

# Article XI.—DESCRIPTION OF A SKULL OF A BRIDGER CROCODILIAN<sup>1</sup>

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PLATES XVI AND XVII

Among a number of well-preserved Tertiary crocodilian skulls in the American Museum collections is one which is unusually well preserved. This specimen (Amer. Mus. No. 6177) consists of a skull and jaws. The skull is complete except for the lack of a few teeth and the extremities of some delicate processes; it is very slightly distorted. The jaws are not so well preserved, the symphysial portion being lacking. The specimen was collected in 1904 by Paul Miller at Henry's Fork Hill, in Horizon C4 of the Bridger Beds.

The identification of the skull is uncertain. It certainly belongs to a species of *Crocodylus*, but the present state of knowledge of the Eocene Crocodylia renders an accurate specific identification difficult, if not impossible. The characters of the skull agree very well with Marsh's description of *Crocodylus affinis*. There are several other Bridger species of *Crocodylus* described in the literature, based for the most part on fragmentary specimens. Until a careful comparison of the type specimens of these various species is made the specific identification of the Eocene crocodiles is uncertain. Provisionally the skull described is referred to *Crocodylus affinis* Marsh.

## GENERAL FORM

In general form the skull is very short and broad. It is low vertically and relatively flat on its superior surface; this does not appear to be due to crushing.

The snout is slightly more than one and one-third times as long as it is broad at the base. The muzzle is narrow, being less than one-half as broad as the snout at its base. The constriction at the premaxillo-maxillary suture is deep; posterior to this the snout broadens considerably to the level of the fifth maxillary teeth; at the level of the seventh maxillary teeth the snout is very slightly constricted. The superior surface of the snout is very flat.

The interorbital region is very flat. The cranial table is moderately flat and is considerably broader than it is long. Its lateral borders converge very slightly forward. Its posterior border is very irregular.

<sup>1</sup>Contributions to the Osteology, Affinities, and Distribution of the Crocodylia. No. 8.

## THE CAVITIES OF THE SKULL

**SUPRATEMPORAL FENESTRÆ.**—The supratemporal fenestræ are moderately large. The fenestra of the right side is nearly circular, and that of the left side is elliptical in outline; this difference may be attributed to distortion. The interfenestral space is narrow.

**INFRATEMPORAL FENESTRÆ.**—These fenestræ are not especially characteristic, except that they face almost directly upward; they are scarcely visible when the skull is viewed from the side.

**ORBITS.**—These cavities are large and, like the infratemporal fenestræ, face almost directly upward. The space between them is of moderate breadth. The breadth of the orbits is great in proportion to their length.

**EXTERNAL NARIAL APERTURE.**—This cavity is about the same size as either of the supratemporal fenestræ, possibly being very slightly smaller. It is subquadrangular in outline; its anterior border is practically straight, and its lateral borders converge very slightly in the posterior direction. Vestiges of a median septum indicate that the aperture was at least partly divided.

**PREMAXILLARY FORAMEN.**—The premaxillary foramen is large. It is somewhat longer than broad, but is not slender. It is pointed at its anterior end and is broadly rounded on its lateral borders and its posterior end.

**PALATINE FENESTRÆ.**—These fenestræ are very large. They are somewhat irregular in outline. Their external and internal borders are both curved. The posterior end is broadly rounded; the anterior end is rounded, but more acutely. The fenestræ extend forward as far as the level of the ninth maxillary teeth.

**INTERNAL NARIAL APERTURE.**—This cavity is large; it faces directly downward. It is situated near, but not at the posterior ends of the pterygoid bones.

## THE BONES OF THE SKULL

**PREMAXILLARIES.**—The premaxillaries are small. They occupy a considerably smaller area on the superior surface of the skull, compared with that occupied by the maxillaries, than in most crocodilians. The anterior mass of the bone is not sharply separated from the posterior process, but merges into it; this posterior process extends back as far as the level of the fourth maxillary teeth.

On the palate the suture between the premaxillaries and the maxillaries is very irregular. On each side it extends irregularly inward and backward as far as the level of the posterior edge of the first maxil-

lary tooth, then inward and forward as far as the level of the anterior end of the first maxillary tooth, then inward and backward to the median line, which it meets at the level of the anterior edge of the third maxillary tooth. From the median line it extends in reverse order to the "canine" notch. All parts of the suture are irregular.

The right premaxillary contains alveoli of four teeth, some of which are partially preserved; the left premaxillary contains alveoli of five teeth, of which No. 4 is well preserved. This tooth is stout and long; it extends a considerable distance below the dental border, and was evidently not fully imbedded in its alveolus when buried. The tooth which is lacking on the right side is the small No. 2. There are no small foramina in the premaxillaries caused by piercing of the upper jaw by the teeth of the lower, but there is a pair of large, deep pits, which evidently lodged the first mandibular teeth, anterior and exterior to the premaxillary foramen and posterior and internal to the first premaxillary teeth.

**MAXILLARIES.**—The maxillaries are large, especially in the transverse diameter. Their contacts with the nasals are unusually short, being only about 28 per cent of the total length of the bones themselves. The contacts with the lacrymals are somewhat complex; they extend backward a short distance from their anterior ends in the same direction as the maxillo-nasal sutures, then turn almost directly outward for a short distance, and then turn back in a direction similar to their anterior portions. The maxillo-jugal sutures are very irregular. They occupy very little space in the longitudinal direction, though their transverse component of length is considerable.

On the palate the sutural connection with the premaxillaries has been described. The median suture of the two maxillaries with each other is short. The suture with the two palatines is almost semicircular in outline; the anterior convexity does not extend forward to the level of the anterior ends of the palatine fenestræ; in this respect the skull differs from all modern crocodilian skulls except perhaps *Osteolæmus* and *Osteoblepharon*. The sutures with the ectopterygoids lie opposite four maxillary teeth.

Each maxillary contains alveoli for fifteen teeth. Most of these are preserved. The teeth are all very stout; the anterior ones are somewhat curved; the posterior ones are more nearly conical. The teeth are all close together, the only notable spacing being between the sixth and seventh teeth and this is less than in most crocodilian skulls.

**NASALS.**—The nasals extend forward a considerable distance into the narial aperture. They broaden rapidly to the points of contact of

premaxillaries, maxillaries, and nasals, and then more gradually to their broadest portions, where maxillaries, nasals, and lacrymals meet. Posterior to this point they narrow rapidly and irregularly, ending in a very irregular, but generally transverse, suture with the frontal.

**LACRYMALS.**—The lacrymal bones are unusually broad. Their lateral borders are nearly parallel throughout most of their length; their anterior processes are narrow and sharp and are sharply separated off from the main mass of the bone. Their sutures with the nasals are short.

**PREFRONTALS.**—These bones are of moderate size. They are characterized by the shape of their boundaries, which consist of three curves on each side. The external contacts, with the lacrymals chiefly, extend forward and inward in a slightly curved direction, with the convexity of the curve inward; the internal contacts, with the frontal and nasals, extend forward and outward and meet the external boundaries with a sharp point at the anterior end of the bone. The convexity of the curve of the internal border is directed inward. The third boundary curves occupy portions of the anterior walls of the orbits, their convexities facing, of course, inward and forward.

**FRONTAL.**—The frontal is very flat. Its anterior process is broad, especially at its anterior end. It is not sharply set off from the posterior plate. No part of the frontal forms a portion of the borders of the supratemporal fenestræ.

**POSTORBITALS.**—These bones are relatively small. They comprise about one-third of the lateral borders of the supratemporal fenestræ. They occupy about three-fifths as much of the surface of the cranial table as the squamosals.

**SQUAMOSALS.**—The squamosals are comparatively small, owing to the large size of the supratemporal fenestræ. They are broad in proportion to their length, but not in proportion to the breadth of the skull; they occupy slightly more than three-fifths of the posterior border of the cranial table.

**PARIETAL.**—The parietal is unusually broad. It is narrow between the fenestræ, but expands rapidly anterior to these cavities.

**SUPRAOCCIPITAL.**—The portion of the supraoccipital exposed on the superior surface of the skull is very broad laterally, and very short antero-posteriorly; its posterior border is concave. On the posterior surface of the skull the supraoccipital extends downward about three-fifths of the distance from the superior border to the foramen magnum; its breadth is about three times as great as its height.

**JUGALS.**—The jugal bones are relatively short and broad; they occupy an unusually large area on the surface of the skull. Their sutures with the maxillaries are more nearly transverse than in most crocodilians. The sculpture of the bones is weak.

**QUADRATO-JUGALS.**—The quadrato-jugals are nearly smooth, the pitting being scarcely visible. The anterior points, which project into the infratemporal fenestræ in the living species of *Crocodylus* and *Tomistoma* may or may not have been present; the anterior ends of the bones are not completely preserved.

**QUADRATES, EXOCCIPITALS, AND BASIOCCIPITAL.**—These bones are characteristic in their great breadth and the stoutness of their construction.

**PALATINES.**—The palatine bones are remarkably short. They do not extend as far forward as the anterior ends of the palatine fenestræ, and their posterior ends are anterior to the level of the posterior ends of these fenestræ. The suture with the pterygoids is essentially transverse in direction. Their broadest portion is at the points where the maxillo-palatine suture reaches the fenestral borders. The narrowest portion is very slightly anterior to the posterior ends of the bones.

**PTERYGOIDS.**—The pterygoids are broad and flat; the flatness may be partially due to distortion. They occupy unusually large portions of the posterior borders of the palatine fenestræ. They occupy a greater area posterior to the internal narial aperture than in the modern crocodiles.

**ECTOPTYERYGOIDS.**—The three processes of each ectopterygoid are all short, but are all stoutly constructed. The lateral diameter is greater than in most crocodilians.

#### Measurements

Length of Skull, Supraoccipital to Tip of Snout	42.7cm.
Length of Skull, Ends of Quadrates to Tip of Snout	48.9
Breadth Across Quadrates	29.1
Breadth Across Posterior End of Cranial Table	13.7
Breadth Across Snout at Base	20.7
Breadth Across Snout at Level of Fifth Maxillary Teeth	14.4
Breadth Across Snout at Notch	8.3
Breadth Across Snout at Muzzle	9.7
Length of Snout	28.6
Length of Right Premaxillary on Superior Surface	12.8
Length of Premaxillaries on Palate	10.3
Length of Palatine at Median Line	11.0
Breadth of Pterygoids	18.2
Maximum Diameter, Right Supratemporal Fenestra	4.3
Maximum Diameter, Left Supratemporal Fenestra	4.7

Length, Right Orbit	6.2
Length, Left Orbit	6.8 (est.)
Breadth, Right Orbit	5.0
Breadth, Left Orbit	5.4
Length External Narial Aperture	3.7
Breadth External Narial Aperture	3.7
Length, Premaxillary Foramen	2.9
Breadth, Premaxillary Foramen	2.0
Length, Right Palatine Fenestra	12.0
Maximum Breadth, Right Palatine Fenestra	6.1
Length, Left Palatine Fenestra	11.6
Maximum Breadth, Left Palatine Fenestra	6.0
Breadth of Internal Narial Aperture	2.8

#### OTHER MATERIAL

Several other skulls appear to be conspecific with the one described. Of these, Amer. Mus. No. 6176 agrees very closely so far as comparison is possible. The skull is badly distorted, making direct comparison difficult. Amer. Mus. No. 1719 is well preserved but has not yet received sufficient preparation for accurate determination of characters. This specimen includes representative portions of nearly all parts of the skeleton. It will be described later. Amer. Mus. No. 4988 is similar in many respects and, when prepared for study, may prove to be conspecific. All of these specimens are from approximately the same horizon.

**PLATE XVI**

PLATE XVI

Skull of *Crocodylus* sp. cf *affinis* Marsh

Amer. Mus. No. 6177

About one-third natural size.

Superior view



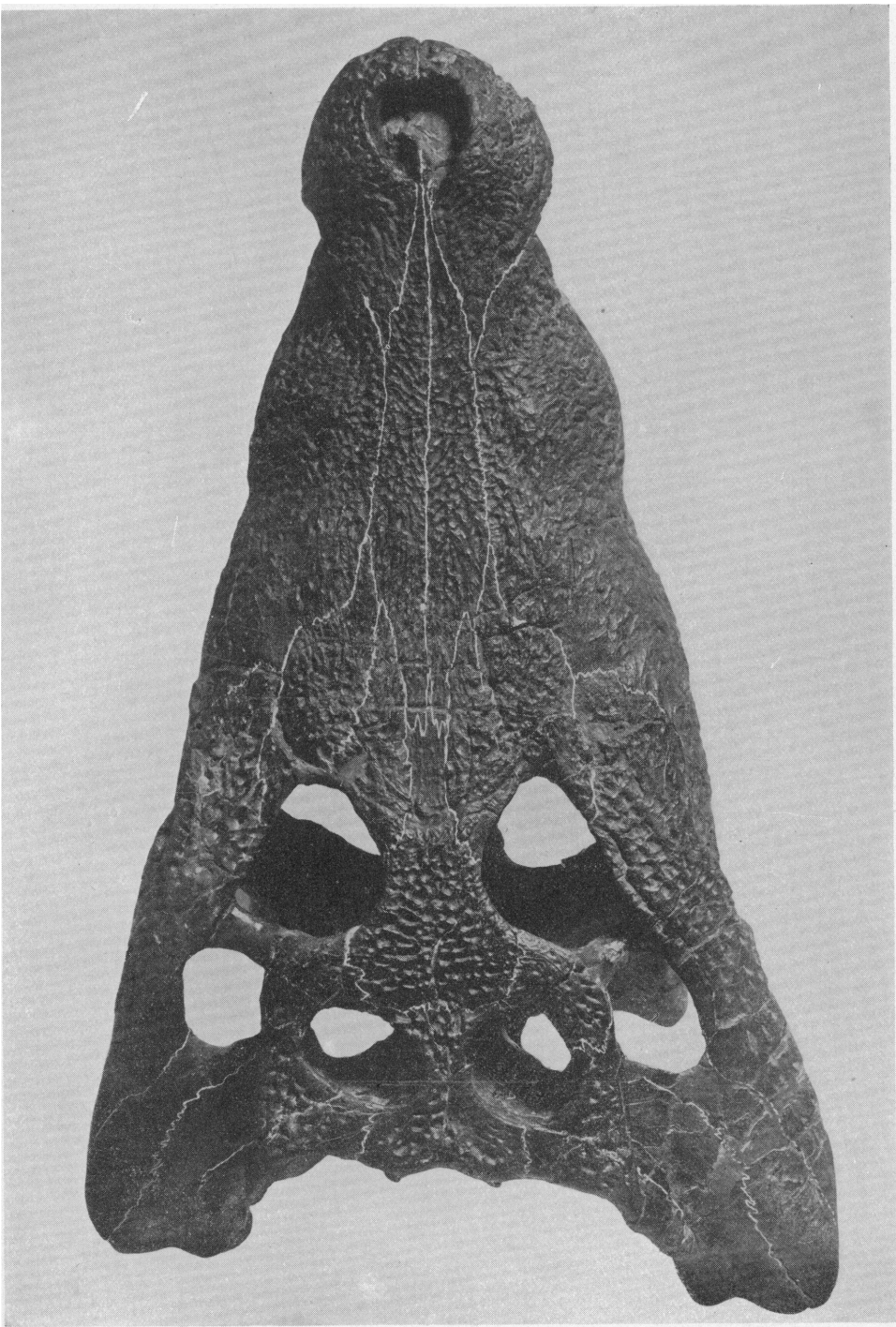


PLATE XVII

Skull of *Crocodylus* sp. cf. *affinis* Marsh

Amer. Mus. No. 6177

About one-third natural size

Inferior view

