

New Rhinoceroses from the Pliocene of Colorado and Nebraska

By

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The Colorado Museum of Natural History field parties of 1918 and 1919, under the leadership of Mr. Philip Reinheimer, collected a wealth of important fossil mammal material in the Pliocene beds near Wray, Colorado. In three previous papers, (¹) the writer has described portions of this fauna. The present paper carries this research a step farther, and adds to our knowledge of the extinct rhinoceros population of the central west. From the closely related Snake Creek beds of western Nebraska, some 17 miles south of Agate, Nebraska, the writer secured another important new type of rhinoceros, the skull of which is now on exhibition in the Colorado Museum of Natural History, and which is described herein.

Paraphelops yumensis sp. nov.

Type No. 731, Colorado Museum of Natural History, Plate I; a nearly complete pair of lower jaws, uncrushed and not distorted. A second specimen from the same place, with nearly identical characters, but an older individual, (No. 735) confirms and supplements the characters found in the type specimens.

This type is closely related to the genotype, *Paraphelops rooksensis* Lane, found in Republican River deposits of Rooks County, Kansas.

It is distinguished from that type by certain important differences, noted herein, and was of somewhat smaller size. The skull of *P. rooksensis* must have been notably deeper, and with a more elevated occiput, as indicated by the elevations of the ascending ramii, 329 mm. in *P. rooksensis* as compared to 225 in *P. yumensis*.

The skull of the latter species was also relatively shorter and wider, as compared to the former species, as shown by the table of comparative measurements herewith, and had more brachyodont, reduced dentition, particularly noticeable in the premolars.

The coronoid process is recurved, giving a hook-like effect, whereas in *rooksensis* the condition is more as is seen in *Teleoceras hicksi*, and in C. M. N. H. No. 732, described herewith. The dentition is reduced to M_3 , P_2 , as in *Teleoceras*, but it is much more brachyodont.

An examination of the comparative figures herewith will call attention to a number of points of interest. When the relative ages of the two deposits, from which these types were found, is more fully known, it will aid in determining their relationships. They are obviously closely related forms.

¹"Two New Bunomastodonts from Colorado," by Harold J. Cook; Proc. Colo. Mus. Nat. History, Vol. 4, No. 1.

"A Pliocene Fauna from Yuma County, Colorado," by Harold J. Cook; Proc. Colo. Mus. Nat. History, Vol. 4, No. 2.

"A New Rhinoceros of the Genus *Teleoceras* from Colorado," by Harold J. Cook; Proc. Colo. Mus. Nat. History, Vol. 7, No. 1.

? *Peraceras ponderis*, sp. nov.

Type No. 732, Colorado Museum of Natural History, Plate II; an almost complete and undistorted pair of lower jaws, in excellent state of preservation, from the same beds as the type of *Teleoceras hicksi*, *Paraphelops yumensis*, and *Aphelops malachorhinus longinarius*.

These jaws are exceptionally heavy, and wide at the condyles, indicating a far more brachycephalic skull than that known in any American rhinoceros, and more comparable to the condition seen in Titanotheres. In fact, when we tried fitting these jaws (for comparison) on to a large male skull of *Megacerops copei*, it was found that the condyles were fully as wide as in that genus, and the rhinoceros jaws even a little longer! The small incisors (as indicated by the alveoli) of this type indicate the probability of its being a female.

As compared with *Paraphelops yumensis*, the dentition is similarly reduced in numbers, but is more hypsodont and larger, with P_3 notably larger. The jaws have a short symphysis in front of P_3 , in contrast to the condition found in *P. yumensis*, and are nearly one-third wider apart at the angles than in that form. The jaws are much more robust and heavier, and shorter in front of P_3 , and with the symphysis more sharply upcurved than in that form. The coronoid process starts to rise almost immediately behind M_3 , more like that in *T. hicksi*, and in contrast to the condition seen in *P. yumensis*; and the coronoid process is not curved backward, but leans slightly forward, and does not rise as high above the alveolar border as in that type.

This species indicates a strongly brachycephalic race, as distinguished from the typically mesaticcephalic *Teleoceras*; and dolichocephalic *Aphelops* and *Paraphelops*. It is provisionally referred to *Peraceras*, as being the most brachycephalic known genus, but until skull material is found for direct comparison, it cannot be proved that this may not equally well represent a brachycephalic race of Teleocerine affinities.

As more and better material becomes available for study, the large and diversified nature of the rhinoceros population of Miocene and Pliocene times in this country becomes more and more evident.

Aphelops malachorhinus longinarius, subsp. nov.

Type, Colorado Museum of Natural History, No. 249, Plates III and IV; a nearly complete skull, and almost certainly associated lower jaws.

Subspecific diagnosis: Closely related to *A. malachorhinus mutilis*, but with more elongated nasals, extending in front of the premolars; premolars reduced in size, as compared to the latter species; and with more elevated occiput.

This specimen was found in the same bed and nearby the types of *Teleoceras hicksi*, *Paraphelops yumensis*, and the other forms described from the Yuma County, Colorado Pliocene deposits, collected by the Colorado Museum parties of 1918 and 1919.

The most noteworthy difference occurs in the reduced size of the upper premolars, as compared to those in *A. mutilis*, in which the posterior premolars are

expanded in size, and do not taper uniformly smaller forward, as is usually the case. The nasals are exceptionally long and even more slender, anteriorly, than in *A. mutilis*.

When the lower jaws, (which were found by the skull, and seem to fit it perfectly, and are believed to belong to it) are placed in articulated position, the unusual length of the "face" is at once appreciated; although the premaxillae would have to be less attenuated than in *Mesoceras thomsoni*, described herewith.

The occiput is more elevated, and extends farther backward than in *A. mutilis*, to which form it is undoubtedly very closely related.

Other differences are noted; but until a wider series of these skulls has been discovered and studied, it is unsafe to predict the limits of individual variation in this race.

Although this is the largest race so far described, in the Colorado Museum collections from these same beds we have a femur, jaw parts, and other material, indicating a vastly larger race, of similar proportions. Until better material is found, however, it seems best to withhold descriptions, beyond calling attention to the fact that we know that such a race existed.

MEASUREMENTS OF SKULL

Aphelops malachorhinus longinaris, subsp. nov.

C. M. N. H.
No. 249

Length, back of occiput to tip of nasals.....	660
Length, back of occiput—condyles to tip of nasals.....	680
Length, back of occiput—condyles to tip of Pmx. (as determined from position of alveoli of lower jaws).....	780a
Length, back of occiput to tip of Pmx. (as determined from position of alveoli of lower jaws).....	860a
Length of nasals in front of orbits, measured on medial line.....	275
Greatest width at zygomatic arches.....	374
Height, base of occiput condyles to top of occiput.....	304
Height of skull above alveolar border of M ³	270
Width of palate at M ²	104
Width of palate at P ²	88
Total length, upper dental series.....	328a
Total length, upper molar series.....	158
Total length, upper premolar series.....	170
Height of skull at frontals above bottom of lower jaw, when articulated.....	460
Height of skull at occiput above bottom of lower jaw, at angle, when articulated.....	620

NOTE.—The teeth of the type specimen are badly damaged. In a second set of teeth (Specimen C. M. N. H. No. 250), which agree in size and characters with those of the type, so far as comparisons can be made with both the teeth and the alveoli, the alveoli indicate clearly that the premolars reduce in size as they go forward,—in direct contrast to the condition seen in *A. malachorhinus mutilis*. The measurements of the teeth of C. M. N. H. No. 250, follow:

MEASUREMENTS OF TEETH
Aphelops malachorhinus longinavis
 No. 250, referred specimen

	MM.
M ² a.p.	57
M ² tr.	60
M ¹ a.p.	55
M ¹ tr.	61
P ⁴ a.p.	49
P ⁴ tr.	65
P ³ a.p.	48
P ³ tr.	64
P ² a.p.	43
P ² tr.	57

Measurements of teeth of type specimen of
Aphelops malachorhinus longinavis

M ¹ a.p.	56
M ¹ tr.	60
M ² a.p.	58
M ² tr.	60
P ⁴ a.p.	48
P ⁴ tr.	63
P ² a.p.—(alveolar measurement)	36
P ² tr.—(alveolar measurement)	55

MEASUREMENTS OF LOWER JAWS

	C. M. N. H. No. 732 Peraceras ponderis , Type	C. M. N. H. No. 731 Paraphelops yumenis , Type	Paraphelops rookensis , Type	C. M. N. H. No. 249 Aphelops multichorhinus Longinaris , Subsp. nov. Type
Greatest width across condyles.....	401	324	306	
Length from back of condyles to incisive border.....	559	533	603	695
Depth of jaw below M ₃	120	109	115	108
Greatest thickness of jaw below M ₃	62	60	55	64
Length of diastema.....	53	58	65	90
Distance between third lower molars.....	120	93		
Distance between third lower premolars.....	63	68		
Width between alveoli of incisors.....	40	52a		16
Length of symphysis.....	142	159	173	172
Extreme width at angle of jaws, outside.....	355	271		
Height of coronoid process above level of alveolar border.....	220	253	329	225a
Height of mandibular notch above alveolar border....	154	128		
Width of coronoid process at bottom of mandibular notch.....	80	70		
Length P ₃ -M ₃ inclusive.....	259	230	260	263
Length, lower molar series.....	127	156		165
Length, lower premolar series.....	82	69		138
P ₂ , a.p.....				37
P ₃ , a.p.....	30	26	40	52
P ₃ , tr.....	29		30	
P ₄ , a.p.....	50	45	50	48
P ₄ , tr.....	35	28	42	38
M ₁ , a.p.....	48	41	54	56
M ₁ , tr.....	34	31		39
M ₂ , a.p.....	61	54	62	54
M ₂ , tr.....	36	35		30
M ₃ , a.p.....	65	62	69	52
M ₃ , tr.....	35	38		30

Teleoceras (*Mesoceras*) *thomsoni*, subgen. et sp. nov.
Dental Formula $M_{\frac{3}{7}} P_{\frac{4}{7}} C_{\frac{0}{7}} I_{\frac{1}{7}}$

The type of this species, Plates V, VI and VII, is a complete skull, No. 495, collections of Harold J. Cook, from the Pliocene Snake Creek Beds of Sioux County, Nebraska, collected in February, 1925 by James H. Cook and the writer.

It is separated from the typical *Teleoceras* by having brachyodont, little reduced, comparatively primitive dentition; long slender premaxillae; skull broad at base, but narrowing rapidly forward, and rounded upward along the nasals and frontals, supporting two rudimentary medial horns, the anterior one on the tips of the nasals as in *Teleoceras*, and a second, less strongly developed rudimentary horn rugosity, situated medially between the eyes, very like that found in *T. (M.) mediocornutus*, Osborn. Compared with *Aphelops*, *Teleoceras*, and *Peraceras*, it agrees much more closely with *Aphelops* in dentition, and certain skull proportions; thus combining characters of both genera (i.e., *Aphelops* and *Teleoceras*) and differing from both in others; as well as differing in the combination of characters present. In most skull characters it agrees more closely with *Teleoceras*. It is apparently closely related to the form which Osborn described in 1904⁽¹⁾ under the name of *Teleoceras mediocornutus*, from the middle Miocene Pawnee Creek beds of Colorado, and together with that species, represents, in the opinion of the writer, a distinct group for which is proposed subgeneric rank, under name *Mesoceras*.⁽²⁾

As compared with *T. (Mesoceras) mediocornutus*, the zygomatic arches are much deeper and heavier; the skull is relatively wider posteriorly, narrowing forward rapidly, giving the skull a very tapering, wedge-shaped effect. The molars and last two premolars are relatively smaller, and P^3 relatively larger, than in *mediocornutus*.

The skull is wide at the base, tapering rapidly forward to a remarkably narrow and pointed face. The occiput is very broad, slightly elevated, with the temporal ridges uniting over the brain case to form a low sagittal crest. The occiput ends decidedly anterior to the condyles, the crest of the occiput being about $3\frac{1}{2}$ inches in front of them. The auditory meatus is practically closed below. The pterygoids are long, rugose, and prominent. The palate is broad, and ends in a wide U-shape, instead of the V-shape seen in the genotype of *Teleoceras*.

The premaxillae are unusually attenuated, as compared with other known rhinoceroses, and extend almost three inches beyond the tips of the nasals. This elongation of the nasals is just the reverse of the condition found in such forms as *T. fossiger*, *T. hicksi*, and the as yet unfigured form found in the Pliocene near Ainsworth, Nebraska.

The dentition is brachyodont and simple, the pattern of the molar-premolar series showing little advancement in type over that seen in the known Lower Miocene species, in marked contrast to the conditions found in the contemporary genera, in *Teleoceras*, *Peraceras*, and *Aphelops*. While lost from the type, the first pre-

¹Osborn, Henry Fairfield, "New Miocene Rhinoceroses with Revision of Known Species," Bull. Am. Mus. Nat. Hist., Vol. XX, Art. XXVII, pp. 307-326.

²The species name is in honor of Mr. Albert Thomson, of scientific staff of the American Museum of Natural History, New York, with whom the writer has had long associations in this work.

molars were present, apparently even less reduced than in most Lower Miocene species,—judging by the size of the alveoli. In these characters it is suggestive of the condition noted by the writer in the species named *Epiaphelops vergasectus*, from the Lower Miocene (Upper Harrison) beds in Sioux County, Nebraska¹). As the latter is based on lower jaws, direct comparison is not practical; but it is possible that it may prove to be a form ancestral to the present type.

This specimen was found in the lowest coarse sand and gravel bed of the Snake Creek beds, about seventeen miles south of Agate, Nebraska, in what is known as "Sinclair Draw"; (Named after Dr. W. J. Sinclair of Princeton, who conducted heavy excavations here) and in the same horizon and spot as the types of *Tomarctus mortifer*, *Plicagnathus matthewi*, and other important types described by the writer, Dr. W. D. Matthew, and Dr. W. J. Sinclair from these beds, in various papers.

MEASUREMENTS OF TYPE OF

Teleoceras (Mesoceras) thomsoni, subgen. et. sp. nov.

	MM.
Greatest length of skull, tip of Pmx. to back of condyles.....	662
Greatest length of skull, tip of nasals to back of condyles.....	595
Length of skull, tip of nasals to back of inion.....	496
Greatest width of skull, across zygomatic arches.....	356
Greatest depth of zygomatic arches.....	102
Greatest depth of skull, from top of occiput to base of occip. cond.....	140
Width of skull between orbits at lachrymal tubercle.....	140
Width of condyles.....	133
Width of palate between upper second molars.....	72
Height of nasals above palate at P ²	139
Length from P ² to tip of premaxillae.....	172
Length of molar-premolar series.....	227
Length of molar series.....	135
Length of premolar series.....	91
P ² a.p.....	27
P ² tr.....	35
P ³ a.p.....	28
P ³ tr.....	47
P ⁴ a.p.....	33
P ⁴ tr.....	54
M ¹ a.p.....	39
M ¹ tr.....	54
M ² a.p.....	49
M ² tr.....	60
M ³ a.p.....	50
M ³ tr.....	58

¹Cook, Harold James, "A New Genus and Species of Rhinoceros, *Epiaphelops virgasectus*, from the Lower Miocene of Nebraska." Nebr. Geol. Survey, Vol. 7, Pt. 3.

- Plate I. *Paraphelops yumensis*. Type—Lower jaws, right side, and crown view of teeth. Colo. Mus. Nat. Hist. No. 731. Size X 1/5.
- Plate II. ? *Peraceras ponderis*. Type—Lower jaws, right side, and crown view of teeth. Colo. Mus. Nat. Hist. No. 732. Size X 1/5.
- Plate III. *Aphelops malachorhinus longinarius*, sub. sp. nov. Type—Skull and jaws, side view, right side. Size X 3/16.
- Plate IV. *Aphelops malachorhinus longinarius*, sub. sp. nov. Type—Top view of skull. Size X 9/32.
- Plate V. *Teleoceras (Mesoceras) thomsoni*. Type—Side view of skull, right side. No. HC 495. Size approximately 9/32.
- Plate VI. *Teleoceras (Mesoceras) thomsoni*. Type—Top view of skull. No. HC 495. Size approximately 9/32.
- Plate VII. *Teleoceras (Mesoceras) thomsoni*. Type—Palatine view of skull. No. HC 495. Size approximately 9/32.

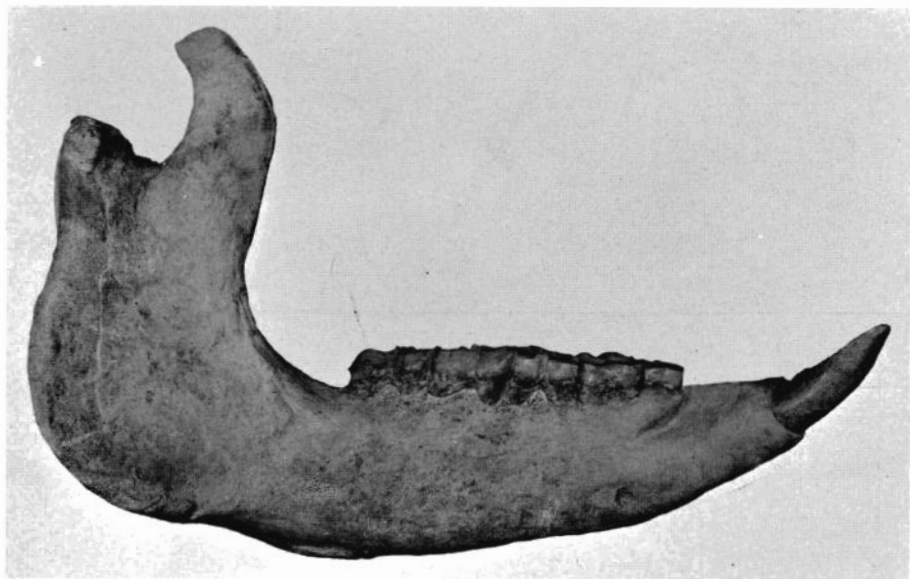
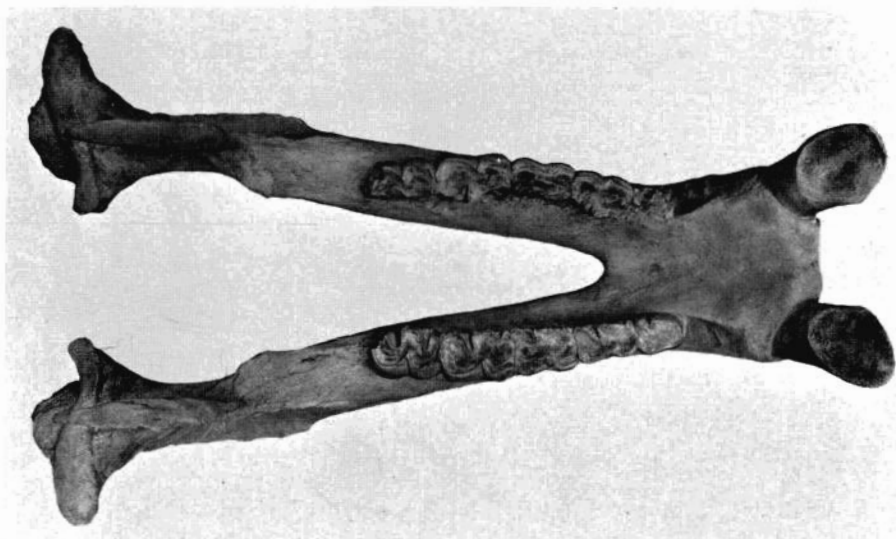


PLATE I



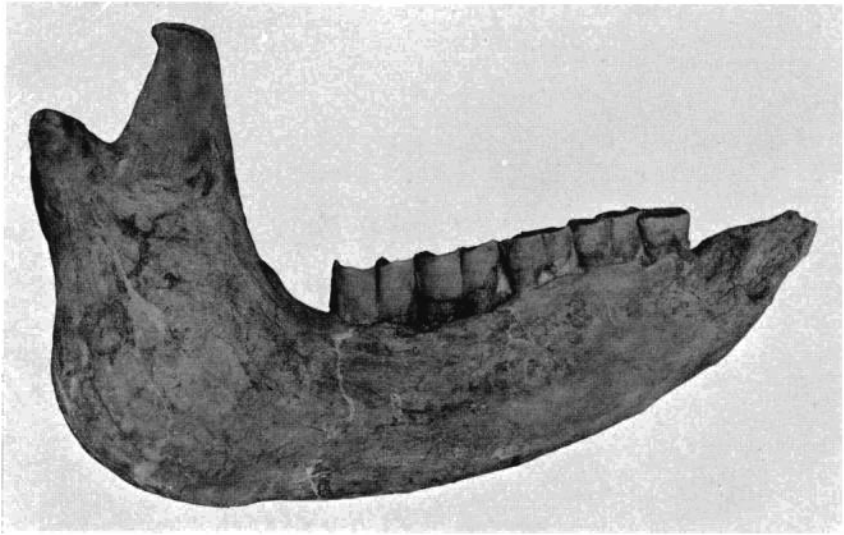
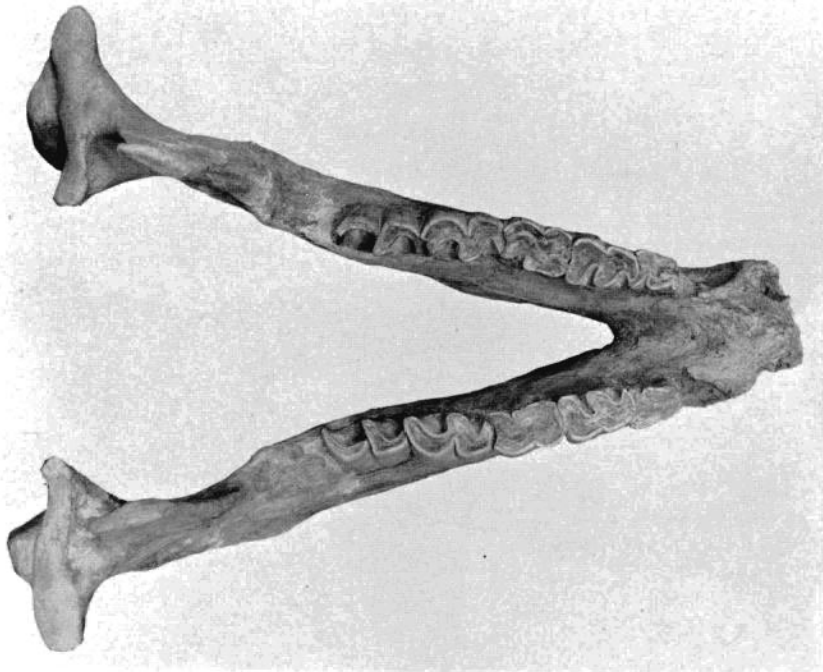


PLATE II



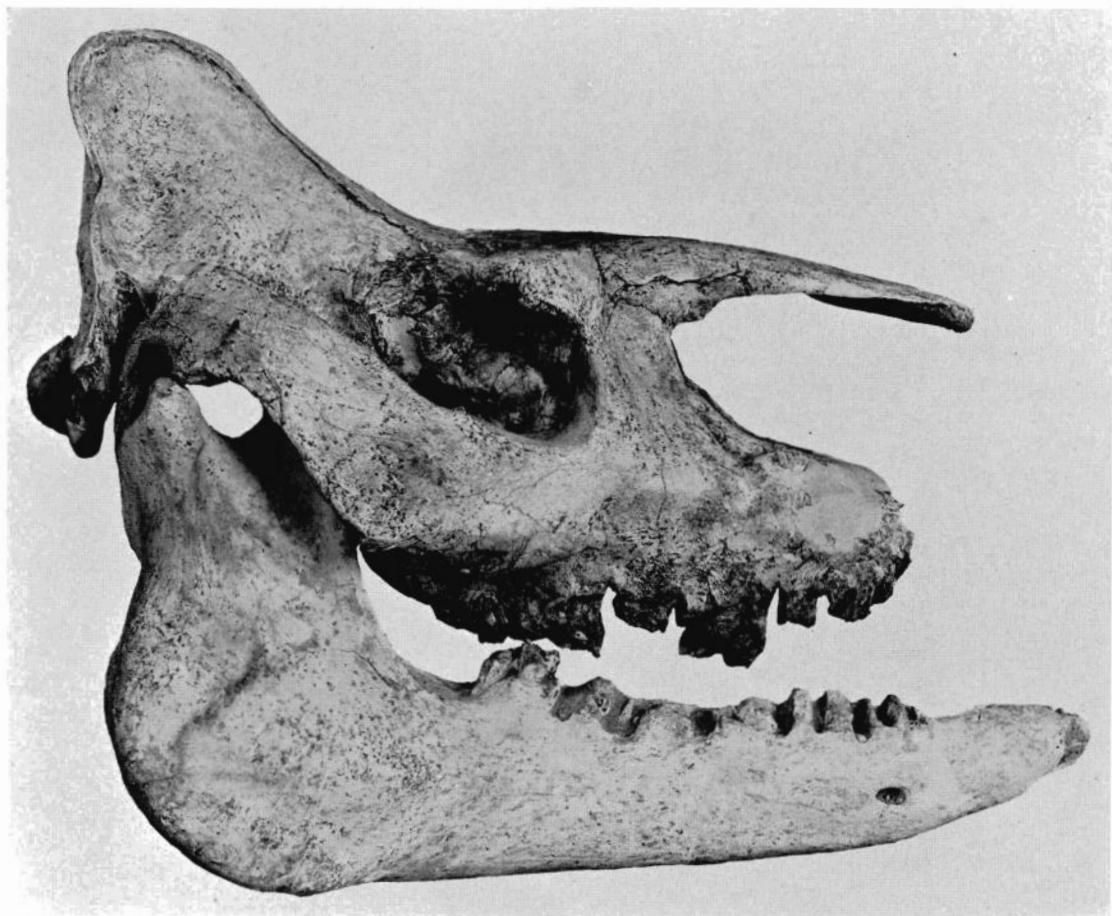


PLATE III



PLATE IV



PLATE V

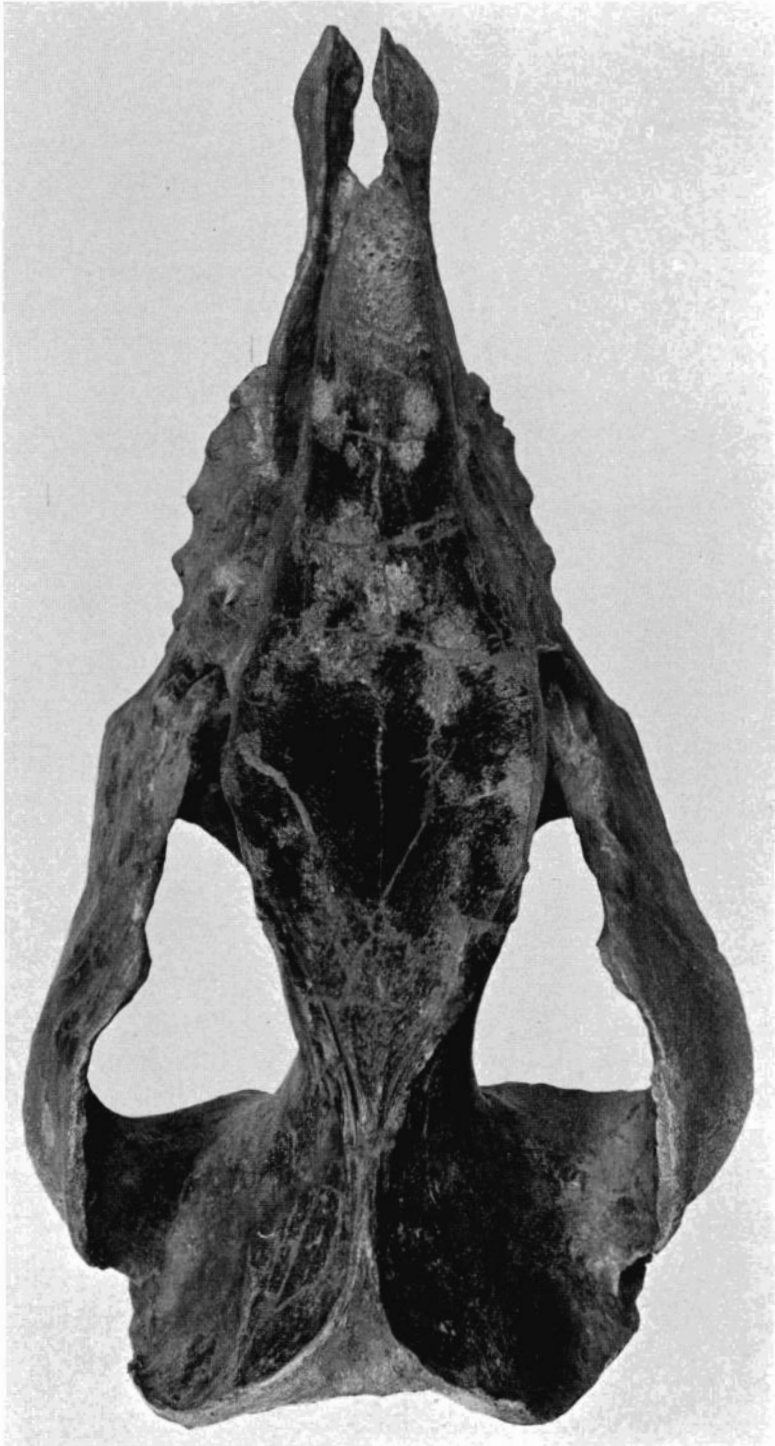


PLATE VI

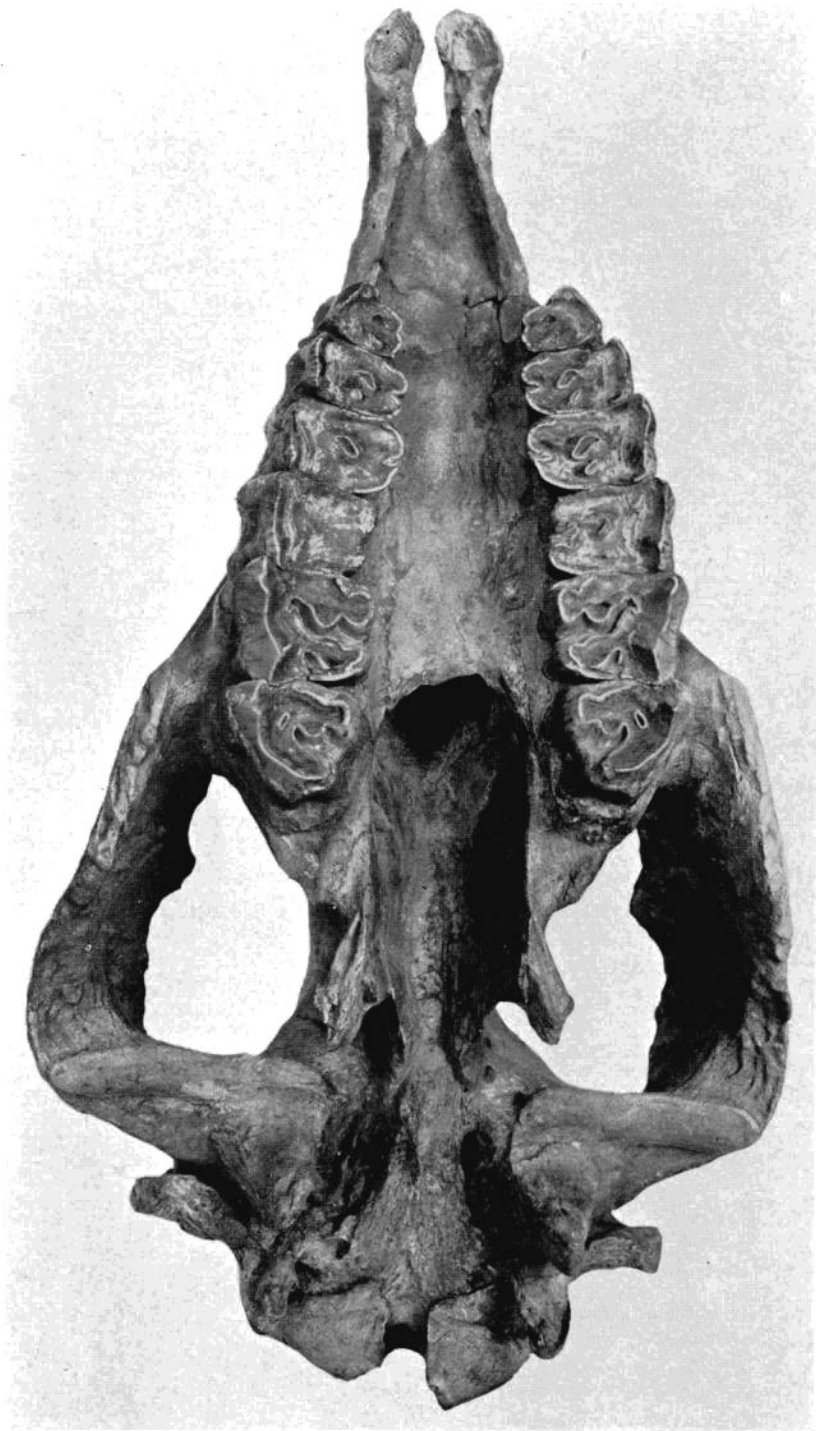


PLATE VII