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A NEW MICROTINE RODENT FROM THE UPPER PLIOCENE OF KANSAS

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A NEW MICROTINE RODENT FROM THE UPPER PLIOCENE OF KANSAS

CLAUDE W. HIBBARD

ABSTRACT—A new species of the small microtine rodent, *Nebraskomys,* from the Upper Pliocene Rexroad fauna is described. It is considered as ancestral to *Nebraskomys mcgrewi* Hibbard from the Pleistocene Sand Draw local fauna of Nebraska. *N. mcgrewi* is considered as the ancestral stock that gave rise to *Atopomys texensis* Patton from the later Pleistocene of Texas.

INTRODUCTION

THE LIGNITIC deposits at the type locality (locality 3) of the Rexroad local fauna in Meade County, Kansas, was at first interpreted as probably being laid down in a beaver pond. Further work in the area showed that the deposits were laid down around an old artesian spring basin.

After the excavation of localities KU1 and KU2 (see Hibbard, 1950, pl. 2, fig. 1) Meade County, Kansas, I realized in 1940 that both localities were old artesian sand tubes with the overlying basin deposits eroded away.

During the excavation of the Keefe Canyon Quarry (KU locality 22, Meade County, Hibbard & Riggs, 1949) a great many things were learned about the deposition in, around, and over an artesian spring. The deposits at this quarry consisted of the main artesian sand tube with its dendritic pattern of minor sand tubes and pockets of flour-sand (chiefly silt size particles) in the overlying silt and clay that filled the small artesian basin around the spring. At the time of this excavation it became evident that the deposits at KU locality 3 and Cragin Quarry (Hibbard & Taylor, 1960) were also laid down in an artesian basin near the boil spring (see plate 1).

The Meade Artesian Basin or Artesian Valley (Frye & Hibbard, 1941, and Frye, 1942) was created by the Crooked Creek fault. The fault is given this name since the fault line is followed by Crooked Creek from Fowler, Kansas, southward toward the Cimarron River (Frye & Schoff, 1942).

The artesian aquifer is the downthrown side of the faulted Lower Pliocene sand and gravel. It is well exposed in the Borchers Gravel Pit in NE¼ sec. 20, T. 33 S., R. 28 W. on the upthrown side of the fault (see Hibbard, 1951, plate III). Small adjustment faults to the west of the fault line have broken the seal to the aquifer and have made it possible for the water under pressure to reach the surface where the elevation is lower than the artesian pressure head of water.

No sand tube for the flow of artesian water was found at KU locality 3 until the summer of 1959, though it was obvious that the upward movement of artesian water had deposited the pockets of flour-sand that contained so many of the small vertebrates in the exposed silt and clay at this locality.

In the fall of 1958 or the spring of 1959 before we arrived in Meade County a heavy rain washed away part of the bank at locality 3 exposing a vertical artesian sand tube approximately three feet in diameter. It was filled with flour-sand, bone fragments, small pieces of polished enamel, many isolated teeth, and some complete or nearly complete bones. The deposit was excavated to a depth of approximately four feet.

The following holotype specimens were recovered from the sand tube: *Urocyon progressus* Stevens (1965), *Stegomastodon rexroadensis* Woodburne (1961), and *Geomys jacobi* Hibbard (1967).

Thirteen isolated teeth of *Nebraskomys* were recovered from the deposit. Further washing was done at the site and no other specimens have been found. Since this microtine is considered as the ancestral stock for the later *Nebraskomys mcgrewi* from the Plains Region, its occurrence is placed on record.

PLATE 1

SYSTEMATIC DESCRIPTION
Class MAMMALIA
Order RODENTIA
Family MURIDAE
Subfamily MICROTINAE
NEBRASKOMYS REXROADENSIS sp. nov.
Text-figs. 1A-L

Holotype.—No. V54135, University of Michigan Museum of Paleontology, a right M_1. Collected in the summer of 1959 by Claude W. Hibbard and party. *Paratypes*—Nos. V43900, RM_1; V54137, RM_1; V54138, RM_2; V54144, RM^1; V54145, RM^2.

Horizon and type locality.—Upper Pliocene, type locality of the Rexroad Formation and Rexroad local fauna, W½ SW¼ sec. 22, T. 33 S., R. 29 W., KU locality 3, Meade County, Kansas.

Diagnosis.—Nebraskomys rexroadensis is the size of *N. mcgrewi* (Hibbard, 1957) with shorter dentine tracts on the labial side of the lower molars, and the first and second triangles of M_2 are not as opposite as in *N. mcgrewi.*

Description of holotype.—The right M_1 is that of an adult. The enamel is of uniform thickness. The posterior loop is closed off from the first alternating triangle. The first and second triangles are confluent. The second triangle is connected to the third by a thin dentine tract between the enamel. The third triangle opens into the anterior loop (text-fig. 1C, D). The occlusal length is 2.13 mm.

Description of paratypes.—There are four right M_1s. They range in age from a young adult (V43900, text-fig. 1E, F) to that of an old adult (V54137, text-fig. 1A, B). They all agree with the holotype in dental pattern and the development of dentine tracts on the labial side of the teeth. Specimen V43900, of a young adult, shows the posterior loop opening into the first triangle (text-fig. 1E); with wear the posterior loop closes off from this triangle (text-fig. 1A). There is also an indication of a prism fold. For dental nomenclature of microtine teeth see Hibbard (1950, fig. 16), and Zakrzewski (1967, fig. 1). The occlusal length of the four M_1s varies from 2.00–2.13, average 2.08 mm. The labial dentine tracts are not as well developed as in a topotype, V57287, of *Nebraskomys mcgrewi* Hibbard (text-fig. 1P). The occlusal length of this tooth is 2.00 mm.

One left and two right M_2s were recovered. M_2 has a posterior loop and four alternating triangles. The first and second alternating triangles, and the third and fourth alternating triangles are broadly confluent (text-fig. 1I). The apices of the first lingual and first labial reentrant angles, as well as the apices of the second lingual and second labial reentrant angles, are not as opposite as those of *Nebraskomys mcgrewi* (text-fig. 1M) from the Dixon local fauna of Kingman County, Kansas. The occlusal length of the three M_2s are 1.59, 1.61, and 1.63 mm.

One right M_3, V54140, was recovered. It is from an immature individual and roots had not started to develop. The first and second alternating triangles are broadly confluent. There are no dentine tracts. The length of the occlusal surface is 1.23 mm. The lower molars are two-rooted.

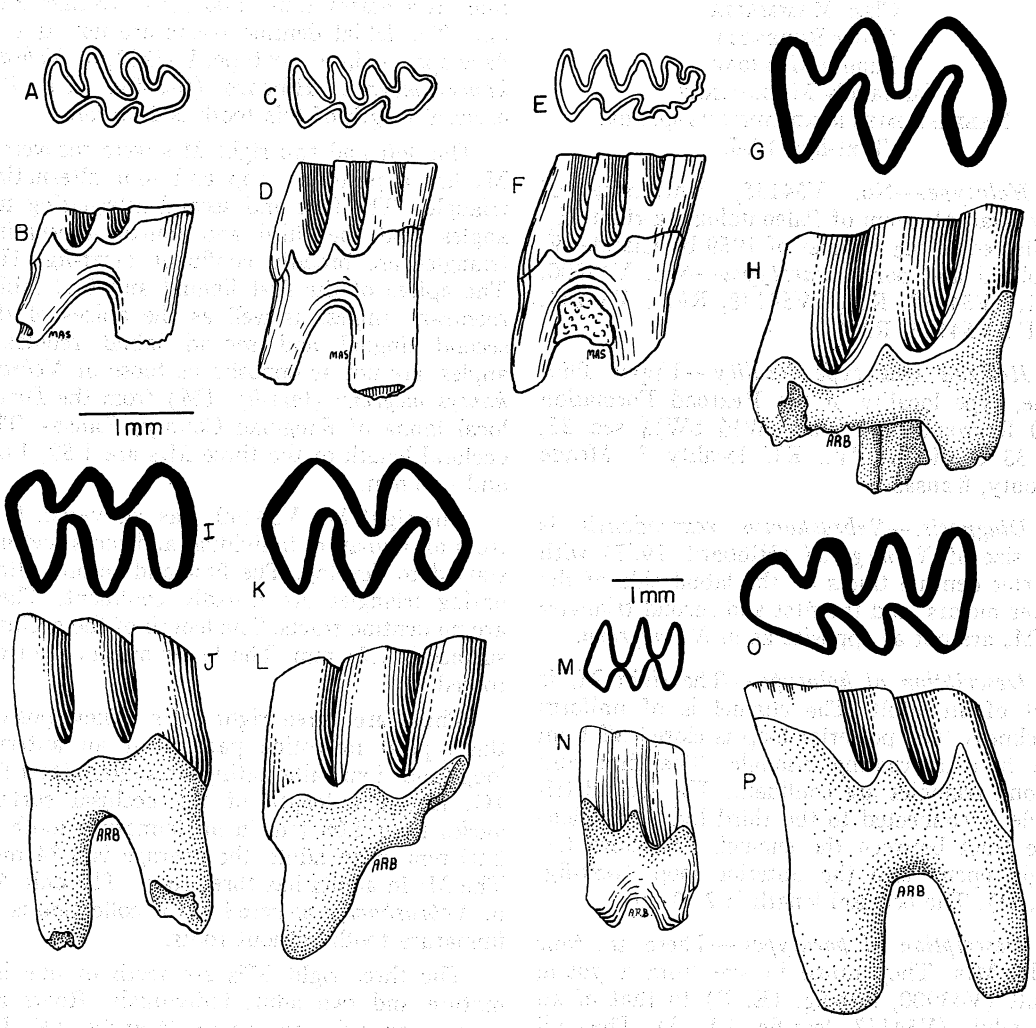
There are three right M^1s. They possess the typical microtine pattern of an anterior loop and four alternating triangles (text-fig. 1G, H). The length of the occlusal surface varies from 1.08 mm in an immature tooth to 2.09 mm in an adult, the average is 1.74 mm. The M^1 in adults has three roots. The only M^1 of *Nebraskomys mcgrewi* in the collection is an immature tooth without roots.

The three right M^2s are teeth of one immature and two adult individuals. Roots are present on only one tooth (text-fig. 1K, L). Two roots support the anterior loop. They are fused at the base but separated at their tips. A single root supports the posterior triangle. The occlusal length of M^2 of the immature tooth is 1.43 mm; of the adults it is 1.60 and 1.75 mm.

Discussion.—It is impossible to explain the rarity of this small microtine in early and late

EXPLANATION OF PLATE 1

A scene during Early Pleistocene at KU locality 1, based upon the mammal remains recovered from the artesian sand tube. Drawing by C. W. Angell.



TEXT-FIG. 1—A–L, *Nebraskomys rexroadensis* sp. nov. A, B, occlusal and labial views of RM_1, V54137. C, D, occlusal and labial views of RM_1, holotype, V54135. E, F, occlusal and labial views of RM_1, V43900. All × 8. G, H, occlusal and labial views of RM^1, V54144. I, J, occlusal and lingual views of RM_2, V54138. K, L, occlusal and labial views of RM^2, V54145. All × 12½. M–P, *Nebraskomys mcgrewi*. M, N, occlusal and labial views of LM_2, V54151, × 8. O, P, occlusal and labial views of LM_1, V57287, × 12½.

Blancan faunas. It must have lived in and around a moist habitat, since it was recovered with the larger *Ogmodontomys* in the Rexroad and Sand Draw local faunas.

Ogmodontomys has always been considered as a form living under moist conditions (Hibbard, 1941). In the Fox Canyon local fauna, which is older than the Rexroad local fauna, there were recovered 149 right and 151 left M_1s of *Ogmodontomys* in contrast to 2094 RM_1s and 2043 LM_1s of *Pliophenacomys* which was considered by Hibbard (1950) as an upland form that lived in a drier habitat. It is of interest to note that no *Pliophenacomys* are known from the Rexroad local fauna. Zakrzewski (1967) reported from this fauna 56 lower jaws and 262 isolated M_1s of *Ogmodontomys*. It is the most abundant rodent in the fauna. *Pliopotamys,* the ancestor of *Ondatra,* does not occur in the fauna but does occur in the later Sand Draw local fauna (McGrew, 1944), and *Ogmodontomys* is very rare.

I consider it of importance that *Sigmodon* (a South American rodent) is common in the Rexroad local fauna. The absence of *Pliophenacomys* may be accounted for by the in-

vasion of a better grazer (pastural form), and the retraction of its range to the north. Baker (1969) has noted that *Sigmodon hispidus* Say & Ord is replacing *Microtus ochrogaster* (Wagner) as the dominant grass eating, runway-making rodent in Oklahoma and parts of Kansas.

Urocyon and *Procyon* make their first appearance along with *Sigmodon* in the North American fauna. To me it seems evident that these three mammals developed in South America and made their way northward at the time of the connection of North and South America in the Late Pliocene, while other North American stocks moved southward into South America.

I know of no immediate ancestor for *Nebraskomys*. The oldest microtine that could have been ancestral to some or all of the later North American Upper Pliocene microtines is *Prosomys mimus* Shotwell (1956) from the lower Middle Pliocene of Oregon. Repenning (1968) assigns the genus *Prosomys* to the European genus *Promimomys* Kretzoi (1955). *Ogmodontomys* is first known from the late Hemphillian (Middle Pliocene) in the Sawrock Canyon local fauna (Hibbard, 1957, & Zakrzewski, 1967). Considerable adaptive radiation of the microtines had taken place in North America during Hemphillian time. There is no evidence of successive invasions of microtines from Eurasia during the Pliocene. The ancestral stock of the microtines as well as their place of origin is unknown.

O. P. Hay (1930) assigned *Poamys rivicola* Matthew from Nebraska to the Microtinae. I studied this specimen when I described *Ogmodontomys*. *Poamys* is not a microtine.

Nebraskomys may have been chiefly an eastern form with the Nebraska and Kansas records occurring along the western edge of its range. I consider *Nebraskomys* as the ancestral stock of the later and more advanced *Atopomys texensis* Patton (1965). This line of microtines did not give rise to any of our Recent forms.

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