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**FIRST RECORD OF PIPESTONEOMYS (MAMMALIA: RODENTIA)  
FROM THE ORELLAN (OLIGOCENE)**

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**ABSTRACT**

The first record of the problematical rodent *Pipestoneomys* Donohoe is reported from the Orellan. Previously this genus was known only from the Chadronian, thus its range of occurrence is extended. The single Orellan specimen of *Pipestoneomys* cannot be readily referred to any previously described species of the genus.

† † †

The rodent *Pipestoneomys* is rare in the fossil record and has been previously restricted to the medial Chadronian of Montana and Nebraska (Alf, 1962; Donohoe, 1956; Ostrander, 1985). It is currently known only from partial dentitions. Although this genus has been referred to both the Aplodontidae and Castoridae, it has been argued that it could not belong to either of these families (Black, 1965).

The specimen described below is part of an anthill fauna collected in August, 1991, as part of an annual paleontological collecting expedition sponsored and staffed by the Cranbrook Institute of Science of Bloomfield Hills, Michigan. The location of the anthill is the Douth West locality on the Geike Ranch, NW ¼, SW ¼, SW ¼, section 17, T33N, R56W (Warbonnet Ranch Quadrangle map) Sioux County, Nebraska (Fig. 1). The sample was taken from approximately 6.5 m (20 ft) below the Orella-Whitney Member boundary. At the locality, the upper 8.5 m (25 ft) of the Orella Member and most of the Whitney Member is exposed. The remaining 32.5 m (100 ft) of the Orella Member present in the area is not exposed at the Geike Ranch locality. The fact that this anthill is located high in the Orella Member uphill of any older sediments, and that the

associated fauna is characteristic of late Orellan (see below discussion), makes the chance of contamination from older deposits very unlikely. There seems to be very little chance for reworking of older material. The anthill was screened and picked under a dissecting microscope during the spring of 1993.

Dental terminology used follows that of Wood and Wilson (1936).

**SYSTEMATIC PALEONTOLOGY**

Order RODENTIA Bowdich, 1821  
Family uncertain  
Genus *Pipestoneomys* Donohoe, 1956  
*Pipestoneomys* sp.

**Referred specimen:** Colby College (CC) specimen 1370, left p4 (Fig. 2).

**Description.** The premolar is high crowned as in the Chadronian species of *Pipestoneomys*, and two rooted. CC 1370 is intermediate in size between that of p4s of the two described Chadronian species of *Pipestoneomys* (Table 1). The occlusal morphology is dominated by two obliquely oriented lophes separated by deep valleys: the posterolophid that runs from the hypoconid to the posterolingual corner of the tooth; and the (?)metalophid that runs from the protoconid to the entoconid. A continuous loph runs along the lingual border of the tooth connecting the metaconid and entoconid to the posterolingual corner of the tooth. There are several minor projections from these lophes into the basins separating them. The major difference between CC 1370 and the p4 of *P. pattersoni* figured by

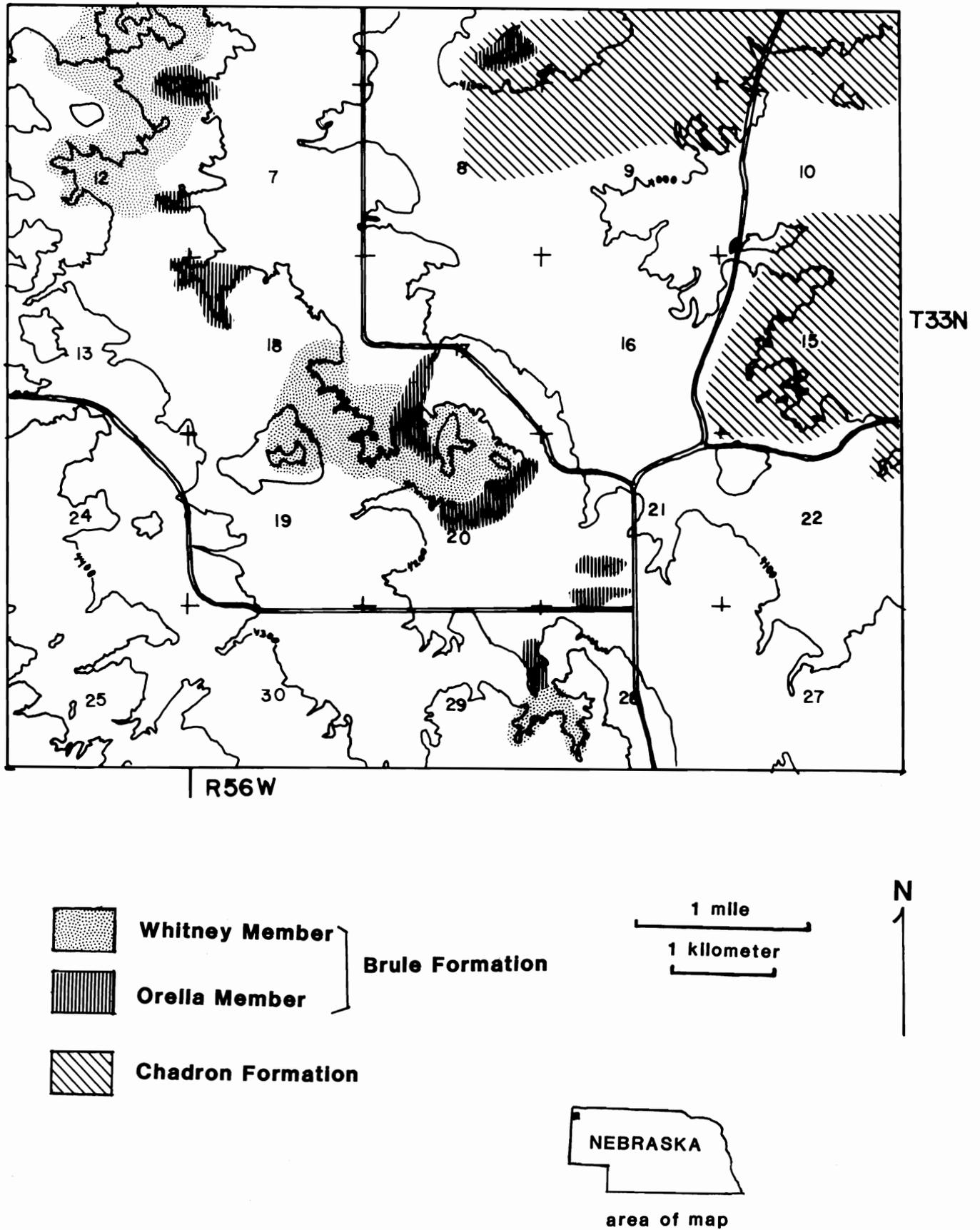


Figure 1. Geologic map of White River exposures, Sioux County, Nebraska. X indicates site of anthills.

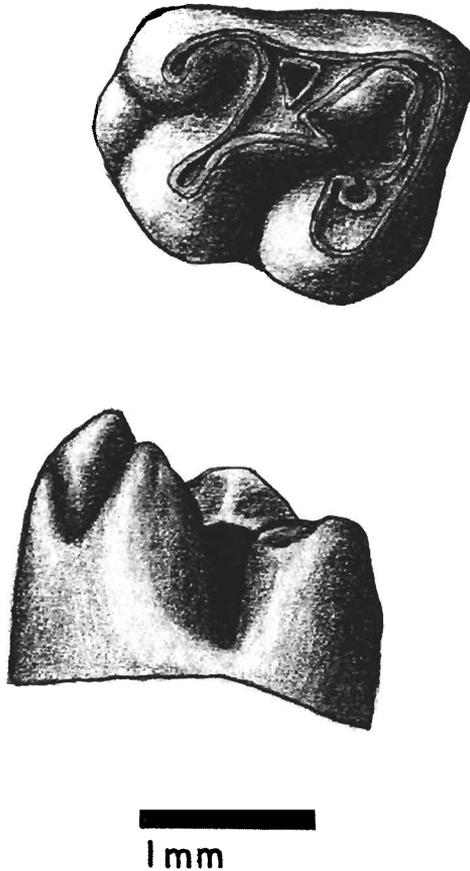


Figure 2. Left p4 of *Pipestoneomys* sp., CC 1370. Occlusal view (above) and buccal view.

Alf (1962: *fig. 1D*) is in the length of the anterior cingulum. In CC 1370 it terminates just buccal to the metaconid in a small cuspule near the center of the anterior margin of the tooth. The p4 of *P. pattersoni* has an anterior cingulum that extends the entire width of the tooth to the buccal border, and the metaconid is not as distinct a cusp.

**Discussion.** CC 1370 cannot be definitely referred to either of the two previously described species of *Pipestoneomys*. This is mainly due to the poor record of these species. CC 1370 is intermediate in size between the two Chadronian species and has a shorter anterior cingulum than p4 of *P. pattersoni*, but the range of variation of this trait is not known because the latter is

Table 1. Comparative measurements of p4 in species of *Pipestoneomys*. Measurements for *P. bisulcatus* from Black (1965: 23), those of *P. pattersoni* from Alf (1962: Table 1). Measurements in mm.

	<i>P. bisulcatus</i>	<i>P. pattersoni</i>	CC1370
		range (mean)	
length	2.1	1.51–1.80 (1.66)	1.95
width	1.9	1.35–1.62 (1.47)	1.59

represented by only four specimens of p4 (Alf, 1962). The only known specimen of p4 of *P. bisulcatus* is heavily worn and no occlusal morphology is recognizable (Black, 1965). It is impossible at this time either to refer CC 1370 to a previously described species of *Pipestoneomys* or to include it in a new species.

Previously, it has been demonstrated that two anthill or surface-collected faunas from Sioux County, Nebraska, were mixtures of Orellan and Chadronian elements (Guthrie and Allen, 1974; Ostrander, 1985). It is very unlikely that the *Pipestoneomys* specimen described above comes from a mixed fauna because of its stratigraphic occurrence and the associated fauna. There are no Chadronian aged exposures in the area where the anthill collection was made from where such a specimen could have been transported by the ants (Fig. 1). The microfauna collected with CC 1370 is typically Orellan (Table 2). Several of the included species of rodents—*Cedromus wardi*, *Heliscomys mcgrewi*, and *Diplolophus insolens*—are characteristic of the late Orellan (Korth, 1988), and there are no other specimens of species or genera from the Geike Ranch anthill fauna that are typical of the Chadronian. Guthrie and Allen (1974) also noted different preservation and greater abrasion on the Orellan specimens that had mixed with an otherwise Chadronian anthill fauna. The preservation and amount of abrasion on CC 1370 is identical to that of all of the other specimens collected along with it. The macrofauna collected at the site is also typical of a late Orellan fauna with oreodonts *Meshippus bairdi*, *Hyracodon* sp., and *Hesperocyon gregarius*.

## CONCLUSIONS

Although rare in the fossil record, *Pipestoneomys* appears to have ranged from the Chadronian into the late Orellan. Several specimens of isolated cheek teeth from the Duchesnean of Saskatchewan previously referred to the eomyid genus *Yoderimys* (Storer, 1987: *figs. 3A, B*) have an occlusal pattern of lophs that resembles that of *Pipestoneomys*. The Duchesnean teeth are lower-crowned and less lophate than those of the Chadronian species of *Pipestoneomys* and thus are referable to a new species and possibly new genus of rodent that was closely related to *Pipestoneomys*.

With the inclusion of the Duchesnean specimens from Saskatchewan, the lineage of rodents that includes *Pipestoneomys* was distinct from other rodents as early as the Duchesnean and persisted until the late Orellan. It remains impossible to definitely refer *Pipestoneomys* to any currently known rodent family. With the range extensions of its lineage suggested here, it may be likely that *Pipestoneomys* represented a new family of rodents. However, until more complete mate-

Table 2. Micromammalian fauna from Geike Ranch anthills.  
\* - indicates occurrence limited to late Orellan.

**MARSUPIALIA**

*Herpetotherium fugax*  
*Copedelphys stevensoni*  
*Nanodelphys hunti*

**INSECTIVORA**

*Leptictis* sp.  
*Centetodon marginalis*  
*?Proscalops tertius*

**CARNIVORA**

*Hesperocyon gregarius*

**ARTIODACTYLA**

*Hypisodus minimus*  
hypertragulid indet.

**LAGOMORPHA**

*Palaeolagus haydeni*

**RODENTIA**

*Ischyromys typus*  
*I. parvidens*  
*Prosciurus relictus*  
*Cedromus wardi*\*  
*Epeiromys* cf. *E. spanios*  
*Adjidaumo minutus*  
*Paradjidaumo trilophus*  
*Diplolophus insolens*\*  
*Heliscomys hatcheri*  
cf. *H. mcgrewi*\*  
*Eumys elegans*  
*Scottimus* cf. *S. viduus*  
*Wilsonneumys planidens*\*

rial of *Pipestoneomys* is known, no such family can be recognized.

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