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**Article III.—NOTICE OF TWO NEW GENERA OF MAMMALS
FROM THE OLIGOCENE OF SOUTH DAKOTA.**

By W. D. MATTHEW.

Among the collections made by Mr. Albert Thomson for the American Museum last summer are skulls and fragmentary skeletons of a rodent and a small artiodactyl clearly distinct from any known genera.

***Eutypomys*,¹ gen. nov.**

Dentition $I\frac{1}{1}$, $P\frac{2}{2}$, $M\frac{3}{3}$. Molars and fourth premolar subhypsodont, quadrate in outline, with complicated surface pattern of numerous small cement lakes. Skull rather elongate, with moderately wide and slender arches, brain-case small, sagittal crest low, no postorbital process. Infraorbital foramen quite small, the root of the arch concave externally, with a ledge above and in front of it for attachment of masseter, as in *Sciuridæ* and *Castoridæ*. Fore and hind limbs moderately long, tibia and fibula separate, fibulocalcaneal contact slight or absent. Pes pentadactyl, the first digit small, divergent, or somewhat opposable, second digit quite slender, third, fourth, and fifth moderately stout and of equal size. Facet of fifth metatarsal on cuboid entirely lateral, the distal facet of the cuboid resting on mt. iv exclusively.

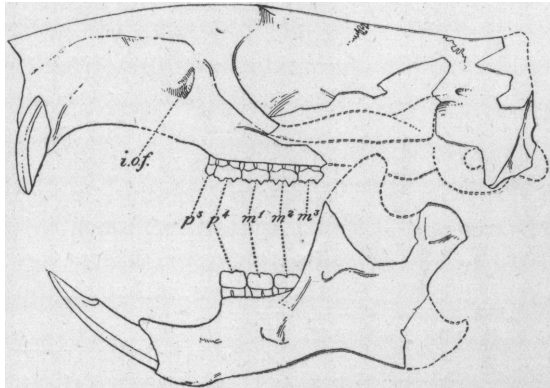


Fig. 1. *Eutypomys thomsoni*. Side view of skull and jaws, natural size. Type specimen No. 12254. Oreadon Beds, South Dakota.

The tooth pattern is difficult to interpret, but appears to be based upon the following elements: There is a pair of internal crescents (protocone and hypocone), each connected by a ridge with the primary external cones (paracone and metacone). In addition are anterior and posterior external cusps (parastyle and metastyle), each prolonged inward in singular ridges joining the inner crescents, and a median external cusp (mesostyle), prolonged inward in a ridge to the centre of the tooth. All these transverse ridges, as well as the internal

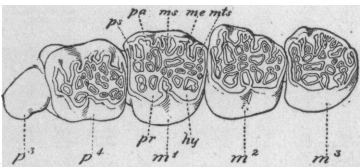


Fig. 2. *Eutypomys thomsoni*. Crown view of upper teeth, three times natural size. No. 12255. Oreadon Beds, South Dakota.

¹ Derivation: *εὐ*, well; *τύπος*, pattern; *μῦς*, mouse.

crests, have irregular cross-ridges on their surface, excepting on the borders of the crown. On wear, the subsidiary crests promptly join, and the valleys between them are converted into small isolated lakes, apparently filled by cement, although there is little trace of cement on the external borders of the crown. There are eighteen of these lakes on m^1 of the type, but their number and form would apparently change much with wear.

Eutypomys is a somewhat difficult genus to place. The dental formula is that of Ischyromyidæ and Sciuridæ. In the forward extension of the origin of the lateral masseter above and beyond the infraorbital foramen, it corresponds with Sciuridæ and Castoridæ, and differs from Ischyromyidæ, in which the origin of this muscle is entirely behind the infraorbital foramen, an arrangement preserved in the Haplodontidæ, *Meniscomys* and *Haplodontia*, and in the Mylagaulidæ. The absence of postorbital processes and strongly constricted postorbital region corresponds with Ischyromyidæ, Haplodontidæ, and Castoridæ, but differs from Sciuridæ. The teeth suggest those of *Steneofiber* in their quadrate outline and general character, but not at all in details of pattern. The pes, with its axis of symmetry passing through the fourth digit, the first and second much reduced, indicates relationship to *Castor*, where the same digital development occurs, although the proportions of the foot are different.

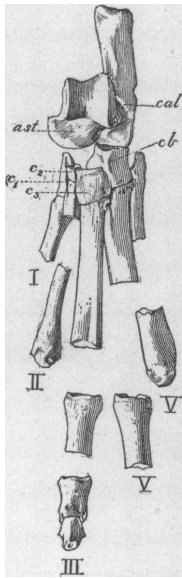


Fig. 3. Hind foot of *Eutypomys*. Natural size. No. 12255.

On the whole, it seems necessary to refer this interesting rodent to the Castoridæ, with which it has in common: (1) two peculiar progressive characters, the quadrate molars with tendency to form small enamel lakes on the surface, and the reduction of digits I and II of the pes; (2) several progressive and several primitive characters shared by one or another of the remaining Sciuroid families; and from which it differs in the primitive character of retention of the third upper premolar.

Eutypomys thomsoni, sp. nov.

The present species is about the size of *Ischyromys typus*. It is based upon two specimens, No. 12254, type, a skull and jaws, with various fragments of the skeleton, and No. 12255, paratype, upper jaws, hind foot, and other fragments. Both specimens were found

in the Lower Oreadon Beds of the White River formation, on Quinn Draw, Cheyenne River, S. Dakota.

Heteromeryx,¹ gen. nov.

This name is applied to a small ruminant about the size of *Protoceras*, from the Titanotherium Beds of the White River formation in South Dakota. It is represented by a skull with a considerable part of the skeleton, including most of the fore feet and parts of the hind feet. Other specimens from the same horizon, consisting of incomplete jaws, teeth, etc., are doubtfully referred.

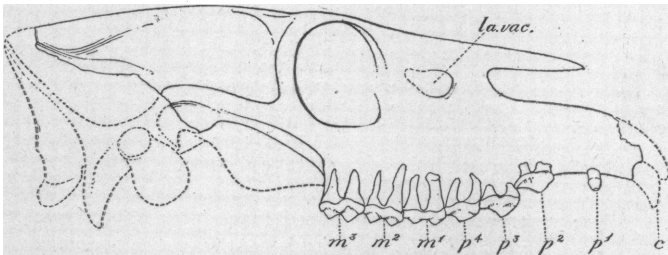


Fig. 4. *Heteromeryx dispar*. Skull, side view, one half natural size. Type specimen No. 12326. Titanotherium Beds, South Dakota.

Char. gen.—Skull rather short, orbits complete behind, situate over the posterior molars, muzzle elongate, nasals considerably reduced. Teeth very short crowned, molars with heavy internal cingula and rudimentary mesostyle. Four premolars, the first small, simple, with long diastemata before and behind it, the others much as in *Leptomeryx*. Ulna with well-developed shaft, co-ossified with radius along its entire length. Manus functionally tetradactyl, with four separate digits as in *Leptomeryx*. Magnum and cuneiform fused. Distal end of fibula separate from tibia; shaft a small vestigial spine. Pes didactyl, with separate metatarsals, cuboid and navicular distinct, ecto- and meso-cuneiform fused. Ungual phalanges short and compressed.

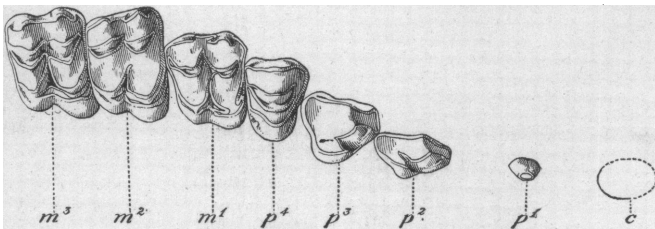


Fig. 5. *Heteromeryx dispar*. Upper teeth, natural size. Type specimen No. 12326.

Heteromeryx dispar, sp. nov.

Char. spec.—Size somewhat less than *Protoceras celer*; a little larger than "*Leptomeryx*" *mammifer* Cope, which may prove to belong to this or a closely

¹ Derivation; ἕτερος, different; μῆρυξ, ruminant.

allied genus rather than to *Leptomeryx*. Type No. 12326, skull and fragmentary skeleton from the Middle Titanotherium Beds on Indian Creek, Cheyenne River, S. Dakota.

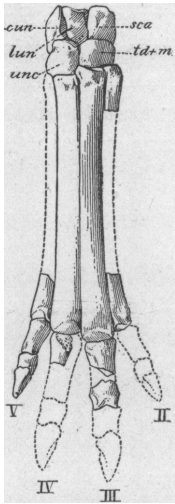


Fig. 6. Fore foot of *Heteromeryx*. One half natural size. Type specimen, No. 12326.

The Hypertragulidæ, to which this genus is referred, are distinguished from all other American ruminants by the combination of functionally tetradactyl manus with didactyl pes. There are five very distinct genera in the White River formation. They have the following characters in common:

Muzzle slender anteriorly, with long diastemata between canines and molar-premolar series ($p_2^{\frac{2}{3}}$, $m_3^{\frac{2}{3}}$). Lower canine incisiform. Premolars elongate or reduced but less compressed than in Camelidæ. Paracone of upper molars convex, metacone flat or convex externally, mesostyle present or absent. Manus tetradactyl, the magnum and trapezoid consolidated (except in *Protoceras*). Fibula vestigial, the distal rudiment separate or consolidated with tibia. Pes didactyl, lateral toes extremely slender or reduced to splints, median metatarsals separate (except in *Leptomeryx*). Cuboid and navicular consolidated (except in *Heteromeryx* and sometimes in *Protoceras*). Ecto- and meso-cuneiforms consolidated. Keels on distal ends of metapodials confined to under surface.

The principal distinctions between the five White River genera are:

	<i>Proto- ceras.</i>	<i>Hetero- meryx.</i>	<i>Lepto- meryx.</i>	<i>Hyper- tragulus.</i>	<i>Hypi- sodus.</i>
Skull:	Elongate.	Inter- mediate.	Inter- mediate.	Short.	Very short.
Orbits:	Behind molars.	Over m^{2-3} .	Over m^{2-3} .	Over m^{2-3} .	Over m^{2-3} .
Recession of anterior nares:	Extreme.	Moderate.	None.	None.	Moderate.
Bullæ:	None.	?	Small.	Larger.	Very large.
Upper Incisors:	Absent.	(Probably absent in all.)			
C_1^1 :	Large, falciform.	Small.	Very small.	Caniniform, rather small.	Unknown.
P_1^1 :	Small.	Small, one-rooted.	Absent.	Large, two-rooted.	Unknown.
P_2^1 :	Small, spaced.	?	Small, spaced.	Caniniform.	Incisi- form.
Premolars:	Elongate.	Complex.	Complex.	Simpler.	Simpler.

	<i>Proto- ceras.</i>	<i>Hetero- meryx.</i>	<i>Lepto- meryx.</i>	<i>Hyper- tragulus.</i>	<i>Hypi- sodus.</i>
Molars:	Very brachydont.	Very brachydont.	Brachy- dont.	Brachy- dont.	Hypso- dont.
Mesostyle:	Strong.	Small.	Strong.	Absent.	Absent.
Ulna and radius:	Separate.	Coössified.	Separate.	Coössified.	Coössified.
Tibia and fibula:	Separate.	Separate.	Separate.	Coössified.	Coössified.
Navicular and cuboid:	Variable.	Separate.	Coössified.	Coössified.	Coössified.
Metatarsals:	Separate.	Separate.	Coössified.	Separate.	Separate.

From the above table it may be seen that the new genus is partly intermediate between *Leptomeryx* and *Protoceras*, retaining several primitive characters of both. It confirms Professor Scott's opinion that *Protoceras* is related to the Hypertragulidæ and should be placed in the same family. Except for the coössified ulna and radius we might regard *Heteromeryx* as a possible ancestor of *Protoceras*; it comes from a much older horizon, the middle Titanotherium beds, corresponding to the lowest Oligocene; while *Protoceras* is found only in the stream-channel beds at the top of the White River formation, and is uppermost Oligocene or even perhaps Lower Miocene. But it is much more probable that the five genera are independent branches.

The premolars recall those of *Leptomeryx*, but the molars resemble more nearly those of *Protoceras* except in the form and position of the heavy internal cingula. The nares have neither the almost terminal position in *Leptomeryx* and *Hypertragulus* nor the great recession seen in *Protoceras*, and there is no sign of the bony bosses that are so conspicuous a feature of the male skull in *Protoceras*. The orbits have the normal position above the posterior molars, whereas in *Protoceras* they are situated entirely behind the molar series.

The position of the Hypertragulids is variously estimated by different authors. By Leidy and Cope they were regarded as related to the Tragulines; Scott regards them as representing a series of offshoots from the camel phylum, of varying divergence; and Schlosser has recently advanced the view that they represent approximately the ancestral stock of the Sivatherines and gazelles. The present writer is unable to accept any of these views, but regards the group as an entirely independent offshoot of the primitive ruminant stock, without especially near relations to any other group, and without any known descendants in the Miocene or later epochs.

The tendency to podial coössification is a marked feature, allying them with Tragulids and Pecora, and one that never occurs in camels, although these have the metapodial reduction much more advanced. The wide difference in evolution between fore and hind feet separates them from all other groups. The fore foot, however, is not known in *Hypertragulus* and *Hypisodus*, which are only provisionally associated with the three more completely known genera. In many respects they are strikingly like the primitive camels, but the resemblance is chiefly in archaic characters and would unquestionably be shared by all primitive ruminants, of no matter what group. The resemblances to *Tragulus* are also marked, especially in *Hypertragulus* and *Hypisodus*, but these, again, must be regarded as chiefly the retention of primitive characters, except in the two genera named, in which the resemblance in pattern of the teeth may indicate a closer relationship. It is quite probable that the Uinta selenodonts are not far removed from the primitive ruminant stock; they certainly appear to bridge the gaps between Hypertragulidæ, camels, and oreodonts, but it does not at all follow that the Old World ruminants are not derived from the same primitive stock toward which all the American types seem to be tending as we trace them back into the Eocene.