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NOTE ON A NEW SPECIES OF THE EOCENE CROCODILIAN *ALLOGNATHOSUCHUS*, *A. WARTHENI*

BY
E. C. CASE

UNIVERSITY OF MICHIGAN
ANN ARBOR

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MEMORIAL DRIVE, ROCHESTER, NEW YORK 14623
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CONTRIBUTIONS FROM THE MUSEUM OF GEOLOGY

UNIVERSITY OF MICHIGAN

Editor: EUGENE S. MCCARTNEY

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NOTE ON A NEW SPECIES OF THE EOCENE CROCODILIAN *ALLOGNATHOSUCHUS*, *A. WARTHENI*

E. C. CASE

In 1921 Doctor Charles C. Mook re-described a lower jaw of an Eocene crocodilian from the Lower Bridger Beds of the Upper Green River, Wyoming. This specimen, Number 4112 of the collections of the U.S. National Museum, is the type of Cope's *Crocodilus polyodon* originally described in the *Sixth Annual Report of the U.S. Geological and Geographical Survey of the Territories*, p. 614, 1876. Recognizing the peculiar character of this species, and the closely related *Crocodilus heterodon* Cope, Mook suggested their inclusion in a new genus, *Allognathosuchus* (*Bulletin of the American Museum of Natural History*, Vol. XLIV, Art. X, p. 106, 1921). In this paper Mook gave the history and the original description of the species and a summary of the characters of his new genus: "Dental series short in comparison with the post-dental part of the jaw; prominent elevation or process on the dentary bone; abrupt elevation from dental border to surangular border. Teeth arranged in definite groups, sharply set off from each other in size; all teeth close together." Photographic reproductions of the jaw of *A. polyodon* are given in Plate XV of Mook's paper.

The party from the Geological Museum of the University of Michigan collected, in the summer of 1924, an incomplete skull from the Lower Beds of the Wasatch Eocene of Tatman Mountain, located near the head of the Grey Bull River in the Big Horn Basin, Wyoming. This specimen preserves the posterior portion of the skull, the maxillary region of the right side, the greater part of the dentigerous region of both rami of the lower jaws, and the articular region of the right ramus. The specimen, Number 8923 of the University of Michigan collection, is particularly valuable as it preserves the major portion of the dentition.

Mook's description of the jaw of *A. polyodon* emphasizes the peculiar outline; he says, p. 106: "The anterior end of the jaw is elevated, and immediately posterior to this the superior border descends in a gentle curve and, slightly posterior to the level of the posterior end of the symphasis, rises again in a reverse curve to a prominent process which lodges the large teeth described below [the three anterior enlarged teeth of this description]. At this point the external surface is divided into two portions, one being chiefly external and the other largely ventral; the two portions are sharply separated from each other.

"Posterior to the superior process noted above, the superior border again descends in a gentle but prominent curve and, very slightly anterior to what appears to be the posterior end of the series, rises again slightly. At the apparent posterior end of the dental series the border rises abruptly, so that the posterior, or surangular, portion is distinctly higher than the anterior, or dental, portion."

This description may be easily followed in Mook's figures or in the outline figure, Number 1, of this paper. The present

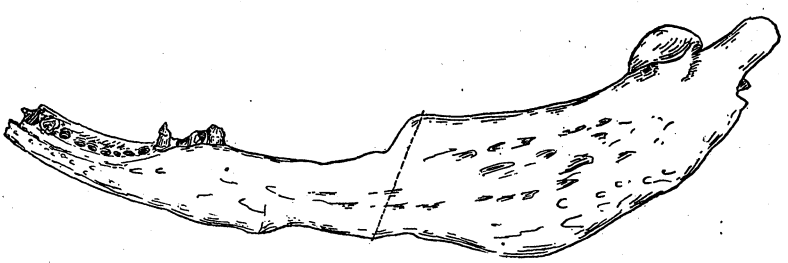

FIG. 1. Outline of the jaw of *Allognathosuchus polyodon* (Cope), showing the peculiar outline of the jaw. The portion anterior to the dotted line is the same region as shown in Plate I, Fig. 2. × .5

specimen will be seen to coincide very exactly with Mook's description and figures of the general character of the jaw, but the arrangement of the teeth is so different that the author feels justified in suggesting its location in a new species, *Allognathosuchus wartheni*, of which the specimen Number 8923 of the University of Michigan collection is the holotype.

Mook's description of the teeth of *Allognathosuchus polyodon* is as follows: "None of the teeth are perfectly preserved, but in several of them the form is discernible. The alveoli indicate the size of the teeth. The anterior end of the jaw being missing, it is impossible to determine the number of the teeth accurately. The first alveolus in the specimen is in the position usual for the third mandibular tooth, and may provisionally be regarded as such. This alveolus is of moderate size. Immediately posterior to the first alveolus is the second, which contains the broken base of a tooth. This alveolus is very large, having twice the diameter of the first.

"Posterior to the large second alveolus are eight small alveoli, not nine as stated by Cope. The first of these is slightly smaller than the first alveolus in the jaw. From this the small alveoli diminish steadily in size to the sixth and then increase slightly to the eighth. The tooth itself is partly preserved in the eighth alveolus of this group; it is very small and is sharply pointed. These eight alveoli face obliquely outward as well as upward.

"Posterior to this group of eight small alveoli is a large alveolus equalling in size the second in the jaw; posterior to it is a slightly smaller alveolus containing the base of a stout conical tooth; these two alveoli occupy the summit of the elevation of the superior border of the jaw mentioned above. The second of the two alveoli, though smaller than the first, is considerably larger than any of the group of eight alveoli noted above. All the alveoli described so far are separated from each other by thin walls of bone; the teeth were crowded close together.

"Posterior to the two alveoli on the summit of the superior process of the dentary, just described, is a series of alveoli of moderate size, which were evidently confluent with each other. This cannot be determined accurately, as the inner wall is not preserved. Five of these alveoli are distinctly visible, and it is probable that another followed these in a space now occupied in the specimen by plaster."

The total number of teeth observed by Mook is eighteen and adding the two teeth in front and the one at the rear which he considers probably present, the total number was twenty. "The

correct number may have been one more or one or two less, hardly more than that."

The teeth of *A. heterodon* (Cope) are described by Mook as "similar" to those of *A. polyodon.*

In the specimen of *A. wartheni* the right ramus is complete from the posterior end of the dental series to a point opposite the posterior end of the symphasis; the left ramus is almost as complete, lacking one tooth at the anterior end (Plate I, Figs. 1 and 2). In the left ramus the first indication of a tooth is the trace of a small one which from its position must be the same as the third of the set of small teeth described by Mook; this tooth was larger than the fourth; the fifth is very small and from that point the teeth steadily increase in size to the seventh. The ramus of the left side shows the same condition, and a second specimen, Number 8925 of the University of Michigan collection, shows the teeth of the same region complete and regularly increasing in size from the fourth to the eighth. All of these teeth are located on the sharply decurved portion of the dentary. They have slightly swollen crowns, somewhat elongate antero-posteriorly, and sharp apices.

Next come three teeth, of equal size but larger than those preceding them; they are located on the crest of the first rise in the jaw. All of these teeth are represented by the broken roots except the posterior one in the right ramus; the crown of this tooth is somewhat elongate antero-posteriorly and the apex is an elongate ridge with the fine lines radiating from the crest to the edge of the swollen crown where they disappear.

The posterior set of three is complete in the right ramus and lacks only the crown of the anterior one in the left ramus. The crowns are low, swollen, somewhat longer than broad, and marked with distinct fine wavy lines radiating to the edge of the crown from a somewhat elongate central crest or from a central point. Apparently there are no walls between the teeth of this series. Mook counted seventeen teeth and postulated three more, twenty in all with a possibility of twenty-one, or eighteen; in this specimen there are twelve counted teeth, and, making the same assumption that Mook did, the maximum number would be eighteen with a possibility of one or two less.

PLATE I

FIG. 1

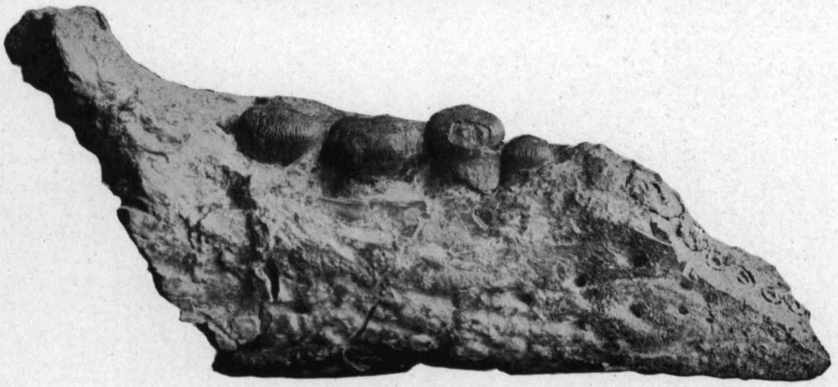

FIG. 2

FIG. 3

FIG. 1. Right ramus of the lower jaw; upper view. × 1.5

FIG. 2. Left ramus of the lower jaw; lateral view of the outer side. × 1.5

FIG. 3. The teeth of the right maxillary; lateral view from the inner side. × 1.5

The right maxillary was found locked in position against the ramus of the lower jaw. The three posterior teeth are of the same character as the corresponding ones of the lower jaw, but the middle one is decidedly larger than the others (Plate I, Fig. 3). The next four teeth anteriorly, all that are preserved, are decidedly smaller than the posterior teeth and smaller than the teeth of the lower jaw to which they were opposed. They decrease steadily in size anteriorly, so there seems to have been no second set of three enlarged teeth in the upper jaw.

It is obvious that in the reptilia, in which the replacement of the teeth is irregular, the size of the roots may be in part due to the age of the individual tooth, but this cannot extend to the size of the teeth in the groups or the sharp differentiation between the groups.

The fragments of the posterior portion of the skull show the posterior border, the outline of the left superior temporal fenestra and the basicranial region as far forward as the anterior edge of the basisphenoid bone. These parts and the arrangement of the various foramina differ somewhat from the modern crocodilian skull, but may be best described after comparison with other material from the same locality.

Measurements:

Length of the portion of the dental series preserved in the right ramus	66 mm.
Space occupied by the three posterior teeth of right ramus	24.5

Mook remarks on the specialized character of *Allognathosuchus* and says: "The character of the skull and jaws indicates an animal of somewhat different adaptations from the normal crocodilians." It seems to the author that Doctor Mook has been very conservative in his statement of the situation; such a wide departure from the normal type of crocodilian as the assumption of a durophagous, probably conchifragous diet, and the adaptation of the teeth to such a diet certainly warrant placing the three recognized species in a distinct family, the *Allognathosuchidae*. This family would be defined by the shape of the jaw and the grouping of the teeth, described under the genus, and the presence of low, blunt teeth adapted to a durophagous diet.