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Tanner, Lloyd G., "A New Species of *Diceratherium* From The Lower Pliocene (Valentinian) of Boyd County, Nebraska" (1977).
Transactions of the Nebraska Academy of Sciences and Affiliated Societies. Paper 425.
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A NEW SPECIES OF *DICERATHERIUM* FROM THE LOWER PLIOCENE
(VALENTINIAN) OF BOYD COUNTY, NEBRASKA

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The presence or absence of rugose areas and convex bosses on the skull are characters useful in the identification of most genera and species of fossil rhinoceros. A rhinoceros skull, collected more than a decade ago from Pliocene sediments in Boyd County, Nebraska (University of Nebraska Collecting Locality Bd-6, the Joseph Jamber farm), is like *Diceratherium armatum* in these respects, but it differs in others. It resembles *Diceratherium* in the presence of very small, elongate, roughened areas on the nasals, but the occipital region of the skull is wide, as in *Peraceras*. In skull outline, the resemblance is to *Diceratherium*, but the teeth are like those of *Peraceras*.

Indeed, this skull for some years was tentatively considered to represent a new species of *Peraceras*, but it is now assigned to *Diceratherium* as the latest species of this genus in the Tertiary of the High Plains.

† † †

INTRODUCTION

In 1965 the Pliocene deposits in Boyd County, Nebraska (University of Nebraska State Museum Locality Bd-6, the Joseph Jamber farm) yielded a nearly complete, well-preserved rhinoceros skull. Initially assigned to *Peraceras* (Tanner, 1976), this skull is here considered instead to represent a new species of *Diceratherium*.

The site, discovered and first worked by the author, has now become a quarry that has produced a large collection of fossil vertebrates—the Jamber local fauna—preserved in the University of Nebraska State Museum (U.N.S.M.).*

The fossils other than the rhinoceros are to be reported upon chiefly by Karen and Charles Messenger, but they include the following: fish; anurans; turtle; snakes; the beaver, *Anchitheriomys*; other beavers, undetermined; a fox-like carnivore, *Leptocyon*; a wolf-like carnivore, *Aelurodon*; a mastodont, *Gomphotherium*; a browsing horse, *Hypohippus*; a

larger browsing horse, *Megahippus*; a grazing horse, *Hipparion*; a camel, *Procamelus*; another camel, undetermined; and a prong-horn, probably *Merycodus*. The assemblage and the stratigraphy indicate a Valentinian age (Schultz and Stout, 1961; Schultz, Martin, and Corner, 1975), considered as Pliocene.

SYSTEMATICS

ORDER PERISSODACTYLA OWEN, 1848

Suborder Hippomorpha Wood, 1937

FAMILY RHINOCEROTIDAE OWEN, 1845

Subfamily Caenopinae Brunning, 1923

Diceratherium Marsh, 1875

Diceratherium jamberi, new species**

Holotype.—U.N.S.M. 62048, a nearly complete skull, including nasals.

Type Locality.—Boyd County, Nebraska, 3.0 miles east and 4.5 miles south of Butte, in Sec. 7, T. 33 N., R. 21 W., in a quarry on the farm of Joseph Jamber (U.N.S.M. Collecting Locality Bd-6).

Geologic Occurrence.—Valentine Formation, probably upper part, possibly from an equivalent of the Burge Member: Valentinian (Pliocene).

Diagnosis.—The skull is relatively elongate, not saddle-shaped, but some measurements are about the same as for *Aphelops megalodus*. However, the occipital region is narrower and less elevated than for *Aphelops megalodus* (Table I), and the occipital crest is situated vertically with respect to the occipital condyles. The frontal region is only slightly lower than the anterior portion of the sagittal crest, and it is smooth, not convex. The brow areas are heavy and only slightly roughened. The nasals are not completely co-ossified, and they show small, elongate, elliptical ridges on each side, which are probably the bases for small horns. The ridges are posterior

*Other abbreviations for institutions cited are: A.M.N.H., American Museum of Natural History (and F:AM, the Frick Collection), New York City; C.M., Carnegie Museum, Pittsburgh; U.S.N.M., United States National Museum, Washington, D.C.; and Y.P.M., Yale Peabody Museum, New Haven, Connecticut. Thanks are expressed to the officers of each of these collections for allowing me to study specimens in their charge.

**Named for Joseph Jamber, to whom we are indebted for many courtesies.

to the tip of the nasals and similar to those on the holotype skull of *Diceratherium armatum* (Y.P.M. 10003).

The premaxillae are retracted and lack the alveoli for I 2/. The anterior openings of the infraorbital foramina are large and situated outside the narial opening, with only slight facial depressions below the foramina. The zygomata are deepest anterior to the mid-point of the arches. The postglenoid processes are relatively small and curved forward at the tips.

Dentition.—The teeth exhibit the following characters:

- P 1/, tooth relatively small, with well-developed parastyle; lacks both pre-fossette and post-fossette; protoloph swings posterad to join the lingual margin of the metaloph, which is short and wider than the protoloph; there is no buccal cingulum and only a trace of a lingual cingulum.
- P 2/, tooth larger than the P 1/; both pre-fossette and post-fossette are present; the protoloph and metaloph are nearly confluent; the lingual cingulum is strong, with a weak crochet, but there is only a trace of a buccal cingulum.
- P 3/, tooth larger than the P 2/, and nearly the same length as the P 4/; there is a post-fossette, a shallow, median valley, and both ante-crochet and crochet; the lingual cingulum has a slight crenulation at the opening of the median valley, and there is only a trace of the buccal cingulum, but it is situated posterad.
- P 4/, tooth nearly the same size as the M 1/ and M 2/; there is a post-fossette, the median valley is open, and the parastylar fold is weak; the lingual cingulum is strong, but the buccal cingulum is weak.
- M 1/, tooth nearly the same size as the M 2/ and P 4/; there is a post-fossette, the median valley is open, and both an ante-crochet and crochet are present; the lingual cingulum is interrupted by a median valley, and the buccal cingulum is weak.
- M 2/, tooth nearly the same size as the two preceding teeth; a post-fossette is present, the median valley is open and deep, and both the ante-crochet and crochet are weak, with the latter situated near the metaloph-ectoloph junction; the lingual cingulum is at the anterior side of the protoloph.
- M 3/, tooth smaller than the M 2/ and triangular; the median valley is open, and the crista is strong;

the parastylar fold is strongest on this tooth, but this is progressive from the P 4/; the lingual cingulum is at the anterior portion of the protoloph, but it is weak at the base of the metaloph.

Selected Measurements (see also Table I).—The distance from the anterior margin of the orbit to the posterior edge of the narial notch is 75 mm. for *Diceratherium jamberi*, compared to 62.5 mm. for *Aphelops megalodus* (A.M.N.H. 8292), 74 mm. for *Peraceras superciliosus* (A.M.N.H. 8380), and 88 mm. for *Peraceras troxelli* (A.M.N.H. 14434).

This measurement is usually greater than these values for both *Diceratherium* and *Menoceras*. It is 110 mm. for the holotype of *Metacaenopus egrigius* (A.M.N.H. 82591), probably best considered as a female *Menoceras*, and as much as 150 mm. for some of the very large skulls (F:AM) of *Diceratherium* from eastern Wyoming. However, the skull of *Menoceras marslandensis* (U.N.S.M. 62004) measures 90 mm. in this regard.

Taking a different measurement—the length of the free portion of the nasal from the narial notch to the tip of the nasal—we obtain a value of 107 mm. for *Diceratherium jamberi*, 116 mm. for *Diceratherium armatum* (U.S.N.M. 11682), and 178 mm. for *Aphelops montanus* (C.M. 1569). One, however, must establish a lineage-progression with a considerable number of specimens, so that age and sex factors, as well as individual variation, are reasonably well known.

DISCUSSION

This skull was first considered by the author (Tanner, 1976) to represent a new species of *Peraceras*, but the assignment to *Diceratherium* is now preferred for the following reasons.

(1) *Peraceras* has a relatively brachycephalic, saddle-shaped skull, with the occipital region well-elevated above the frontal region and with both the occiput and the occipital crest inclined far forward with respect to a vertical plane rising from the occipital condyles. The skull of *Diceratherium* is more elongate, and the occiput as well as the occipital crests rise nearly vertically from the occipital condyles.

(2) *Diceratherium*, as its name indicates, had two, paired horns located toward the anterior end of the nasals. It is differentiated from its contemporary, *Menoceras* in several ways: by being slightly concave, not saddle-shaped in side-profile; with the narial notch above the P 1/ and not retracted; with nasal bosses that are elongate, elliptical ridges with a broad and relatively shallow palate; and with the length of the M 1/–M 3/ series approximately 250 mm. (Tanner 1969).

(3) The dental pattern of *Diceratherium* is relatively simple in the early forms of the lineage, but it seems

Table I:

Measurements in Millimeters of Three Rhinoceros Skulls:
Diceratherium jamberi, New Species (U.N.S.M. 62048),
Aphelops megalodus (A.M.N.H. 8292),
and *Diceratherium armatum* (Y.P.M. 10003)

	U.N.S.M. 62048	A.M.N.H. 8292	Y.P.M. 10003
Occipital condyles to tip of premaxillary	-----	-----	-----
Occipital condyles to tips of nasals	470	495	(512)
Midpoint occipital crest to tips of nasals	453	451	(503)
Anterior margin of P ¹ to occipital condyles	440	445	452
Narial notch to occipital crest	354	332	453
Palatal notch to foramen magnum	237	258	272
Palatal notch to palatal foramina	-----	-----	170
Narial notch to tips of nasals	107	163	-----
Zygomatic breadth (maximum)	277	-----	278
Width across palate to buccal sides M ²	170	168	174
Orbital breadth (between notches)	152	145	210
Occipital height, base condyles to crest	162	181	159
Occipital width (maximum)	165	188	150
Condylar width (outer margins occ. condyles)	104	-----	107
Tooth row, P ¹ -M ³ (midline, to rear of M ³)	236	-----	254
Tooth row, P ² -M ³ (midline, to rear of M ³)	97	-----	-----
Premolars (midline)	120	-----	123
Length P ² -P ⁴ (midline, to rear of P ⁴)	-----	-----	95
Molars (midline, to rear of M ³)	123	-----	133
Length P ¹ (maximum)	23	22	27
Width P ¹ (maximum)	20	18	23
Length P ² (maximum)	29	28	27
Width P ² (maximum)	39	36	37
Length P ³ (maximum)	32	31	33
Width P ³ (maximum)	48	48	43
Length P ⁴ (maximum)	33	34	31
Width P ⁴ (maximum)	57	53	47
Length M ¹ (maximum)	40	41	47
Width M ¹ (maximum)	55	55	52
Length M ² (maximum)	45	40	50
Width M ² (maximum)	53	52	56
Length M ³ (maximum)	35	47	37
Width M ³ (maximum)	49	52	47

() = estimated dimension

to become progressively more complicated. The teeth of *Diceratherium jamberi* are more complicated than for the holotype of *Diceratherium armatum*, especially in the presence of a well-developed crista on the upper third molar, lacking in *Diceratherium armatum*. However, a complicated tooth-pattern similar to that found in both *Peraceras* and *Aphelops* is seen in *Diceratherium jamberi*.

(4) There seem to be few affinities of *Diceratherium jamberi* with the *Teleoceras* lineage, for *Teleoceras major* has more hypsodont teeth and the third upper molar is much longer.

These considerations are suggestive of a close relationship, possibly an ancestral-descendant one, between the *Diceratherium* and *Peraceras* lineages, but at present this can be only an hypothesis.

ACKNOWLEDGMENTS

Thanks are extended to Joseph Jamber and his family of Boyd County, Nebraska, for permission to excavate the fossil quarry on their farm, and for other help. Examination of comparative rhinoceros material, particularly of *Diceratherium*, was facilitated due to the cooperation of Richard Tedford, Malcolm McKenna, Earl Manning, and Morris Skinner at the American Museum of Natural History. C. Bertrand Schultz, T.M. Stout, and Michael Voorhies gave helpful suggestions. Other much-appreciated assistance was given by George Corner, Karen and Charles Messenger, Martha Haack, Rebecca Monke, and especially by my wife, Mary.

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Figure 1. Lateral view of holotype skull (U.N.S.M. 62048) *Diceratherium jambori* n. sp. X 2/5.



Figure 2. Dorsal view of same skull as shown in Fig. 1. X 2/5.

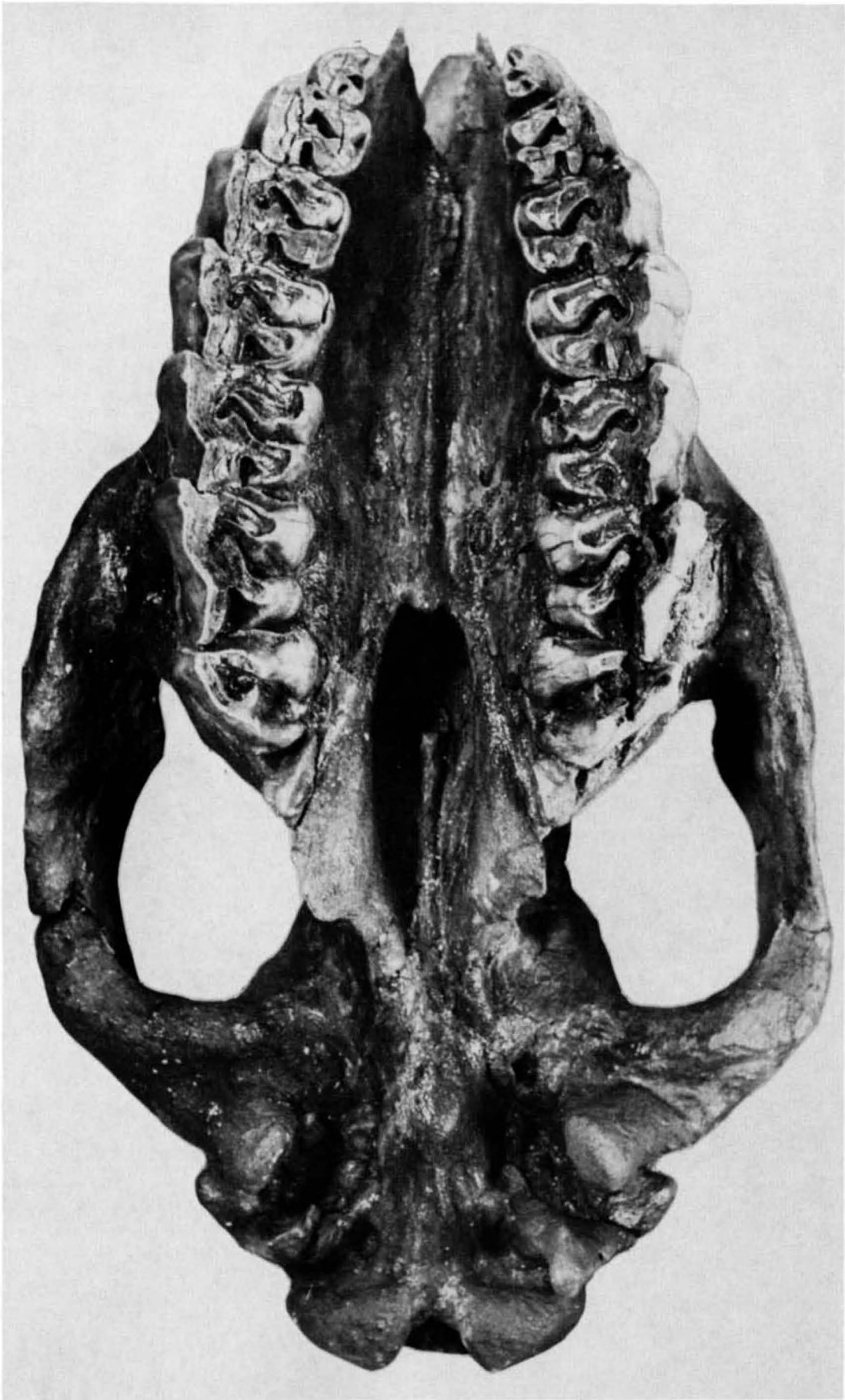


Figure 3. Palatal view of same skull as shown in Fig. 1. X 2/5.

