

Article X.—*ALLOGNATHOSUCHUS*, A NEW GENUS OF EOCENE CROCODILIANS¹

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PLATE XV

This genus is founded on *Crocodylus polyodon* Cope, which was originally described in 1873 in the 6th Annual Report of the U. S. Geological and Geographical Survey of the Territories, page 614. Cope's description of the species is as follows:

Represented by portions of cranium and teeth, with probably some vertebrae found close to them. This crocodile is similar in size to the *D. subulatus*, or our alligator. It differs much from the last in the arrangement of the teeth. There is one pre-eminently large canine opposite the symphysis, (in *D. subulatus* this tooth is opposite the posterior end of the same,) which is followed by nine very small teeth, whose round alveoli are only separated by very thin walls. Following the last of these immediately is another very large tooth, with nearly round alveolus, which is closely succeeded by other smaller teeth of larger size than those in front of it, and not differing in this respect among themselves. The crowns of the teeth are cylindric at base, and have a double ridge on the anterior outer aspect. The enamel is obsoletely rugose, striate at the base. The external surface of the dentary bone is deeply and coarsely pitted; at its anterior part the pits are close, deep, and small; on the inferior face they are deep, short grooves. There is a series of close, small foramina along the inner side of the alveolæ.

Measurements

	M.
Depth of symphysis	0.014
Diameter "anterior end of canine tooth"	.008
Distance of same from median "canine"	.030
Depth dentary bone at latter	.027
Width ramus at anterior canine	.025

This species differs in many respects from the one last described, [*subulatus*]. The teeth, anteriorly, are much more closely placed, and the anterior and middle canines are less separated, and more numerous small teeth occupy the interval. The splenial bone has a larger share in the symphysis, and the sculpture is much more profound. The teeth are not fluted.

The type specimen was found on the bluffs of Upper Green River by the writer.

The species was redescribed and partially figured in 1884 in the volume on the Tertiary Vertebrata.²

¹Contributions to the Osteology, Affinities, and Distribution of the Crocodilia. No. 7.

²Report U. S. Geological and Geographical Survey of the Territories. Vol. III. Tertiary Vertebrata, by E. D. Cope, p. 154, Pl. xxxiii, figs. 2, 3.

The type specimen, which now constitutes U. S. National Museum No. 4112, was kindly loaned to the writer for study and description through the courtesy of Mr. C. W. Gilmore. The geological horizon is Lower Bridger.

Upon studying the type, the writer noted that it differed from all other known crocodilian jaws (except the jaw of *Crocodylus heterodon*, described below) to a considerable degree, also that Cope's description is only partially accurate and does not do justice to the peculiar character of the specimen.

DESCRIPTION OF TYPE OF *Allognathosuchus polyodon*

TYPE MATERIAL.—The type specimen consists of the greater portion of a left mandibular ramus. The teeth are preserved only as a few fragments, but many of the alveoli are complete. The anterior end of the jaw is lacking and the region of the mandibular foramen is incomplete. Part of the inner portion of the jaw is missing, and no part of the splenial bone is preserved, but its impress upon the dentary is marked.

GENERAL FORM.—The general form of this jaw is as unusual as its apparent dentition. The jaw, as a whole, is slender; it is more curved in the vertical plane than in most crocodilians, the inferior border being decidedly convex and the superior border generally, though irregularly, concave.

The anterior, or symphysial, portion is shallow vertically and moderately wide. The chief external surface at this point faces obliquely downward and outward, but principally downward. The angle of the symphysial surface with the longitudinal axis of the ramus indicates that the two rami did not diverge sharply and that the entire jaw, and consequently the skull also, was narrow. The splenial bone evidently formed a part of the symphysis. 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 symphysis, rises again in a reverse curve to a prominent process which lodges the large teeth described below. 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 pronounced curve and, very slightly anterior to what appears to be the posterior end of the dental series, rises again slightly. At the apparent posterior end of the dental series the border rises abruptly, so that its posterior, or surangular, portion is distinctly higher than its anterior, or dental, portion.

The series of curves in the anterior portion of the superior border gives the jaw a wavy appearance unlike any other known crocodilian. Very large and old specimens of some of the living species of crocodiles and alligators sometimes have the superior border of the jaw elevated in some places and depressed in others, but never to the extent in this fossil form; in the modern specimens it is always relatively slight in proportion to the length of the dental series.

The borders of the mandibular foramen are not preserved, but the foramen could not have been large. The posterior two-fifths of the jaw is deep vertically. The posterior process of the articular bone is deflected inward.

DENTITION.—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 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 this 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 in size steadily 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 equaling 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 of 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 alveoli clearly visible in the jaw is seventeen. Adding the hypothetical two anterior teeth (considering the first alveolus preserved as No. 3) and the hypothetical one last tooth, the probable number of teeth in the jaw is twenty. The correct number may have been one more or one or two less, hardly more than that.

The actual number observable, seventeen, is greater than in any known species of the genus *Crocodylus*, also the relative size and distribution of the teeth is different from any species of that genus. The symphyseal surface extends back to a point opposite the third or fourth of the group of eight small alveoli.

SURFACE.—The anterior portion of the external surface is excavated by numerous small pits; on the ventral portion of the anterior end of the external surface the pits are elongate. On the upper portion of the lateral surface, especially on the side of the superior process of the dentary, the surface of the bone is smooth. The greater part of the external surface of the angular and surangular bones is sculptured by deep, irregular, coarse-textured pitting. The region posterior to this area of coarse pitting, on the angular and articular bones antero-inferior to the posterior process of the articular, is smooth.

Measurements

Total Length of Portion of Mandible Preserved	21.3cm.
Total Length of Portion of Dental Series	9.1
Antero-posterior Diameter of Second Alveolus	.9
Length of Row of Eight Small Alveoli	3.1
Antero-posterior Diameter of Eleventh Alveolus	.9
Depth of Symphysis	1.3
Breadth of Ramus at Posterior End of Symphysis	2.5
Height of Ramus at Bottom of First Concavity	1.4
Height of Ramus at Superior Process of Dentary	2.4
Maximum Height of Ramus in Angular-surangular Region	4.4

CONCLUSIONS.—The form of the jaw and the character of the dentition clearly indicate that this specimen did not belong to a species of the genus *Crocodylus*, although it is certainly referable to the Crocodylia. It is doubtful if it may be included in the family Crocodylidae. The solution of this problem may be deferred until further study of the Eocene Crocodylia has been made.

For the reasons outlined above the specimen is referred to a new genus, which may be called **Allognathosuchus**, in allusion to the strange character of the mandible, with *Crocodylus polyodon* Cope as the type species, now becoming *Allognathosuchus polyodon*.

SUMMARY OF GENERIC CHARACTERS.—Dental series short in comparison with post-dental portion of jaw; prominent elevation or process on 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.

SUMMARY OF SPECIFIC CHARACTERS.—Two very large teeth, separated by eight small teeth facing obliquely outward as well as upward. Jaw relatively narrow.

Allognathosuchus heterodon (Cope)

In the collections of the American Museum are several short, broad crocodilian skulls in which the posterior teeth are flat and blunt, not pointed as are most crocodilian teeth; with these skulls are a number of fragmentary jaws and isolated teeth. All are from the Wasatch Beds.

These skulls and teeth agree with Cope's descriptions of *Crocodylus heterodon* and with the type of that species, which now constitutes U. S. National Museum No. 4115 and which is somewhat fragmentary in character; the skulls may be referred to that form. On comparing the jaws of these specimens with the type of *Allognathosuchus polyodon*, described above, a striking similarity was noted. The distribution of large and small teeth is similar in the Wasatch jaws to that of *A. polyodon*. The large superior process of the dentary, which is so prominent in the latter species, is also possessed by the Wasatch specimens. It therefore seems advisable to consider the Wasatch form generically identical with *A. polyodon*. Detailed characters of the form of the jaw and consequently of the skull, also of the teeth, differ from those of *A. polyodon*. The Wasatch form is therefore not identical specifically with *A. polyodon*. *Crocodylus heterodon* Cope therefore becomes *Allognathosuchus heterodon* (Cope). The skulls need further preparation before complete description may be attempted. The specific characters which they exhibit may be indicated here, however.

SUMMARY OF SPECIFIC CHARACTERS.—Skull and jaws very broad in proportion to their length. External narial aperture very broad. Seven or eight small teeth between two large teeth in anterior and middle parts of jaw. Posterior three teeth on either side in both upper and lower jaws flat and blunt, with the crowns lower than they are broad or long; in unworn teeth fine striations radiate outward from the center of the crown.

REMARKS

Allognathosuchus evidently represents a side line of crocodilians, differing from the normal Eusuchian type. It evidently did not survive Eocene time. The material discussed above is from Bridger and Wasatch beds, but in the collections of Puerco material in the American Museum are some small flat teeth closely resembling those of *A. heterodon*. It seems likely, therefore, that the genus existed in Paleocene as well as in Eocene time. The characters of the skull and jaws indicate an animal of somewhat different adaptations from the normal crocodilians.

PLATE XV

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Left Mandibular Ramus of *Allognathosuchus polyodon* (Cope)

Three-fourths natural size

U. S. Nat. Mus. No. 4112, type specimen

Upper Figure: Superior view

Lower Figure: Lateral view, left side



