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*** START OF THE PROJECT GUTENBERG EBOOK A NEW SUBSPECIES OF WOOD RAT
(*NEOTOMA MEXICANA*) FROM COLORADO ***

A New Subspecies of Wood Rat (*Neotoma mexicana*) From Colorado

**BY
ROBERT B. FINLEY, JR.**

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By
ROBERT B. FINLEY, JR.

Field and museum studies of the wood rats of Colorado have revealed the existence of an unnamed subspecies of *Neotoma mexicana* in eastern Colorado south of the Arkansas River. The characters of the new subspecies are most distinctive in the northeastern part of its range near Two Buttes and Higbee. It differs in cranial characters from *N. m. fallax* and *N. m. inopinata* and averages slightly larger, but cannot be distinguished by coloration of the pelage.

This heretofore undescribed subspecies may be known as:

Neotoma mexicana scopulorum subsp. nov.

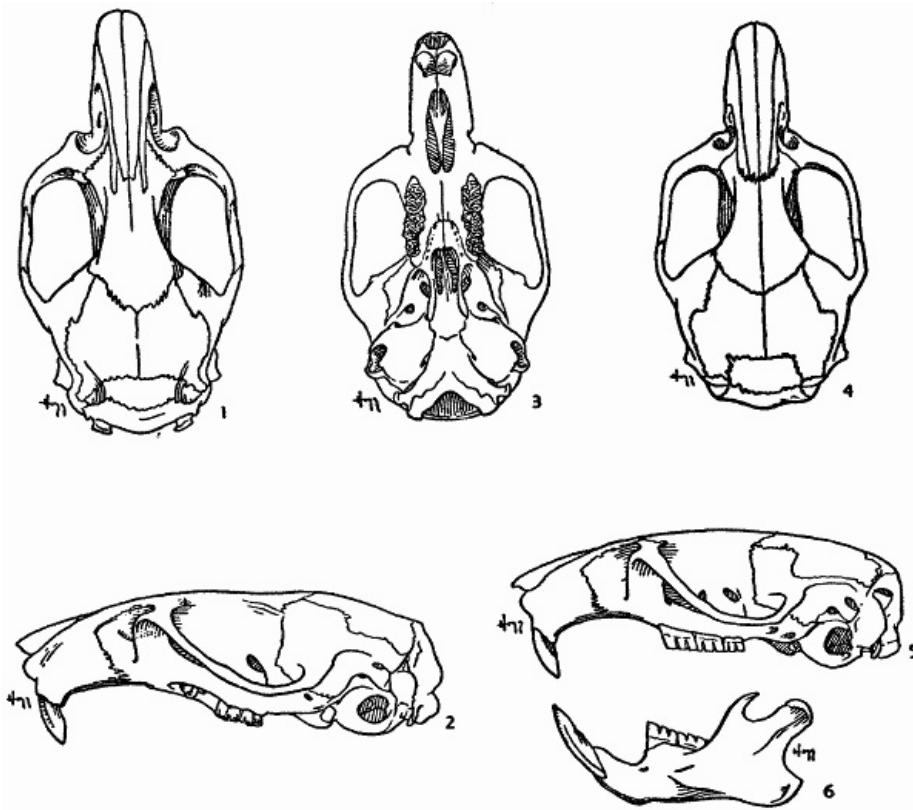
Type.—Mus. Nat. Hist., Univ. Kansas, No. 37137, old adult male, skin and skull; from 37° 47' N, 103° 28' W, three miles northwest of Higbee, 4300 feet, Otero County, Colorado; trapped 16 May 1950 by R. B. Finley, Jr., original number 500516-1.

Range.—Cañons, mesas, and foothills south of the Arkansas River, east to Two Buttes, Colorado, and south to Clayton, New Mexico. The extent of the range to the southwest in New Mexico has not been determined.

Diagnosis.—Size large for the species; interorbital constriction near middle of frontal rather than anteriorly; supraorbital ridges of frontal concave laterally; skull large, strongly arched at base of rostrum; rostrum wide; nasals wide anteriorly; upper incisors wide, light yellow; molars large, tooth-rows long; zygomatic arches wide and heavy; interparietal short, wide, and posterior margin straight or with a slight posterior median angle.

Description.—Adults in dense unworn pelage taken in February at Two Buttes Reservoir: size large for the species; tail approximately 76 per cent as long as head and body; hind feet of medium length. Pelage: moderately long, thick; tail covered with short hairs; longest vibrissae 80 mm. Color: sides near Raffia (11 E 6) (capitalized color names and designators are of Maerz and Paul, A Dictionary of Color, McGraw-Hill Book Co., New York, 1930) overlaid with black, the general effect being grayish buff (13 G 6); back darker, moderately to heavily overlaid with black; indistinct dark eye ring; underparts whitish, fur basally gray except patch of fur pure white to base almost always present on upper throat; dark line around mouth; tail bicolor, black above, whitish below; feet white to ankles.

Skull: large for the species, strongly arched at base of rostrum; rostrum heavy; zygomatic arches widely spreading, heavy, squarish; braincase moderately ridged and angular; nasals wide anteriorly, lateral margins nearly parallel or converging evenly posteriorly, tapered abruptly at posterior ends which reach posteriorly beyond anterior plane of orbits; dorsal branches of premaxillae extending 0.5 to 1.2 mm. posterior to nasals; interorbital region moderately channeled, narrowly constricted near middle of frontal (instead of anteriorly); supraorbital ridges concave laterally, diverging more strongly posterior to interorbital constriction (frontal 8.7 to 9.5 mm. wide at posterior ends of supraorbital ridges); temporal ridges widely flaring on parietals; occipital ridges prominent; interparietal broadly rectangular between temporal ridges, usually short in median line of skull, posterior margin straight or with slight median posterior angle; incisive foramina tapered toward both ends, sometimes narrower anteriorly than posteriorly; anterior palatal spine usually forming a blade thickened on ventral edge, and right and left sides usually incompletely fused; nasal septum with a posterior notch separating vomer from maxillary; posterior margin of palate usually bearing single or double point, sometimes straight; interpterygoid fossa moderately wide, lateral margins concave; sphenopalatine vacuities large; auditory bullae of medium size; basioccipital with low median ridge or crest; upper incisors wide, yellow or yellow-orange; molars large, M1 wider than M2; maxillary tooth-rows long, nearly parallel; anterointernal fold of M1 deep, cutting more than half way across first enamel loop.



FIGS. 1-6. Skulls of *Neotoma mexicana*. All $\times 1$.

FIGS. 1-2. *Neotoma mexicana scopulorum*, holotype.

FIGS. 3-6. *Neotoma mexicana fallax*, 1-1/2 mi. NW Golden, 6200 ft., Jefferson County, Colorado, 8 June 1948, σ No. 29182 KU.

Adult in worn pelage taken in May at Two Buttes peak: no molt in evidence; pelage thinner and rougher than in adults of same tooth wear taken in February in unworn pelage (described above); upper parts duller, less heavily overlaid with black; sides less richly yellowish, slightly more pinkish in hue; underparts with no fur white to base (as usual for the species). The skull of this rat has narrower nasals than other adults from Two Buttes and a longer interparietal with a posterior median angle.

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Subadult taken in April at Regnier: completing postjuvinal (first) molt; new pelage fairly long and thick everywhere except on neck and upper back, where covered by remaining juvenal pelage; upper parts of new pelage duller than in adults, sides less buffy, more grayish; juvenal pelage grayer than new pelage; new pelage indistinguishable from same pelage (second pelage of first year) of *N. m. fallax*.

Comparisons.—*N. m. scopulorum* is extremely variable in color but averages lighter and richer in color than *N. m. fallax*, and about the same as *N. m. inopinata*. *N. m. scopulorum* can be separated from either by the following cranial differences: skull larger, more strongly arched at base of rostrum, interorbital constriction more posterior; supraorbital ridges concave laterally (in contrast to straight, diverging); interparietal shorter in median line, more widely spreading and rectangular; zygomatic arches more widely spreading and heavier; upper incisors wider; and molars larger. *N. m. scopulorum* differs from *inopinata* also in paler upper incisors and less prominent basicranial ridges.

N. m. scopulorum is paler than *N. m. pinetorum*. The skulls of these two subspecies are of about the same size, but the subspecies differ in other respects as *scopulorum* differs from *fallax* and *inopinata*.

Judging from the description and photograph of *mexicana* in Goldman's revision of the genus *Neotoma* (N. Amer. Fauna, 31: 54-56, Pl. IV, 19 October 1910), *scopulorum* differs from *N. m. mexicana* in: larger skull; longer nasals and dorsal branches of premaxillae; more posterior interorbital constriction (supraorbital ridges more concave laterally); wider upper incisors; and larger molars.

Measurements.—Mean and extreme measurements in millimeters of 6 males and 5 females from 3 mi. NW Higbee and the vicinity of Two Buttes are, respectively, as follows: total length, 357 (345-368), 345 (310-379); length of tail, 147 (140-158), 159 (138-178); length of hind foot, 35 (32-38), 36.4 (35-38); length of ear, from notch, 25.5 (25-26), 25.7 (25-27); weight (in grams), 234 (213-253), 206 (161-246); basilar length, 37.9 (36.8-38.9), 36.2 (34.5-38.6); length of nasals, 19.0 (18.2-20.0), 17.9 (16.4-19.6); zygomatic breadth, 23.9 (23.0-24.5), 23.3 (22.3-24.0); interorbital breadth, 5.3 (4.9-5.6), 5.1 (5.0-5.3); breadth of rostrum, 7.2 (6.8-7.7), 6.8 (6.7-6.9); diastema, 12.8 (12.3-13.3), 12.2 (11.1-13.7); alveolar length of maxillary tooth-row, 9.5 (9.2-9.8), 9.4 (9.0-9.7);

length of incisive foramina, 9.7 (9.2-10.2), 9.2 (8.6-10.2); length of palatal bridge, 8.8 (8.4-9.2), 8.5 (8.0-8.9).

Measurements of the type.—Total length, 348; length of tail, 143; length of hind foot, 35; length of ear, from notch, 25; weight (in grams), 230; basilar length, 38.1; length of nasals, 18.8; zygomatic breadth, 24.2; interorbital constriction, 5.5; breadth of rostrum, 7.2; diastema, 13.0; alveolar length of maxillary tooth-row, 9.2; length of incisive foramina, 9.7; length of palatal bridge, 8.9.

Remarks.—The large size and distinctive cranial characters of *N. m. scopulorum* are fairly constant in the northeastern part of its range, but there is a wide range of variation in color. The only two skins from the type locality differ markedly in color. Both specimens (the type and KU 37138, adult male) were collected on 16 May 1950 and are in moderately worn pelage. The upper parts of the holotype are much more yellowish than in KU 37138, and are even lighter buff than adults in unworn pelage from Two Buttes. The underparts of the holotype are more extensively white than in almost any other specimen seen of *Neotoma mexicana*. The basal gray coloration, where it is present along the sides of the venter, forms only a narrow intermediate color band extending not more than one third the length of the hairs. An extensive area of the throat, breast, axillae, median belly, and inguinal region is covered by hairs pure white to the skin. The dark line around the mouth is present, as usual for the species. The upper parts of KU 37138 are like those of the adult in worn pelage from Two Buttes peak, described above; the underparts have only small patches of pure white fur on the throat and inguinal region, being elsewhere gray at the base of the fur, as is usual for the species.

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The molars of the type specimen are in an advanced state of wear, having the pattern of the enamel folds still discernible but the depth of remaining enamel slight. A large alveolar abscess surrounds the abnormal left M1. There are two, much worn, peglike fragments of the tooth projecting slightly from an ovoid alveolar cavity 5.1 mm. long and 4.3 mm. wide. As a result of the reduction of wear on the opposing m1, the crown of m1 is much less worn than those of the other lower molars and projects 0.8 mm. above the occlusal level of the two posterior molars. A few barbed cactus glochids (bristles) are inbedded in the cavity around the base of the molar remnants. Although glochids are of rather frequent and normal occurrence between the teeth of *Neotoma albigula* and *N. micropus*, they are not so commonly found in *N. mexicana* and possibly induced the alveolar infection in this individual.

In addition to the skins in unworn and worn pelages already described from Two Buttes, an extremely dark specimen is at hand from Two Buttes peak, taken on 9 May 1950. This specimen (KU 37141 ♀) is an adult in moderately worn pelage. The back is dark brownish gray (Taupe, 16 A 6), the sides lighter (a shade lighter than Beaver, 15 A 6). The entire underparts are washed with reddish buff (Grain, 11 B 5) over the gray basal coloration, with a patch of white only in the genital region. The dark eye ring and dark line around the mouth are heavier than usual. The underside of the tail is light gray. The white hind feet are sharply set off from the dark gray ankles.

Each of four skulls from Regnier (three adults and one subadult) differs from skulls from Two Buttes in having a longer interparietal with a posterior angle. The skins of five adults collected in December at Trinchera are less richly colored on the sides than skins from Two Buttes and look more nearly like topotypes of *N. m. fallax*. The skull of one of the five from Trinchera differs from skulls from Two Buttes in much narrower nasals anteriorly, narrower rostrum, much narrower upper incisors, and smaller zygomatic breadth, these characters being as in *fallax*.

Four adults and one subadult from Trinidad are intergrades between *N. m. scopulorum* and *N. m. fallax*, perhaps more nearly resembling the former. In pelage they are indistinguishable from specimens of *fallax* from Gold Hill (the type locality), less buff than most individuals of *scopulorum* from Otero, Prowers, and Baca counties. The skulls of the three fully mature adults are large with a wide zygomatic breadth, large rostrum, and large upper incisors as in *scopulorum*; but the upper molars are small and the bullae are rather small and narrow as in *fallax*. In the degree of arching at the base of the rostrum, the shape of the frontal, the shape of the interparietal, and the size of the upper molars, the specimens from Trinidad are intermediate. It seems to me best to refer them to *scopulorum*.

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Two first-year adults from Fisher Peak and Long Cañon are indistinguishable from topotypes of *fallax* of similar age and also resemble a young adult and a subadult from Trinidad, but all are insufficiently mature to show subspecific characters distinctly. Until adequate series are available from southwestern Las Animas County it seems best to regard all specimens from the three localities as representatives of a single uniform population which is intermediate between *fallax* and *scopulorum* but more nearly like the latter. Unfortunately no other specimens are available from the foothill zone south of the Arkansas River where morphological intergradation and ecological transition between *fallax* and *scopulorum* might reasonably be expected to occur.

Three specimens from the north side of the Arkansas River, about 26 miles below Canon City, Pueblo County, are like *fallax* in size, dorsal profile of the skull, and shape

of the interorbital constriction; but they approach *scopulorum* in shape of the interparietal, size of the rostrum, and size of the molars. They are intergrades referable to *fallax*.

Neotoma mexicana was first reported from Oklahoma by W. Frank Blair in 1939 (Amer. Midl. Nat., 22:126) who referred a specimen from Tesequite Canyon, Cimarron County, to *N. m. fallax*. I have seen one specimen (MZ 80469) from Tesequite Canyon and refer it to *scopulorum*.

Of *scopulorum*, each of eight skulls, of the 28 skulls examined, has an anteroexternal enamel fold on the m3 and one (BSC 35222/47487 ♂) has an anterointernal fold on the m3. Of the other 19 mandibles, a few are too old to show such a fold, which tends to be obliterated with wear in later age, and the others lack the fold.

Two other wood rats (*N. albigula warreni* and *N. micropus canescens*) occur at many of the same localities as *N. m. scopulorum*. The dens of *scopulorum* almost always are situated among rocks, but the dens of *warreni* and *canescens* are in a variety of other situations as well as among rocks. Houses of sticks or cactus joints piled up around the base of a juniper (*Juniperus monosperma*), thicket of skunkbush (*Rhus trilobata*), clump of soapweed (*Yucca glauca*) or tree cactus (*Opuntia arborescens*) have been found to shelter only *N. a. warreni* or *N. micropus canescens*. When these wood rats are associated with *scopulorum* among the rocks, their dens can be recognized by the compact midden of innumerable cactus spines. The dens of *scopulorum* have only a few loosely scattered spine areoles or none at all.

I am grateful to the officials of the following institutions for permission to examine specimens from the collections under their care: Denver Museum of Natural History; Biological Survey Collection, U. S. Fish and Wildlife Service; American Museum of Natural History; Museum of Vertebrate Zoology, University of California; Museum of Zoology, University of Michigan. The drawings of the skulls were made by Victor Hogg.

Specimens examined.—Total 66, distributed as follows:

Colorado. *Baca County*: "Furnace Canyon" [= Furnish Canyon], 1 (DMNH); Regnier, 4500 ± ft., 4 (2 DMNH, 2 KU); Two Buttes Reservoir, 4200 ± ft., 5 (3 DMNH, 2 KU). *Las Animas County*: Fisher Peak, "about 8000 ft." [6 mi. SE Trinidad], 1 (BSC); Long Cañon (near Martinsen), 1 (BSC); Mesa de Maya, 1 (MZ); 9 mi. W jct. Purgatory [= Purgatoire] & Chaquaqua [= Chacuaco] rivers ("Red Rock Canyon," collector's field notes), 1 (MVZ); Trinchera, 6 (5 DMNH, 1 AMNH); Trinidad, 5 (BSC); 20 mi. E Walsenburg, "Huerfano Co." [probably Las Animas County], 1 (DMNH). *Otero County*: 3 mi. NW Higbee, 4300 ft., 4 (KU). *Prowers County*: Two Buttes peak, 4600 & 4650 ft., 2 (KU).

New Mexico. *Union County*: Clayton, 9 (BSC); 9 mi. NE Des Moines on the "Carramba River" [= Cimarron River], 1 (DMNH); Folsom, 6 (BSC); Raton Range (Oak Cañon), 8 (BSC); Sierra Grande, 9 (BSC).

Oklahoma. *Cimarron County*: Tesequite Canyon, 1 (MZ).

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Museum of Natural History, University of Kansas, Lawrence. Transmitted April 20, 1953.

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