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ON SOME MAMMALIA

OF THE

LOWEST EOCENE BEDS OF NEW MEXICO

By E. D. COPE.

(*Extr. Am. Phil. Soc.*)

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FOR SALE BY A. E. FOOTE,

1123 BELMONT AVENUE,

PHILADELPHIA.

2

On some Mammalia of the Lower Eocene beds of New Mexico. By E. D. Cope.

(Read before the American Philosophical Society, Sept. 17, 1881.)

MESONYX NAVAJOVIUS, sp. nov. Smaller than the two known species, and with the crowns of the molars more compressed and the blades of the heels of the inferior series more acute. Molars seven, the first one-rooted. Last molar with a cutting heel like the others, and with the penultimate, with a rudimental anterior inner cusp. All the molars with an anterior basal tubercle except the first, second and third. No basal cingula. Principal cusp elevated and compressed, as in the premolars of *Oxyena*. Enamel minutely rugose. Mandibular rami and inferior canine teeth compressed, the angle of the latter not inflected. Length of inferior molar series M. .078; do. of premolar series .046; fourth premolar, length of base .010; elevation of cusp .008; second true molar, length .012, elevation .010; width of heel .005; depth of ramus at .020; diameter of base of crown of canine, vertical .009.

PERIPTYCHUS CARINIDENS, gen. et. sp. nov. Creodontium. *Char. Gen.* No distinct sectorial teeth, the first and second true inferior molars similar. They support a principal median cusp, a broad heel and a prominent anterior cingulum. The heel is more or less divided into tubercles; the anterior cingulum is on the inner side, and represents the anterior cusp of a sectorial tooth. On the inner side of the principal cusp a cingulum rises, forming a flat internal tubercle. Last molar not smaller than the others; premolars unknown.

This genus belongs to the *Amblyctonidae* with *Amblyctonus* and *Palæonyctis*. It differs from both in the rudimental character of the anterior cusp, and from the former, in the presence of the internal tubercle. In *Mesonyx* the heel has a median cutting edge. *Char. Specif.* Parts of both mandibular rami and the shaft of a humerus represent this species. They indicate an animal of the size of the red fox, but much more robust. The mandibular ramus is rather shallow and thick, and the molars are not large. The heel of the penultimate supports three tubercles, of which the external is the largest. The anterior cingulum supports a small cusp, and then rises to the internal tubercle, which is compressed. The sides of all the cusps are marked with distinct, well separated, vertical ridges. Each extremity of the internal cusp is connected with the principal cusp by a ridge. The first true molar has fewer cusps. Those of the heel are scarcely distinct, and form a border which rises prominently into the flat internal tubercle, which forms a narrow longitudinal blade. The anterior cingulum has no cusp and does not rise into the inner tubercle. The principal cusp has a strong entering groove next the inner tubercle. Length of crown first molar .0115; width of do. .006; elevation of do. .006. Length of second molar .011; width of do. .007; elevation of do. .0065. Depth of ramus at do. .020. The species is a good deal smaller than the *Amblyctonus sinosus*.

TRIISODON QUIVIRENSIS, gen. et sp. nov. *Char. gen.* Derived from the lower jaw. Probably only three premolars. True molars alike, consisting of three anterior cusps and a heel. The cusps are relatively small and the heel large. Of the former the internal is much smaller than the external, and the anterior is rudimental, being merely a projection of the cingulum. The cutting edges of the large external cusp are obtuse. The heel is basin-shaped, and its posterior border is divided into tubercles, of which the external is a large cusp. The fourth premolar has no anterior inner tubercle, so that the anterior part of the crown consists of a compressed cutting cusp. The heel has two well-developed posterior cusps. The third premolar has a similar principal trenchant cusp, but a smaller heel. Canines large.

This genus differs from *Herpetotherium* and *Ictops* in the simplicity of its fourth inferior premolar, and from *Stypolophus* and *Deltatherium* in the rudimental character of the accessory anterior cusps of the true molars, as well as in the three premolars. The rudimental anterior cusp of the true molars, with the three similar true molars, separates it from *Palaonyctis*, and the presence of a conic inner cusp of the same indicates it as different from *Amblyctonus* and *Periptychus*. It is not possible to state whether *Triisodon* must be placed in the *Amblyctonidae* or not, on account of the absence of the superior molar teeth.

This specimen of the type species of this genus is instructive as showing the succession of premolar teeth. Both the third and fourth premolars have temporary predecessors. The predecessor of the fourth premolar differs much from it in form, and is essentially identical in all respects with the true permanent molars. The crown of the predecessor of the third premolar is wanting, the roots only remaining in the jaw.

The permanent third premolar was protruded before the permanent fourth. Which temporary tooth of *Triisodon* is homologous with the single one of the *Marsupialia* pointed out by Professor Flower?* As the additional permanent teeth of the placental *Mammalia* must have appeared later in time than the one already found in the implacentals, they must be those later protruded; hence the fourth tooth in the jaw of *Triisodon* must be regarded as homologous with the fourth premolar of a placental, which is the last of that series to appear. If this be true, the tooth which follows the shed tooth of the Marsupials is not the fourth premolar, as supposed by Professor Flower, but the third premolar. This view is confirmed by the fact that the milk tooth displaced by the fourth tooth in *Triisodon* resembles in all respects the true molars, just as the permanent tooth occupying the same position does in *Didelphys* and some extinct eocene genera. This goes to show that this tooth, permanent in marsupials, is temporary in placentals, and that, in spite of its form in the former group, it is the fourth premolar, and not the first true molar, as supposed by Professor Flower. Thus the posterior milk-molar of diphyodonts is a permanent tooth in the *Marsupialia*.

* Transactions of the Royal Society, 1867, p. 631.

This observation confirms my conclusion that the *Credonta* form a group intermediate between the *Marsupialia* and *Carnivora*. I may add that in *Trisiodon* the inferior border of the lower jaw is not inflected posteriorly.

Char. specif.—Size about that of the wolf. Inferior canine directed upwards, its section nearly elliptic; a faint posterior, no anterior cutting edge. Fourth premolar rather large, with an anterior basal cingulum which is angulate upwards, and is not continued on the inner side of the crown. Cusps of the heel each sending a ridge forwards, the internal lower, obtuse and descending to base of inner side of large cusp; the external larger, with an acute anterior cutting edge continuous with the cutting edge of the large cusp. True molars with an external, but no internal basal cingulum. Border of heel with one large and three smaller tubercles, the former with, the latter without, anterior cutting edge. Enamel of all the teeth nearly smooth. All the cusps are rather obtuse. *Measurements.*—Length of inferior molar series: M. .080; long diameter of base of canine .013; length of true molar series .044; length of base of Prem. IV. .016; elevation of crown of do. .014; length of base of M. II. .016; width of do. in front .011; elevation of do., .014. The measurements of the jaw are not given, as the animal is not adult, the last molar not being yet protruded.

From the lowest Eocene beds of New Mexico.

DELTATHERIUM FUNDAMINIS, gen. et sp. nov. *Char. Gen.* Fam. *Lepictidae*, agreeing with *Ictops* and *Mesodectes* in possessing an internal tubercle of the third superior premolar, but differing from both in having but one external cusp of the fourth superior premolar. *Char. Specif.* Represented by the dentition of both maxillary bones minus the canines. The second premolar is convex on the inner face. The base of the third is a nearly equilateral triangle. The bases of the true molars are triangles, with the bases external. The internal angle supports an acute cusp, and has a posterior basal cingulum, which is very strong in the last three molars. The two external cusps of the first and second molars are situated well within the base, which is folded into a strong cingulum. This cingulum develops strong anterior and posterior angles. This is the largest species of the family yet discovered. Extent of series of last six molars, M. .045; of true molars .026; diameters of fourth premolar, anteroposterior .0074; transverse .0076; do. of second true molar, anteroposterior .0087; transverse .0100. This species was a fourth larger than the common opossum, and very much resembles it in dental characters.

CONORYCTES COMMA, gen. et sp. nov. *Char. Gen.* Allied to *Mesonyx*. Inferior canines not rodent-like, with conic crowns. Molars 3—3, the first one-rooted, the second two-rooted, the third with an anterior conic cusp and a posterior grinding heel. True molars consisting of two lobes, of subcylindric section, separated by deep vertical grooves. Enamel developed on internal and external faces of crowns. *Char. Specif.* Founded on a mandibular ramus which lacks the last molar, and has the crowns of the others worn. The external faces of the molars are much more ex-

posed than the internal, and are somewhat contracted inwards. In the unworn crown there is a distinct anterior inner cusp, which is soon con-founded on attrition. The heel of the last premolar has a crescentic section, the internal horn the narrower. The anterior lobe is a robust cone. The base of the second and third premolar is oblique to the axis of the ramus outwards and forwards. It is possible that there is a minute first premolar filling the short space between the second and the canine. No cingula; enamel obscurely plicate, ramus robust. Length of molars minus the last .0465; length of base of first true molar .010; width of do. .009; elevation of crown do. .0055; length of base of fourth premolar .011; width of do. .008; elevation of crown of do. .0065. Anteroposterior diameter of base of crown of canine .010. Depth of ramus at first true molar .023; width of do. at do. .013. This genus differs from *Esthonyx* in the form of the fourth premolar. In the latter the anterior lobe is compressed and trenchant. The species is larger than any of that genus, and nearly equal to the *Ectoganus gliriformis*.

CATATHLÆUS RHABDODON, gen. et sp. nov. *Char. Gen.* With this genus I commence descriptions of several genera with bunodont dentition, which has some resemblance to that of some of the hogs. The one above named, with *Mioclenus*, remind one of *Tetraconodon* Falc. and Lydd., in the enlarged proportions of their premolar teeth. I compare the genera as follows, introducing a probably perissodactyle form (*Protogonia*) for comparison:

- I. Third and fourth superior premolars one or two lobed externally, and with internal lobes.
- α. Superior premolars with two external lobes; inferior fourth with two median cusps.
Intermediate tubercles; premolars not enlarged.....*Phenacodus*.
- αα. Superior premolars enlarged, generally with one external cusp.
β. A posterior internal cusp of superior molars;
Intermediate tubercles present; last inferior premolar with inner cusp;
Catathlæus.
- Intermediate tubercles wanting, replaced by branches of an internal V;
no cusp on inner side of last inferior premolar.....*Anisonchus*.
- Intermediate tubercle present, connected with anterior inner by ridges;
inferior molars with Vs.....*Protogonia*.
- ββ. No posterior inner cusp of superior molars.
Intermediate tubercles present; no inner lobe of last inferior premolar
Mioclenus.
- II. Superior premolars 1, 2 and 3 without inner lobe; third with three external lobes (Pictet).
Premolars compressed.....*Dichobune*.

In the genus *Catathlæus* the development of the premolars is remarkable while the true molars are relatively small. The last three superior premolars have an elevated internal crescentic cingulum homologous with

the inner lobe of the fourth superior premolar of the ruminants. The general character of the true molars is that of *Phenacodus*. Parts of two or three individuals of this species have come into my possession, one of which includes nearly all of the molar dentition of both jaws. The external cusp of the superior premolars is compressed conic, and the internal cingulum extends to its *anterior* base in the second, third, and fourth. The crown of the last true molar is about as long as wide, while that of the first is wider than long. Each supports seven cusps; two subconic external, and one large median internal, which is connected by ridges with a small anterior and posterior median. Then there are a small anterior and posterior internal, making three internal. The internal crest is distinct from the principal cusp in the inferior premolars III and IV, but unites with it in the II; it supports on the IV an anterior, a median and a posterior cusp, the latter forming part of the rather narrow heel. The true molars I and II have seven tubercles, the four principal ones, and three smaller, one anterior, one posterior, and one median. On the third the posterior forms a large heel. All of the molars, but especially the premolars, have the enamel thrown into sharp vertical parallel folds, in a manner I have not seen in any other mammal. Length of six superior molars .067; length of three true molars .029; length of base of third premolar .012; width of do. .012; width of base of first true molar .010; do. of third true molar .009; length of do. .010. Length base fourth inferior premolar .012; width do. .010; length of third true molar .0115; width of do. .009. The teeth indicate an animal of the size of the peccary.

ANISONCHUS SECTORIUS, gen. et sp. nov. *Char Gen.* This is derived from the superior P-m. IV and M. I and II, and from all the inferior molars of three individuals. The superior teeth are accompanied by a ramus mandibuli, which contains alveoli of all the inferior molars, and the crowns of the P-m. IV and M. II. The leading characters have been given above. The inner posterior lobe is more prominent in this genus than in any of the others, and has a V-shaped apex. It projects further inwards than the anterior inner lobe. It is represented by a mere tubercle of the cingulum in *Miocænus*. In the lower jaw the last premolar is quite simple, consisting of a principal cusp, and a non-cutting heel. The second true molar has intermediate anterior and posterior cusps. The genus differs from *Pantolestes* in the more numerous tubercles of the molars, and in the fact that the anterior inner tubercle of the true molars is not double. It may, however, be allied to that genus.

Char. Specif. The fourth superior premolar covers a larger base than either of the true molars. The external cusp has a base extended antero-posteriorly, but the apex is conical, and there are no basal tubercles. The inner cusp has a crescentic base as in *Catathlæus*, but the apex is narrowed and compressed conic. The external tubercles of the true molars are subconic, and do not develop any external ridges. They are connected by the crescentic slightly angular crest, whose apex forms the inner ante-

rior boundary of the crown. This crest is not divided into parts homologous with the intermediate tubercles. The crowns of the M. I and II are surrounded by a basal cingulum, which in the M. I develops a tubercle at the anterior external angle. No internal or external cingulum on P-m. IV. Enamel nearly smooth.

The ramus of the mandible is rather slender anteriorly. The P-m. IV is robust, and the cusp is behind the middle of the base of the crown. The heel is short and narrow, and has a raised border, connected with the base of the main cusp. The cusps of the second true molar are elevated and conic, the anterior external the highest, the others subequal. The base of the posterior pair is a little narrower than that of the anterior pair. There is no central tubercle as in *Catathlæus rhabdodon*, and no basal cingulum on either tooth.

<i>Measurements.</i>	M.
Length of three superior molars.....	.0160
Diameters superior P-m. IV {	
anteroposterior.....	.0055
transverse.....	.0070
Diameters superior M. I {	
anteroposterior.....	.0052
transverse.....	.0060
Length of inferior molar series.....	.0610
“ “ “ true molar series.....	.0160
Diameters inferior P-m. IV {	
anteroposterior.....	.0060
transverse.....	.0040
Diameters inferior M. II {	
anteroposterior.....	.0050
transverse.....	.0040
Depth ramus at M. II.....	.0090

A number of minor points will distinguish this species from those included among the *Mesodonta*, and especially those of *Pantolestes*, which it most resembles. The molar teeth are narrower behind, and the fourth premolar is larger. It is *Miocænus sectorius*, American Naturalist, October, 1881, p. 831.

MIOCLÆNUS TURGIDUS, gen. et sp. nov. This genus differs from *Catathlæus* in the structure of the inferior premolars, which are without internal crest or cusp. The inner lobe of the superior premolars is less developed than that genus. In the present species the characters of *Miocænus* are best seen in the subconical tubercles of the premolars, particularly that of the heel of the fourth inferior premolar. In the other three species this heel is more of a crest and is connected with the principal cusp by a low ridge. The four species may be characterized as follows :

a. Cusps of last premolars conical in both jaws.

Size medium. Last lower molar disproportionately small ; cusps low ; two anterior inner distinct ; true molars, .018. *M. turgidus*.

aa. Fourth superior premolar with flattened external and conic internal cusp ; inferior unknown.

- Size medium ; fourth upper premolar equilateral ; all cusps acute ; true molars .0165.....*M. subtrigonus*.
aaa. Cusps of last premolars compressed in lower jaw.
 Least. Second and third lower true molars subequal ; cusps, especially the internal, elevated ; anterior inner confluent into an edge ; true molars, .013.*M. angustus*.
 Largest ; cusps of inferior molars obtuse ; P-m. III .008, its heel short and small.*M. mandibularis*.
 Medium ; last inferior molar larger than penultimate ; true molars, .014 ; P-m. III .006.....*Anisonchus sectorius*.

Of *M. turgidus* there are two specimens ; and of *M. subtrigonus*, *M. angustus* and *M. mandibularis* one each.

In the *M. turgidus* there are no cingula on the fourth premolar. It is wider than long, and the external face is a little flattened. The tubercles are conic ; the external has a small one at the anterior base, and a rudiment at the posterior base, and there is a low one on the posterior side at the middle. The second true molar is wider than the first. The tubercles are all round in section. Besides those already mentioned, there is a rudiment of a posterior inner on the first, which is represented by a cingulum on the second. The latter has basal cingula all around except on the inner side ; the same are visible on the first true molar in a rudimental condition. Enamel nearly smooth.

The inferior molars are of robust proportions. Their sizes are, commencing with the largest : P-m. IV ; M. II ; M. I ; M. III. The last molar is only half as large as the penultimate. It has two anterior and an external lateral tubercles, and a heel. On the penultimate molar, there are two anterior tubercles with a trace of anterior inner ; also a broad flat heel, with a low tubercle on the external side. The constitution of the first true molar is identical. The fourth premolar has a rudimental heel consisting of a low tubercle only. The principal cusp is conic and is over the middle of the transverse diameter, and a little behind the middle of the antero-posterior diameter. No cingula. Enamel nearly smooth.

Measurements. M.

Maxillary bone.

Length of base of P-m. IV, M. I and M. II.....	.0175
Diameters base P-m. IV	{ anteroposterior..... .0055
	{ transverse..... .0065
Diameters base M. I	{ anteroposterior..... .0060
	{ transverse..... .0070
Diameters base M. II	{ anteroposterior..... .0060
	{ transverse..... .0095

Mandible.

Length of bases of last four molars.....	.0250
Diameters P-m. IV	{ anteroposterior..... .0070
	{ transverse..... .0055

<i>Measurements.</i>		M.
Diameters M. I	{ anteroposterior0060
	{ transverse.....	.0060
Diameters M. III	{ anteroposterior0055
	{ transverse.....	.0043
Depth of ramus at M. I.....		.0115
Thickness " " "0085

MIACLÆNUS SUBTRIGONUS, sp. nov. Represented by a portion of a cranium anterior to the orbits and lacking the extremity of the muzzle, distorted by pressure. It exhibits nearly all of the molar teeth. The species differs from *M. turgidus* in the greater acuteness of all its cusps, and in the equilateral form of the fourth premolar. It is too large to belong to the *M. angustus*, which is represented by a mandible only; and too small to be the *M. mandibularis*, whose maxillary dentition is unknown.

The inner borders of the molar teeth are shorter than the outer, especially in the last two molars. The last true molar is smaller than either of the others. The cusps are all subconical, but the internal is connected with the intermediate by ridges, which give it a triangular section. The latter form a V, homologous with that in *Anisonchus*, but not so distinct, and the intermediate tubercles are not lost in its branches as in that genus. The posterior inner lobe of that and other genera, is represented by a thickening of the cingulum. This cingulum extends entirely round the P-m. IV and M. I, and M. II; the M. III is injured. The sides of the base of the P-m. IV are slightly concave. The enamel of all the molars is wrinkled.

<i>Measurements.</i>		M.
Length of bases of last five molars0285
Diameters of base of P-m. IV	{ anteroposterior.....	.0060
	{ transverse0050
Diameters of base of M. I	{ anteroposterior.....	.0060
	{ transverse.....	.0060
Diameters base of M. II	{ anteroposterior.....	.0060
	{ transverse.....	.0075
Diameters base of M. III	{ anteroposterior.....	.0040
	{ transverse.....	.0060

MIACLÆNUS ANGUSTUS Cope, American Naturalist, 1881, October (September 22d), p. 831. The least species of the genus, with the teeth about the size of *Hyopsodus paulus* Leidy, but with more robust jaw. The molar teeth diminish in size regularly posteriorly from the P-m. IV. They all have three subequal posterior cusps which are less elevated than the anterior ones. The median is enlarged into a heel on the last tooth. The anterior are opposite, and the external is larger than the internal. There is no anterior internal. The external wears into an anteroposterior narrow grinding surface, which looks like a combination with an anterior median. The latter is, however, not separate on the least worn molars. The

anterior outer cusp increases in size anteriorly, and is the large cusp of the P-m. IV. It sends a branch backwards on the inner side of the crown which forms the edge of the narrow concave heel. There are no cingula except a short one on the anterior corners of the base of the crown of the P-m. IV. Enamel obscurely wrinkled.

<i>Measurements.</i>		M.
Length of posterior four molars.....		.0180
Diameters of P-m. IV	{ anteroposterior.....	.0050
	{ transverse.....	.0035
Diameters of M. I	{ anteroposterior.....	.0050
	{ transverse.....	.0035
Diameters of M. II	{ anteroposterior.....	.0040
	{ transverse.....	.0032
Diameters of M. III	{ anteroposterior.....	.0045
	{ transverse.....	.0030
Depth ramus at M. I.....		.0110
Thickness " " "0060

PHENACODUS PUERCENSIS, sp. nov. Three individuals. Last superior molar smallest; first and second true molars with six tubercles, two external, two median and two internal. A strong basal cingulum except on inner side. Inferior true molars besides the usual five tubercles, furnished with an anterior ledge with a tubercle at its interior extremity. A weak external basal cingulum. A little larger than the *P. vortmani*. Length of superior true molars M. .021; length of base of crown of M. III .006; do. of M. I .008; width of do. .008; length of base of crown of inferior M. III .0085; width of do. in front .006; depth of ramus at M. I .019.

PHENACODUS ZUNIENSIS, sp. nov. The least species of the genus, represented by the mandibles of two individuals. The first and second true molars are narrowed in front, and there is no distinct anterior ledge, only a minute anterior inner tubercle. The external cingulum is more distinct and the enamel is wrinkled. The fourth premolar has a short base and the inner cusp is much smaller than the principal one; it has a wide heel and an anterior basal tubercle. Length of true molars, M. .018; of last true molar .006; of base of first true molar .006; width of do. .004; depth of ramus at do. .011.

PROTOGONIA SUBQUADRATA, gen. et sp. nov. Fourth superior premolar with one external and one internal lobe. True molars with two external, two internal, and two intermediate lobes, both the latter connected with the anterior internal by a ridge. Supposed inferior true molars with two Vs with weak anterior branches; last true molar with heel.

This genus will enter the *Chalicotheriidae* of my system of *Perissodactyla*,* if the feet are found to possess the requisite characters. It is allied, apparently, also to *Hyracotherium*, but differs in the Vs of the infe-

*See Proceedings Amer. Philosoph. Society, 1881, p. 377-8.

rior molars, if they are properly identified; and in the superior molars. The anterior transverse crest of that genus is represented in *Protogonia*, but not the posterior. This is replaced by a low ridge running across the course it pursues in *Hyracotherium*. The posterior median tubercle is also not found in the latter genus. *Protogonia* differs from *Limnocybus* in the subconic character of the external lobes of the superior molars. If the tubercles, excepting the posterior inner, should be converted into crescents, the genus *Meniscotherium* would be produced.

Char. Specif. Probably two specimens; one supporting three superior molars; the other including damaged superior molars and the last two inferior molars. The animal was about the size of the red fox. The external cusp of the fourth superior premolar is flattened externally, and has a small lobe on its posterior edge. The inner tubercle is conic and is separated by a tubercle from the anterior base of the external. True molars without external ridges. The external cusps of the true molars are lenticular in section. The posterior inner cusp is in nearly the same antero-posterior line with the anterior, its section about equaling that of the intermediate cusps. The first and second molars have an external, an anterior and posterior, but no internal, basal cingula. The enamel is somewhat wrinkled where not worn.

The heel of the last inferior true molar is elevated, and its worn surface forms the extended posterior branch of the posterior V. The posterior edge of the penultimate molar is elevated and curved forwards on the inner side of the crown. The anterior cusp forming the angle of the V of this tooth, is higher than the posterior angular cusp, but the anterior limb descends rapidly as in *Coryphodon*. A weak antero-external, and postero-external cingula. Enamel wrinkled where not worn.

Measurements.

M.

No. 1.

Length of bases of three superior molars.....		.025
Diameters of superior P-m. IV	{	anteroposterior..... .0066
		transverse..... .0086
Diameters of superior M. I	{	anteroposterior..... .0085
		transverse..... .011
Diameters superior M. II	{	anteroposterior..... .009
		transverse..... .011

No. 2.

Length of bases of last two inferior molars.....		.0225
Diameters of last inferior molar	{	anteroposterior..... .0114
		transverse..... .0066
Diameters of inferior M. II	{	anteroposterior..... .0112
		transverse..... .0080
Depth of ramus at M. II.....		.0240
Thickness " " ".....		.0110

MENISCOTHERIUM TERRÆRUBRÆ, sp. nov. My specimens of this species embrace the dentition of several individuals.

The dimensions of the superior molars increase to the penultimate, while the external and posterior sides of the last molar are contracted, reducing its size. The external faces of the external Vs of the true molars are considerably impressed; those of the premolars are nearly flat.

The second premolar is two-rooted, and has a compressed crown, without either heel or cingulum, except a thickening of the posterior base. The base of the crown is triangular. The external plate of the third premolar is simple, and is connected with the internal cusp by a cingulum on the posterior base of the crown. The crown is transverse, and the inner tubercle rather small. The fourth premolar is much larger than the third. Its external plate is divided into two apices, which are not impressed. Their external faces are separated by a faint ridge, and are divided medially by a faint ridge. The anterior external angle is rather prominent. The anterior and a posterior cingulum extend to and round the inner base of the interior tubercle. Within the anterior external apex, is a well developed intermediate crest parallel to it; and there is a corresponding crest within the posterior external apex. This one turns inwards at its posterior extremity, which is on the posterior cingulum.

The anterior angle or horn of each external crescent of the true molars is very prominent. They are sections of short vertical ridges, which unite near the base of the crown, giving abruptness to the impression of the external surface of the anterior lobe. The middle of each face has a faint median ridge. The two molars have an anterior basal cingulum, but no posterior or internal, excepting a trace between the bases of the internal lobes. The anterior intermediate crescent is quite parallel with the external; the anterior internal tubercle has a slightly V-shaped section. The posterior inner tubercle is quite confluent with an oblique intermediate crest, as in *M. chamense*. In the last true molar, as there is only one internal tubercle, this crest is short, terminating at the posterior border. The last true molar is like the last premolar, except in its two impressed external crescents.

A fragment of the right branch of the lower jaw supports two molars, and the alveoli of two others, all of which have two roots. These teeth are the four premolars, although the last one has the form of the first true molar. Should my surmise be correct, then the third premolar has nearly the same form and structure as the fourth. The anterior horn of its anterior V is not produced quite so far inwards as in the fourth tooth. At the point of junction of the adjacent horns of the Vs there is a slight antero-posterior extension, forming a median buttress of the inner side of the crown as in *Anchitherium*. The posterior horn of the posterior V is also incurved, as in that genus. The angles of the Vs of the inferior molars are rounded.

The surfaces of the enamel of the teeth of both jaws is smooth.

	<i>Measurements.</i>	M.
Length of superior molars, less P-m. I046
“ of true molar series.....		.028
“ of base of P-m. II.....		.005

<i>Measurements.</i>		M.
Diameters of base P-m. III	{ anteroposterior.....	.006
	{ transverse.....	.007
“ of base P-m. IV	{ anteroposterior.....	.008
	{ transverse.....	.010
“ of base of M. II	{ anteroposterior.....	.011
	{ transverse.....	.013
“ inferior P-m. III (or IV)	{ vertical.....	.005
	{ anteroposterior... ..	.007
	{ transverse.....	.005
Depth of ramus at same tooth012
Thickness ramus at succeeding tooth.....		.009

The *Meniscotherium terrærubræ* differs from the *M. chamense* in two features. The first is its superior size. The second is the flattened form of the external faces of the true molars and the absence of the convexity of the external bases of the crown.

My specimen of this species is from the red Eocene bed in Northwestern New Mexico, from the true Wasatch horizon, or higher than that which produced the other species here described. It was found by my assistant, D. Baldwin.

REMARKS.

As stated in my report to Lieut. Wheeler in 1877, no vertebrate remains had been found in the Puerco beds, which underlie the Wasatch in New Mexico, up to that time. It was therefore uncertain whether they form the top of the Cretaceous or the bottom of the Tertiary series. I have recently obtained evidence of the existence of *Champsosaurus* in them, so that their position might be supposed to be in the Postcretaceous system.

It is however quite possible that the species of Mammalia described in this paper were derived from the Puerco Formation. Their horizon is below the Wasatch, and they represent a different fauna from that of those beds.

Attention has already been directed to this fauna in the pages of the *American Naturalist*.* I have recorded the presence of the Creodont genera, *Periptychus*, *Trisodon* and *Deltatherium*, and of the saurian *Champsosaurus*. I have now added the genera *Hyracotherium* and *Meniscotherium*, and a number of new forms of considerable interest. These are the Creodont *Mesonyx*, a new genus allied to *Esthonyx*, and a series of genera and species with a suilline type of dentition, but whose affinities are by no means certain. This point cannot be determined until the characters of the feet are known.

The facies of this fauna differs in several points from that of the Wasatch. *Coryphodon* has not yet been discovered in it, and the flesh-eaters are very primitive. The suilloid genera are characteristic.

*April, August and October, 1881.