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Sinclairella, Family Apatemyidae, From the Chadronian and Orellan, by
William Alvin Clemens**

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SINCLAIRELLA, FAMILY APATEMYIDAE, FROM THE CHADRONIAN AND ORELLAN ***

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BY

WILLIAM A. CLEMENS, JR.

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Sinclairiella, Family Apatemyidae,
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[Pg 485]

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Introduction

The family Apatemyidae has a long geochronological range in North America, beginning in the Torrejonian land-mammal age, but is represented by a relatively small number of fossils found at a few localities. Two fossils of Orellan age, found in northeastern Colorado and described here, demonstrate that the geochronological range of the Apatemyidae extends into the Middle Oligocene. Isolated teeth of *Sinclairiella dakotensis* Jepsen, part of a sample of a Chadronian local fauna collected by field parties from the Webb School of California, are also described.

I thank Mr. Raymond M. Alf, Webb School of California, Claremont, California, and Dr. Peter Robinson, University of Colorado Museum, Boulder, Colorado, for permitting me to describe the fossils they discovered. Also Dr. Robinson made available the draft of a short paper he had prepared on the tooth found in Weld County, Colorado; his work was facilitated by a grant from the University of Colorado Council on Research and Creative Work. I also gratefully acknowledge receipt of critical data and valuable comments from Drs. Edwin C. Galbreath, Glenn L. Jepsen, and Malcolm C. McKenna who is currently revising the Paleocene apatemyids and studying the phylogenetic relationships of the family. The prefixes of catalogue numbers used in the text identify fossils in the collections of the following institutions: KU, Museum of Natural History, The University of Kansas, Lawrence; Princeton, Princeton Museum, Princeton, New Jersey; RAM-UCR, Raymond Alf Museum, Webb School of California, Claremont, California (the permanent repository for these specimens will be the University of California, Riverside); and UCM, University of Colorado Museum, Boulder, Colorado. The system of notations for teeth prescribed for use here is as follows: teeth in the upper half of the dentition are designated by a capital letter and a number; thus M2 is the notation for the upper second molar; teeth in the lower half of the dentition are designated by a lower-case letter and a number; thus p2 is the notation for the lower second premolar.

**Family APATEMYIDAE Matthew, 1909
Genus *Sinclairiella* Jepsen, 1934
Sinclairiella dakotensis Jepsen, 1934**

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The type of the species, Princeton no. 13585, was discovered in Chadronian strata of the upper part of the Chadron Formation cropping out in Big Corral Draw, approximately 13 miles south-southwest of Scenic, in southwestern South Dakota (Jepsen, 1934, p. 291). Detailed descriptions of the type specimen are given in papers by Jepsen (1934) and Scott and Jepsen (1936). Isolated teeth of Chadronian age referable to *Sinclairiella dakotensis* have been discovered subsequently at a locality in Nebraska and fossils of Orellan age, also referable to *S. dakotensis*, have been collected at two localities in Colorado. The sample from each locality is described separately.

Sioux County, northwestern Nebraska

Material.—RAM-UCR nos. 381, left M1; 598, left m2; 1000, right m1; 1001, right m2; 1079, right m2; 1674, right M2; and 3013, left m2.

Locality and stratigraphy.—These Chadronian fossils were discovered by Raymond Alf and members of his field parties in several harvester ant mounds built in exposures of the Chadron Formation in Sec. 26, T 33 N, R 53 W, Sioux County, Nebraska (Alf, 1962, and Hough and Alf, 1958). This is UCR locality V5403. The

collectors carefully considered the possibility that some of the fossils found in the ant mounds were collected from younger strata by the harvester ants and concluded this was unlikely (Alf, personal communication).

Description and comments.—The cusps of RAM-UCR no. 381, a left M1, are sharp and the wear-facets resulting from occlusion with the lower dentition are small. The paraconule is a low, ill-defined cusp on the anterior margin of the crown; a metaconule is not present. A smooth stylar shelf is present labial to the metacone. The crown was supported by three roots. There are no interradicular crests.

The crown of RAM-UCR no. 1674, a right M2, is heavily abraded and many morphological details of the cusps have been destroyed. Low interradicular crests linked the three roots of the tooth with a low, central prominence. As was the case with RAM-UCR no. 381, no significant differences could be found in comparisons with illustrations of the teeth preserved in Princeton no. 13585.

RAM-UCR nos. 598, 1001, 1079, and 3013 all appear to be m2's. The talonids of these teeth are not elongated, their trigonids have quadrilateral outlines, and the paraconids are small but prominent, bladelike cusps. The trigonid of RAM-UCR 1000 is elongated and the paraconid is a minute cusp; the tooth closely resembles the m1 of the type of *Sinclairiella dakotensis*.

Logan County, northeastern Colorado

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Material.—KU no. 11210 (fig. 1), a fragment of a left maxillary containing P4 and M1-2.

Locality and stratigraphy.—The fossil was found in the center of the W-1/2, Sec. 21, T 11 N, R 53 W, Logan County, Colorado, " ... in the bed below *Agnotocastor* bed, Cedar Creek Member...." (Ronald H. Pine, 1958, field notes on file at the University of Kansas). The bed so defined is part of unit 3 in the lower division of the Cedar Creek Member, as subdivided by Galbreath (1953:25) in stratigraphic section XII. The fauna obtained from unit 3 is of Orellan age.

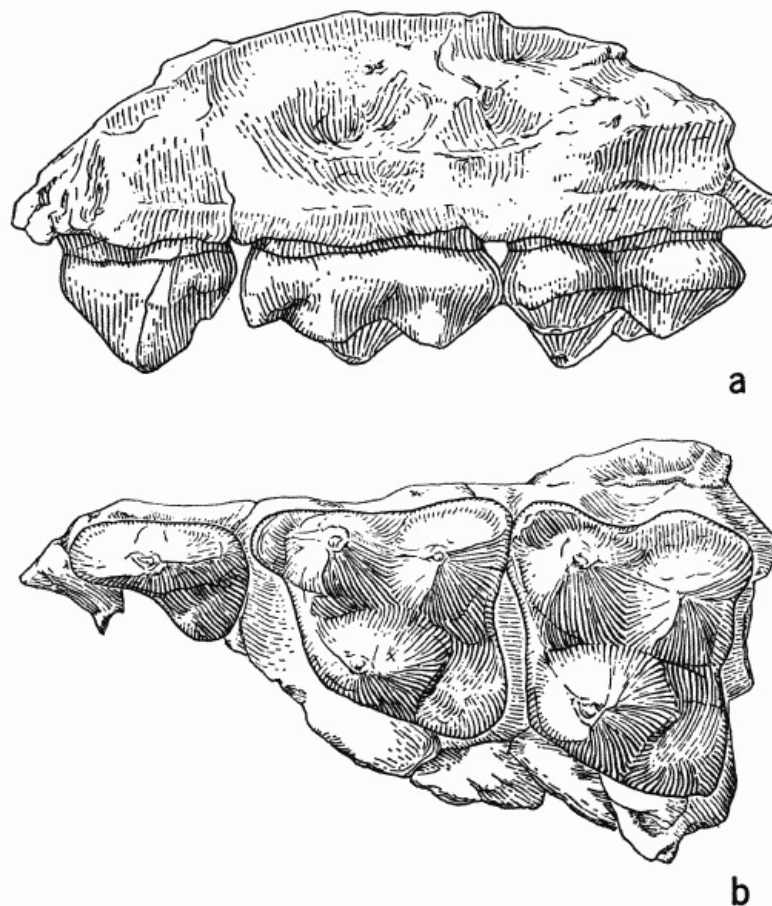


Fig. 1. *Sinclairiella dakotensis* Jepsen, KU no. 11210, fragment of left maxillary with P4 and M1-2; Orellan, Logan County, Colorado; drawings by Mrs. Judith Hood: a, labial view; b, occlusal view; both approximately $\times 9$.

Description and comments.—P4 of KU no. 11210 has a large posterolingual cusp separated from the main cusp by a distinct groove, which deepens posteriorly. The posterolingual cusp is supported by the broad posterior root. P4 of the type specimen of *Sinclairiella dakotensis* is described (Jepsen, 1934, p. 392) as having an oval outline at the base of the crown, and a small, posterolingual cusp. A chip of enamel is missing from the posterior slope of the main cusp of the P4 of KU no.

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11210. The anterior slope of the main cusp is flattened, possibly the result of wear, and there is no evidence of a groove like that present on the P4 of the type specimen.

Only a few differences were found between the molars preserved in KU no. 11210 and their counterparts in the type specimen. A styler shelf is present labial to the metacone of M1 of KU no. 11210, but, unlike the type, its surface is smooth and there is no evidence of cusps. Of the three small styler cusps on the styler shelf of M2 the smallest is in the position of a mesostyle. The M2 lacks a chip of enamel from the lingual surface of the hypocone. Unlike the M2 of Princeton no. 13585, in occlusal view the posterior margin of the M2 of KU no. 11210 is convex posterior to the metacone. The anterior edge of the base of the zygomatic arch of KU no. 11210 was dorsal to M2. The shallow oval depression in the maxillary dorsal to M1 might be the result of post-mortem distortion.

The molars preserved in KU no. 11210 and their counterparts in the type specimen do not appear to be significantly different in size (table 1) or morphology of the cusps. The only difference between the two specimens that might be of classificatory significance is the difference in size of the posterolingual cusp of P4. At present the range of intraspecific variation in the morphology of P4 has not been documented for any species of apatemyid. The evolutionary trend or trends of the apatemyids (McKenna, 1960, p. 48) for progressive reduction of function of p4 probably were paralleled by similar trends in the evolution of the P4. If so, the intraspecific variation in the morphology of P4 could be expected to be somewhat greater than that of the upper molars, for example. The morphological difference between the P4's of the type of *Sinclairiella dakotensis* and KU no. 11210 is not extreme and does not exceed the range of intraspecific variation that could be expected for this element of the dentition. The close resemblances in size and morphology between the M1-2 of Princeton no. 13585 and KU no. 11210 also favor identification of the latter as part of a member of an Orellan population of *Sinclairiella dakotensis*.

Weld County, northeastern Colorado

Material.—UCM no. 20173 (fig. 2), is a right M2.

Locality and stratigraphy.—The tooth was discovered at the Mellinger locality, Sec. 17, T 11 N, R 65 W, Weld County, Colorado. The Mellinger locality is in the Cedar Creek Member, White River Formation, and its fauna is considered to be of Orellan age (Patterson and McGrew, 1937, and Galbreath, 1953).

Description and comments.—UCM no. 21073, which is more heavily abraded than KU no. 11210, shows no evidence of a styler cusp either anterolabial to the metacone or in the position of a mesostyle. A small styler cusp is present anterolabial to the paracone. A notch that appears to have been cut through the enamel of the posterolabial corner of the crown could have received the parastylar apex of M3. A similar notch is not present on the M2 of KU no. 11210 nor indicated in the illustrations of the M2 of Princeton no. 13585. The coronal dimensions of UCM no. 21073 (table 1) do not appear to differ significantly from those of the M2's of KU

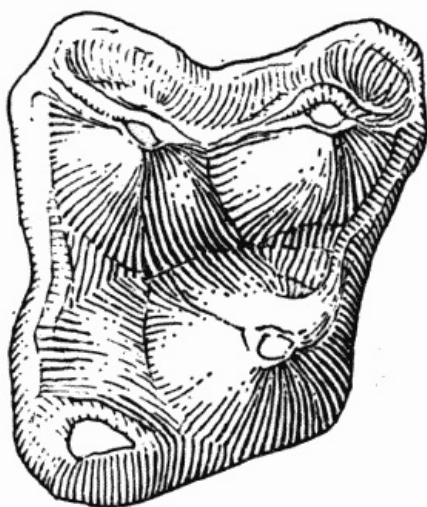


Fig. 2. *Sinclairiella dakotensis* Jepsen, UCM no. 21073, right M2; Orellan, Weld County, Colorado; drawing by Mrs. Judith Hood: occlusal view, approximately $\times 9$.

no. 11210 and the type specimen of *Sinclairiella dakotensis*.

Comments

With the discovery of Orellan apatemyids the geochronological range of the family in North America is shown to extend from the Torrejonian through the Orellan land-mammal ages. The discoveries reported here enlarge the Oligocene record of apatemyids to include not only the type specimen of *Sinclairiella dakotensis*, a skull and associated mandible from South Dakota, but also seven isolated teeth, representing at least two individuals, from a Chadronian fossil locality in Nebraska and one specimen from each of two Orellan fossil localities in northeastern Colorado. Simpson (1944:73, and 1953:127) presented tabulations of the published records of American apatemyids and suggested the data indicated the populations of these mammals were of small size throughout the history of the family. The few pre-Oligocene occurrences of apatemyids described subsequently (note McKenna, 1960, figs. 3-10, and p. 48) and occurrences described

here tend to reinforce Simpson's interpretation. This interpretation may have to be modified to some degree, however, when current studies of collections of pre-Oligocene apatemyids are completed (McKenna, personal communication).

Although information concerning the evolutionary trends of American apatemyids has been published, no data on the morphological variation in a population are available in the literature. An adequate basis for evaluating the significance of the morphological differences between the P4's of Princeton no. 13585 and KU no. 12110 coupled with the similarities of their M1-2's is lacking. In the evolution of American apatemyids the P4 underwent reduction in size and, apparently, curtailment of function. This history suggests the range of morphological variation of P4 in populations of *Sinclairella dakotensis* could be expected to be greater than that of the molars and encompass the morphological differences between the P4's of Princeton no. 13585 and KU no. 12110. The difference in age of the Chadronian and Orellan fossils does not constitute proof that they pertain to different species. Although the identification is admittedly provisional until more fossils including other parts of the skeleton are discovered, the Orellan fossils described here are referred to *Sinclairella dakotensis*.

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TABLE 1.—MEASUREMENTS (IN MILLIMETERS) OF TEETH OF SINCLAIRELLA DAKOTENSIS JEPSSEN.

	P4		M1		M2	
	length ^[1]	width	length ^[1]	width ^[1]	length ^[1]	width ^[1]
Princeton no. 13585 ^[2]	2.1	1.1	4.0	3.7	3.4	4.7
RAM no. 381			4.1	3.5		
RAM no. 1674					3.4	4.2
KU no. 11210	2.4	1.6	3.9	3.5	3.8	4.1+
UCM no. 21073					3.6	4.1
			m1		m2	
			length	width	length	width
Princeton no. 13585 ^[3]			3.5	2.4	3.7	2.8
RAM no. 1000			3.5	2.2		
RAM no. 598					3.8	2.6
RAM no. 1001					3.6+	2.6
RAM no. 1079					4.0	2.8
RAM no. 3013					3.6	2.8

[1] Length defined as maximum dimension of the labial half of the crown measured parallel to a line drawn through the apices of paracone and metacone. Width defined as maximum coronal dimension measured along line perpendicular to line defined by apices of paracone and metacone.

[2] Dimensions provided by Dr. Glenn L. Jepsen.

[3] Dimensions taken from Jepsen (1934:300).

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