

# Petalodus jewetti, a New Species of Fossil Bradyodont Fish From Kansas

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A fish tooth found in October 1956, by John Mark Jewett, of the State Geological Survey of Kansas, which has been referred to me for study, has been identified as belonging to the genus *Petalodus*. This occurrence of a petalodontid fish in Pennsylvanian rocks of Kansas is the first to be recorded, although several species of *Petalodus* have been described from the Pennsylvanian rocks of Illinois.

*Petalodus* (Zittel, 1913, p. 89), has been found in the Carboniferous limestone of England, Scotland, Ireland, Belgium, Russia, and North America. It is, according to Zittel, rare in the Coal Measures of North America.

*Petalodus* (Romer, 1945, p. 74) was a raylike fish with a depressed body and greatly enlarged pectoral fins. It was presumably a bottom-living fish with habits similar to those of the recent rays and skates.

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The tooth of *Petalodus* was found in the Plattsmouth limestone, Oread formation, Virgilian Series, upper Pennsylvanian System, in a quarry at the SE. 1/4, S. 20, T. 15 S., R. 18 E., northwestern Franklin County, Kansas.

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Genus *Petalodus* Owen, 1840

*Petalodus* Owen, 1840, Odontography, p. 61, pl. 22.

Genotype, *Petalodus hastingsiae*.

*Discussion.*—The teeth are compressed anteroposteriorly and laterally elongated. The crown is trapezoidal to parallelogram-shaped, with a sharp cutting edge and basal margin bearing enamel folds. The root is long, slender, and truncate or divided distally. The teeth were close to one another in the mouth so as to form a solid crushing pavement.

*Occurrence.*—Carboniferous (lower limestone shales, Carboniferous limestone, and Lower Coal Measures), England.

*Petalodus jewetti* Miller, n sp.

Description of this species is based on a single tooth, with a nearly complete and well-preserved crown, and the root in a fragmentary condition (Figs. 1, 2). The height of the anterior face of the crown

### Interpretation

While no data are available with transference numbers of sulfamates, comparisons with other monovalent ions of copper and cadmium may be made. No information of 2-1 copper salts<sup>(3)</sup> was found; however, for  $\text{CuSO}_4$ , the value of the  $\text{SO}_4$  = transference number varied from 0.626 at 0.05M to 0.643 at 0.20M, values greater than for the sulfamates. The value of 0.400M of sulfamate, 0.986, varies greatly from an interpolated 0.66 for the sulfate.

Cadmium chloride gives values of the transference number for from 0.59 at 0.05M to 0.69 at 0.5M which give some agreement.

Results for 0.4M copper sulfamate, a transference number of 0.986 are similar to those for  $\text{CdI}_2$ , for which a 0.5M solution has an anion transport number of 1.00.

Explanations of the abnormal values may be found in the possibilities of hydration of the ions. However, application of the formula  $\text{X}^T = \text{X}^H - n \cdot D$  does not apply, compared to known values for  $\text{Cu}^{++}$  and  $\text{Cd}^{++}$  since  $n$  would be negative in some instances. In the above formula,  $\text{X}^T$  represents ionic transference corrected for transference of water,  $\text{X}^H$  the Hittorf number,  $n$  the gram moles of water carried from the anode section per faraday, and  $D$  the gram equivalents of salt dissolved per mole of water in the original solution .

Two other possibilities occur: Association of ions and complex ion formation. Results of  $\text{Cu}(\text{NH}_2\text{SO}_3)_2$  compare with those of  $\text{CdI}_2$  as previously mentioned. An explanation proposed for  $\text{CdI}_2$  is the formation of a complex  $\text{CdI}_4$  . Such a complex of  $\text{Cu}^{++}$  with  $\text{NH}_2\text{SO}_3$  may be possible in more concentrated solutions, although it has not been described.

### Literature Cited

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- (3) GLASSTONE, SAMUEL, *Textbook of Physical Chemistry*. New York: D. Van Nostrand Co. Inc. (1940) p. 902.

is 25 mm., width of the crown is 40 mm., length of the root (partially broken at base) 30 mm. Height of posterior face of crown is approximately 35 mm. The anterior portion of the crown is convex and serrated by fine crenulations on the superior margin. The lower margin is similarly crenulate. There are four basal enamel folds. The crenulations seemingly are formed by the exposure of tubules within the tooth enamel, possibly as the result of wear.

The posterior face of the crown roughly resembles a parallelogram in outline. The root is relatively long and thick, and only partially preserved.

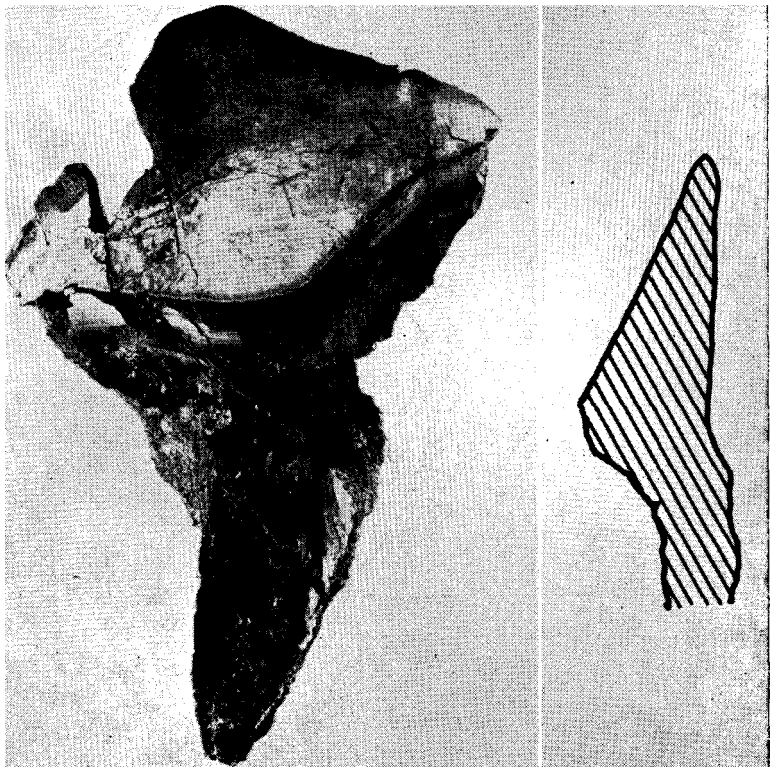


Fig. 1 (left). Anterior view of holotype, Univ. Kans. Museum No. 9972, *Petalodus jewetti*. (X2).

Fig. 2 (right). Transverse section through center of tooth. Univ. Kans. Museum No. 9972. (X1.5).

*Petalodus jewetti* resembles *P. destructor* Newberry and Worthen closely. However *P. jewetti* has a relatively longer root, and the lateral ends of the crown are not deflected toward the root, as in *P. destructor*. *P. destructor* has been reported from Illinois and Pennsylvania and is a very variable species. It seems probable that *P. jewetti* is most closely related to *P. destructor* (Table I).

*Petalodus jewetti* differs from *P. curtus*, in that *P. jewetti* possesses a longer and relatively thicker root. Also, the general outline of *P. jewetti* is that of parallelogram, whereas that of *P. curtus* is trapezoidal. *P. jewetti* differs from other described species of *Petalodus* in its measurements, width-to-height ratio, and relatively longer root. The species is named in honor of John Mark Jewett, who presented the specimen to the University of Kansas Museum.

Inasmuch as the teeth of *Petalodus* form a crushing pavement, it is highly probable that all teeth in the mouth of an individual are not similar. In view of this, it is quite probable that teeth from different parts of the mouth of individuals of the same species have been described as different species, as has been done with fossil sharks. The validity of the described species of *Petalodus* can only be established by finding a group of teeth preserved in the same relative position in the rock as they occupied in the living animal. Nevertheless, it is permissible to describe *Petalodus jewetti* as a new species, because of its obvious morphologic distinctions and because of its occurrence in an area geographically separated from all previously found specimens of *Petalodus*.

**Table I. Comparative measurements of species of *Petalodus*.**

| Species                  | Anterior face height | Crown width         | Width/height ratio | Occurrence  | Reference |
|--------------------------|----------------------|---------------------|--------------------|---|-----------|
| <i>P. jewetti</i>        | 25 mm                | 40 mm               | 1.60               | Plattsmouth <b>ls.</b> , Kansas.                                  |           |
| <i>P. allegheniensis</i> | 24 mm                | 50 mm               | 2.08               | "Coal Measures",<br>Springfield, Illinois.                        | 1         |
| <i>P. curtus</i>         | 18 mm                | 30 mm               | 1.66               | <b>Keokuk ls.</b> , Illinois                                      | 2         |
| <i>P. hybridus</i>       | 19 mm                | 43 mm               | 2.26               | St. Louis <b>ls.</b> , Illinois                                   | 3         |
| <i>P. proximus</i>       | 5 mm                 | 23 mm               | 4.60               | "Upper Coal Measures",<br>Springfield, Illinois.                  | 3         |
| <i>P. linguifer</i>      | 5 mm                 | 29 mm               | 5.80               | Salem <b>ls.</b> , & Chester <b>ls.</b> ,<br>Illinois & Missouri. | 4         |
| <i>P. destructor</i>     | 23-<br>20 <b>mm</b>  | 39-<br>42 <b>mm</b> | 1.69-<br>2.1       | "Coal Measures",<br>Springfield, Illinois.                        | 5         |

1. Leidy, 1856.
2. Newberry & Worthen, 1870, p. 355.
3. St. John & Worthen, 1875, pp. 394-96.
4. Branson, 1905, p. 1379.
5. Newberry & Worthen, 1866, pp. 35-36.

**Depository**

The holotype is accession number 1446, catalog number 9972 of the University of Kansas Museum of Natural History.

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## Report on a Plesiosaur Skeleton From Western Kansas.

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The Fort Hays Kansas State College Museum has recently received an important specimen for its Division of Paleontology. This latest accession consists of an unusually complete skeleton of one of the smaller plesiosaurs of the Kansas Niobrara Cretaceous. A preliminary study indicates that it is closely related to those forms known in the scientific literature as *Trinacromerum* of the family Polycotyliidae.

This very fortunate discovery was made by Mr. M. C. Bonner of Leoti, Kansas, and he has kindly presented it to the museum. The specimen was collected from a small exposure of Niobrara Cretaceous a few miles southwest of Russell Springs, Kansas. The nearly complete skeleton, although somewhat disarticulated, was imbedded in the bluish chalky-shale member which lies below the reddish-buff chalk in this area. Fossil vertebrates found in this chalky shale member are usually well replaced and excellently preserved. This individual is certainly no exception, for the bone is very hard and dense. This condition greatly facilitated preparation of the specimen, and should make possible careful and detailed study of the skull, lower jaws and all other portions of the skeleton.

The general form and size of the skull and lower jaws is similar to previously described specimens of *Trinacromerum*; however, there are some differences in the length of the tooth-bearing surfaces of the premaxillae and dentary. The suture lines of the skull, as well as other skeletal features, indicate that the specimen was a fully mature individual.

The vertebral column appears to be nearly complete, and a majority of the vertebrae are free from crushing or distortion. They are typically plesiosaurian in structure with conspicuously concave centra and well-developed spinous processes and articulations. The atlas-axis and all cervicals are present; possibly one or two dorsals are either absent or reduced in this specimen, and perhaps two to five terminal caudals may be missing. For the most part, the vertebrae and articulating surfaces and processes are well preserved. Several complete ribs are present, plus a number of incomplete and fragmentary rib sections.

Both hind limbs are present and nearly complete except for a few of the terminal phalanges. The femur is especially well preserved and