AMERICAN MUSEUM NOVITATES

Number 146 — Published by THE AMERICAN MUSEUM OF NATURAL HISTORY New York City — Nov. 11, 1924

56.9,743A(1181:51.7)

ANDREWSARCHUS, GIANT MESONYCHID OF MONGOLIA[1]

BY HENRY FAIRFIELD OSBORN

Dedicated to the leader of the Third Asiatic Expedition, Mr. Roy Chapman Andrews, are the name and description of this giant omnivorous carnivore of the Upper Eocene of the Irdin Manha formation of Mongolia. When first discovered by Mr. George Olsen, it was hailed by Mr. Andrews as a carnivore, a supposition which proved to be correct.

Later, its surpassing size led to the view that it was a member of the giant pig family represented by *Entelodon* in Europe and by the Entelodontidæ in North America,—giant omnivorous pigs with elongate skulls; in fact, the cranial and facial proportions of *Andrewsarchus* are remarkably similar to those of *Entelodon* of the Oligocene and of *Dinohyus* of the Lower Miocene of North America, doubtless because of similar omnivorous feeding habits.

An outline sketch of the skull was sent in a letter to the Museum, from which Dr. W. D. Matthew immediately observed its real affinity to the primitive Creodonta of the family Mesonychidæ. When the specimen reached the laboratory, it was compared with the giant *Mesonyx* (*Harpagolestes*) *uintensis* of the Upper Eocene of Wyoming (Osborn, 1895.98, p. 79, Fig. 4).

ANDREWSARCHUS, new genus

Derived from surname "Andrews" and from ἀρχός, a leader, chief or commander. Giant mesonychid with greatly elongated facial region. Zygomata broadly expanded; face contracted behind muzzle; full eutherian dentition, thus differing from *Mesonyx* (*Harpagolestes*) in which m^3 is absent; fourth premolar, p^4, molariform, triangular, with prominent tritocone.

Andrewsarchus mongoliensis, new species

Genotypic species of *Andrewsarchus*. Type cranium (Amer. Mus. 20135), Irdin Manha formation, Mongolia. Breadth-length index of cranium, .67; faciocranial index, 1.50; basicranial length, condyles to

[1]Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 34.

tips of premaxillaries, 834 mm.; zygomatic width, 560 mm.; m^3 with metacone greatly reduced, ectoloph consisting mainly of paracone.

This is the largest terrestrial carnivore which has thus far been discovered in any part of the world. The cranium far surpasses in size that of the Alaskan brown bear (*Ursus gyas*), the largest living carnivore, which, when full-grown, weighs 1,500 lbs.; in length and breadth of skull, *A. mongoliensis* is double *Ursus gyas* and treble the American wolf (*Canis occidentalis*). It is also treble the size of its American relative

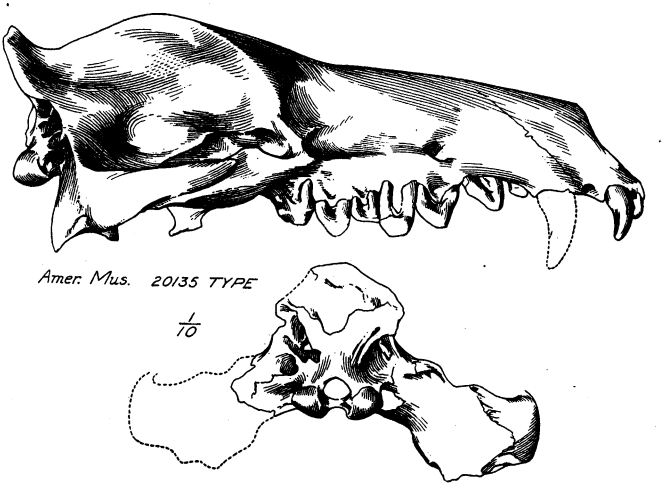

Fig. 1. Type skull of *Andrewsarchus mongoliensis* (Amer. Mus. 20135), Irdin Manha formation of Mongolia. Lateral and occipital views. One-tenth natural size.

Mesonyx obtusidens from the Middle Eocene of Wyoming and double that of *Mesonyx* (*Harpagolestes*) *uintensis* (Fig. 3) from the Upper Eocene of northern Utah, Uinta B.

CRANIAL CHARACTERS.—A comparison of the palate (Fig. 2) and occiput (Fig. 1) of *A. mongoliensis* (one-tenth scale) with the palate of *Harpagolestes uintensis* (Fig. 3), reproduced to one-fourth scale, brings out: (1) the great difference in size, and (2) the difference in generic and specific characters. The comparative measurements are as follows:

	Harpagolestes uintensis	*Andrewsarchus mongoliensis*
Total basal length of cranium	429 mm.	834 mm.
Width of zygomatic arches	270	560
Facial length, distance from i^1 to m^3	206	500
Cranial length, distance from m^3 to condyles	223	334

	Harpagolestes uintensis	*Andrewsarchus mongoliensis*
Zygomatic width across occipital condyles.....	71 mm.	117 mm.
Faciocranial index.....	92%	150%
Cephalic, or breadth-length index.....	63%	67%

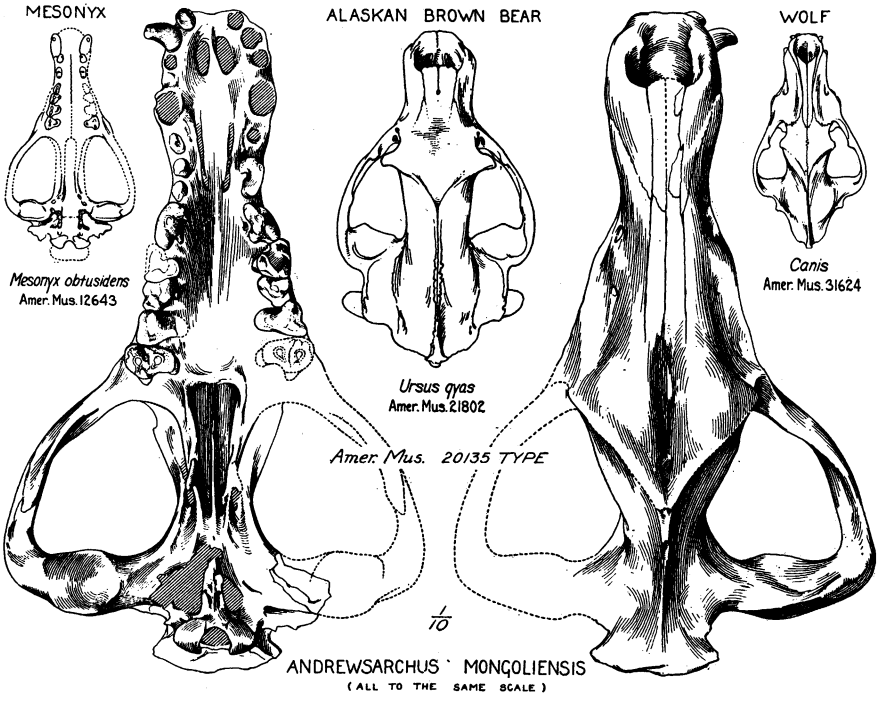

Fig. 2. Comparison of *Andrewsarchus* with *Mesonyx*, *Ursus* and *Canis*. Type cranium of *Andrewsarchus mongoliensis* (Amer. Mus. 20135). Palatal and superior views. All figures one-tenth natural size.

Cranium of *Mesonyx obtusidens* (Amer. Mus. 12643).

Cranium of Alaskan Brown Bear (*Ursus gyas*) (Amer. Mus. 21802).

Cranium of Wolf (*Canis occidentalis*) (Amer. Mus. 31624).

DENTAL CHARACTERS.—Type characters of *A. mongoliensis* which may prove to be of generic or specific value are the following (Figs. 1, 2):

I^2 greatly enlarged; i^3 much smaller.

Canines, superior, not preserved, of enormous size.

P^1 small, with single fang and cone.

P^2 bifanged, with single cone; ap. 46 mm., tr. 21 mm.

P^3 with rudimentary third fang, double cone, prominent protocone, no deuterocone; ap. 59 mm., tr. 37 mm.

P^4 enlarged, molariform, with prominent tritocone, three fangs; ap. 51 mm., tr. 43 mm.

M^1 somewhat smaller in size, three fangs; ap. 39 mm., tr. 42 mm.

M^2 broadly triangular, large internal fang, with prominent proto- and tritocones, deuterocone worn off; ap. 44 mm., tr. 61 mm.

M^3 prominent proto- and tritocones, rudimentary deuterocone; ap. 50 mm., tr. 66 mm.

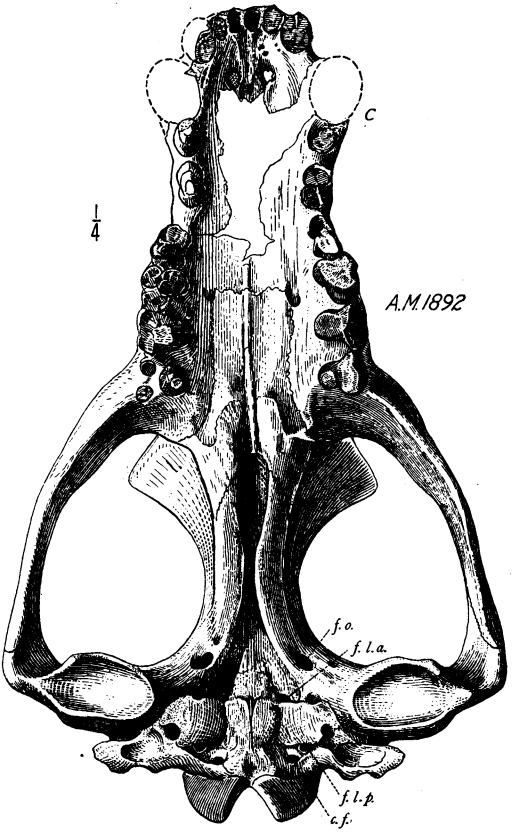

Fig. 3. Palate of *Mesonyx uintensis* S. & O. ref. (Amer. Mus. 1892), Uinta B, Utah, Dolichorhinus cornutus level. One-fourth natural size. For comparison with palate of *Andrewsarchus mongoliensis* (Fig. 2).

These measurements show that the cranium of *Andrewsarchus* (834 mm.) is nearly twice as long as that of *Harpagolestes* (429 mm.), that the zygomatic arches are twice as broad and that the facial length of *Andrewsarchus* (500 mm.) is 150% as compared with that of *Harpagolestes* (206 mm.), 92%. The face of *Andrewsarchus* is 150% of the cranium, whereas the face of *Harpagolestes* is 92% of the cranium, supporting the statement that in *Andrewsarchus* the face is relatively elongate.

COMPARISON WITH HARPAGOLESTES.—While in nearly all dimensions double the size of its American contemporary *Harpagolestes*, *Andrewsarchus* differs also in other characters:

	Harpagolestes	*Andrewsarchus*
Incisive series	Transverse in position.	Anteroposterior in position.
Faciocranial proportions	Equal.	Face greatly exceeds cranium.
Posterior nares	Tubular alisphenoids.	Widely open alisphenoids.
Third molar	Absent.	Present.

RESTORATION

According to Scott (1913, pp. 558–560), the Mesonychidæ, prevailingly a North American family, ranged from the Paleocene to the Upper Eocene, in adaptation an analogue of the Hyænodontidæ among the Carnivora. Skeletal restorations are those of Scott (1887, Journ. Acad. Nat. Sci. Phila., IX, Pl. v, *Mesonyx obtusidens*) and of Wortman (1901, Amer. Journ. Sci., XII, Pl. VIII, *Dromocyon vorax*). From these restorations the following comparisons may be made:

	Dromocyon vorax	*Mesonyx obtusidens*
Incisive teeth to back of pelvis	1272 mm. (4 ft. 2 in.)	1278 mm. (4 ft. 4 in.)
Height of shoulder above the ground	672 mm. (2 ft. 2½ in.)	576 mm. (1 ft. 10½ in.)
Basal length of cranium	318 mm.	279 mm.

LENGTH OF BODY.—As the length of the cranium of *Mesonyx obtusidens* (279 mm.) is to the total body length (1278 mm.), so is the length of the cranium of *Andrewsarchus* (834 mm.) to its total body length, namely, 3820 mm. (=3 m. 82 cm. or 12 ft. 6½ in.).

HEIGHT OF BODY.—As the length of the skull of *M. obtusidens* (279 mm.) is to the height of the vertebræ (576 mm.), so is the length of the skull of *Andrewsarchus* (834 mm.) to the height of the vertebræ, namely, 1890 mm. (=1 m. 89 cm. or 6 ft. 2 in.).

If *Andrewsarchus mongoliensis* was proportioned in the same manner as *Mesonyx obtusidens*, it had a length from the snout to the back of the pelvis of 12 ft. 6½ in. and a height from the ground to the shoulder or middle of the back of 6 ft. 2 in. Thus in round numbers it was three times the size of *Dromocyon vorax* or of *Mesonyx obtusidens* of the Middle Eocene of Wyoming, Bridger formation.