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Two New Species of *Oxydactylus* from the Middle Miocene Rosebud Formation in Western South Dakota

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INTRODUCTION

While working on the Wounded Knee faunas from the early and middle Miocene of Shannon County, South Dakota, I found that two species of *Oxydactylus* from this area had been described by W. D. Matthew in an unpublished manuscript. The types had been collected in 1906 by W. D. Matthew and Albert Thomson in the "Upper Rosebud beds" near Porcupine Butte on the Pine Ridge Indian Reservation. Matthew (1907, p. 173) had listed "?*Miolabis* sp." in the "Upper Rosebud fauna" but had made no other mention of this material.

This small portion of Matthew's manuscript on the Camelidae is now being published in the present form in order that (1) the material may be properly identified in my review of the Wounded Knee faunas, and (2) the names may be properly accredited to Matthew.

Permission to use this material was given to me by Dr. Edwin H. Colbert, Chairman of the Department of Geology and Paleontology at the American Museum of Natural History. Mr. Childs Frick, who was using this material in his study of the Camelidae, was kind enough to make the specimens available for the preparation of this publication.

All the diagnoses, descriptions, and tables of measurements, and the first part of the discussion of *Oxydactylus exilis,* are quoted directly from Matthew's manuscript. The final paragraph of discussion of *Oxydactylus exilis* and the full discussion of *O. lacota* were supplied

by me, as shown by my initials (J.R.M.), which are appended to the respective paragraphs. The statements of type and horizon were supplied by me; remarks quoted from Matthew under Type Locality are set off by quotation marks in the usual way. The figures were prepared for the manuscript by Helen Ziska and were found in the American Museum files.

All measurements are in millimeters. Both specimens are in the collections of the American Museum of Natural History, and the abbreviation A.M.N.H. precedes their catalogue numbers.

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J. R. MACDONALD

DESCRIPTION OF THE SPECIES

Oxydactylus exilis Matthew, new species

TYPE: A.M.N.H. No. 12997, partial skull and fore and hind limbs.

TYPE LOCALITY: "E. of Porcupine Butte, 'Bird Head' of Porcupine Creek." Field notes of the American Museum of Natural History Ex-

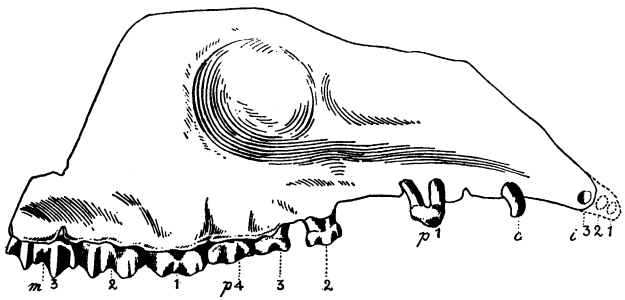

FIG. 1. *Oxydactylus exilis* Matthew, new species. Lateral view of the cranium of the type specimen (A.M.N.H. No. 12997) with the canine and the alveolus for I^3 reconstructed from the left side. One-half natural size.

pedition of 1906. Probably within a mile of Porcupine Butte in sections 16 or 17, T. 37 N., R. 42 W., Shannon County, South Dakota.

HORIZON: Rosebud formation, middle Miocene.

DIAGNOSIS AND DESCRIPTION: I^1—M^3 (estimated), 172 mm.; P^2—M^3, 88 mm. Incisors and canine small, P^1 compressed, two-rooted, with a long diastema behind it, P^{2-4} of subequal length, P^4 longer than wide, P^3 with anterior and posterior inner cingula not quite meeting medially. Molars very brachyodont. Muzzle slender, antorbital fossa round, well defined. Lower jaw slender anteriorly, canine moderately com-

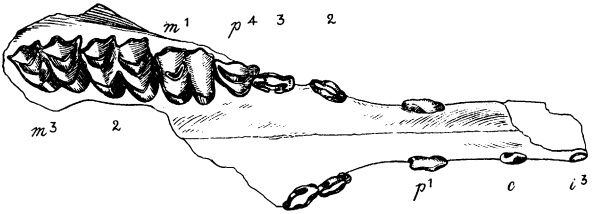

FIG. 2. *Oxydactylus exilis* Matthew, new species. Palatal view of the cranium of the type specimen (A.M.N.H. No. 12997). One-half natural size.

pressed, close to incisors, long diastemata behind canine and P_1. P_3 with rudimentary inner crest, paraconids of premolars distinct.

Metapodials moderately long, not coössified into a cannon bone. Vestigial lateral digits coössified in both fore and hind feet.

DISCUSSION: The molar teeth are distinctly more brachyodont than in most species of *Poebrotherium*. In this feature, as also in the more caniniform front teeth, the Oligocene *Paratylopus primaevus* is more nearly ancestral. It is probable that *Poebrotherium* is not wholly in the direct line of ancestry of the typical Miocene camels but is more or less intermediate between them and *Stenomylus*. There are, however, quite a number of species of *Poebrotherium* differing considerably in height of crowns, caniniform or compressed form of anterior teeth,

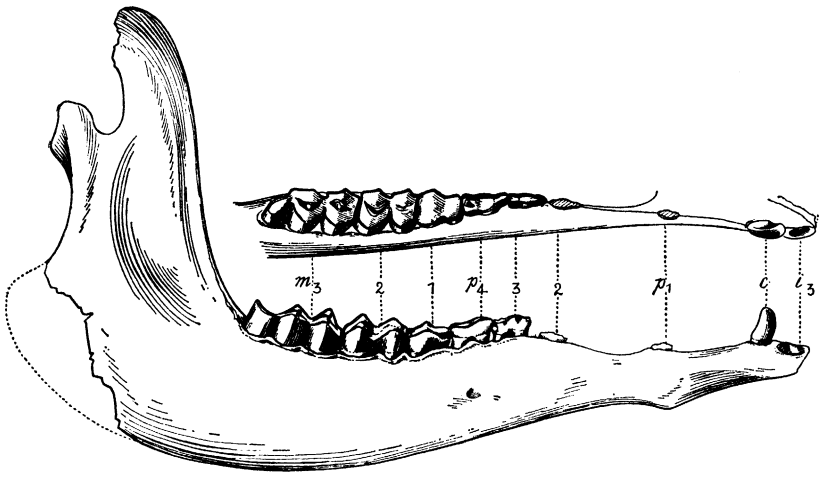

FIG. 3. *Oxydactylus exilis* Matthew, new species. Occlusal and lateral views of the left mandible (reversed) of the type specimen (A.M.N.H. No. 12997). One-half natural size.

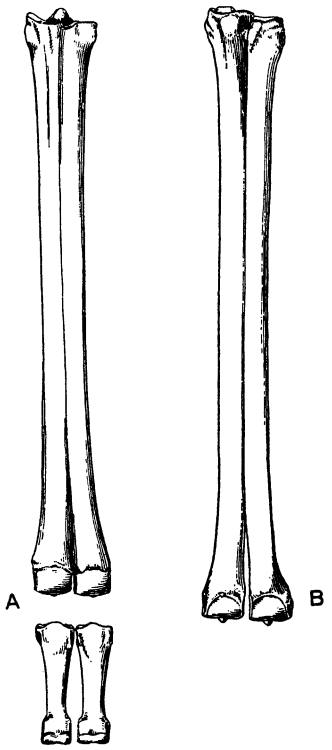

FIG. 4. *Oxydactylus exilis* Matthew, new species, type specimen (A.M.N.H. No. 12997). A. Metacarpals III and IV with proximal phalanges. B. Metatarsals III and IV. Anterior views. Both one-third natural size.

and in the diastemata, the length and slenderness of the muzzle, and other characters. Differences even more marked are to be seen in the characters of the feet.

In addition to Matthew's remarks, it should be noted that the "vestigial lateral digits" are little more than nubbins of bone that do not exceed 10 mm. in length. The type is an old individual with heavily worn first molars and moderately worn last molars; in spite of the age of the individual, the metapodials are not coössified. It is questionable whether this lack of coössification may be considered as a generic character of *Oxydactylus* in spite of the fact that it is often given this distinction. (J.R.M.)

The measurements (in millimeters) of the type of *Oxydactylus exilis* (A.M.N.H. No. 12997) are as follows:

Length, I^3–M^3	160.0
Length, canine–M^3	142.0
Canine, anteroposterior diameter	5.0
Diastema behind I^3	15.0
Diastema behind canine	17.0
Diastema behind P^1	19.5
Length, P^1–M^3	116.0
Length, P^3–M^3	88.0
Length, M^{1-3}	51.0
Lower jaw, estimated length	206.0
Length, canine–M_3	140.0
Diastema behind canine	19.0
Diastema behind P_1	20.0

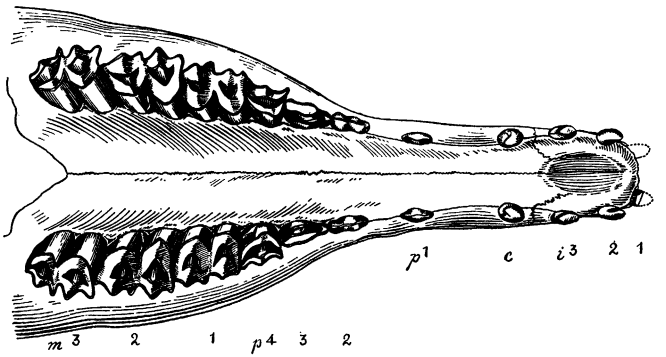

FIG. 5. *Oxydactylus lacota* Matthew, new species. Palatal view of the cranium of the type specimen (A.M.N.H. No. 12999). One-half natural size.

Length, P_2–M_3	87.0
Length, M_{1-3}	53.0
Depth of jaw beneath M_3	30.0
Depth of jaw behind P_1	13.0
Radius, length	260.0
Radius, diameter of head	34.0
Radius, diameter of shaft	23.0
Humerus, diameter of shaft	19.0
Humerus, diameter of distal end	38.0
Metacarpals III and IV, length	231.0
Metacarpals III and IV, diameter across heads	30.0
Metacarpals III and IV, diameter across shafts	19.0
Metacarpals III and IV, diameter across distal ends	33.0
Calcaneum, length	77.0
Calcaneum, depth at fibular facet	33.0
Metatarsals III and IV, length	230.0
Metatarsals III and IV, diameter across heads	29.0

Metatarsals III and IV, diameter across shafts	19.0
Metatarsals III and IV, diameter across distal ends	31.0

Oxydactylus lacota Matthew, new species

TYPE: A.M.N.H. No. 12999, partial cranium and skeletal fragments.

TYPE LOCALITY: Same as for *Oxydactylus exilis* Matthew.

HORIZON: Rosebud formation, middle Miocene.

DIAGNOSIS AND DESCRIPTION: This species is nearly related to *O*[*xydactylus*] *exilis*, but the teeth are a little larger, the muzzle is broader and shorter, the caniniform teeth are more robust, and the diastemata behind I^3 and P^1 are much shorter. The limbs are considerably larger in proportion. The premolars are broader, P^4 being a little wider than its length. It differs from *O. campestris* [Cook, 1909, pp. 188–189] chiefly in the P^1, which has a very short diastema behind and is much like the following premolars in construction instead of being a caniniform tooth as in other species of *Oxydactylus*.

The spacing before and behind I^3 is about equal to the anteroposterior diameter of the tooth. The post-canine diastema is more considerable, about 16 mm. The spacing between P^1 and P^2 is about half of the anteroposterior length of P^1.

The measurements (in millimeters) of the type of *Oxydactylus lacota* (A.M.N.H. No. 12999) are as follows:

Length, I^1–M^3	158.0
Length, canine–M^3	127.0
Length, P^1–M^3	103.0
Length, P^2–M^3	56.0
Palate, width at M^3, inclusive of teeth	71.0
Palate, width at post-canine diastema	16.0
Rostrum, width at P^2	31.0
Metacarpals, estimated length	305.0
Metacarpals, width across heads	37.0
Metacarpals, width across shafts	31.0
Astragalus, length	49.0
Astragalus, width	27.0
Cuboid, depth	38.0
Cuboid, width	22.0

DISCUSSION

Matthew did not consider the possbility that the differences in these two specimens might be the result of normal population variation or sexual dimorphism. While such possibility must be kept in mind, the much greater length and massiveness of metacarpals III and IV seems to be beyond the expected range in a single species. (J.R.M.)

In the discussion of the relationships of *Hesperocamelus* Macdonald, I (1949, pp. 190–191, fig. 11) suggested that it was derived from *Oxydactylus longipes* Peterson. As these two species from the Rosebud formation are probably contemporaries of Peterson's species, or at least closely related temporally, they too may be considered as possible ancestors of *Hesperocamelus.* (J.R.M.)

The types of *Hesperocamelus alexandrae* (Davidson, 1923) from the late Miocene Barstow fauna and *H. stylodon* Macdonald from the early Pliocene Chalk Spring fauna have fused metapodials. Such a condition was given as a generic character in the description of the genus, but may well be a condition that varies with the age of the individual or between members of a population, as is apparently the case in *Oxydactylus.* (J.R.M.)

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