

paper be alluded to only when necessary to do so in the interests of perspicuity.

In 1902 Mr. J. B. Hatcher² subdivided these beds and mentioned a number of species belonging to their faunæ. While the subdivisions which Hatcher proposed are here followed in the main, it may be stated that the horizons determined by him are difficult to distinguish on account of their lithological similarity. This is especially true of the Gering and Monroe Creek beds. In Fig. 1 each horizon is defined far more clearly than in nature in order to make the subject plain to the reader. The species given by Hatcher (*l. c.*, p. 117) in one or two cases are incorrectly identified.³

Referring to Fig. 1 attention should be called to the fact that the upper fifty or sixty feet of Squaw Butte appear to represent the Harrison beds. The Monroe Creek beds, however, run insensibly into the latter and the dividing line is difficult to determine except for the fact that *Dæmonelix*, which is characteristic of the Harrison beds, occurs in the upper strata. Along the line of the section Niobrara River (locally known as the "Running-water") does not cut through the Harrison beds, and the thickness of the Monroe Creek beds and the Gering horizons are here only conjectural. The sedimentary mass apparently decreases in thickness southward and eastward, so that if the lower horizons (Monroe Creek beds and Gering beds) are present at this point they are probably quite thin.

The sandhill region, south of the Niobrara River, represented in the illustration is a narrow strip extending east and west. The deposit is of late origin and has the usual æolian character met with in the more extensive sandhill areas further east in the State of Nebraska. This deposit rests unconformably on the Harrison and the Upper Harrison (Nebraska^{3a}) beds.

Spoon Butte is located in the southwestern part of Sioux County, Nebraska. It is a long and narrow elevation with deeply eroded sides and a flat top. The long axis of the butte is directed nearly east and

² *Proc. Am. Phil. Society*, Vol. XLI., pp. 113-131, 1902.

³ Hatcher wrongly identified *Protolabis* for *Oxydactylus*, and *Cyclopidius* for *Merychys*. No *Cyclopidius* has as yet been found in the Upper Harrison beds.

^{3a} From a verbal statement made recently by Professor H. F. Osborn it now appears that the beds which Professor W. B. Scott referred to the Nebraska beds are of later origin than those, which, in former papers, I have referred to that horizon. This horizon, therefore, may be called the Upper Harrison beds and in this paper will be referred to under that name.

west, the western extremity lying within the State of Wyoming, in Laramie County. The summit of Spoon Butte, which is represented at the top of the section (Fig. 1) is capped by a hard pinkish-gray sandstone, thirty-five to fifty feet in thickness. In this hard cap of sandstone, which is regarded as the top of the Upper Harrison beds, our party found no fossils. The base of this elevation is composed of the Lower Harrison beds.

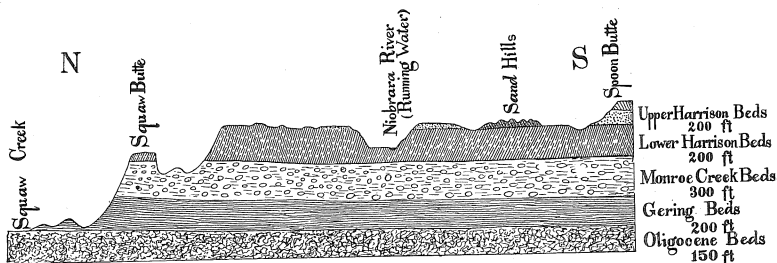


FIG. 1. A section of the Lower Miocene of western Nebraska and eastern Wyoming.

THE GERING BEDS.

The Gering horizon forms the contact between the Oligocene and the lower Miocene formations over extensive areas in eastern Wyoming and western Nebraska, and perhaps also parts of eastern Colorado. At Squaw Butte, the northern limit of the lower Miocene, where the section represented in Fig. 1 was obtained, the Gering sandstones rest directly on the *Leptauchenia* clays, which compose the uppermost horizon of the Oligocene formation. No fossils were found in this horizon in the neighborhood of Squaw Butte, but farther east, near Sand Creek and near Chadron, Nebraska, a few remains were found.

LIST OF THE FAUNA.

? *Mesoreodon*.

Leptauchenia.⁴

THE MONROE CREEK BEDS.

In the vicinity of Squaw Butte it is quite difficult to separate this horizon from the underlying Gering beds by lithological characters alone. While remains of *Leptauchenia* were found in the lower part

⁴The material referred to *Leptauchenia* differs but slightly from that referred to *L. decora* Leidy, from the Oligocene, and should not in my judgment be regarded as belonging to the genus *Cyclopidius*.

of this horizon, none were found at the top by the parties from the Carnegie Museum, but it is quite probable that true *Cyclopidius* may occur in the upper levels. Other changes of the fauna occur which help to identify the horizon.

LIST OF THE FAUNA.

<i>? Diceratherium.</i>	} These genera are found in the lower levels of the beds and may with equal propriety in part be regarded as belonging to the fauna of the Gering horizon.
<i>Mesoreodon.</i>	
<i>Leptauchenia.</i>	
<i>Cameloid fragments</i> (Genus?).	
<i>Canid fragments</i> (Genus?).	} These genera and species are from the upper Monroe Creek horizon.
<i>Euhapsis platyceps</i> Peterson.	
<i>Promerycochærus carrikeri</i> , n. sp.	
<i>Phenacocælus typus</i> , gen. et sp. nov.	
<i>Protomeryx cederensis</i> Mathew.	
<i>Nothocyon lemur</i> Cope.	

DESCRIPTION OF NEW MATERIAL.

Diceratherium sp. indet.

A few fragments of jaws and teeth were found in the lower level of the Monroe Creek beds which evidently belong to the genus *Diceratherium*. The incisor is large and apparently occupied the usual prominent position which is characteristic of the family. The specimen is probably that of an earlier type of the genus.

Mesoreodon melagodon sp. nov.

In the collection of the Carnegie Museum are five or six individuals upon which this species is founded. The material was found in the middle and lower Monroe Creek beds near Squaw Butte, Sioux County, Nebraska. All the specimens are crushed and the true contour of the skulls is consequently lost.

The front of the skull and lower jaws (No. 1325) of a young individual, but with all the permanent teeth in position (see Fig. 2) are selected as the type. A second specimen of a fully adult animal (No. 1323) is chosen as the paratype, and consists of the back part of the skull, the lower jaws very nearly complete (see Fig. 3), fragments of lumbar vertebræ, fore and hind limbs, and feet.

MEASUREMENTS.

	mm.
Greatest length of the jaw fragment.....	86
Depth of mandible at $M_{\overline{1}}$	24
Depth of mandible at $P_{\overline{2}}$	20
Length of the dental series, including canine.....	68
Length of premolar series.....	33
Length of molars $\overline{1}$ and $\overline{2}$	22
Antero-posterior diameter of carnassial tooth.....	15
Transverse diameter of carnassial tooth at base.....	8
Antero-posterior diameter of heel of carnassial tooth.....	4

A PROVISIONAL LIST OF THE FAUNA OF THE AGATE SPRING
FOSSIL QUARRY.

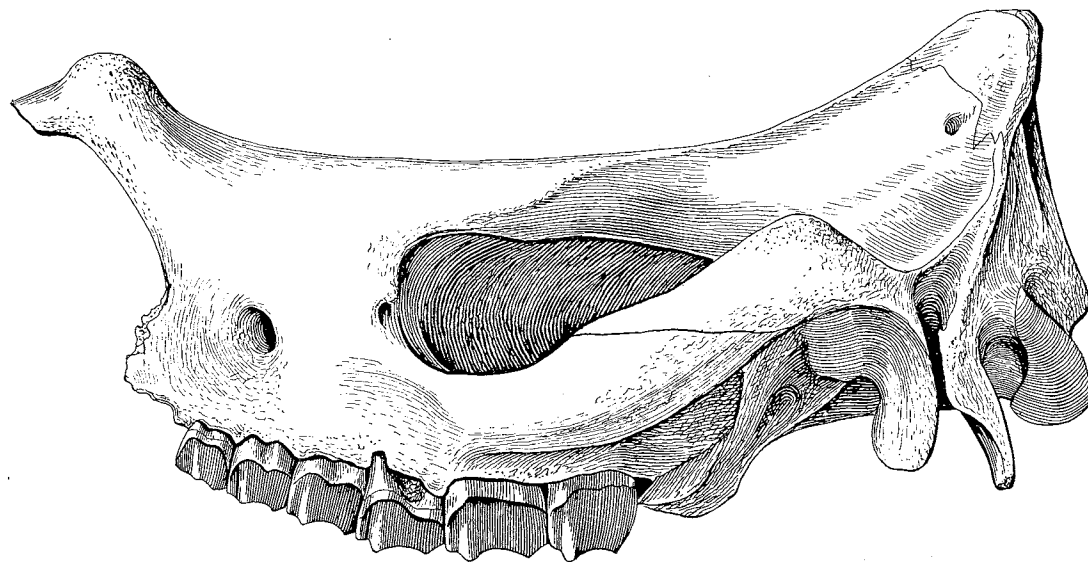
*Parahippus.**Diceratherium niobrarense* Peterson.*Diceratherium cooki* Peterson.*Moropus elatus* Marsh.*Dinohyus hollandi* Peterson.? *Merycochaerus.**Merychys elegans* Leidy.*Amphicyon superbus* sp. nov.*Nothocyon annectens* sp. nov.***Diceratherium niobrarense* Peterson.***(Science, Vol. XXIV., No. 609, pp. 281-282, 1906.)**(PLATES XIII. and XIV.)**(Type. No. 1271 Carnegie Museum Catalogue of Vertebrate Fossils.)*

In comparing this species with the type of *Diceratherium nanum* Marsh,¹⁵ and also with the complete and well preserved skull of that species (No. 7324) in the American Museum of Natural History,¹⁶ certain differences are observed.

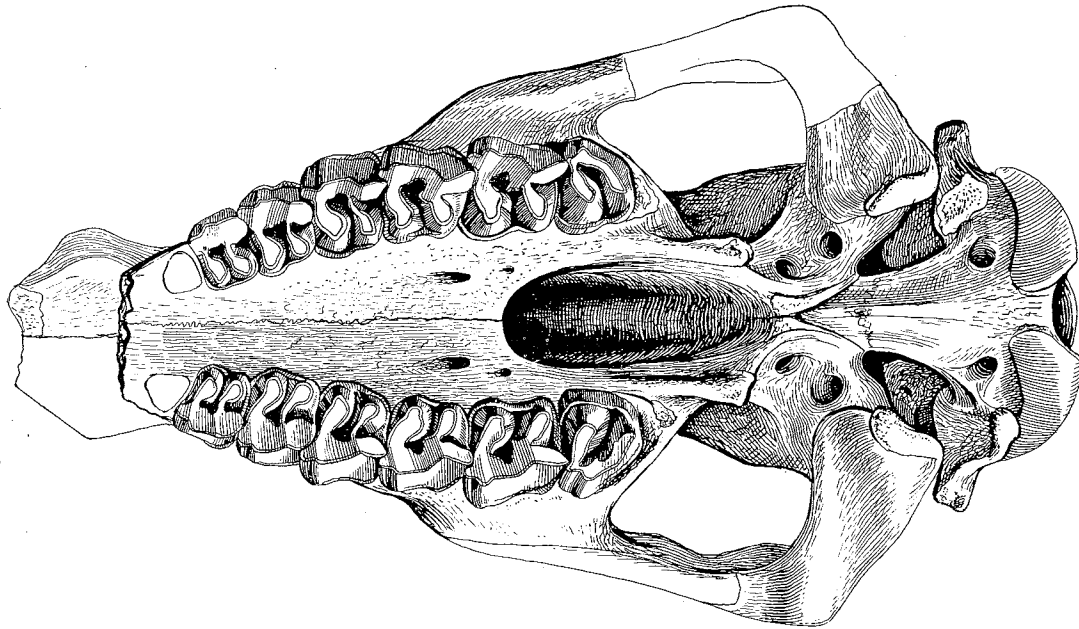
In the type of *Diceratherium nanum*, $P_{\overline{1}}$ is relatively larger than that tooth in *Diceratherium niobrarense*, the nasals are somewhat more produced in front of the nasal horn-cores, and are also apparently heavier than in the latter species. In the specimen in the collection of the

¹⁵ The front of a skull and lower jaws in Yale Museum, No. 526.

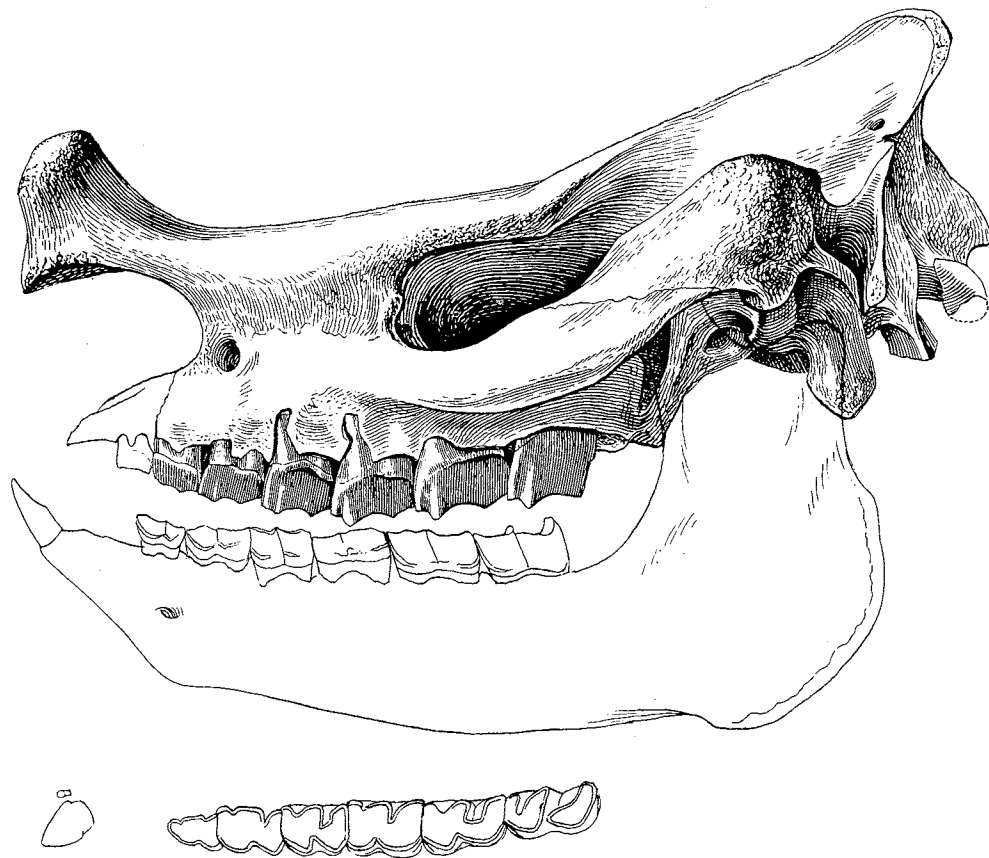
¹⁶ This specimen was referred by Cope to the species *Diceratherium nanum*, and is apparently identical with the type so far as comparison can be made.



Side View of Skull of *Diceratherium niobrarense* Peterson, $\frac{1}{3}$.



Palate View of *Diceratherium niobrarense* Peterson, $\frac{1}{3}$.



Side View of Skull and Lower Jaws and Crown View of Inferior Dentition
of *Diceratherium cooki* Peterson, $\frac{1}{3}$.

American Museum of Natural History P¹ and the nasals show very close similarities to those of the type specimen in the Yale Museum. The specimen in the American Museum is further distinguished from the type of *Diceratherium niobrarense* by the less convex contour of the skull from side to side, the smaller brain case and occipital condyles, the more complicated grinding surfaces of the teeth, and by a small

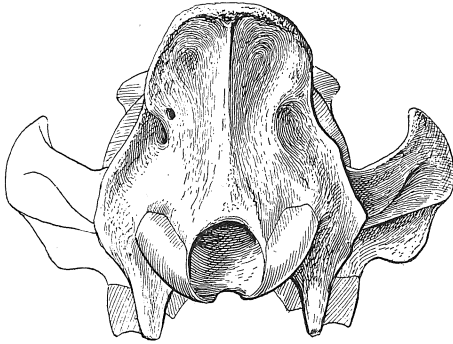


FIG. 11. Posterior view of skull of *Diceratherium niobrarense*. $\frac{1}{4}$ nat. size. Type, No. 1271.

tubercle in the median valley on the internal side of M³. The type of *D. niobrarense* and the specimen in the American Museum referred to *D. nanum* are very nearly of the same size. The type of *D. armatum* represents an animal of larger size, and there are other differences which were pointed out by Marsh (Am. Jour. Science (3), Vol. IX, p. 242, 1875).

***Diceratherium cooki* Peterson.**

(Science, Vol. XXIV., No. 609, pp. 281-282, 1906.)

(PLATE XV.)

The modification of the teeth and the general construction of the skull of this species at once separates it from other American species. The European species *Diceratherium minimum* Cuvier is perhaps the most nearly allied. It is interesting to note that the configuration of the triturating surfaces of the teeth in *Diceratherium nanum* is more nearly similar to the present species than to *Diceratherium niobrarense* and *Diceratherium armatum*, and that the two latter have the teeth complicated in nearly the same degree.

In the abundant material of *Diceratherium cooki* in the Carnegie Museum a great variation in the size of the nasal horn cores is observed. This is undoubtedly due to differences in age, sexual charac-

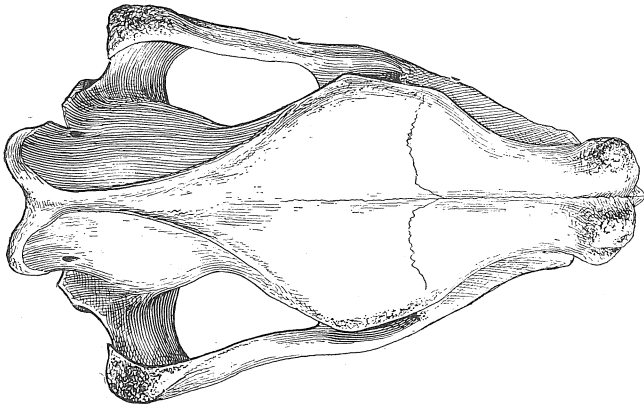


FIG. 12. Top view of skull of *Diceratherium cooki*. $\frac{1}{4}$ nat. size. Type, No. 1572.

ters, and individual variations. When the material from the Agate Spring Fossil Quarry is freed from the matrix full descriptions of the various forms will be given in the publications of the Carnegie Museum.

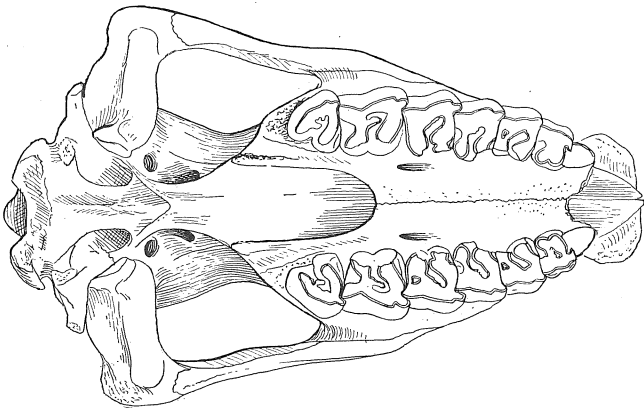


FIG. 13. Palate view of skull of *Diceratherium cooki*. $\frac{1}{4}$ nat. size. Type, No. 1572.