

A NOTE ON THE OCCURANCE OF AN UPPER CRETACEOUS ICHTHYOSAURMORPH TOOTH, FROM WEST TEXAS.

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Abstract: During the Early-Late Cretaceous (Albian–Cenomanian) of the Western Interior Seaway, ophthalmosaurid ichthyosaurs were in a significant decline due to the various paleoecological pressures, such as faunal shifting. During this interval, ichthyosaurs were represented by just a single well-known genus, *Platypterygius*. The genus has mostly been known from fragmentary remains and teeth which have been found broadly in North American sediments. These medium sized, yet robust Ichthyosaurs have been reported globally from both the northern and southern hemispheres, with the type specimen found in New Zealand. Reports of their presence in Europe and South America are indicative and that they had attained a cosmopolitan status. However, North American occurrences have been rarely documented, and in various taphonomic settings from coastal to deep marine. This note will bring a possible new occurrence for the North American fossil record. This new information is based on a tooth morphology closely resembling *Platypterygius* found in west Texas. Emphasis on Texas occurrences, species summary, and identification based on tooth morphology along with paleoecological interpretation are also discussed in this report.

INTRODUCTION

Members of the taxonomic order Ichthyosauria are marine reptiles that swam the various seaways during the Mesozoic from the Triassic Period up to the Early-Late Cretaceous (Zammit, 2012). These animals may have evolved from an ancestral body plan, exhibited by *Catorhynchus lenticarpus*. Ichthyosauria also achieved extraordinary evolutionary feats such as attaining thunniform swimming motion and achieving one of the largest body sizes of marine organisms, with *Shonisaurus popularis* or *Shastasaurus sikkanniensis* growing up to 20m long (Montani, 1999; Nicholls and Manabe, 2004; Montani et al., 2014). However ichthyosaur taxonomy is not fully resolved on some branches and several taxa such as *Ichthyosaurus* and *Platypterygius* are “waste-basket” genera (McGowan, 1972; Arkhangelsky, 2001; Montani, 1999; Lawrence, 2008; Fisher et al., 2014). Due to the various revisions of *Platypterygiinae*, new fossil specimens have recently increased the taxonomic content of the group. For example, the inclusion of *Aegirosaurus*, *Leptopterygius*, *Simbirskiasaurus*, *Pervushovisaurus*, *Arthropterygius*, and *Caypullisaurus* within *Platypterygiinae*, along with *Platypterygius*, makes it necessary to revise the derived Ichthyosaur groups (Maish and Matzke, 2000; Maish, 2010; Fisher et al., 2014; Fisher, 2016).

The common fossils found attributed to *Platypterygius* are teeth and vertebrae (McNulty and Slaughter, 1962; Slaughter and Hoover, 1963; Maxwell and Caldwell, 2006). The teeth of *Platypterygius* can assist in a better understanding of Cretaceous ichthyosaur odontology, along with the biogeographic and stratigraphic distribution of these marine reptiles. The group's stratigraphic range ends in the Cretaceous Period due to extreme faunal shifting and competition along with possible negative environmental shifts (Bakker, 1993; Zammit, 2012). This paper will discuss a new occurrence of *Platypterygius* in western Texas.

Institutional Abbreviations – Dallas Museum of Nature and Science, Dallas, Texas (DMNH). Witte Museum, San Antonio, TX.

GEOLOGICAL SETTING

A *Platypterygius* cf. tooth was collected as float near a road cut along US highway 67, roughly 20 miles east of Forth Stockton, Pecos County, Texas. GPS coordinates are recorded as N 30° 51' 40.24" and W 102° 32' 58.94. The author has determined that this tooth of "*Platypterygius* cf." Most likely the specimen came from the Fort Tarrett Formation in what is currently being considered part of the Comanchean series, possibly within the Fredericksburg or Edwards group (Rose, 1972; Langston, 1974; Jackal, 1977; Lundelius, 1986). The Formation is of at least Albian or Cenomanian in age based on some of the tentatively identified invertebrate fauna (Emerson et al., 1994; Akers and Akers, 1997; 2002; Lock, Bases, and Glaster, 2007). This tooth is a new occurrence of Ichthyosaurs in west Texas. Normally the Texas occurrences of *Platypterygius* have been collected within the Grayson Marl and Duck Creek in eastern Texas (McNulty and Slaughter, 1962; Slaughter and Hoover, 1963; Main and Fiorillo, 2002; Adams and Fiorillo, 2011). A visual representation of the outcrop can be seen in Figure 1.

SYSTEMATIC PALEONTOLOGY

Class: Reptillia

Order: Ichthyosauria

Family: Ophthalmosauridae

Genus: cf. *Platypterygius* sp.

Collections Number – Witte Museum 2016-14-G, an isolated tooth

DESCRIPTION

The tooth is small, robust, and incomplete in that the root is missing and the remaining part is the crown. The incomplete and weathered condition of the specimen is due to it lying exposed to the elements at a roadcut. However, there are enough characters to properly diagnosis the taxon.

In lateral view seen in Figure 2 2016-14-G is short and slightly recurved posteriorly as seen in *Platypterygius* (Massare, 1987; Smith and Dodson, 2005; Kear, 2005). The apex of 2016-14-G is

slightly rounded and polished which is diagnostic for ichthyosaur teeth (Montani, 2005). Longitudinal grooves extend parallel from the bases of the root to the crown. These grooves delineate as they approach the apex and become very fine and less pronounced as seen in pliosaurids such as “Polyptychodon” these may be interpreted also as apiscobasal striations or grooves as they start from the root and move toward the apex and visually look worn to slightly worn. In mesial view the tooth is triangular in shape. The grooves are not as pronounced in lateral view compared to DMNH 11843. From apical view the shape of 2016-14-G is semi-circular at the section with the grooves being more noticeable. The material that would consist of the root is missing or not preserved in the specimen. Measurements are given in Table 1 of this article. The author speculates that this is one of the anterior most teeth based on size and images from Fischer (2016).

DISCUSSION

Platypterygius is a medium to large sized ichthyosaur from the early-late Cretaceous and known to be found globally with a single taxa being known to North America prior to their extinction, *Platypterygius americanus* (Maish and Matzke, 2000). Most of the fossil remains from North America consist of vertebrae (mostly centra), skull fragments, and isolated teeth. The teeth shares unique wear traits and morphological characters similar to that pliosaurs. The tooth is grooved with a shape allowing for a “grasp and grab” tactic that has been implied for pliosaurs, and indicative of the higher end of the “generalist” and is considered evolutionary convergence (Massare, 1987; Fischer et al., 2014; Fischer et al., 2016). *Platypterygius* teeth, are commonly misidentified as smaller or subadult pliosaurs such as *Polyptychodon interruptus*, *Brachauchenius lucasi* or even polycotlids when they have become isolated from the skull material (Conybeare, 1822; Owen, 1845; Bardet and Godefroit, 1995; Rompianesi and Sirotti, 1994; Papazzoni, 2003; Kear et al., 2014; Angst and Bardet, 2015; Bardet, Fischer, and Machalski, 2015 Cleary et al., 2015).

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CONCLUSIONS

There are three major concepts that became apparent when this study concluded.

- 1) Confirmed presence of ichthyosaurs located in western Texas, outside of the Big Bend region. This occurrence suggests a west coast (this occurrence) and east coast (Dallas-Fort Worth) population of these animals.
- 2) If the tooth is not attributed to *Platypterygius* then it should at least be considered "Ophthalmosaurinae indet." which will still support the occurrence of west Texas ichthyosaurs.
- 3) Pliosaur teeth and Cretaceous ichthyosaur teeth should be reexamined to differentiate on another in further studies. Both have been accomplished but need to be applied to formal collections focused on isolated teeth. This endeavor can easily be accomplished in the coming years through the network of scientists, collectors, and museums.

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Figure 1: Photography of the locality where the Ichthyosauromorph tooth was found. Arrow indicates where the tooth is assumed to have originated. Upper left (A) image shows the locality standing from the outcrop facies, bottom left (B) image is looking in from the highway base of section on right and possible top on section indicates top of older bed, right image (C) is the younger sediments. Tooth may have come from either the base of the older bed or bottom of the younger one. West Texas outside of Fort Stockton.

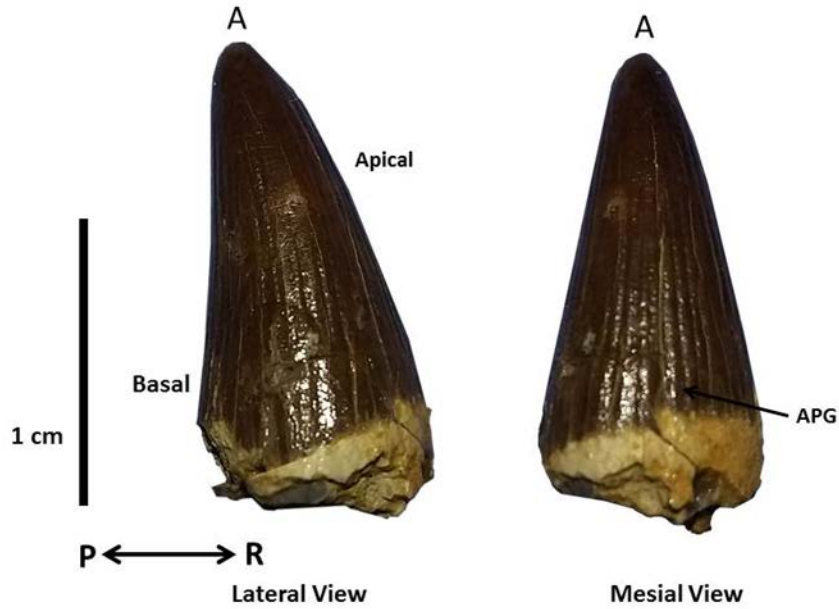


Figure 2) 2016-14-G from the Fort Tarrant Formation of western Texas. This tooth is diagnostically represented for the taxon “*Platypterygius* cf.” seen in both lateral view and mesial view. Scale in centimeters (cm).

A = Apex

P = Posterior from Rostrum

R = Rostral

APG = Apiscobasal Groove

Height of Tooth (mm)	16.30
Width of Tooth (mm)	6.31
Size of Ridges (mm)	approx. 1.75

Table 1: Measurements of 2016-14-G found at research locality.
Measurements in millimeters.