

A NEW FOSSIL ALLIGATOR FROM THE HELL CREEK BEDS OF MONTANA.

By CHARLES W. GILMORE,

Assistant Curator of Fossil Reptiles, U. S. National Museum.

The specimen described below belongs to the vertebrate paleontological collection of the American Museum of Natural History, New York, and it is through the generosity of Dr. H. F. Osborn and Mr. Barnum Brown, of that institution, that I now have the privilege of describing it.

This specimen represents a true though primitive member of the Alligatoridæ, as is abundantly shown by the general proportion of the skull, especially in the shortness and flatness of the broadly rounded muzzle and the nonconstriction at the maxillo-premaxillary union, the reception of the anterior teeth in pits of the upper jaw, the lower teeth biting within the upper, and the divergent lateral borders of the anterior ends of the palatines.

In North America three genera, *Diplocynodon*, *Alligator*, and *Bottosaurus*, have been included under the family Alligatoridæ.

From *Diplocynodon* the present form is to be separated at once by the nonconstriction of the snout at the maxillo-premaxillary suture and the uniform size of the premaxillary teeth.

The abbreviated facial region, the posterior extension of the nasal bones, and differences in the dentition distinguish it from *Alligator*.

On account of the lack of homologous parts for comparison, the separation of this specimen from *Bottosaurus* is somewhat more difficult, though their distinctness appears to be indicated.

In Leidy's description¹ of the type specimen of *Bottosaurus harlani* he says: "The fragment of the dental bone is about 15 inches in length, and in this extent contains the remains of 11 alveoli, which, perhaps, comprise the whole number except three or four." In the Montana skull the total length of the dental series is 8 inches and contains alveoli for 19 teeth. Still further Leidy says the alveoli "appear to indicate a succession of teeth related to one another in size nearly as in the *Crocodile* and *Alligator*." The succession of

¹ Smithsonian Contributions to Knowledge, vol. 14, 1865, p. 13.

teeth in the present form, as will be shown later, is not like that of the *Crocodile* and *Alligator*, and, when considered with the great disparity in the proportional extent of the dental series, appears to justify their generic separation. On that account the new generic name *Brachychampsa* is proposed for its reception. Under this genus I would include the species *Bottosaurus perrugosus* Cope from the Arapahoe beds of eastern Colorado, which Cope provisionally assigned¹ to the New Jersey genus *Bottosaurus*.

The type of this species cannot now be located, but in the original description is said to consist of a "fragmentary dentary, vertebræ, and pieces of the skull." Cope says: "There is a slight difference in the sizes of the alveoli, but not such as is usual in Tertiary crocodiles." In view of the character of the dentition shown by this newly discovered specimen, "the slight differences, etc.," noted above appear especially significant when taken into consideration with the similarity of their geological occurrence.

The classification of this form may be best expressed by the following:

Order.—Crocodilia.

Suborder.—Eusuchia.

Family.—Alligatoridæ.

Genus.—*Brachychampsa*.

Species.—*Brachychampsa montana*.

The genus *Brachychampsa* will now include the two species *B. montana*, *B. (Bottosaurus) perrugosa* (Cope).

BRACHYCHAMPSEA, new genus.

The characters of this genus are included in the description that follows of *Brachychampsa montana*, the type-species.

BRACHYCHAMPSEA MONTANA, new species.

Plates 26 and 27.

Type.—The anterior two-thirds of the skull, accompanied by detached fragments of the posterior portion. Cat. No. 5032, Amer. Mus. Nat. Hist. Collected by Barnum Brown.

Type-locality.—Twenty-five miles southeast of Lismas, Dawson County, Mont.

Horizon.—Upper sandstone, "Hell Creek Beds," Lance formation, Upper Cretaceous.

Description.—The type-specimen is a short, broad-snouted skull, the length from the level of the front border of the orbits being only 7 mm. greater than the width at the same point. Excepting a few detached fragments, the posterior portion of the skull behind the orbits is missing (Pl. 26). The remaining part is fairly complete

¹ Bull. Geol. and Geog. Survey of Terr., vol. 1, 1874-5, p. 27.

and undistorted. The upper surface of the preorbital region is flat and without crests or ridges; the muzzle is evenly but broadly rounded; the nasal aperture is large and pear-shaped in outline. In the absence of a roof-like covering formed by the premaxillaries over the anterior part of the external nares, *Brachychamps*a differs from all known alligators, both recent and extinct. On account of the damaged condition of the anterior extremities of the nasal bones it can not be determined whether they extended forward into the nasal opening. The facial processes of the premaxillaries extend posteriorly to the level of the alveolus for the fifth maxillary tooth. The nasal bones are comparatively slender and extend posteriorly to the level of the anterior borders of the orbits. In recent alligators these bones terminate well in front of the orbital line. The maxillaries are broad, flattened above, and much compressed vertically. The jugals are heavy, with roughly sculptured surfaces. The interorbital surface is flat and not concave as in many crocodiles and alligators. The orbital openings are everted as in the alligators and some crocodiles and are confluent with the lateral vacuities. The sculpturing of the facial surface of the bones is more strongly marked in the neighborhood of the orbits than it is anteriorly.

In the palatal view (Pl. 27), where the bones have not suffered mutilation, all of the sutures are plainly indicated. Latero-inferiorly the maxillo-premaxillary suture passes obliquely backward and inward on the palate. The damaged condition of the palate just back of the anterior palatine vacuity renders uncertain the posterior extent of the premaxillaries. In the recent alligators this suture extends nearly straight across on a level with the second maxillary tooth, while in this form it extends posteriorly at least as far as the level of the fourth maxillary tooth.

Each of the broad maxillaries has alveoli for 14 teeth, and each of the premaxillaries for 5. The palatines, of which only the anterior portions are present, unite with the maxillæ by an almost straight transverse suture on a level with the eleventh maxillary tooth. The lateral borders of the anterior ends of the palatines are divergent, as in all alligators, instead of parallel or convergent as in all true crocodiles. On the left side of the palate enough of the boundary of the posterior palatine vacuity remains to indicate that it was subround instead of elongate as in most members of this group. The preserved borders of the anterior palatine vacuity show it to have been of large size and probably pear-shaped in outline.

The pits on the palatal surface of the premaxillary for the reception of the anterior teeth of the lower jaw are broad and exceedingly shallow.

A detached fragment of the pterygoid shows the processes to have been blunt and stout.

Measurements of skull of Brachychampsa montana. Type-specimen.

	mm.
Distance from anterior angle of orbits to tip of snout.....	164
Width of skull at anterior angle of the orbits.....	157
Width of skull at maxillo-premaxillary suture.....	105
Greatest width of nasal opening.....	44
Greatest longitudinal length of premaxillary.....	80
Least width of interorbital bar.....	26
Greatest width of nasals.....	32
Greatest width of anterior palatine processes.....	45
Greatest width of anterior palatine vacuity.....	33
Distance from anterior end of palatine vacuity to tip of snout.....	24
Length of alveolar border of maxillary.....	135
Length of alveolar border of premaxillary.....	65

Teeth.—The dental formula of the upper jaw consists of 5 premaxillary and 14 maxillary teeth, the total number (38) being the same as found in the upper mandible of many modern alligators. Judging from the size of the alveoli, all of the premaxillary teeth appear to have been of approximately the same size. The teeth still present in the skull are: the bases of three premaxillary teeth, and the third, fourth, fifth, sixth, seventh, ninth, eleventh, and twelfth maxillary teeth on the right side; the roots of the third, fifth, sixth, and seventh, with the tenth and eleventh teeth intact, in the left maxillary. The first three maxillary teeth were relatively small and evidently of about equal size. The fourth is slightly larger than the third; the fifth is larger than the fourth and is the most robust tooth of the anterior dental series; the sixth tooth is slightly smaller than the fifth; the seventh, eighth, ninth, and tenth were quite small, being the weakest of those in the upper mandible; the eleventh and twelfth were robust, and, judging from the size of the alveoli for the thirteenth and fourteenth, all of these teeth were of approximately the same size.

The anterior teeth of the maxillary series although somewhat compressed transversely are acutely pointed, and while the fifth is as long as the eleventh and twelfth the anterior posterior extent of the tooth is only a little over half that of the latter. The relative dimensions are well shown in the table of measurements of the teeth given below.

The posterior teeth of *Brachychampsa montana* resemble most nearly those figured by Leidy¹ as *Bottosaurus harlani* from the Cretaceous of New Jersey.¹

The crowns of the posterior teeth are somewhat compressed laterally, mammiliform, with outer and inner surfaces separated by a somewhat obscure carinæ which extends from the subacute apex to the base of the corrugated surface as shown in figure 1. The upper

¹ Smithsonian Contributions to Knowledge, vol. 18, pl. 18, figs. 11-14.

surface is corrugated with depressions radiating from the apex but the base of the enameled surface is smooth. The upper part of the tooth is separated from the gibbous root by a slight constriction at the base of the enamel.

In the collection of the U. S. National Museum there is a large number of detached teeth from the "Ceratops beds" of Converse County, Wyoming, which can not be distinguished from those in the specimen under discussion. With them are other teeth which from their minute size and other differences appear to indicate the presence in those beds of one or more undescribed species, but the material is too meager upon which to base a determination. Many of these scattered teeth showed wear on their internal surfaces, thus substantiating the evidence of the *Alligatoroid* nature of the bite as shown by the worn posterior teeth of the type-specimen.



FIG 1.—TWELFTH MAXILLARY TOOTH OF BRACHYCHAMPSA MONTANA. NATURAL SIZE. a, LATERAL VIEW; b, POSTERIOR VIEW. TYPE-SPECIMEN.

Principal measurements of maxillary teeth of Brachychampsia montana. Type-specimen.

Number of tooth....	Third.	Fourth.	Fifth.	Sixth.	Seventh.	Ninth.	Tenth.	Eleventh.	Twelfth.
Length.....	mm. 9	mm. 10	mm. 12	mm. 9	mm. 7	mm. 5	mm. 6.5	mm. 12	mm. 11
Extent antero-posteriorly.....	6.5	7	8	7	6	5	6	12	12

EXPLANATION OF PLATES.

PLATE 26.

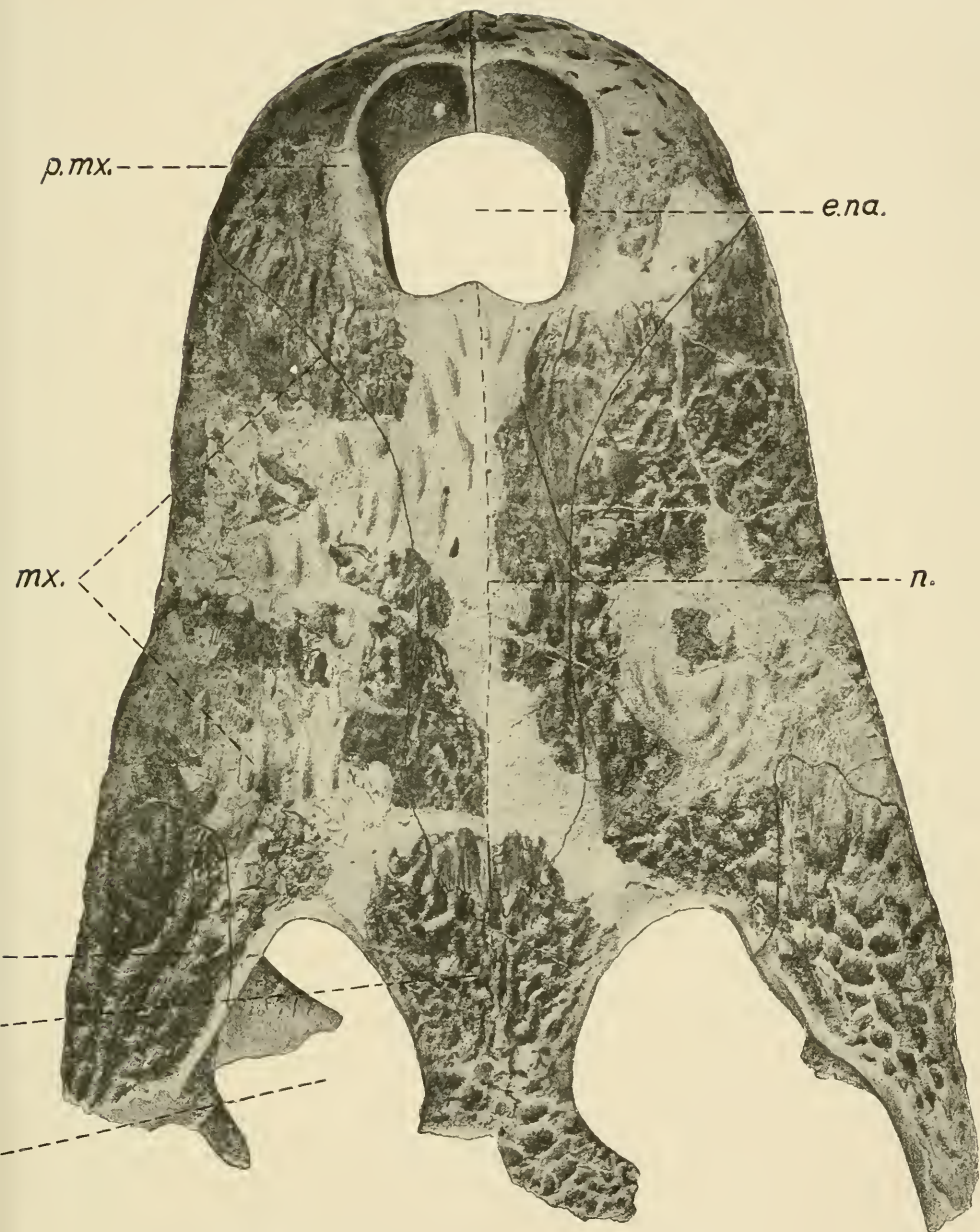
Skull of *Brachychampsia montana*. Cat. No. 5032. Amer. Mus. Nat. Hist. Type-specimen. Superior view of the anterior part of the skull. Natural size.

e. na., external nares; *fr.*, frontal; *ju.*, jugal; *mx.*, maxillary; *n.*, nasal; *o.*, orbit; *p. mx.*, premaxillary.

PLATE 27.

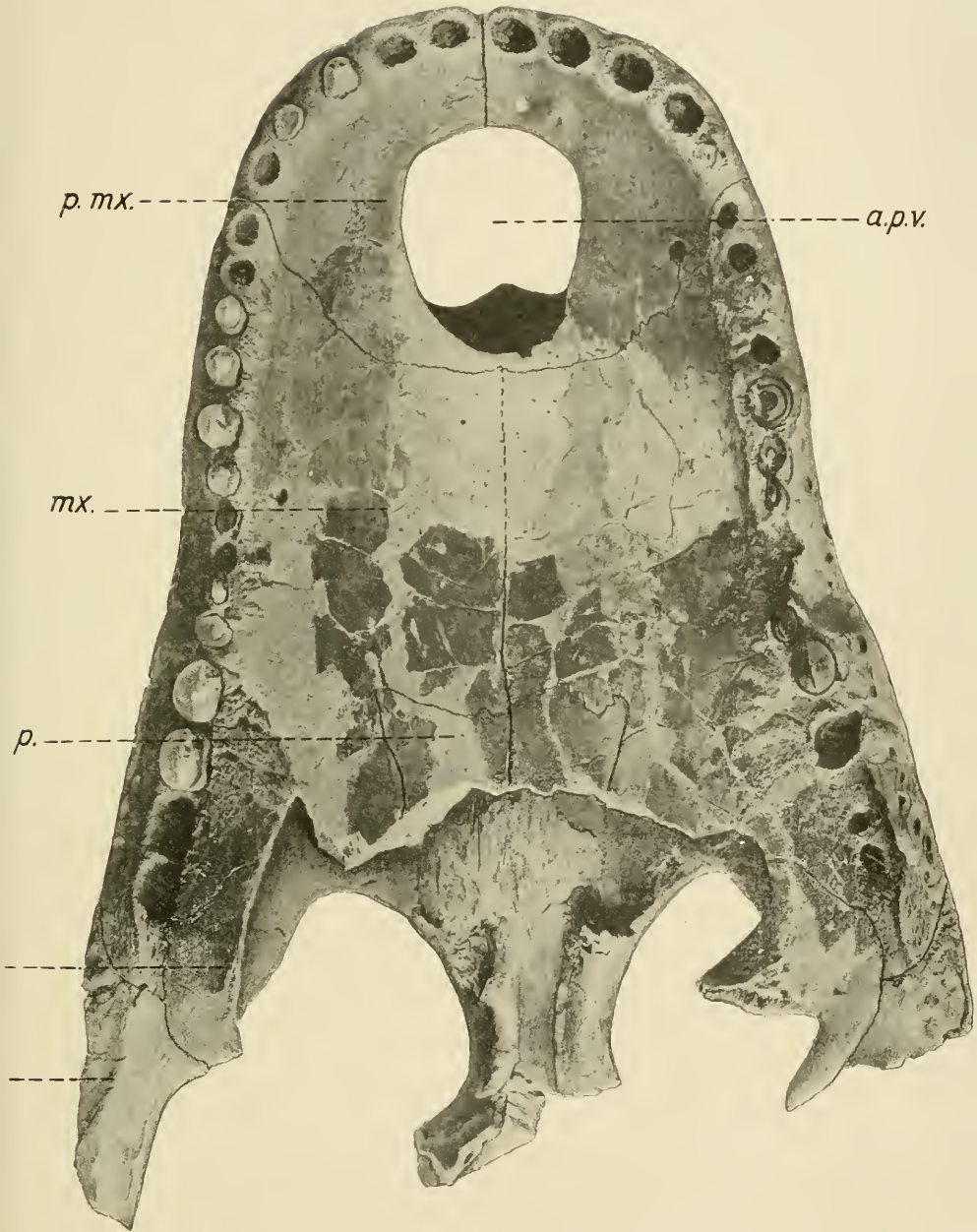
Skull of *Brachychampsia montana*. Cat. No. 5032. Amer. Mus. Nat. Hist. Type-specimen. Inferior view of the anterior part of the skull. Natural size.

a. p. v., anterior palatine vacuity; *ju.*, jugal; *mx.*, maxillary; *p.*, palatines; *p. mx.*, premaxillary; *t. p.*, transpalatines.



ANTERIOR PART OF SKULL OF BRACHYCHAMPSA MONTANA.

FOR EXPLANATION OF PLATE SEE PAGE 302.



ANTERIOR PART OF SKULL OF BRACHYCHAMPSA MONTANA. PALATE VIEW.

FOR EXPLANATION OF PLATE SEE PAGE 302

