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CRANIAL CHARACTERS OF *HOMALODOTHERIUM*

BY BRYAN PATTERSON  
ASSISTANT IN PALEONTOLOGY

RESULTS OF THE FIRST MARSHALL FIELD PALEONTOLOGICAL EXPEDITION  
TO ARGENTINA AND BOLIVIA, 1922-24

A thorough account of the skull and dentition of *Homalodotherium*,<sup>1</sup> the best-known member of the notoungulate suborder Entelonychia, has been given by Scott (1912, pp. 247-268), who based his description on the excellent specimen of *H. segoviae* Ameghino in the Ameghino Collection. In this specimen, however, the temporal fossae and the posterior narial opening were filled with matrix which prevented discussion of these regions of the skull. The First Marshall Field Paleontological Expedition to Argentina and Bolivia had the good fortune to collect a partial skeleton of this rare genus, F.M. No. P13092, also belonging to *H. segoviae*, which was described by Scott (1930). The skull was not included in his description but was merely figured in side view.<sup>2</sup> The auditory region of this specimen has been fully described by me (1932, pp. 6-9). The purpose of the present communication is to describe the sphenoidal area and the cranial foramina, and thus to round out as far as possible the published record of the cranial morphology of this important genus.

The drawing is by Mr. Carl F. Gronemann, Staff Illustrator of Field Museum.

*Homalodotherium segoviae* Ameghino.

*Horizon*.—Santa Cruz, middle Miocene.

*The sphenoidal area*.—The basisphenoid is long and quite strongly arched transversely; it bears a prominent keel on its anterior portion.

<sup>1</sup> Usually known as *Homalodontotherium* Flower 1884. The change is necessitated by the fact that *Homalodotherium* has priority, since Flower used this name in 1873 (Proc. Roy. Soc. Lond., 21, p. 383). I am indebted to Professor Scott for calling this point to my attention.

<sup>2</sup> In the figure (Plate 1, Fig. 1) the lower canine and cheek-teeth are drawn as though preserved. Actually only  $M_3$  and half of  $M_2$  are represented.

No trace of the suture with the presphenoid can be seen. The vomer is very long posteriorly, extending as far back as the posterior extremity of the pterygoids; in the posterior narial opening it unites with a process extending dorsally from the palatines. The choanae are thus completely divided, a condition that occurs in *Trigonostylops*, *Thylacosmilus*, *Tapirella*, and many other genera. The boundaries of the orbitosphenoids cannot be determined from the specimen. The dorsal limits of the alisphenoids are obscured, the pterygoid processes are large and stout and take a conspicuous share in the formation of the pterygoid crests. The pterygoids are wide antero-posteriorly and extend back to a point opposite the anterior ends of the auditory bullae. The hamular processes are not preserved. The pterygoid processes of the palatines are moderately divergent, broad laterally, and form approximately half of the pterygoid crests.

*Homalodotherium* differs in several respects from the *Toxodonta* and *Tytopheria* in the composition and form of the pterygoid crests. In *Adinotherium*, which may be taken as fairly typical of the two suborders mentioned above, the processes of the palatines are long and form the greater part of the ventral borders of the crests. The processes of the alisphenoids, although large, form only the posterior extremity of the ventral borders. The pterygoids are narrow and quite anterior in position. The pterygoid fossae are large but shallow. In *Homalodotherium* the alisphenoids form half of the crests, the pterygoids are wide and posterior in position, and the pterygoid fossae are small and poorly defined. The structure in *Adinotherium* is more advanced and can probably be attributed to the cyptocephalic condition of the skull.

*The cranial foramina.*—Although involving some slight repetition, all available information on the foramina may profitably be summarized here. Those surrounding the bullae are not as clearly defined as might be desired but it is believed that the relations and positions described below are essentially correct.

Optic foramen: small, slightly above and anterior to the lacerum anterius.

Foramen lacerum anterius: large and in its usual position.

Foramen rotundum: probably confluent with the lacerum anterius.

Foramen lacerum medium: large, situated between the alisphenoid and the anterior extremity of the bulla.

Foramen ovale: probably confluent with the lacerum medium.

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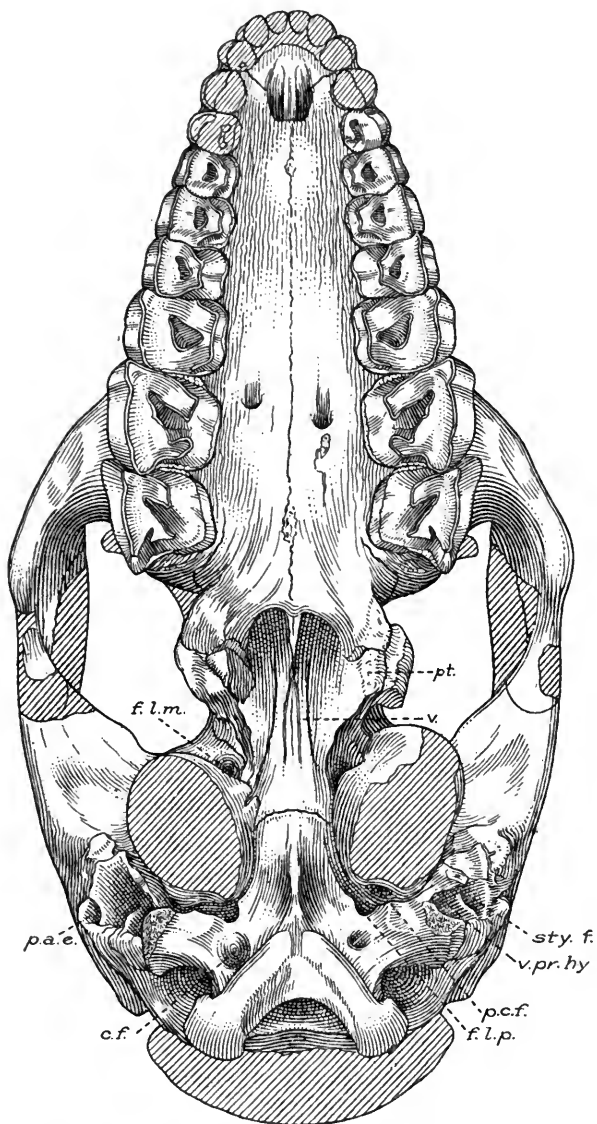


FIG. 23. *Homalodotherium segoriae* Ameghino. Ventral view of skull. Bullae enlarged by crushing, that of left side shifted somewhat anteriorly. Cross-hatched areas restored from Scott's figure. F.M. No. P13092. x 1/3. *c.f.*, condylar foramen; *f.l.m.*, foramen lacerum medium (including foramen ovale and possibly Eustachian canal); *f.l.p.*, foramen lacerum posterius; *p.a.e.*, porus acusticus externus; *p.c.f.*, posterior carotid foramen; *pt.*, pterygoid; *sty.f.*, stylomastoid foramen; *v.*, vomer; *v.pr.hy.*, vagina processus hyoidei.

Eustachian canal: possibly confluent with the lacerum medium.

Infraorbital foramen: opening above the anterior extremity of  $M^1$ ; very large on the left side, double on the right.

Internal orbital foramen: orifice behind the floor of the orbit at the posterior extremity of the maxillary-palatine suture.

Ethmoid foramen: unknown.

Anterior palatine foramen: large, channels the premaxillary for some distance.

Posterior palatine foramen: small, opposite  $M^2$  on the maxillary-palatine suture, right foramen in advance of the left.

Post-glenoid foramen: large, channels the post-glenoid process, bounded posteriorly by the crista meati.

Foramen lacerum posterius: large, situated at the postero-internal corner of the bulla between this element and the exoccipital.

Posterior carotid foramen: small, situated in the posterior wall of the bulla immediately anterior to the lacerum posterius.<sup>1</sup>

Stylomastoid foramen: orifice between the vagina processus hyoidei and the porus acusticus externus; bounded anteriorly by the crista meati, posteriorly by the mastoid.

Condylar foramen: situated a little distance postero-internal to the lacerum posterius; the right is large, the left divided by a septum.

Lachrymal foramen: unknown but certainly situated within the orbit.

Choanae: fairly large but somewhat narrower than the palate; completely divided by the vomer and the ascending process of the palatines.

Porus acusticus externus: placed low on the side of the skull; bounded anteriorly and ventrally by the tympanic, dorsally and posteriorly by the squamosal.

Foramen magnum: large, slightly oval in outline.

The arrangement and relations of the foramina are typically notoungulate. All features described above, with the exception of the divisions of the choanae, condylar and infraorbital foramina, can be found in other genera, and the great majority of them occur throughout the order. The division of the condylar and infraorbital foramina is probably an individual abnormality; Scott does not

<sup>1</sup> As in *Pseudotyphotherium pseudopachygnathum* (Ameghino). This foramen was formerly concealed by plaster and hence not detected at the time the auditory region was studied.



mention any such characters in the specimen of *H. segoviae* studied by him. The complete division of the choanae is a relatively unimportant character that occurs in a number of unrelated mammals and is not constant among closely related ones, even those in the same family.

The structure of the condyles in the skull at hand is slightly different from that described by Scott (1912, p. 262). In the latter the articular surface of the condyles extends over on the basioccipital in a shield-shaped area; there is no trace of such a structure in the Field Museum specimen.

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