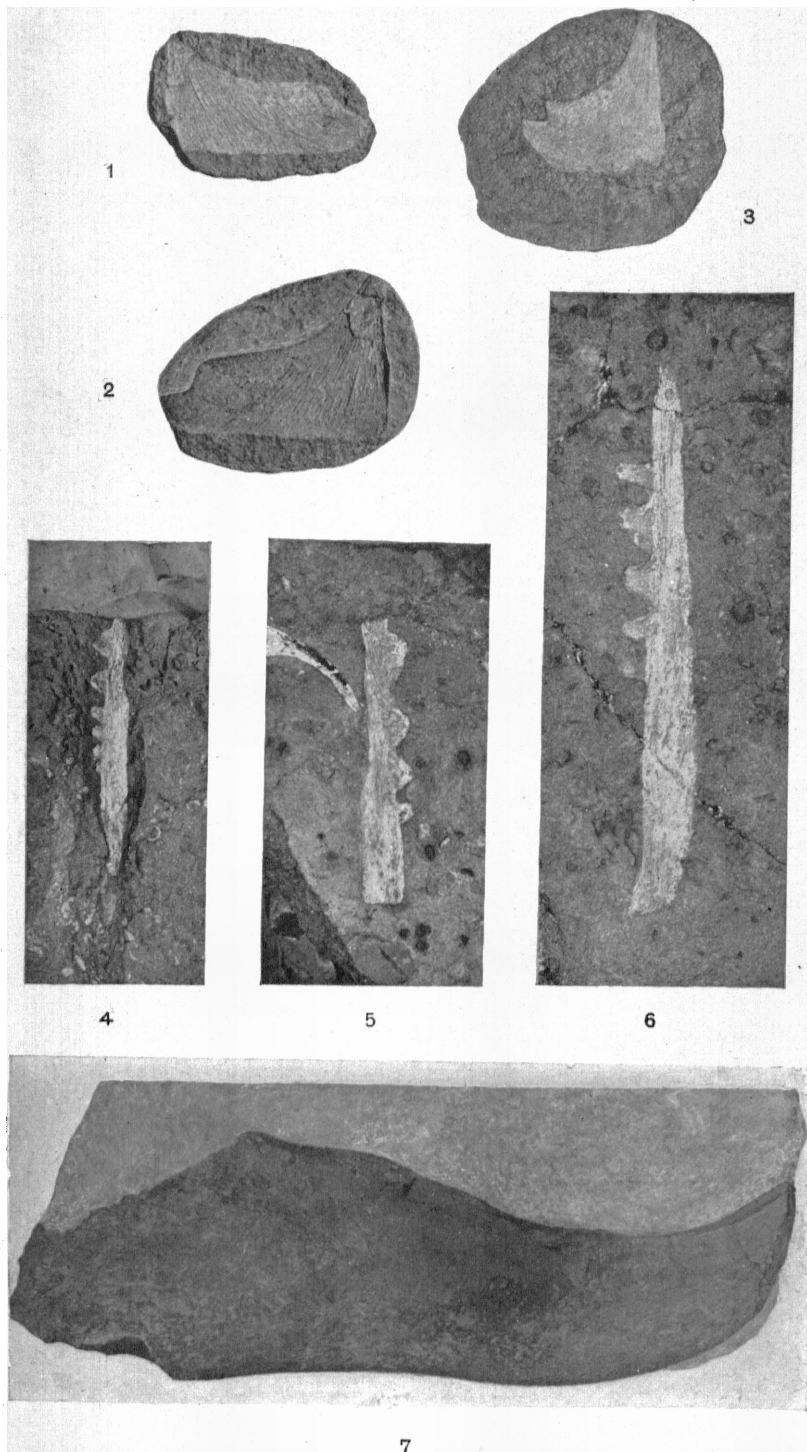
Waverlyan; Knob Lick, Ky.

Figs. 4, 5, 6. *Apteacanthus peculiaris* n. sp. Three imperfect spines in matrix; natural size. Cotypes. Originals of Figs. 4 and 5 in the Amer. Mus. (Nos. 873 and 413); original of Fig. 6 in N. Y. State Museum, Albany, N. Y.

Onondaga (Lower Middle Devonian); Franklin, Delaware Co., N. Y.

Fig. 7. *Dinomylostoma eastmani* n. sp. Right mandible, in outer aspect; natural size. Type. No. 7932 Amer. Mus.

New Albany shale (Upper Devonian); near Louisville, Ky.



7  
NEW PALÆOZOIC FISHES.