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TEN NEW MARMOTS FROM NORTH AMERICA.

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A study of the marmots or woodchucks of North America, based chiefly on the collections of the U. S. Department of Agriculture, has revealed a surprisingly large number of unrecognized races, and examination of a large amount of material from practically all parts of the range of the genus has served to show clearly that the three groups represented in North America are practically three species, the forms in each group, with the exception of two isolated species in the *caligata* group, being all subspecifically related to one another. Thus the *flaviventer* group (which includes *engelhardti* and *dacota*) ranges from the Cascades of Oregon and the Sierra Nevada of California to the Black Hills of South Dakota, and consists of a single species divisible into 9 or more races connected by almost perfect series of intergrades.

Since the publication of the results of this study may necessarily be delayed for some time, it is deemed advisable to publish here preliminary descriptions of the new forms.

***Marmota monax rufescens*** subsp. nov.

RUFESCENT WOODCHUCK.

*Type* from Elk River, Minnesota. Adult male, No. 186,521, U. S. National Museum (Merriam Collection, No.  $\frac{2563}{3173}$ ); April 9, 1886, V. Bailey; original number, 237.

*Characters*.—Similar to *M. m. monax* (from Maryland and Virginia), but colors much redder, both above and below, the underfur on back pinkish cinnamon instead of light buff; skull similar to that of *monax*, but decidedly smaller and relatively broader across the zygomata; much larger than that of *canadensis*.

*Measurements.*—Average of five adult males from Minnesota: Total length, 548; tail vertebrae, 143; hind foot, 83. *Skull*: Adult male (type): Condyllo-basal length, 87.2; zygomatic breadth, 64.7; breadth of rostrum, 18.7.

*Remarks.*—The range of this form includes the southern parts of Minnesota, Wisconsin, Michigan, and Ontario, and the greater part of New York State. The animal is intermediate in size between *monax* and *canadensis* and differs from both in color and cranial characters.

***Marmota monax preblorum***\* subsp. nov.

NEW ENGLAND WOODCHUCK.

*Type* from Wilmington, Mass. Adult male, No. 78,360, U. S. National Museum (Biological Survey Collection); April 19, 1896, A. E. Preble; original number, 127.

*Characters.*—Size medium (smaller than *rufescens*, larger than *canadensis*); colors pale (redder than *monax*, but red not so dark as in *canadensis* or *rufescens*); skull smaller and relatively narrower than that of *rufescens*, especially the rostrum and inter-orbital region.

*Measurements.*—Adult male (type): Total length, 560; tail vertebrae, 149; hind foot, 80. *Skull* (type): Condyllo-basal length, 85.3; zygomatic breadth, 57.4; breadth of rostrum, 18.5.

*Remarks.*—The woodchuck of southern New England is noticeably smaller and paler than *rufescens*, and larger and paler beneath than *canadensis*. Its skull is much larger than that of *canadensis*. It ranges from Connecticut north to Rutland, Vermont and Ossipee, New Hampshire, and probably farther, but material is lacking from northern New England to determine its exact limits.

***Marmota flaviventer parvula*** subsp. nov.

NEVADA MARMOT.

*Type* from Jefferson, Nye Co., Nevada (in Toquima Range, about 10 miles north of Belmont). Adult female, No. 93,690, U. S. National Museum (Biological Survey Collection); June 3, 1898, V. Bailey; original number, 6495.

*Characters.*—Similar to *M. f. avara*, but smaller, and colors darker; similar in color to *flaviventer* from the southern Sierra of California, but colors less reddish and upperparts overlaid with a buffy mantle; similar to *engelhardti*, but smaller, the upperparts more buffy and underfur paler; skull similar to that of *avara*, but decidedly smaller, with rostrum narrowed at the tip; smaller than that of *engelhardti* with narrower and less inflated bullae.

*Measurements.*—Adult female (type): Total length, 470; tail vertebrae, 130; hind foot, 70. *Skull* (type): Condyllo-basal length, 71.3; zygomatic breadth, 49; breadth of rostrum, 17.4.

*Remarks.*—This is the smallest of the subspecies of *flaviventer* and the

\* Named for Messrs. Edward A. and Alfred E. Preble.

smallest known form in the genus. It is known only from the Toyabe and Toiyabe Ranges but probably occurs, also, in other desert ranges in central Nevada.

**Marmota flaviventer nosophora\*** subsp. nov.

GOLDEN-MANTLED MARMOT.

*Type* from Willow Creek, 7 miles east of Corvallis, Montana (altitude 4000 feet). Adult female, No. 168,494, U. S. National Museum (Biological Survey Collection); April 8, 1910, A. H. Howell; original number, 1723.

*Characters*.—Similar to *M. f. dacota*, but slightly smaller; upperparts less extensively reddish and more mixed with black, the underfur decidedly paler; fore part of back overlaid with a mantle of golden buff; skull averaging smaller, with relatively slenderer rostrum and much smaller palatal foramina.

*Measurements*.—Adult female (type): Total length, 583; tail vertebrae, 170; hind foot, 75. *Skull* (type): Condyllo-basal length, 79; zygomatic breadth, 53.2; breadth of rostrum, 17.

*Remarks*.—This race occupies the northern Rocky Mountain region, from Flathead Lake, Montana, south to the Wasatch Mountains, Utah, and east to the Bighorn Mountains, Wyoming. It intergrades with *avara* at the northern end of its range, with *dacota* in Wyoming and probably with *engelhardti* and *parvula* in Utah and Nevada, respectively.

**Marmota flaviventer luteola** subsp. nov.

PARK MARMOT.

*Type* from Woods P. O., in Medicine Bow Mountains, Wyoming (altitude about 7500 feet). Adult male, No. 186,520, U. S. National Museum (Merriam Collection, No.  $\frac{465}{306}$ ); August 13, 1888, V. Bailey; original number, 148.

*Characters*.—Similar in color to *dacota* and *nosophora*, but paler and less intensely ochraceous above and yellowish instead of deep red below. Compared with *engelhardti*: colors paler and more yellowish (less brownish). Skull similar to that of *nosophora*, but averaging slightly longer and narrower, with longer rostrum and smaller audital bullae.

*Measurements*.—Sub-adult male (type): Total length, 650; tail vertebrae, 182; hind foot, 90. *Skull* (old male from Mt. Lincoln, Colorado): Condyllo-basal length, 92.5; zygomatic breadth, 59.4; breadth of rostrum, 20.8.

*Remarks*.—This subspecies occupies the mountains of northern Colorado and southeastern Wyoming (from the Laramie Mountains south to Park County, Colorado), intergrading with *dacota* on the north and with *warreni* on the south.

\* In allusion to the fact that the animal aids in the spread of Rocky Mountain spotted fever, through serving as a host for the fever ticks.

**Marmota flaviventer warreni**\* subsp. nov.

## WARREN'S MARMOT.

*Type* from Crested Butte, Colorado. Adult female, No. 202,937, U. S. National Museum (Biological Survey Collection); July 11, 1902, E. R. Warren; original number, 35 (10,639, X catalogue).

*Characters*.—Size large (equalling *flaviventer* or *dacota*); colors deep red with very little buff (much darker than *luteola*); skull larger than that of *dacota*, with longer, slenderer rostrum and narrower palatal foramina.

*Measurements*.—Adult female (type): Total length, 565; tail vertebrae, 131; hind foot, 82. *Skull* (type): Condyllo-basal length, 89.3; zygomatic breadth, 59; breadth of rostrum, 20.3.

*Remarks*.—This race is the reddest of the forms of *flaviventer*. It is apparently confined to western Colorado, but the limits of its range are not definitely known. It intergrades with *luteola* on the north and with *obscura* on the south. It differs markedly, both in size and color, from *engelhardti*, but material from eastern Utah will very likely show that these two forms are connected by intergrades. Specimens have been examined from Crested Butte, Mud Springs (Garfield Co.), Cochetopa Pass, and Sapinero.

**Marmota flaviventer obscura** subsp. nov.

## DUSKY MARMOT.

*Type* from Wheeler Peak, 5 miles south of Twining, New Mexico (altitude 11,300 feet). Adult female, No. 133,505, U. S. National Museum (Biological Survey Collection); July 24, 1904, V. Bailey; original number, 8181.

*Characters*.—Size large (exceeding *dacota* and equalling *flaviventer*); sexes about the same size; tail long; colors dark brown mixed with white, with little of the buff or tawny shades of the related races; face usually without white markings; skull similar to that of *dacota* (that of male about same size, of female larger) with narrower palatal foramina.

*Measurements*.—Average of 3 adult males from New Mexico: Total length, 655; tail vertebrae, 204; hind foot, 90.7; average of four adult females from same localities: 646; 190; 89.3. *Skull*: Adult female (type): Condyllo-basal length, 84.5; zygomatic breadth, 59.4; breadth of rostrum, 22.3.

*Remarks*.—This is the darkest and one of the largest of the races of *flaviventer*. It occupies the upper slopes of the higher peaks, chiefly above timber line, in northern New Mexico and southern Colorado, from the Pecos River Mountains north to the Sangre de Christo and San Juan Ranges, Colorado. Intergradation with *warreni* is indicated by an intermediate specimen from Florida, Colorado.

\* Named for Mr. Edward R. Warren, whose extensive collection of Colorado marmots has aided materially in clearing up the relationships of the group.

**Marmota caligata cascadensis** subsp. nov.

CASCADE HOARY MARMOT.

*Type* from Mt. Rainier, Washington (altitude 6000 feet). Adult female, No. 90,134, U. S. National Museum (Biological Survey Collection); August 11, 1897, W. K. Fisher; original number, 422.

*Characters*.—Size large (equalling *olympus* and “*sibila*,”\* larger than *caligata*); color similar to that of *caligata*, but head and feet usually browner and underparts darker; skull similar to that of *sibila*, but relatively broader across zygomata and inter-orbital region; decidedly larger than that of either *caligata* or *okanagana*.†

*Measurements*.—Adult female (type): Total length, 740; tail vertebrae, 230; hind foot, 107. *Skull*: Adult male from Cascade River (near head), Washington: Condyllo-basal length, 106.2; zygomatic breadth, 69.8; breadth of rostrum, 24.5.

*Remarks*.—The Cascade Marmot differs from the Olympic Marmot in being much whiter, and in skull characters; from *okanagana* of the Selkirk and Gold Ranges and *sibila* of northern British Columbia in whiter and browner (less black) coloration above; and from *caligata* in much larger size. It ranges from Mount Rainier, Washington, north to the Mount Baker Range, British Columbia.

**Marmota caligata nivaria** subsp. nov.

MONTANA HOARY MARMOT.

*Type* from mountains near Upper St. Mary's Lake, Montana (altitude about 6100 feet). Adult female, No. 72,235, U. S. National Museum (Biological Survey Collection); May 27, 1895, A. H. Howell; original number, 23.

*Characters*.—Similar in size and skull characters to *sibila*, but colors much whiter, both above and below; skull closely similar to that of *sibila*, possibly averaging a little shorter; compared with *cascadensis* the premaxillæ are broader.

*Measurements*.—Average of 4 adult females from type locality: Total length, 751; tail vertebrae, 224; hind foot, 105. *Skull*: Average of 4 adult females from same locality: Condyllo-basal length, 102; zygomatic breadth, 65.7; breadth of rostrum, 23.

*Remarks*.—This form, although closely resembling *sibila* in skull characters, differs widely from it in color, being, indeed, the whitest member of the group. In addition to the series from the type locality, specimens have been examined from the Bitterroot and Salmon River Mountains, Idaho.

\* *Marmota sibila* Hollister, Smiths. Misc. Coll., vol. 56, No. 35, 1912, p. 1; type locality, Moose Pass, Alberta (not *Arctomys sibila* Wolf).

† *Arctomys okanaganus* King, Narr. Journ. to Shores of the Arctic Ocean, II, 1836, p. 236; type locality: The region occupied by the Okanagan Indians, "on the borders of the Rocky Mountains \* \* \* between the Columbia and Fraser Rivers"—hereby fixed in the Gold Range, British Columbia.

***Marmota caligata sheldoni***\* subsp. nov.

MONTAGUE ISLAND MARMOT.

*Type* from Montague Island, Alaska. Adult male, No. 137,319, U. S. National Museum (Biological Survey Collection); May 24, 1905, Charles Sheldon; original number, 12. (5461, X catalogue.)

*Characters*.—Similar to *caligata*, but size smaller; skull with shorter nasals and narrower premaxilla.

*Measurements*.—Adult male topotype: Total length, 670; tail vertebrae, 185; hind foot, 94; adult female topotype: 640; 180; 90. *Skull*.—Adult male (type): Condylar-basal length, 89.5; zygomatic breadth, 61.5; breadth of rostrum, 20.5.

*Remarks*.—This race is confined to Montague Island and differs from the mainland form in size only.

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\* Named for Mr. Charles Sheldon, in recognition of his valuable contributions to our knowledge of Alaska mammals.