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CRETACEOUS OF ALBERTA

by
Bruce R. Erickson
The Science Museum of Minnesota

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ALBERTOCHAMPSA LANGSTONI, GEN. ET
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A very distinctive specimen of fossil alligatorine was collected by the writer during the 1967 Canadian expedition of The Science Museum of Minnesota. The specimen has since been fully developed and is found to hold considerable interest. Its significance lies in its affinities to described alligators as well as with its potential bearing on the geographical location of the ancestral lineage of the group.

The specimen to be described herein consists of a somewhat fractured but essentially complete skull that is considered to represent the oldest known member of the alligatorinae.

Suborder Eusuchia
Family Crocodylidae
Subfamily Alligatorinae
Genus *Albertochamps*, new genus

Diagnosis — A modest-sized crocodylian pertaining to the alligatorinae with a broad, bluntly triangular rostrum that is slightly longer than wide. Unusually wide, external narial opening with low anterolateral border. Third and fourth maxillary teeth largest, premaxillary teeth variable in size. Well defined pits for reception of fourth mandibular teeth. Palatines elongate and convex forward. Palatine vacuities subrounded.

*Albertochampsia langstoni*¹, sp. nov.

Type — SMM P67.15.3. A nearly complete skull lacking the lower jaws.

Type Horizon and Locality — Oldman formation (late Cretaceous), Sec. 12, T. 21, R. 9, W4, Alberta, Canada.

Diagnosis — As for genus.

DESCRIPTION

General Form of the skull — Important features of the skull are preserved in the single specimen available in spite of its somewhat flattened condition due to crushing.

On the dorsal surface, the anterior end of the right nasal has been displaced to the right, and minor portions of the rostrum and cranial table are missing. Ventrally, also missing is the tip of the snout including the medial premaxillary region with the first right tooth and the first three left teeth. The posterior margins of the pterygoids and the occipital condyle are also wanting. Eight of the estimated 40 teeth remain in the skull.

In the present specimen, all of the following suggest maturity in development (Mook, 1921): relative lengths of preorbital (facial) and postorbital (cranial) regions; rather moderate-sized orbits; relatively close spacing and position of the supratemporal fenestrae posterior to the inner border of the orbits, as well as noticeable depression of the cranial table; and marked vertical festooning of the oral margin of the rostrum. Yet the skull is small, being less than 250 mm. in total length.

Skull openings — Although the area around the *external nares* is damaged and the anterior portion missing, it is apparent that the opening was exceedingly large. The anterior margin must have been very thin and low as indicated by the preserved and undistorted lateral borders of the opening as well as the floor of the nasal chamber especially on the right side (fig. 1). The inner surface of the chamber is smooth and its outer edge reflexed. Posteriorly, the rim of the opening is lacking; however, if the lateral rims are carried around, the arc formed would indicate that the nasals at least reached the opening and may well have penetrated it. Figure 3 shows the nasals with their anterior tips restored.

¹ For Wann Langston, Jr.

The *orbits* are irregular in outline, broadly rounded internally, straight on the outer border, and narrowed forward. They are rather close set to one another.

The *supratemporal fenestrae* are large and elliptical in shape, being longer than wide. Their spacing is moderately close, but their centers are only approaching the level of the inner margins of the orbits.

Infratemporal fenestrae as preserved show a subcircular outline. If their posterior margins were totally intact, it is suspected that they would have a more triangular form (figs. 3 and 4).

On the palate, the region of the *premaxillary foramen* is not preserved. The attempted restoration (fig. 4) is after *Brachychampsa*, which has the same general rostral configuration. The lateral rims of the *palatine vacuities* are somewhat displaced but complete. These openings are small and fairly uniform in their elongate shape.

The opening for the *internal nares* is circular and large. It occupies a position just behind the level of the posterior extent of the palatine vacuities. Remnants of what might be a bony septum imply that this opening was divided. There is also a slight upward flaring of the rear perimeter that resembles the condition seen in many species of alligator.

Bones of the skull — The bones on the dorsal surface are highly sculptured and their sutures well defined. The *premaxillaries* have a rather conventional union with the maxillaries. They possess wedge-shaped processes on the superior surface that reach backward between the medial nasals and the lateral maxillaries to the level of the fifth maxillary teeth. The greater part of this surface, however, was evidently occupied by the narial aperture. Anterolaterally, the premaxillaries are depressed to a point nearly level with the floor of the narial chamber and not greatly unlike the condition observed in the Miocene form *Alligator mcgrewi* (Schmidt, 1941).

Four alveoli are preserved in the right premaxillary, two in the left. At least five must have been present in each. Believed to be the second in the series, the first preserved alveolus on the right side of the skull carries a small tooth that has been forced inward. The next two alveoli show a slight increase in size — the last of which is the fourth and largest tooth in the series. This tooth is present in the left element. The ventrad premaxillo-maxillary sutures are present laterally but disappear as they converge mediad at the level of the second maxillary teeth. Portions of the maxillaries present immediately posterior to this line indicate that the sutures were simple and

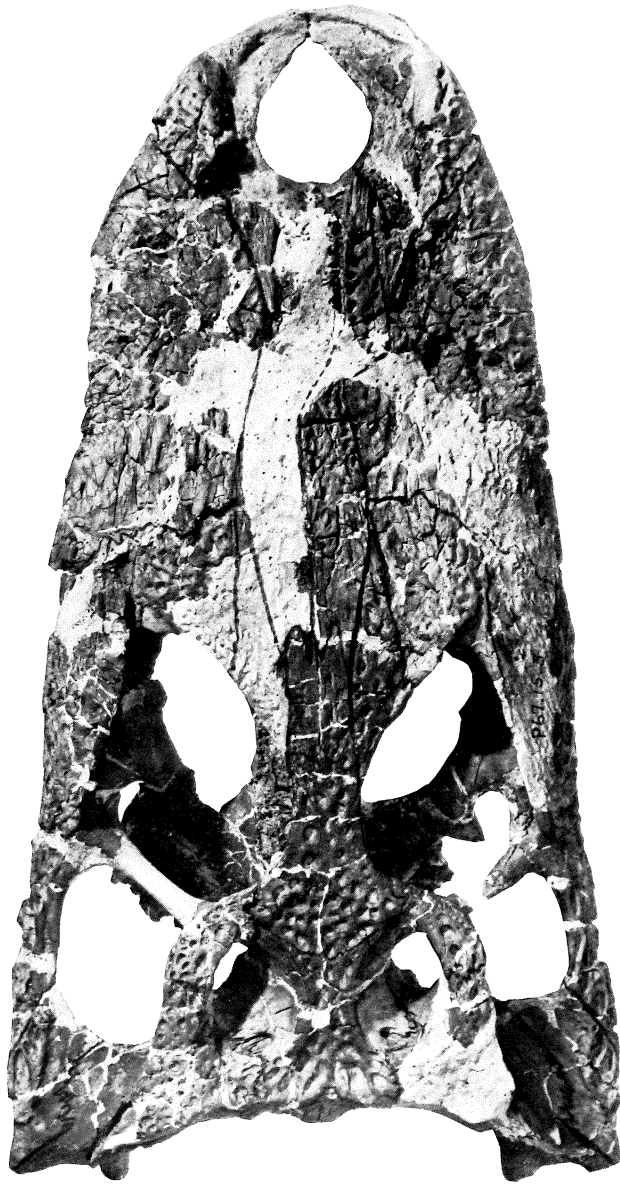


Figure 1
Albertochampsia langstoni, type specimen SMM P67.15.3.
Dorsal view of skull. Approximately 2/3 natural size.

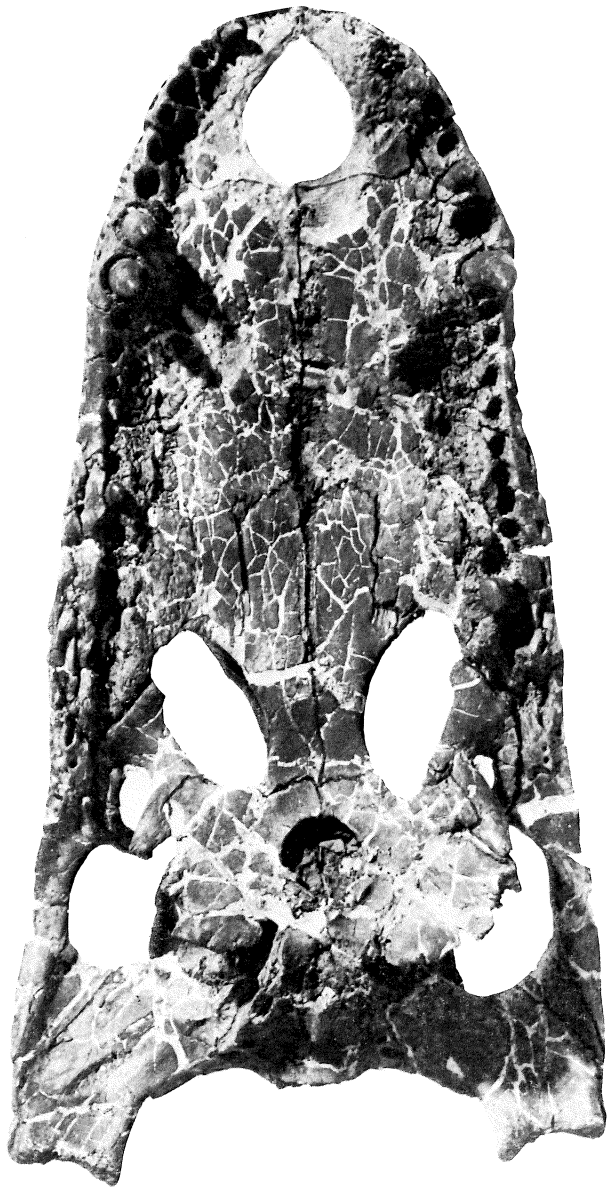


Figure 2
Albertochampsia langstoni, type specimen SMM P67.15.3.
Ventral view of skull. Approximately 2/3 natural size.

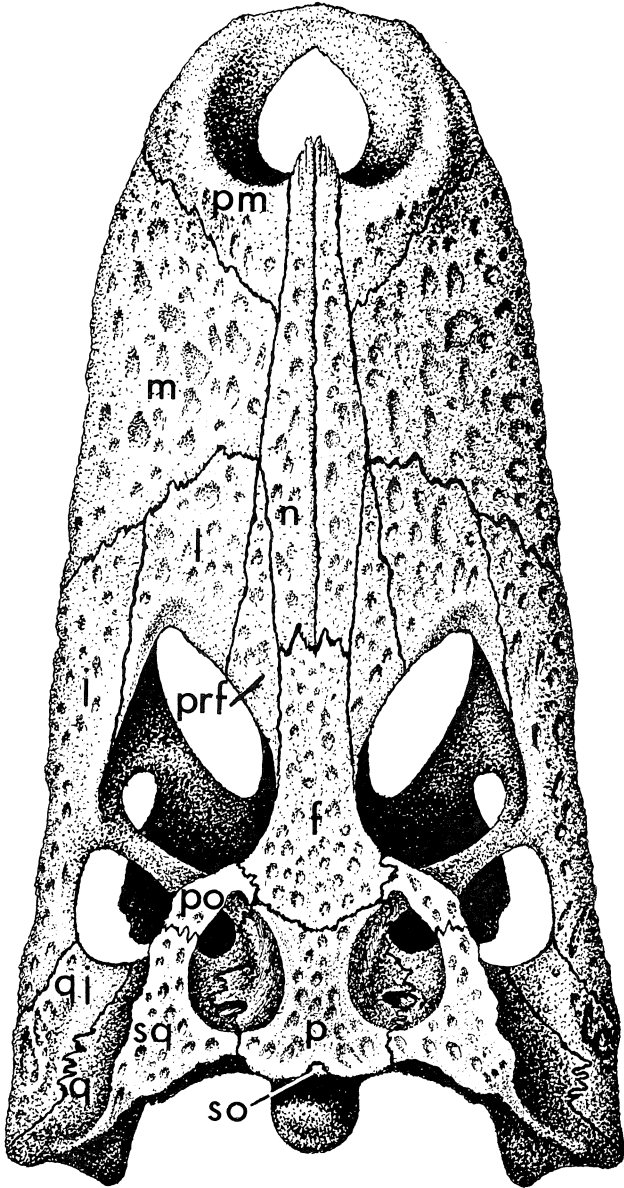


Figure 3
Restoration of the skull, *Albertochampsia langstoni*, dorsal view.

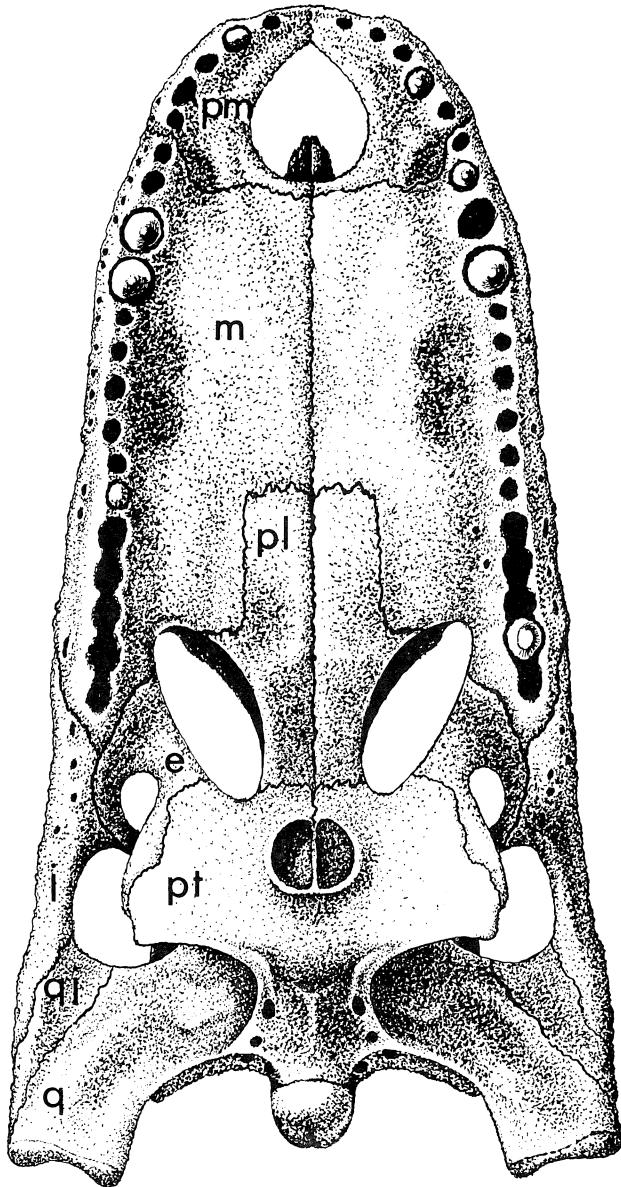


Figure 4
Restoration of the skull, *Albertochampsia langstoni*, ventral view.

more or less directly connected. Small shallow pits for reception of the mandibular teeth are found on the lingual side between each alveolus. A much larger pit, presumably to lodge the fourth mandibular tooth, is situated in a similar position on the premaxillo-maxillary suture.

The *maxillaries* are broad and short. They join the premaxillaries in long sutures that terminate at the extreme hinder tips of the latter. From this point caudad they achieve greatest width while contacting the nasals medially. At about the level of the tenth maxillary tooth, which is also the forward most extent of the rostrad process of the prefrontals, they are joined by the lacrimals and jugals. The resulting suture in each has modest fluctuations as it traces an outward and slightly backward course to the oral border of the skull.

In ventral aspect the maxillaries meet along midline for the distance between the second and tenth teeth. The premaxillo-maxillary suture as noted was simple for much of its length. Where it is preserved laterally, it swings forward and passes between the fifth and sixth alveoli of the skull. On either side the maxillo-palatine suture projects inward and then forward from the anterior boundary of the palatine vacuity to the level of the tenth maxillary tooth. Its lateral borders must have been parallel, although in the present specimen they are slightly divergent forward due to slight separation of the palatines along midline. Anteriorly, the transverse segment of the suture is slightly convex. There were fifteen teeth in the maxillary and in general size and arrangement like those of the recent alligator. The last five, however, were very large and different in sharing a common alveolar groove instead of having individual alveoli as the anterior teeth. From the first, maxillary teeth increase regularly in size to the fourth, which is the largest in the skull. It is of the alligator type having a blunt, conical shape. The fifth through the tenth are small by comparison. The tenth tooth is present on the right side. It has a low silhouette with its horizontal length appreciably greater than the height of the crown. The crown is bluntly pointed and striated and similar to the twelfth tooth of *Brachychampsa*. On the left side, the fourteenth tooth is in place. Its size is several times greater than that of the tenth. The crown is very broad and low with peripheral striations. The top has been reduced to a flat surface presumably by wear. Shallow pits to receive mandibular teeth appear medial to interdental spaces from the first to the eighth — the last two being very large.

Only the right *nasal* is preserved, and its anterior portion is displaced (fig. 1). This element is slender with its widest point at the level of contact with the perpendicular maxillo-lacrimonal suture. It joins the frontal in a Z-shaped contact. The bone tapers in forward. In the absence of the extremity of this

bone, its involvement in the narial opening is uncertain; however, as noted above, the nasals evidently reached the opening.

The *lacrimals* are broad and contribute substantial portions of the anterior orbital rim. The prefrontal-lacrimal suture and the lacrimal-jugal contacts are nearly parallel.

The *prefrontals* are wedge shaped, having the frontals and nasals on their medial sides and the lacrimals on the other. The rear boundary is heavy and forms about half of the superior edge of the orbit.

The cranial table consists of a long, narrow *frontal* that barely reaches the front of the supratemporal fenestrae; a broad, concave *parietal* surface; short *postorbitals* that are not distinctive; slender squamosal segments that lack posterior ends; and a small process of the *supraoccipital*. The latter contributes also the largest part of the postcranial border as preserved.

The *jugal* is nearly one half the length of the entire skull, extending to the level of the eleventh maxillary alveolus.

The posterior region of the skull including the *basioccipital*, *basisphenoid*, *exoccipital*, *quadrato-jugal*, and *quadrate* are essentially like that of *Alligator*. The latter element is thin, and its articular facets are not as robust as in some forms. The *pterygoids* and *ectopterygoids* resemble *Alligator* as well insofar as their shape. The internal narial aperture is distinctive, however. The *palatines* are characterized by their long form and parallel longitudinal borders.



Figure 5
Albertochampsia langstoni, type specimen SMM P76.15.3.
Posterior view of skull. Approximately 4/5 natural size.

MEASUREMENTS

Albertochampsia langstoni, type, SMM P67.15.3

	mm.
Length of skull, posterior border of supraoccipital to tip of snout (est.)	216
Greatest width of skull, between quadrato-jugals	126.5
Length, posterior border of supraoccipital to anterior rim of orbits . . .	90
Length of rostrum, anterior rim of orbits to tip of snout (est.)	126
Width of rostrum base, level of anterior rim of orbits	105
Greatest width of premaxillaries	65.2
Narrowest point of interorbital plate	13
Greatest width of orbits	39
Length of orbits	52.6
Narrowest point between supratemporal openings	10
Greatest width of supratemporal openings	20
Length of supratemporal openings	26.1
Greatest width of external narial opening (est.)	39
Narrowest point between palatine vacuities	19.8
Width of palatine vacuities (est.)	22
Length of palatine vacuities	38
Width of internal narial aperture	17

COMPARISON WITH LATER ALLIGATORINES

The characterization of *Albertochampsia* leaves no doubt that it belongs to the subfamily Alligatorinae. In numerous ways it is distinctive from other known primitive members of this group, yet possesses features similar to Tertiary and recent forms.

It resembles *Brachychampsia* from the Hell Creek (late Cretaceous) of North America in the general shape of its broad, short rostrum. Comparison is limited to this region of the skull as the younger form is known only from the type specimen comprising the anterior two thirds of the skull and detached fragments (Gilmore, 1911). However, the unusually large, external narial aperture of *Albertochampsia*, more like that seen in later genera as noted above, contrasts markedly where the lateral walls of the opening are depressed forward, and the extreme anterior rim is very low instead of massive and high as in *Brachychampsia*.

In the premaxillaries and anterior maxillaries of the new fossil, the tooth pattern departs from the Hell Creek specimen. The premaxillary teeth are not uniform in size and the anterior maxillary teeth increase regularly in size from the first to the fourth and thereafter become much reduced as in

some later alligators including recent specimens. The posterior maxillary teeth are distinctive as they share a common alveolar groove and are of large size. The expanded narial aperture and these peculiar posterior teeth would suggest a specialized feeding habit.

Among other features *Albertochampsia* is distinct from *Brachychampsia* in having: a longer rostrum, a narrower interorbital plate, 15 instead of 14 maxillary teeth, prominent pits to receive mandibular teeth, and longer palatines with a convex anterior border.

Resemblances to Paleocene taxa are noted. The salient distinguishing features of the new skull are a much broader rostrum and the absence of the horn-like vertical expansion of the squamosal possessed by *Ceratosuchus* (Schmidt, 1938). The present specimen departs from *Allognathosuchus* (Patterson, 1931) in having a much longer dental series.

Sill (1968) has pointed out an outward radiation from North America for the alligators. The relative abundance of early Tertiary species and the relationships of the new form further lend support to the notion that the ancestral alligator lineage developed in North America. It would seem that their radiation began to take place in late Cretaceous times.

The new specimen also appears to be closest of the known forms to a potential ancestral type from which later eusuchian alligators arose. In its affinities it indicates that *Brachychampsia* was a specialized offshoot as suggested by Sill (ibid). *Paralligator* (Konjukova, 1954) of Mongolia was probably also aberrant. *Albertochampsia* seems best considered a more direct predecessor of later alligators. It also possesses "good" alligator characters that suggest perhaps an early Cretaceous derivation from some relatively small, broad-snouted crocodile.

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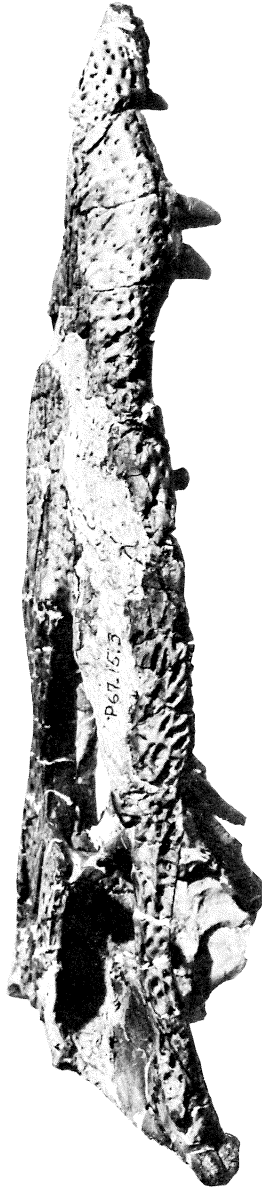


Figure 6
Albertochampsia langstoni, type specimen SMM P76.15.3.
Lateral view of skull. Approximately 2/3 of natural size.