

THE
AMERICAN JOURNAL
OF
SCIENCE (AND ARTS.)

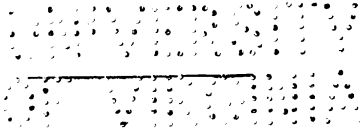
EDITORS AND PROPRIETORS,
PROFESSORS JAMES D. DANA AND B. SILLIMAN.

ASSOCIATE EDITORS,
PROFESSORS ASA GRAY AND WOLCOTT GIBBS,
OF CAMBRIDGE,
PROFESSORS H. A. NEWTON, S. W. JOHNSON,
GEO. J. BRUSH AND A. E. VERRILL,
OF NEW HAVEN,
PROFESSOR A. M. MAYER, OF HOBOKEN, N. J.

THIRD SERIES.
VOL. V.—[WHOLE NUMBER, CV.]
Nos. 25—30.

JANUARY TO JUNE, 1873.

WITH TWO MAPS AND FOUR PLATES.



NEW HAVEN: EDITORS.
1873.

PRINTED BY TUTTLE, MOREHOUSE & TAYLOR, 221 STATE ST.

APPENDIX.

Notice of New Tertiary Mammals; by O. C. MARSH.

IN addition to the extinct Mammals already described by the writer, the Museum of Yale College contains some interesting remains of this group from the various Tertiary deposits of the Rocky Mountain region. Not a few of these specimens are new to science, and some of the more important are here described.

Orohippus agilis, sp. nov.

Additional specimens of this genus fully justify its separation from *Anchitherium*, and likewise show that it holds a most interesting intermediate position between that genus and the less specialized mammals of the *Palæotherium* type. The genus differs essentially from *Anchitherium* in having four functional digits in the manus, in having the first premolar nearly as large as the second, and in the absence of an antorbital fossa. The skull is elongated, and equine in its proportions. The orbit was not enclosed behind. There were three upper true molars, and four premolars. The radius and ulna were separate, and the latter bone is stouter than in *Anchitherium*.

The present species differs from *Orohippus pumilus* Marsh,* in having the inner cones of the upper molars more nearly of equal size, and each with a distinct basal ridge. The remains preserved indicate, moreover, a somewhat larger animal, which nearly equalled a fox in size.

Measurements.

| | |
|--|---------|
| Space occupied by upper molar series,..... | 49· mm· |
| Space occupied by upper true molars,..... | 23· |
| Antero-posterior diameter of penultimate upper molar, .. | 8· |
| Transverse diameter,..... | 9·5 |
| Transverse diameter of distal end of humerus,..... | 20· |
| Transverse diameter of proximal end of radius,..... | 17· |
| Transverse diameter of distal end on articulation,..... | 12·4 |
| Transverse diameter of distal end of ulna,..... | 5·6 |
| Length of third metacarpal,..... | 55·5 |

The known remains of this species are all from the Eocene of Wyoming.

Colonoceras agrestis, gen. et sp. nov.

In its cranial characters and dentition, this genus resembles most nearly *Hyrachyus* Leidy, and *Helaletes* Marsh. It differs

* This Journal, vol. iv, p. 207, Sept., 1872.

especially from these genera, so far as they are known, in the presence of a pair of dermal horns on the nasal bones, which were strengthened to support them. These horns were placed opposite each other, and their position, in a nearly perfect skull in the Yale Museum, is indicated by two rugosities, which have their surfaces marked by radiating lines. In the present species, which was about as large as a sheep, the horns were widely divergent.

Measurements.

| | |
|--|---------|
| Space occupied by seven teeth in upper molar series, | 77· mm. |
| Extent of three true molars, | 41· |
| Distance between orbits, | 62· |
| Distance between apices of horn rugosities, | 27· |
| Length of frontals on median suture, | 62· |
| Expanse of occipital condyles, | 40· |

The remains of this species at present known are from the Eocene of Wyoming.

Dinoceras lucaris, sp. nov.

This genus may be distinguished from *Tinoceras* Marsh (*Eobasileus* Cope), by the anterior position of the maxillary horns, by the elevated parietal crests, by the short and arched diastema, and by the compressed and trenchant canine tusks. From *Uintatherium* Leidy, so far as that genus is at present known, *Dinoceras* differs in the position of the occipital condyles, in the more anterior position of the posterior horns, and in the last upper molar, which lacks the external cone between the two transverse ridges, and has a second smaller tubercle behind the posterior ridge.

The present species, which may provisionally be referred to *Dinoceras*, differs from *D. mirabilis* Marsh,* aside from its larger size, in the structure of the upper molars. The penultimate has the inner posterior tubercle double, and the last true molar has a tubercle in the angle of the transverse crests, and also lacks the second posterior tubercle. The basal ridge is continuous on the inner side of each of the three upper premolars.

Measurements.

| | |
|--|----------|
| Space occupied by upper molar series, | 157· mm. |
| Extent of last three upper molars, | 93· |
| Antero-posterior diameter of last upper molar, | 35·5 |
| Transverse diameter through posterior crest, | 38· |

The locality and geological horizon of these remains are essentially the same as those of the preceding species.

* This Journal, vol. iv, p. 343, and vol. v, p. 117.

Oreodon occidentalis, sp. nov.

An interesting species of *Oreodon* occurs in the Miocene of Oregon, in the same deposits with *O. superbus* Leidy. It resembles *Oreodon Culbertsoni* in most of its cranial characters, but differs materially in the large auditory bulla, which is several times the size of the postglenoid process. The species is smaller than *O. major*, and has the frontals between the orbits more depressed, and the antorbital fossa deeper.

In comparing the various species of *Oreodon* some new points in the structure of this genus were observed. The dentition of all is essentially the same, the formula being as follows:—

Incisors $\frac{3}{3}$, canines $\frac{1}{1}$, premolars $\frac{4}{4}$, molars $\frac{3}{3} \times 2 = 44$. The

caniniform tooth of the lower jaw is clearly the first premolar, as Dr. Gill has stated. The metacarpals are slender, and those in *O. Culbertsoni* are about twice as long as those in *Dicotyles torquatus*. The first is wanting. The third and fourth are nearly equal in size, and had their coadapted faces immovably united by cartilage. The second and fifth are both well developed. The navicular and cuboid bones were loosely coössified, or separate. The phalanges are much more slender than in the Peccaries.

The following are some of the dimensions of a large specimen of *Oreodon occidentalis*.

Measurements.

| | |
|---|----------|
| Space occupied by last three upper molars, | 45.5 mm. |
| Antero-posterior diameter of last upper molar, | 15.5 |
| Extent of last three lower molars, | 53. |
| Distance between outer faces of postglenoid processes, .. | 77. |
| Length of frontals on median suture, | 54. |
| Vertical diameter of auditory bulla, | 22. |

The type specimen of this species was presented to the Museum of Yale College by Rev. Thomas Condon, who has done so much for the palæontology of Oregon. Other specimens were collected by the Yale party in the autumn of 1871.

Rhinoceros annectens, sp. nov.

There are two well-marked species of *Rhinoceros* represented in the Yale collections from the Miocene of Oregon. One of these Dr. Leidy has called *R. pacificus*;* the other appears to be undescribed. It was apparently about half the bulk of the former species, which it resembles in some of its dental characters. In the upper molars, however, the transverse crests approach each other much more nearly, and in the true molars preserved they are united, thus dividing the interposed valley.

* Proceedings Philadelphia Academy, 1872, p. 248.

The basal ridge, also, is much less developed on the inner side of the upper molars. Upper incisors were present, and one of the lateral ones was greatly compressed, and its crown very short, as in the existing *R. Javanicus*.

Measurements.

| | |
|---|---------|
| Antero-posterior diameter of penultimate upper molar,--- | 27· mm· |
| Transverse diameter,----- | 36· |
| Antero-posterior diameter of first upper true molar,----- | 26· |
| Transverse diameter,----- | 34·5 |
| Antero-posterior diameter of first upper premolar,----- | 20·6 |
| Transverse diameter,----- | 17· |
| Antero-posterior diameter of upper incisor,----- | 21· |
| Transverse diameter,----- | 7·6 |

The remains on which this species is mainly based were found, in November, 1871, in the John Day Valley, Oregon, by Mr. G. G. Lohdell of the Yale party.

Rhinoceros Oregonensis, sp. nov.

A second new species of this genus, much larger than either of the Miocene species, is indicated by portions of several individuals which were found by the Yale party, in 1871, in the Pliocene deposits of Oregon. One of these specimens is a penultimate upper molar which is quite characteristic, and differs widely from the corresponding tooth in any of the known species. At the union of the transverse posterior ridge with the outer cusp, there is a deep cavity, nearly circular, and enclosed by a vertical cylinder of enamel. The anterior crest, also, is divided, a strong branch being sent inward and backward from the posterior side into the main transverse valley.

Measurements.

| | |
|--|---------|
| Antero-posterior diameter of penultimate upper molar,-- | 41· mm· |
| Transverse diameter (approximate),----- | 48· |
| Transverse diameter of circular cavity,----- | 6·5 |
| Distance from center of cavity to front margin of tooth,-- | 21· |

This species appears to have been about two thirds the size of *R. crassus* Leidy, from essentially the same geological horizon.

Yale College, New Haven, April 24th, 1873.

APPENDIX.

ART. LIII.—*Notice of New Tertiary Mammals* (continued);
by O. C. MARSH.

THE present paper is a continuation of that on page 407. The remains here described were nearly all collected by the late expeditions from Yale College, and the type specimens are preserved in the Museum of that institution.

Tillotherium hyracoides, gen. et sp. nov.

This genus presents some remarkable characters in its dentition, which separate it widely from any described, with the possible exception of *Anchippodus* Leidy, to which it may prove to be nearly related, when additional remains of that genus are discovered. There were two large incisors in each premaxillary, the inner and larger one being gliriform, and covered on its front and outer faces with enamel. The canine was small and directed well forward. There appear to have been four upper premolars, increasing in size posteriorly. There are three true molars, the last being the largest. They are all much greater in transverse than in antero-posterior extent, and this is especially true of the last. They are composed essentially of a pair of external cones, connected with a single internal lobe by two oblique converging ridges. There is a small tubercle in the depression thus enclosed. The basal ridge on the posterior side is expanded, forming a low shelf. The antero-external cone has an outer cusp, which projects outward and forward. The present species was about two-thirds the size of a Tapir. The large upper incisors are sub-triangular in transverse outline, the posterior face being concave. The lower jaws and skeleton are not known with certainty. It is possible that the present remains may prove to be generically identical with *Anchippodus minor* Marsh (*Trogosus castoridens* Leidy).

Measurements.

| | |
|--|---------|
| Antero-posterior diameter of large upper incisor, | 21· mm· |
| Transverse diameter, | 15· |
| Space occupied by last three upper molars, | 59· |
| Antero-posterior diameter of first upper true molar, | 16·5 |
| Transverse diameter, | 29· |
| Antero-posterior diameter of last upper molar, | 21· |
| Transverse diameter, | 38· |

The known remains of this species are all from the Eocene of Wyoming.

Brontotherium gigas, gen. et sp. nov.

An examination of the remains, in the Yale Museum, of the huge mammals allied to *Titanotherium*, has led to the discovery that two different animals have hitherto been referred to the species known as *T. Prouti*. These animals are generically distinct, and probably are from separate geological horizons. The one here described differs from *Titanotherium* in its dentition, having but three lower premolars, the series being as follows:—Incisors 2, canine 1, premolars 3, molars 3. The animal was, moreover, a true Perissodactyl, with limb-bones resembling those of *Rhinoceros*. The genus is related to *Titanotherium** and the two appear to form a distinct family, which may be called *Brontotheridae*.

The present species is based on portions of three individuals, one of which has the lower jaws and entire molar series complete. They indicate an animal fully equal to *T. Prouti* in size, and but little inferior in bulk to the Elephant. The lower molars resemble those in the type specimen of *T. Prouti*, but the jaw below them is not so deep, and its lower margin is more nearly straight, descending but very slightly toward the angle. The front part of the lower jaws is somewhat suilline in form. The incisors are quite small, and the two next to the symphysis are separated from each other. There is a short diastema between the canine and first premolar.

From the other specimens preserved, the greater part of the skeleton can be made out. It closely resembles that in recent Perissodactyls, but shows some approach to the Proboscidea. The femur has a third trochanter, and its head a pit for the round ligament. The fibula is entire, and slender. The astragalus is remarkably short. It has a deep groove on its upper surface, and the articular facets for the navicular and cuboid are nearly equal. In the manus there are four toes of nearly equal size, the first digit being rudimentary or wanting. There were three digits only in the pes, the first and fifth being entirely wanting. The toes were short and thick, as in Proboscidiens. The metacarpals and metatarsals are longer than in the elephant, and the phalanges shorter. The foot was also more inclined. The carpal and tarsal bones are very short, and form interlocking series. The tail was long and slender.

* The generic name *Titanotherium* Leidy is antedated by *Menodus* Pomel (Bib. Univ. de Genève, x, p. 75, Jan., 1849). The latter, however, is essentially the same word as *Menodon* von Meyer, 1838, and is also objectionable in its form; hence *Titanotherium* should be retained.

Measurements.

| | | |
|--|------|-----|
| Length of lower jaw, from condyle to front of symphysis, | 634 | mm. |
| Depth of lower jaw, from top of coronoid process to angle, | 367 | |
| Depth below front of last lower molar, | 123 | |
| Depth below first lower molar, | 113 | |
| Length of symphysis, | 122 | |
| Length of last lower molar, | 117 | |
| Length of last lower premolar, | 51 | |
| Transverse diameter, | 35 | |
| Length of first lower premolar, | 31 | |
| Transverse diameter, | 21 | |
| Distance between lower canines, | 28.5 | |

The remains on which the above description is based were found in the Miocene of Colorado by Mr. H. B. Sargent, Mr. J. W. Griswold, and the writer.

Elotherium crassum, sp. nov.

A large suilline mammal, which probably belongs in the genus *Elotherium*, is indicated by portions of two skeletons, in the Yale Museum. These specimens present some features not before observed in any Ungulates. The most striking of these is a very long process descending from the malar bone, and giving attachment to the masseter muscle. This process resembles somewhat the downward prolongation from the zygomatic arch in some Edentates and Marsupials, but it is longer, and more compressed. The radius and ulna were separate, or very loosely united. The third and fourth metacarpals were nearly equal in size, and the second and fifth larger than the corresponding bones of the pes. In the latter the first digit was wanting, and the fifth rudimentary. The hoof phalanges were short. The tail was long, and quite slender. This species is intermediate in size between *E. Mortoni* and *E. ingens*.

Measurements.

| | | |
|---|------|-----|
| Length of malar process below squamosal suture, | 130 | mm. |
| Length of symphysis of lower jaws, | 144 | |
| Antero-posterior diameter of lower canine, | 32.5 | |
| Transverse diameter, | 28.5 | |
| Transverse diameter of humerus at distal end, | 81 | |
| Transverse diameter of radius at distal end, | 75 | |
| Transverse diameter of head of tibia, | 81 | |
| Length of third metatarsal, | 102 | |

A rather smaller specimen, apparently of the same species, afforded the following

Measurements.

| | |
|---|---------|
| Length of symphysis,..... | 122· mm |
| Depth of jaw below first premolar,..... | 57· |
| Depth below last lower molar,..... | 69· |
| Space occupied by lower molar series,..... | 216· |
| Space occupied by three lower true molars,..... | 76· |

All the known remains of the present species are from the Miocene of Colorado.

Yale College, May 5th, 1873.