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REVISION OF THE AMERICAN HARVEST MICE

(Genus REITHRODONTOMYS)

BY

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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF BIOLOGICAL SURVEY,
Washington, D. C., January 3, 1914.

SIR: I have the honor to transmit herewith, for publication as North American Fauna No. 36, the results of a study of the American harvest mice by Arthur H. Howell, assistant biologist, Biological Survey.

The American harvest mice occur abundantly in or near meadows and cultivated lands over a large part of the United States. Their exact economic relations are still little known, but they belong to a group of mammals many species of which are injurious to agriculture, and there is no doubt that they consume large quantities of forage and some grain.

Up to the present time the relationships and distribution of the many species have been imperfectly understood. The present report furnishes for the first time a complete systematic synopsis of the group, with maps showing the ranges of the species of most economic importance.

Respectfully,

H. W. HENSHAW,
Chief, Biological Survey.

Hon. DAVID F. HOUSTON,
Secretary of Agriculture.

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REVISION OF THE AMERICAN HARVEST MICE.

(Genus REITHRODONTOMYS.)

By ARTHUR H. HOWELL.

INTRODUCTION.

HISTORY AND MATERIAL.

The mice of this genus have been known to naturalists since the days of Audubon and Bachman. At that time only a single species, the eastern harvest mouse, was known, it having been described by Bachman in 1841 under the name of *Mus humilis* from specimens collected near Charleston, S. C. The following year (1842) the same authors redescribed this species as *Mus lecontei* from a specimen collected by Maj. John Leconte in Liberty County, Ga.

Although the species was known from only a few localities (Georgia, South Carolina, and Virginia), and considered rare, its habits were quite fully described by Bachman in "Quadrupeds of North America," published in 1851. The spelling of the name was there changed to "*humilis*." Even at that time Bachman appreciated the fact that this species was not closely related to true *Mus*, as is indicated by the following statement:

In examining the teeth of this species, we have found that the tuberculous summits on the molars were less distinct than in those which legitimately belong to the genus *Mus*, and that there are angular ridges on the enamel by which it approaches the genus *Arvicola*; it is in fact an intermediate species, but in the aggregate of its characteristics perhaps approaches nearest to *Mus*, where we for the present have concluded to leave it.¹

His keenness in noting the distinction between the molars of the harvest mouse and of *Mus* makes his failure to mention the grooving of the incisors all the more remarkable, but as pointed out by Osgood² the rest of the description fits the species so well that there

¹ Aud. & Bach., Quad. N. Am., II, 1851, p. 106.

² Proc. Biol. Soc. Wash., XX, 1907, pp. 49-50.

can be no doubt of the applicability of the name *humilis* to the harvest mouse of the Atlantic coast.

In 1853 Leconte pointed out that "*Mus Lecontei* of Bachman is a *Reithrodon*, and neither a *Mus* nor a *Hesperomys*." ¹

In 1855 Baird described a second species in the genus, *Reithrodon montanus*, based on a single specimen collected on one of the Government exploring expeditions in the Rocky Mountains, the exact locality being unknown. This specimen remained unique in collections for over 50 years, and not until 1907 was a series of topotypes secured, making possible accurate characterization of the species. In his great work on the "Mammals of North America," published in 1857, Prof. Baird recognized four valid species—*humilis* and *montanus*, already described, and *megalotis* and *longicauda*, proposed as new, the range of the genus being extended to the Mexican border and to the coast of California. A fifth species, *R. carolinensis* (Aud. & Bach.), was provisionally recognized.

Baird realized that considerable differences existed between true *Reithrodon* of South America and the North American mice placed in the same genus, but as he had never seen either skins or skulls of the former, he found it impossible to indicate the discrepancies.

In 1860 De Saussure described a species from Vera Cruz, Mexico, as *R. mexicanus* and the next year another, *R. sumichrasti*, also from Mexico but without definite locality.

In 1874 Coues published a synopsis of the genus,² pointing out the characters which distinguish it from true *Reithrodon* and proposing the name *Ochetodon* for the North American species. Five species were recognized in this paper—*humilis*, *longicauda*, *mexicanus*, *montanus*, and *sumichrasti*, the last two provisionally. *R. megalotis* was placed in synonymy under *humilis*. Using practically the same material, he published in 1877 a more detailed revision of the genus³ in which he recognized only four species, having dropped *O. sumichrasti* even from synonymy.

The name *Ochetodon* quickly became current, American naturalists having overlooked the name *Reithrodontomys* proposed by Giglioli some month earlier than *Ochetodon*, and not until Merriam called attention to this fact in 1892,⁴ was the earlier name given precedence.

In 1893 Allen revived the names *megalotis* and *montanus*, placing them formally in the genus *Reithrodontomys* and naming a new form, *R. aztecus*, from New Mexico.⁵

In 1895 Allen published an extended revision of the genus⁶ in which he recognized 15 forms, 8 of which were there first described,

¹ Proc. Acad. Nat. Sci. Phila., 1853, p. 410.

² Proc. Acad. Nat. Sci. Phila., 1874, pp. 184-186.

³ Mon. N. Am. Rodentia, Rept. U. S. Geol. Surv. Terr., XI, 1877, pp. 120-130.

⁴ Proc. Biol. Soc. Wash., VII, 1892, p. 26.

⁵ Bull. Am. Mus. Nat. Hist., V, 1893, p. 79.

⁶ Bull. Am. Mus. Nat. Hist., VII, 1895, pp. 107-143.

and the range of the genus was shown to extend practically across the continent from the Carolinas to California and south to Costa Rica. Of the 15 forms recognized, three (*nebrascensis*, *deserti*, and *pallidus*) are considered synonyms by the present writer. Dr. Allen's material consisted of 920 specimens, chiefly from the United States. The paucity of material from southern Mexico, where the genus reaches its highest development, of course accounts for the incompleteness of this revision in so far as the southern forms are concerned. Only 2 specimens from southern Mexico and 17 from Costa Rica were at that time available—only 19 specimens from a region where over 35 subspecies are now known.

As a result of increased activity in the collection and study of North American mammals, new species were discovered almost every year. In 1898 Thomas described *R. söderströmi* from Ecuador, thus extending the range of the genus into South America. In 1901 Merriam published a paper¹ giving descriptions of 23 new forms, based chiefly on the unexampled collections of Nelson and Goldman in Mexico and Guatemala. Since that date 9 additional species have been described, bringing the total number of named forms up to 67, of which 16 are at present regarded as synonyms. Fifty-eight forms are recognized in the present revision, of which 7 are here described as new.

The material on which the present revision is based consists of 2,280 specimens contained in the collections of the United States National Museum, including that of the Biological Survey, and the Merriam Collection. This material has been supplemented by a considerable number of specimens borrowed from other American museums, thus bringing the total number of specimens examined up to 2,583. All the existing types have been examined with the exception of *R. tenuis*, *R. söderströmi*, and *R. modestus*, which are in the British Museum, and *R. mexicanus* and *R. sumichrasti*, which are in the Geneva Museum. Of the last two I have seen photographs of the type skulls, while of *tenuis* and *modestus* I have examined practical topotypes. The National Museum collections contain representatives of all but 5 or 6 of the recognized forms and in most cases considerable series showing all ages and pelages.

In this connection I wish to acknowledge the kindness of the following gentlemen, who have generously loaned from the collections under their charge such material as was needed to supplement the collections in the National Museum: Dr. J. A. Allen, of the American Museum of Natural History; Mr. Outram Bangs, of the Museum of Comparative Zoology; Mr. F. J. V. Skiff, of the Field Museum of Natural History; Mr. Witmer Stone, of the Academy of Natural Sci-

¹ Proc. Wash. Acad. Sci., III, 1901, pp. 547-558.

ences of Philadelphia; and Mr. Joseph Grinnell, of the Museum of Vertebrate Zoology, Berkeley, Cal. I am indebted, also, to Mr. Gerrit S. Miller, jr., and Mr. Ned Hollister for valuable criticism.

DISTRIBUTION.

The genus *Reithrodontomys* is clearly of Austral origin, being most abundant and highly developed in southern Mexico.

In western North America the typical subgenus ranges practically throughout the Upper and Lower Austral Zones, the northern limits of its range being indicated by the following localities where specimens have been taken: Prescott, Wash.; Custer, Mont.; and Fort Clark, N. Dak. East of the Mississippi River its range is more restricted, and so far as known the genus does not occur north of the Ohio and Potomac Valleys, the most northerly records being at Ceredo, W. Va., and Falls Church, Va. Southward the subgenus *Reithrodontomys* ranges through Mexico and Central America to Panama, but it is not known from South America.

The subgenus *Aporodon*¹ ranges from central Mexico (Jalisco and Vera Cruz) south throughout Central America and thence to Ecuador, its exact limits being very imperfectly known.

In the United States the genus is confined to the Austral Zones, but in Mexico and Central America ranges from the Tropical at or near sea level through all the zones to and including the Canadian at timber line.

HABITS AND ECONOMIC STATUS.

The harvest mice are preëminently field mice. Practically all the known species live in more or less open grassy situations and are partial to neglected fields overgrown with grasses or sedges and to weedy and grassy borders of cultivated tracts. Many species seem to prefer moist situations, and some (as *R. raviventris*) live exclusively in wet marshes, either salt or fresh; others (notably *R. albescens* and *R. montanus*) are found only in dry, sandy uplands. In the arid West in general harvest mice are most often taken along the grassy borders of sloughs, small streams, or irrigation ditches; but they may be found in almost any situation where there is sufficient cover of vegetation to hide them from their enemies.

Certain Mexican and Central American species ascend the mountains to timber line and live in grassy openings or among brush in the more open parts of the forest. *R. söderströmi*, of South America, is described as living in gardens among climbing plants.

Some species, and perhaps all, construct substantial nests of grasses, often lined with soft materials and placed either on the

¹ See page 63.

ground or in vines, bushes, or low trees some distance above the ground. Deserted birds' nests are sometimes used as a base for the nest of the mouse. Mr. H. P. Attwater has found their nests in old woodpecker holes in fence posts, and Mr. Howard Lacey, at Kerrville, Tex., has found them on cornstalks and made of corn silk. The breeding season extends in northern latitudes from April to October and in tropical regions may cover the entire year. The number of young produced at a birth varies from three to seven.

All the species live chiefly above ground, but burrows are also used, and cracks and openings in the ground are often occupied by the nests. The mice sometimes travel in narrow beaten paths of their own, and also are caught in the runways of other mammals, particularly those of cotton rats (*Sigmodon*) and meadow mice (*Microtus*). They are both nocturnal and diurnal in habit and remain active during the entire year.

FOOD.

The food of harvest mice consists largely of seeds and grain, with considerable green vegetation and occasionally fruit. Our knowledge of their preferred habitat indicates that most of their food must be obtained from wild plants of little or no value to man.

Bachman, who had studied the habits of the eastern harvest mouse rather closely, writes of it as follows:

We doubt whether this species is of much injury to the farmer. It consumes but little grain, is more fond of residing near grass fields, on the seeds of which it subsists, than among the wheat fields. We have observed in its nest small stores of grass seeds—the outer husks and other remains of the broom grass (*Andropogon distichiflorum*)—also that of the crab grass (*Digitaria sanguinalis*), and small heaps of the seeds of several species of *paspalum*, *poa*, and *panicum*, especially those of *panicum italicum*.¹

Mr. H. P. Attwater, writing of *Reithrodontomys intermedius*, as observed in Bexar County, Tex., says:

These mice seem to be fond of peaches, eating the peach and leaving the stone hanging on the tree.²

Mr. E. A. Goldman, at Metlaltoyuca, Mexico, captured a specimen of *R. mexicanus goldmani* on a bunch of bananas hanging about 8 feet above the ground.

Only rarely is any damage to crops reported. Mr. C. W. Seegmiller, of St. George, Utah, states that he has known harvest mice to do some damage by climbing grain stalks and cutting off the heads. He has found their nests built several feet from the ground in close-growing clusters of grain stalks. Prof. D. E. Lantz reports that in eastern Kansas *Reithrodontomys dychei* is often found in the fall under shocks of wheat and corn, and in such situations it may be expected to glean some of the grain.

¹ Aud. & Bach., Quad. N. Am., II, 1851, p. 105.

² Allen, Bull. Am. Mus. Nat. Hist., VIII, 1896, p. 236.

Although in most places harvest mice are only moderately numerous, in a few regions they occur in great abundance.

PELAGES.

The mice of this genus usually molt but once a year, normally in the late fall (at least in northern latitudes), but the changes produced in the pelage by wear and fading are so great that the summer pelage of adults differs markedly from their winter pelage. The young are usually less ochraceous and in some species darker than adults, but the difference between young and adults is less marked than in *Peromyscus* and other related genera. Of the forms examined, *R. humulis merriami* presents the greatest differences between young and adults.

Immature or subadult individuals taken in summer and fall always present a fresh, unworn appearance, the color usually being decidedly paler than in fresh winter pelage. Adults taken in midsummer or early fall are almost always in a more or less worn condition—often so much so as to appear “ragged”—but occasionally one may be found in summer in fresh pelage. The fresh, full pelage is retained during most of the winter, and little evidence of wear is seen before March or April. As the tips of the hairs wear off, the pelage in most species becomes redder, and by midsummer the evidences of fading are often pronounced, individuals and local colonies, however, showing marked differences in the amount of wear and the date of its appearance. Excessively worn individuals of certain species (particularly *R. megalotis*) often become very pale and gray.

Specimens showing clearly the process of molting are comparatively rare, and in the majority of cases the molt seems to progress insidiously, new hairs coming in simultaneously over all parts of the body. In a few cases, however, the line of demarcation is plainly evident, new pelage appearing first on the hinder back and along the sides, the fore part of the back being the last portion to be invested. This is equally true of young and adults.¹

While the fall molt is doubtless normal in northern latitudes, occasional exceptions have been noted, indicating the occurrence (probably abnormal, at least rare) of a spring or midsummer molt. A young adult male specimen of *R. megalotis dychei*, from Meadow, Wyo., taken June 28, 1909, has nearly completed a full molt, the new pelage covering the whole of the anterior portion of the body to the rump, where the old pelage, decidedly redder than the new, remains. A specimen of *R. fulvescens aurantius* (also a young adult male), from Sour Lake, Tex., taken July 18, 1902, shows a fresh, long

¹ Specimens showing this molt are as follows:

R. humulis merriami, ♀ juv., Lexington, Ky., November 19.

R. megalotis longicauda, ♂ ad., Stanford University, Cal., November 7.

R. megalotis astecus, ♀ subadult, Grand Junction, Colo., November 2.

R. montanus, ♀ ad., Medano Ranch, Colo., November 4.

pelage covering the anterior half of the body. As in the previous instance, the new pelage is darker and more ochraceous (less reddish) than the old. In both examples it will be noticed that the progress of the molt is directly the reverse of the normal autumn molt, the rump being the last part of the body to be invested, instead of the first, as in the usual method.

The molting period of the species inhabiting Mexico and Guatemala is less strictly confined to the autumn, but as a general rule (with many exceptions) individuals taken from December to June show a fuller and fresher pelage than those taken in the other half of the year. In the entire collection from Mexico I have been able to find only two specimens showing a clearly marked molting line. These are both adult males of *R. megalotis alticolus*, taken at La Parada, Oaxaca (in the lower edge of the Transition Zone), August 19, 1894. In these the molt is nearly completed, the new pelage covering the anterior portion of the body to the rump.

Genus REITHRODONTOMYS Giglioli.

Reithrodon Leconte, Proc. Acad. Nat. Sci. Phila., 1853, pp. 410, 413; Baird, Mamm. N. A., 1857, p. 447. (Not *Reithrodon* Waterhouse.)

Reithrodontomys Giglioli, Ricerche intorno alla Distrib. Geog. Gener. <Boll. Soc. Geog. Ital., Roma, XI, May-July, 1874, p. 326. Author's separates dated 1873 (probably dated from first part of paper in Vol. X), repaged, p. 160. (North American members of the genus *Reithrodon*; no species mentioned.)¹

Ochetodon Coues, Proc. Acad. Nat. Sci. Phila., December 15, 1874, p. 184 (no type selected; species included: *O. humilis*, *O. longicauda*, *O. mexicanus*, *O. montanus*, and *O. sumichrasti*).

Aporodon Howell, *postea*, p. 63. Type, *Reithrodontomys tenuirostris* Merriam.

Remarks.—Since no species were mentioned by Giglioli when he named the genus *Reithrodontomys*, the type must be fixed by subsequent designation. Miller and Rehn² have selected *Mus leontii* Aud. and Bach. [= *R. humilis*] as the type, but this is in violation of Opinion 46 of the International Commission on Zoological Nomenclature, which advises that the species first associated with the name be considered the type.³ Allen, in 1893, was the first to use the generic name in connection with a specific name, his paper including three species—*R. megalotis*, *R. aztecus*, and *R. montanus*.⁴ Since both *megalotis* and *montanus* were published prior to the naming of the genus, either may be selected as the type. I therefore designate *Reithrodon megalotis* Baird as the type of the genus *Reithrodontomys*.

GENERIC CHARACTERS.

Form murine; tail long, always more than one-third, often more than one-half total length, slender, scaly, thinly haired; ears promi-

¹ Elliot in Pub. Field Columb. Mus., Zool. Ser. III, 1903, p. 145, and several times subsequently, spells this name "*Rhithrodontomys*".

² Proc. Boston Soc. Nat. Hist., XXX, 1901, p. 95.

³ Smiths. Inst., Pub. 2060, February, 1912, p. 104.

⁴ Bull. Am. Mus. Nat. Hist., V, 1893, pp. 79-80.

ment, often large, more or less hairy; soles of hind feet 6-tuberculate; mammae, 6—P $\frac{1}{2}$, I $\frac{2}{3}$; no cheek pouches. Skull with smoothly rounded braincase, more or less inflated, without prominent ridges; zygomatic slender; outer wall of anteorbital foramen a broad thin plate; anterior palatine foramina relatively large, forming long narrow slits separated by a thin septum, slightly narrower anteriorly, terminating about at the plane of anterior border of tooth row; posterior border of palate square, often with a slight median spine, terminating at plane of posterior border of tooth row; pterygoids nearly parallel; audital bullae more or less inflated, longer than broad, and obliquely situated. Descending process of mandible a broad flattened plate, strongly deflected inward, the lower portion twisted into a nearly horizontal position and the inner margin raised, leaving a distinct depression in the ramus;¹ coronoid process short. Upper incisors with a deep longitudinal groove near the middle of the tooth. Molars brachyodont, tuberculate, the tubercles arranged in two longitudinal series; first upper molar with five principal tubercles, an anterior median one, and two pairs of lateral ones; m^1 and m^2 with or without accessory tubercles or enamel loops in the principal angles; upper molars normally three-rooted, but in some species four-rooted; lower molars two-rooted.

List of Species and Subspecies, with Type Localities.

Subgenus REITHRODONTOMYS.

R. humulis group:

- Reithrodontomys humulis humulis* (Bachman).....Charleston, S. C.
humulis impiger Bangs.....White Sulphur Springs, W. Va.
humulis merriami Allen.....Alvin, Tex.
albescens albescens Cary.....18 miles northwest of Kennedy,
 Nebr.
albescens griseus Bailey.....San Antonio, Tex.

R. megalotis group:

- Reithrodontomys montanus* (Baird)....."Rocky Mountains, latitude 38°"
 [=San Luis Valley, Colo., near
 San Luis Lakes].
megalotis megalotis (Baird)....."Between Janos, Sonora [=Chi-
 huahua] and San Luis Spring"
 [New Mexico].
megalotis aztecus Allen.....La Plata, N. Mex.
megalotis dychei Allen.....Lawrence, Kans.
megalotis nigrescens nobis.....Payette, Idaho.
megalotis longicaudus (Baird).....Petaluma, Cal.
megalotis peninsulæ Elliot.....San Quintin, Lower California.
megalotis cinereus Merriam.....Chalchicomula, Puebla.

¹ Less importance is to be ascribed to this character in distinguishing *Reithrodontomys* from *Peromyscus* than the remarks of Baird (Mamm. N. Am., p. 447) and Coues (Mon. N. Am. Rodentia, p. 122) would indicate, for although typical *Peromyscus* differs noticeably on the average from *Reithrodontomys* in the shape of the descending process, yet certain species of the subgenus *Haplomylomys* show practically the same condition as *Reithrodontomys*.

R. megalotis group—Continued.

<i>Reithrodontomys megalotis saturatus</i> Allen & Chapman.....	Las Vigas, Vera Cruz.
<i>megalotis alticola</i> Merriam.....	Cerro San Felipe, Oaxaca.
<i>megalotis arizonensis</i> Allen.....	Chiricahua Mountains, Ariz.
<i>megalotis zacatecæ</i> Merriam.....	Valparaiso Mountains, Zacatecas.
<i>amoles nobis</i>	Pinal de Amoles, Queretaro.
<i>catalinæ</i> Elliot.....	Santa Catalina Island, Cal.
<i>raviventris raviventris</i> Dixon.....	Redwood City, Cal.
<i>raviventris halictæ</i> Dixon.....	Petaluma, Cal.

R. fulvescens group:

<i>Reithrodontomys fulvescens fulvescens</i> Allen.....	Oposura, Sonora.
<i>fulvescens tenuis</i> Allen.....	Rosario, Sinaloa.
<i>fulvescens intermedius</i> Allen.....	Brownsville, Tex.
<i>fulvescens aurantius</i> Allen.....	Lafayette, La.
<i>fulvescens difficilis</i> Merriam.....	Orizaba, Vera Cruz.
<i>fulvescens toltecus</i> Merriam.....	Tlalpam, D. F., Mexico.
<i>fulvescens helvolus</i> Merriam.....	Oaxaca, Oaxaca.
<i>fulvescens chiapensis</i> nobis.....	Canjob, Chiapas.
<i>fulvescens nelsoni</i> nobis.....	Colima, Colima.
<i>fulvescens mustelinus</i> nobis.....	Llano Grande, Oaxaca.
<i>amoenus</i> Elliot.....	Reforma, Oaxaca.
<i>otus</i> Merriam.....	Sierra Nevada de Colima, Jalisco.

R. rufescens group:

<i>Reithrodontomys rufescens rufescens</i> Allen & Chapman.....	Jalapa, Vera Cruz.
<i>rufescens luteolus</i> nobis.....	Juquila, Oaxaca.
<i>alleni</i> nobis.....	Mountains near Ozolotepec, Oaxaca.
<i>colimæ colimæ</i> Merriam.....	Sierra Nevada de Colima, Jalisco; altitude, 12,000 feet.
<i>colimæ nerterus</i> Merriam.....	Sierra Nevada de Colima, Jalisco; altitude, 6,500 feet.
<i>dorsalis</i> Merriam.....	Calel, Guatemala.
<i>australis australis</i> Allen.....	Volcan de Irazu, Costa Rica.
<i>australis modestus</i> Thomas.....	Jinotega, Nicaragua.

Subgenus APORODON.

R. levipes group:

<i>Reithrodontomys levipes</i> Merriam.....	San Sebastian, Jalisco.
<i>hirsutus</i> Merriam.....	Ameca, Jalisco.

R. chrysopsis group:

<i>Reithrodontomys chrysopsis chrysopsis</i> Merriam.....	Mount Popocatepetl, Mexico.
<i>chrysopsis tolucae</i> Merriam.....	Volcan Toluca, Mexico.
<i>chrysopsis orizabæ</i> Merriam.....	Mount Orizaba, Puebla.
<i>perotensis</i> Merriam.....	Cofre de Perote, Vera Cruz.

R. mexicanus group:

<i>Reithrodontomys mexicanus mexicanus</i> (De Sausure).....	Mountains of Vera Cruz.
<i>mexicanus goldmani</i> Merriam.....	Metlatoyuca, Puebla.
<i>mexicanus cherrii</i> (Allen).....	San Jose, Costa Rica.
<i>milleri</i> Allen.....	Munchique, Colombia.
<i>söderströmi</i> Thomas.....	Quito, Ecuador.
<i>gracilis</i> Allen & Chapman.....	Chichen Itza, Yucatan.

R. tenuirostris group:

<i>Reithrodontomys tenuirostris tenuirostris</i> Merriam.....	Todos Santos, Guatemala.
<i>tenuirostris aureus</i> Merriam.....	Calel, Guatemala.
<i>creper</i> Bangs.....	Volcan de Chiriqui, Panama.
<i>microdon microdon</i> Merriam.....	Todos Santos, Guatemala.
<i>microdon albilabris</i> Merriam.....	Cerro San Felipe, Oaxaca.

Key to Species and Subspecies.¹

[Based on adults.]

- a. Outer wall of anteorbital foramen decidedly broader than width of interpterygoid fossa; upper molars usually without subsidiary enamel loops.²
 - b. Tail length, 120 mm. or more.
 - c. Greatest length of skull more than 24 mm. *hirsutus* (p. 66).
 - cc. Greatest length of skull less than 24 mm.
 - d. Dorsal area blackish..... *toltecus* (p. 51).
 - dd. Dorsal area not blackish..... *otus* (p. 55).
 - bb. Tail length less than 120 mm.
 - c. Tail length more than 65 mm.
 - d. Ears blackish brown, without ochraceous hairs.
 - e. Underparts whitish.
 - f. Tail length 100 mm. or more.
 - g. Hind foot more than 20 mm..... *tolucæ* (p. 68).
 - gg. Hind foot less than 20 mm..... *alleni* (p. 59).
 - ff. Tail length less than 100 mm.
 - g. Upperparts mainly ochraceous..... *chiapensis* (p. 53).
 - gg. Upperparts mainly blackish or brownish.
 - h. Paler; sides light ochraceous-buff.
 - i. Larger; hind foot more than 18 mm..... *cinereus* (p. 35).
 - ii. Smaller; hind foot less than 18 mm.
 - j. Sides of face pure buff (Arizona)..... *arizonensis* (p. 38).
 - jj. Sides of face ochraceous-buff or grayish.
 - k. Tail length more than 80 mm. (Lower California)
 - peninsulæ* (p. 35).
 - kk. Tail length less than 80 mm.
 - l. Feet gray (California)..... *longicaudus* (p. 33).
 - ll. Feet white..... *nigrescens* (p. 32).
 - hh. Darker; sides dark ochraceous-buff or pinkish cinnamon.
 - i. Skull length less than 21.5 mm.
 - j. Smaller; hind foot less than 17 mm..... *amoles* (p. 40).
 - jj. Larger; hind foot more than 17 mm..... *halicetes* (p. 42).
 - ii. Skull length more than 21.5 mm.
 - j. Tail length more than 80 mm.
 - k. Breadth of braincase more than 11 mm..... *tolucæ* (p. 68).
 - kk. Breadth of braincase less than 11 mm.
 - l. Skull larger, with wider zygomata..... *dorsalis* (p. 61).
 - ll. Skull smaller, with narrower zygomata..... *saturatus* (p. 36).
 - jj. Tail length less than 80 mm.
 - k. Ear from notch more than 13 mm..... *alticolus* (p. 37).
 - kk. Ear from notch less than 13 mm..... *modestus* (p. 63).
 - ee. Underparts ochraceous-buff or pinkish cinnamon.
 - f. Tail unicolor or nearly so.
 - g. Tail length more than 80 mm..... *rufescens* (p. 56).
 - gg. Tail length less than 80 mm..... *raviventris* (p. 41).

¹ Color comparisons made with Ridgway's "Color standards and color nomenclature" (1912).² Present in *leupes*, *hirsutus*, *chrysopsis*, *tolucæ*, *orizabæ*, and *perotensis*.

- ff.* Tail distinctly bicolor.
 - g.* Pelage long; upper molars always with subsidiary enamel loops (except in *colimæ*); habitat above 9,000 feet altitude.
 - h.* Braincase flattened.....*perotensis* (p. 69).
 - hh.* Braincase globular.
 - i.* Larger; tail length more than 95 mm.
 - j.* Breadth of braincase more than 11 mm.....*chrysopsis* (p. 66).
 - jj.* Breadth of braincase less than 11 mm.....*orizabæ* (p. 69).
 - ii.* Smaller; tail length less than 95 mm.....*colimæ* (p. 59).
 - gg.* Pelage short; upper molars usually without subsidiary enamel loops; habitat below 9,000 feet altitude.
 - h.* Skull length less than 22 mm.....*zacatecz* (p. 39).
 - hh.* Skull length more than 22 mm.
 - i.* Larger; hind foot 20–21 mm.
 - j.* Braincase flattened.....*luteolus* (p. 57).
 - jj.* Braincase rounded.....*nerterus* (p. 60).
 - ii.* Smaller; hind foot 18–20 mm.
 - j.* Nasals longer (8–9.7 mm.); black dorsal area well defined.
 - k.* Skull larger, with wider zygomata.....*dorsalis* (p. 61).
 - kk.* Skull smaller, with narrower zygomata.....*saturatus* (p. 36).
 - jj.* Nasals shorter (7.3–8.8 mm.); black dorsal area not well defined.
 - k.* Tail longer (88–101 mm.); (Mexico).....*difficilis* (p. 50).
 - kk.* Tail shorter (82–92 mm.); (Costa Rica).....*australis* (p. 62).
- dd.* Ears light brown or drab, with ochraceous hairs.
 - e.* Underparts buffy or ochraceous.
 - f.* Skull length more than 22.5 mm.
 - g.* Length of nasals more than 8.5 mm.....*toltecus* (p. 51).
 - gg.* Length of nasals less than 8.5 mm.....*levipes* (p. 64).
 - ff.* Skull length less than 22.5 mm.
 - g.* Tail length 105 mm. or more.....*mustelinus* (p. 54).
 - gg.* Tail length less than 105 mm.
 - h.* Upperparts strongly mixed with blackish.
 - i.* Underparts strongly washed with buff.....*difficilis* (p. 50).
 - ii.* Underparts faintly washed with buff.....*aurantius* (p. 48).
 - hh.* Upperparts mainly ochraceous-buff.
 - i.* Larger and paler.....*tenuis* (p. 45).
 - ii.* Smaller and brighter.....*nelsoni* (p. 53).
 - ec.* Underparts white.
 - f.* Tail length more than 104 mm.
 - g.* Larger; skull length 23 mm. or more.....*toltecus* (p. 51).
 - gg.* Smaller; skull length less than 23 mm.....*helvolus* (p. 52).
 - ff.* Tail length less than 104 mm.
 - g.* Skull length less than 20 mm.....*amænus* (p. 55).
 - gg.* Skull length more than 20 mm.
 - h.* Tail length more than 80 mm.
 - i.* Upperparts tawny-ochraceous, or cinnamon mixed with black.
 - j.* Braincase flatter; nasals shorter.....*chiapensis* (p. 53).
 - jj.* Braincase higher; nasals longer.....*aurantius* (p. 48).
 - ii.* Upperparts ochraceous-buff or mixed with blackish.
 - j.* Upperparts mainly ochraceous-buff.
 - k.* Sides deep ochraceous-buff.....*tenuis* (p. 45).
 - kk.* Sides pale ochraceous-buff.

- l. Paler; sides of face grayish.....*fulvescens* (p. 43).
 - ll. Darker; sides of face ochraceous-buff.....*intermedius* (p. 47).
- jj. Upperparts mainly blackish or brownish.
 - k. Skull heavy; interpterygoid fossa broad.
 - l. Paler (less ochraceous).....*intermedius* (p. 47).
 - ll. Darker (more ochraceous).....*aurantius* (p. 48).
 - kk. Skull light; interpterygoid fossa narrow.....*catalinae* (p. 40).
- hh. Tail length less than 80 mm.
 - i. Upperparts mainly deep ochraceous-buff.....*longicaudus* (p. 33).
 - ii. Upperparts mainly light ochraceous-buff or brownish.
 - j. Skull length more than 21.5 mm.....*aztecus* (p. 30).
 - jj. Skull length less than 21.5 mm.
 - k. Tail longer; ear 12-13 mm.....*megalotis* (p. 26).
 - kk. Tail shorter; ear 10-11 mm.....*dychei* (p. 30).
- cc. Tail length less than 65 mm.
 - d. Upperparts mainly grayish or light buff, mixed with black.
 - e. Black dorsal stripe distinct; ears usually with blackish patches.
 - f. Paler; skull heavier.....*albescens* (p. 22).
 - ff. Darker; skull lighter.....*griseus* (p. 23).
 - ee. No distinct dorsal stripe; ears without blackish patches.
 - f. Darker and more ochraceous.....*dychei* (p. 30).
 - ff. Paler and less ochraceous.
 - g. Larger; skull broader.....*megalotis* (p. 26).
 - gg. Smaller; skull narrower.....*montanus* (p. 24).
 - dd. Upperparts mainly blackish or dark brown.
 - e. Upperparts Prout's brown.
 - f. Ear from notch 8-9 mm.....*impiger* (p. 20).
 - ff. Ear from notch 9-10 mm.....*humilis* (p. 19).
 - ee. Upperparts sooty or with blackish stripe.....*merriami* (p. 21).
- aa. Outer wall of anteorbital foramen usually narrower than width of interpterygoid fossa;¹ upper molars always with subsidiary enamel loops.
- bb. Skull length more than 25 mm.
 - c. Upperparts tawny or ochraceous-tawny.
 - d. Upperparts tawny.....*tenuirostris* (p. 78).
 - dd. Upperparts ochraceous-tawny.....*aureus* (p. 78).
 - cc. Upperparts mummy-brown (Panama).....*creper* (p. 79).
- bb. Skull length less than 25 mm.
 - c. Rostrum long and slender; braincase inflated.
 - d. Darker; underparts (in adult) pinkish cinnamon.....*microdon* (p. 80).
 - dd. Paler; underparts white.....*albilabris* (p. 80).
 - cc. Rostrum short and broad; braincase not inflated.
 - d. Upperparts tawny or cinnamon-brown.
 - e. Colors darker; skull smaller.....*mexicanus* (p. 70).
 - ee. Colors paler; skull larger.
 - f. Upperparts bright tawny.....*cherrii* (p. 73).
 - ff. Upperparts dull tawny or brownish.
 - g. Smaller; underparts white.....*milleri* (p. 74).
 - gg. Larger; underparts buffy.....*söderströmi* (p. 75).
 - dd. Upperparts pinkish cinnamon.
 - e. Skull length less than 23 mm.....*gracilis* (p. 76).
 - ee. Skull length more than 23 mm.....*goldmani* (p. 72).

¹ In *gracilis* of about equal width or slightly broader.

Subgenus REITHRODONTOMYS Giglioli.

Subgeneric characters.—Enamel pattern of upper molars simple, the first and second each with two outer reëntrant angles, usually without accessory tubercles.¹

REITHRODONTOMYS HUMULIS GROUP.

REITHRODONTOMYS HUMULIS HUMULIS (Bachman).

EASTERN HARVEST MOUSE.

(Pl. I, fig. 1; Pl. IV, fig. 1.)

Mus humilis Aud. & Bach., Proc. Acad. Nat. Sci. Phila., I, 1841, pp. 97-98.

Mus leontii Aud. & Bach., Journ. Acad. Nat. Sci. Phila., VIII, 1842, p. 307 (Georgia, taken by Major John Le Conte).

Mus humilis Aud. & Bach., Quad. N. Am., II, 1851, pp. 103-106, Plate LXV.

Reithrodon lecontei Le Conte, Proc. Acad. Nat. Sci. Phila., VI, 1853, p. 413.

Reithrodon humilis Baird, Mamm. N. Am., 1857, p. 448.

Ochetodon humilis Coues, Proc. Acad. Nat. Sci. Phila., 1874, p. 185 [part].

Reithrodontomys humilis Rhoads, Proc. Acad. Nat. Sci. Phila., 1894, p. 161.

Reithrodontomys leontii Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 116.

Reithrodontomys humilis dickinsoni Rhoads, Amer. Nat., XXIX, 1895, p. 590 (Willow Oak, Florida).

Reithrodontomys humilis Rhoads and Young, Proc. Acad. Nat. Sci. Phila., 1897, p. 309.

Reithrodontomys humilis Osgood, Proc. Biol. Soc. Wash., XX, 1907, pp. 49-50 (name formally reinstated).

Type locality.—Charleston, S. C.

Distribution.—Southeastern United States, east of the Alleghenies, from southern Virginia to central Florida.

Characters.—Size small; color dark brown; skull narrow, with highly arched cranium and heavy rostrum.

Color.—General tone of upperparts about Prout's brown, being a mixture of blackish brown and pinkish cinnamon, usually darkest along median line; underparts ashy, usually with a tinge of light pinkish cinnamon; tail bicolor, fuscous or hair-brown above, grayish white below; ears fuscous or fuscous-black; feet grayish white. Immature specimens are more fuscous above with slight admixture of brown.

Skull.—Braincase narrow, highly arched; rostrum short and broad; nasals broad, ending nearly on a line with end of premaxillæ; zygomatica parallel or slightly contracted anteriorly; palatal foramina broadest in the middle, ending posteriorly about on a line with plane of first molars; bullæ rather small and elongated.

Measurements.—Average of 5 adults from Georgia and South Carolina: Total length, 120 (114-124); tail vertebræ, 57 (53-60); hind foot, 16 (15-17); ear, 9.5 (9-10). Average of 8 adults from Dismal Swamp, Va.: 122; 56; 16; (ear) 9.6. Skull: (See table, p. 81).

Remarks.—This little species—the first member of the genus to be described—has a rather extensive range in the South Atlantic States, from southern Virginia to Florida. In Georgia, Alabama, and Florida

¹ Small tubercles irregularly present in some species, particularly *R. rufescens* and *R. dorsalis*.

the typical race shades insensibly into the subspecies *merriami* of the Mississippi Valley. Specimens from North Carolina and Virginia, as might be expected, exhibit the specific characters in their most pronounced form, the color of the upperparts being uniformly brownish. Specimens from Florida are intermediate but nearer on the whole to *humilis*. In a series of three from Kissimmee one is clearly *humilis*, while the others might without impropriety be referred to *merriami*. The skulls, however, are nearer to *humilis*. The type of "*dickinsoni*," from Willow Oak, is a very dark specimen, but is in the uniform sooty pelage indicative of immaturity. It is closely similar to numerous individuals of *merriami* examined from Alabama and Louisiana. A single specimen from Tarpon Springs, however, can be exactly matched by specimens of *humilis* from the coast of Georgia. In the absence

FIG. 1.—Distribution of *Reithrodontomys humilis*, *R. albescens*, and subspecies.

of suitable material the west Florida form is provisionally referred to *humilis*, but a larger series may show it to be nearer *merriami*.

Specimens examined.—Total number, 96, from the following localities:

Virginia: Dismal Swamp, 17.

North Carolina: Chapanoke, 1; Currituck, 4; Moran, 1; Raleigh, 53.

South Carolina: Georgetown, 1.

Georgia: Riceboro (Le Conte Plantation), 8.

Florida: Enterprise, 1;¹ Gainesville, 4;¹ Kissimmee, 3; Sawgrass Island, Polk County, 1; Tarpon Springs, 1;² Willow Oak, Pasco County, 1.²

REITHRODONTOMYS HUMILIS IMPIGER Bangs.

SMALL-EARED HARVEST MOUSE.

Reithrodontomys leontii impiger Bangs, Proc. Biol. Soc. Wash., XII, 1898, p. 167.

Type locality.—White Sulphur Springs, W. Va.

Distribution.—Northern Virginia and mountains of West Virginia.

¹ Collection Field Mus. Nat. Hist.

² Collection Acad. Nat. Sci. Phila.

Characters.—Closely similar in size and color to *humulis*; ears decidedly smaller.

Color.—Not appreciably different from that of *humulis*.

Skull.—Closely similar to that of *humulis*.

Measurements.—Average of 9 adults from type locality: Total length, 116 (114–122); tail vertebræ, 53 (50–57); hind foot, 15.7 (15–16.5); ear from notch, 8.7 (8–9). Skull: (See table, p. 81).

Remarks.—This subspecies is a rather poorly marked race of *humulis* occupying the northern end of the range of the species. In the series from the type locality—White Sulphur Springs, W. Va.—I have been unable to see any color differences to distinguish it from *humulis* from the coast of the Carolinas. Three specimens from the vicinity of Washington, D. C., however, are considerably paler than the series of topotypes, with which they agree in having very small ears. These may represent an undescribed race, but it seems best not to name it until more material can be secured.

Specimens examined.—Total number, 12, from the following localities:

West Virginia: White Sulphur Springs, 9.

Virginia: Alexandria, 1; Falls Church, 1; Fort Myer, 1.

REITHRODONTOMYS HUMULIS MERRIAM Allen.

MERRIAM HARVEST MOUSE.

(Pl. I, fig. 2; Pl. IV, fig. 2; Pl. VII, fig. 8.)

Reithrodontomys merriami Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 119.

Type locality.—Austin Bayou, near Alvin, Tex.

Distribution.—Coast region of east Texas and southern Louisiana north to northeastern Kentucky and West Virginia; east to Alabama; limits of range imperfectly known.

Characters.—Similar to *humulis*, but upperparts blacker and grayer (less brownish); ears smaller and blacker.

Color.—*Adults*: Upperparts mixed blackish and light pinkish cinnamon, the black prevailing and forming usually a well-defined stripe in middle of back. Specimens in full, unworn pelage show an indistinct lateral stripe of light pinkish cinnamon. Ears blackish brown; tail fuscous above, grayish white below; underparts grayish, sometimes with a distinct wash of light pinkish cinnamon. Some specimens in worn pelage have a broad median dorsal band of black and scarcely any cinnamon on the sides. *Young*: Upperparts fuscous-black, practically without cinnamon hairs.

Skull.—Practically identical in size and proportions with that of *humulis*, but rostrum slightly heavier.

Measurements.—Average of 7 adults from type locality: Total length, 113 (107–128); tail vertebræ, 54 (51–60); hind foot, 16 (15.5–17). Skull (see table, p. 81).

Remarks.—This subspecies is a slightly differentiated race of *humulis*, with which it is connected by a complete series of intergrades. Indeed, occasional specimens of *humulis* from localities within the range of the typical race are difficult to distinguish from *merriami*. The differences are perhaps most evident on comparing individuals of the two forms in worn pelage, *merriami* being in that condition decidedly sooty, while *humulis* is a warm brown. Three specimens from Lexington, Ky., seem referable to this subspecies, but one from Ceredo, in the extreme western corner of West Virginia, is intermediate in color between *merriami* and *humulis*.

Specimens examined.—Total number, 37, from the following localities:

Texas: Austin Bayou near Alvin, 8; Richmond, 2.

Louisiana: Hackley, 1; Lafayette, 3; Mermentau, 3.¹

Alabama: Barachias, 5; Carlton, 1; Dean, 1; Jackson, 2; York, 7.

Kentucky: Lexington, 3.

West Virginia: Ceredo, 1.

REITHRODONTOMYS ALBESCENS ALBESCENS Cary.

PALLID HARVEST MOUSE.

(Pl. I, fig. 4; Pl. IV, fig. 4.)

Reithrodontomys albescens Cary, Proc. Biol. Soc. Wash., XVI, 1903, p. 53.

Reithrodontomys montanus albescens Cary, N. Am. Fauna No. 33, 1911, p. 110.

Type locality.—Eighteen miles northwest of Kennedy, Nebr.

Distribution.—Sand-hill region of Nebraska and western South Dakota; west to Loveland, Colo.

Characters.—Similar to *R. montanus*, but paler, with a more distinct dorsal stripe; ears smaller; skull shorter and broader.

Color.—*Unworn winter pelage* (November): Upperparts mixed blackish and light buff, darkest on the median line and shading to pure buff on the sides; ears buffy, usually with two rather large brownish or blackish patches; tail sharply bicolor, dark hair-brown above, white below; feet soiled whitish; underparts pure white. *Worn summer pelage* (October): Upperparts mixed ochraceous-buff and blackish, the buff prevailing, shading to light ochraceous-buff on sides. A gray phase occurs in which the upperparts are mixed blackish and pale mouse-gray, with very slight admixture of buff.

Skull.—Shorter and relatively broader than that of *montanus*; rostrum short and heavy; zygomata heavy and widely expanded.

Measurements.—Average of 6 adults from Nebraska: Total length, 125 (121-129); tail vertebræ, 53.4 (50-56); hind foot, 16.7 (16.5-17). Skull (see table, p. 81).

Remarks.—This handsome mouse is the palest member of the genus. According to Cary it occurs only in sand-hills or on sandy land. At

¹ Collection Field Mus. Nat. Hist.

Kennedy and Neligh, Nebr., it has been taken in the same weed patches with *R. megalotis dychei*. It may be distinguished from the latter by its smaller size, paler and less ochraceous coloration, and small ears with distinct black spots.

Although closely resembling *montanus* in color, it differs considerably from it in cranial characters, and no evidence of intergradation between the two species has been obtained. In southern Nebraska it grades into the subspecies *griseus*.

Specimens examined.—Total number, 25, from the following localities:

Nebraska: Kennedy, 1; 18 miles northwest of Kennedy, 4; Neligh, 8; Niobrara, 1; Niobrara River, 10 miles south of Cody, 2; Verdigris, 4.
South Dakota: Belle Fourche River (15 miles from mouth), 1.
Colorado: Loveland, 4.¹

REITHRODONTOMYS ALBESCENS GRISEUS Bailey.

LITTLE GRAY HARVEST MOUSE.

(Pl. I, fig. 3; Pl. IV, fig. 3.)

Reithrodontomys dychei Allen, Bull. Am. Mus. Nat. Hist., VIII, 1896, p. 67 (not of VII, 1895, p. 120).

Reithrodontomys griseus Bailey, N. Am. Fauna No. 25, 1905, p. 106.

Type locality.—San Antonio, Tex.

Distribution.—Southern Nebraska, Kansas, Oklahoma, central and western Texas, and eastern New Mexico. Limits of range imperfectly known.

Characters.—Similar to *albescens* but colors darker and skull narrower; much paler and grayer than *merriami*.

Color.—Upper parts mixed black and light ochraceous-buff, the black predominating and usually forming an indistinct stripe along the median line; lateral line of buff very faintly indicated; buff on sides of head darker than in *montanus*; ears same color as back, usually with a large blackish patch on exterior surface; tail sharply bicolor, hair-brown above, grayish white below.

Skull.—Similar to that of *albescens*, but zygomata weaker and less widely expanded and rostrum narrower. Compared with *merriami*: Braincase less elongated; rostrum slenderer; zygomata more widely expanded posteriorly; interpterygoid fossa averaging narrower; bullae less elongated. Compared with *montanus*: Braincase shorter and relatively broader, with shorter rostrum; zygomata more contracted anteriorly.

Measurements.—Average of 9 specimens (mostly immature) from type locality: Total length, 115 (107–120); tail vertebrae, 54 (48–61); hind foot, 14.6 (14–16).² Average of 2 adults from Clyde and San

¹ Collection of G. S. Miller, jr.

² The total length is probably less than in adult specimens and the foot measurements are apparently smaller in some cases than they should be.

Angelo, Tex.: 142; 60; 15. Average of 8 (subadult) from Alva, Okla.: 117; 51.5; 16. Skull: (See table, p. 81).

Remarks.—Although clearly belonging in the same group with *R. humilis merriami*, this form appears not to intergrade with it. In both skin and skull characters it agrees closely with *albescens* and differs widely from *merriami*, its nearest relative geographically. Specimens from Kansas and Oklahoma and one from Santa Rosa, N. Mex., can not be distinguished from typical examples.

Specimens examined.—Total number, 82, from the following localities:

Nebraska: London, 2.

Kansas: Onaga, 18; Pendennis, 5; Trego County, 10.

Oklahoma: Alva, 12.¹

Texas: Clyde, 1; Gainesville, 1; Mason, 9; San Angelo, 1; San Antonio, 22.

New Mexico: Santa Rosa, 1.

REITHRODONTOMYS MEGALOTIS GROUP.

REITHRODONTOMYS MONTANUS (Baird).

SAN LUIS VALLEY HARVEST MOUSE.

(Pl. I, fig. 5; Pl. IV, fig. 5.)

Reithrodon montanus Baird, Proc. Acad. Nat. Sci. Phila., VII, 1855, p. 335; Mamm. N. Am., 1857, p. 449.

Ochetodon montanus Coues, Proc. Acad. Nat. Sci. Phila., 1874, p. 186.

Reithrodontomys montanus Allen, Bull. Am. Mus. Nat. Hist., V, 1893, p. 80; VII, 1895, p. 123; Cary, N. Am. Fauna No. 33, 1911, p. 108.

Type locality.—"Rocky Mountains, latitude 38°" [upper end San Luis Valley, Colo., near San Luis Lakes].

Distribution.—San Luis Valley, Colo.

Characters.—Size medium (smaller than *R. m. megalotis*, larger than *R. a. griseus*); ears small; color slightly paler and less ochraceous than in *megalotis*; skull similar to that of *megalotis* but smaller and narrower. Compared with *R. a. albescens* and *R. a. griseus*: No distinct blackish dorsal stripe; skull relatively longer and narrower; tail slightly longer.

Color.—*Fresh winter pelage* (October and November): Light buff, clearest on sides and face, much mixed with blackish on dorsal surface; black hairs most pronounced on hinder back; no distinct median line of black; ears dark hair-brown, often clothed on inner surface with ochraceous-buff hairs (a little darker than body hairs), rarely with a distinct blackish area on lower outer margin; tail distinctly bicolor, dark hair-brown above, white beneath; feet and underparts white. Compared with *megalotis*, the general tone is paler and less intensely ochraceous; the sides light buff instead of ochraceous-buff.

¹ Collection Field Mus. Nat. Hist.

Skull.—Similar in shape to that of *R. m. megalotis*, but smaller and braincase relatively narrower; zygomata (in adults) with sides parallel. Compared with *R. a. griseus*: Longer and relatively narrower, with longer rostrum.

Measurements.—Average of 10 specimens (including adults and subadults) from Medano Ranch, near Mosca, Colo.: Total length, 126 (118–139); tail vertebrae, 58 (51–64); hind foot, 17 (16–17); ear from notch, 11.2 (11–12). Skull: (See table, p. 81).

Remarks.—This species, the second member of the genus to be recognized, was described by Baird in 1855 from a single specimen, and until within the last few years has remained practically unknown. Efforts were made by the Biological Survey field party in 1904 to secure specimens from the San Luis Valley and a single immature individual was caught at Del Norte by Vernon Bailey. In the autumn of 1907, Merritt Cary trapped for about 10 days at Medano Ranch, 15 miles northeast of Mosca, and succeeded in securing a series of 20 specimens, including several adults, which for the first time made possible accurate comparison and characterization of the species. Most of the specimens taken by Cary were caught in a grassy weed-patch on a broad sand-ridge extending through the meadows and perhaps 6 feet above their level. None was taken in wet situations.

Dr. J. A. Allen has determined the approximate type locality of this species from a careful study of the records of Capt. Beckwith's expedition, on which the type was secured.¹ The type specimen (No. 13 of the expedition) was collected in August, 1853, in the upper end of the San Luis Valley, at some point between Fort Massachusetts and Sawatch Creek. The route of the expedition was northward along the east side of the valley to a point a little north of 38° latitude, and thence westward across the valley not far from the present town of Saguache.² The second camp of the party, on the night of August 24, was on a small stream "nearly opposite to Roubideau's or Mosca Pass," about 21 miles from Fort Massachusetts. The specimens collected by Cary in 1907 were taken along the very creek on which the Beckwith party camped, now called Medano Creek. The type may have been taken on this creek or at one of the other camping places a few miles farther north.

Even with a series of 20 topotypes, the relationships of this species are not entirely clear. This uncertainty is due in part to the fact that the topotype series includes only two adults, one of which has the skull broken, and in part to the failure to find in the series a single skull that agrees with that of the type. The latter, an adult with moderately worn teeth, is decidedly smaller and has a much

¹ See Bull. Am. Mus. Nat. Hist., VII, 1895, pp. 124–125.

² See Expl. & Surv. Pac. R. R., II, pp. 41–45, and map accompanying Vol. XI.

shorter rostrum than the two adults taken by Cary at Medano Ranch, thus closely agreeing with specimens of *R. a. griseus* from Texas. The rostrum of this specimen is deflected markedly to the right, indicating an injury during life, which may account for its small size and peculiar characters. The original description of the color accords perfectly with the series now in hand, so that there seems no alternative but to consider the type skull aberrant, and to continue to use the name for the form represented by the modern series.

The species, although combining in a remarkable degree the characters of the *megalotis* and *albescens* groups, seems not to be directly connected with either of them. It is perhaps best placed in the *megalotis* group, but seems not to intergrade with any member of it.¹

Though but little smaller than *R. m. megalotis*, it is markedly smaller than *aztecus*—the form ranging through northern New Mexico, nearest to the home of *montanus*. It may be distinguished from both *megalotis* and *aztecus* by smaller size, particularly of the ears and tail, and by paler and less ochraceous coloration. Externally it much resembles *R. a. albescens* but is somewhat darker and has larger ears and feet. The nearest approach geographically of *R. albescens griseus* to the range of *montanus* is at Santa Rosa, N. Mex., and the single specimen taken there shows no departure from typical *griseus*.

Specimens examined.—Total number, 21, from the following localities:

Colorado: Del Norte, 1; Medano Ranch (15 miles northeast of Mosca), 20.

REITHRODONTOMYS MEGALOTIS MEGALOTIS (Baird).

DESERT HARVEST MOUSE.

(Pl. I, fig. 6; Pl. IV, fig. 6; Pl. VII, figs. 1, 7.)

Reithrodon megalotis Baird, Mamm. N. Am., 1857, p. 451.

Reithrodontomys megalotis Allen, Bull. Am. Mus. Nat. Hist., V, 1893, p. 79; VII, 1895, p. 125.

Reithrodontomys megalotis deserti Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 127 (Oasis Valley, Nev.).

Reithrodontomys megalotis sestiniensis Allen, Bull. Am. Mus. Nat. Hist., XIX, 1903, p. 602 (Rio Sestín, northwestern Durango).

Type locality.—Between Janos, Chihuahua, and San Luis Springs, N. Mex.

Distribution.—From northern Nevada and southern Idaho south to Zacatecas, Mexico; occupying the greater part of Nevada, Arizona, and Utah (except eastern part); southern New Mexico; western Texas (west of Pecos River); desert regions of southern and northeastern California, northeastern Lower California, and northern Sonora; and northern portion of Mexican table-land.

¹ Cary's assignment of this species to the *albescens* group (N. Am. Fauna No. 33, 1911, p. 108) was on the authority of the present writer, who, after more detailed study, has reached the conclusions set forth above.

Characters.—Size medium (larger than *R. montanus* and smaller than *R. f. fulvescens*); general tone brownish buff above and white below; ears usually without dark markings.

FIG. 2.—Distribution of *Reithrodontomys montanus*, *R. megalotis*, and subspecies.

Color.—*Unworn winter pelage:* Upperparts mixed blackish brown and light ochraceous-buff, darkest in middle of back, shading to nearly pure buff on sides; feet and underparts white; tail hair-brown above, whitish below; ears drab, usually with a tuft of ochraceous-buff hairs at base. *Unworn summer pelage:* Similar to the fresh

winter pelage, but colors less strongly contrasted and black variations of upperparts much reduced. *Worn spring and summer pelage:* General tone browner and colors less contrasted than in the winter pelage, the buff on sides less pronounced and often lacking.

Skull.—Larger than that of *montanus*, with broader, flatter braincase. Compared with *fulvescens* and *tenuis*: Slightly smaller, with longer palatal foramina and narrower interpterygoid fossa.

Measurements.—Average of 6 adults from type region (Casas Grandes, Chihuahua; Mexican boundary, 50 to 100 miles west of El Paso; and Organ Mountains, N. Mex.): Total length, 140 (128–145); tail vertebrae, 71 (65–77); hind foot, 17.6 (17–18.5); ear from notch, 12.5 (12–13.2). Average of 12 adults from Lone Pine, Cal.: 139; 70; 17.5; of 10 adults from Oasis Valley, Nev. (measured to end of tail hairs): 139; 72; 18.4. Skull: (See table, p. 81).

Remarks.—This subspecies has the widest range of any of the forms of *megalotis* and is subject to considerable individual variation, both in color and in size of skull. It intergrades with *aztecus* in central New Mexico, with *longicaudus* in California, with *nigrescens* in southern Idaho, and with *cinereus* in central Mexico. The present writer is in accord with Dr. J. A. Allen, who revised the group in 1895, in his failure to find any constant color differences between the series from the deserts of Nevada and California and that from the type region (southern New Mexico and northern Chihuahua), individuals in comparable pelage from the two regions being practically indistinguishable. Specimens from the Death Valley region of southern California and Nevada have slightly larger skulls than those of the typical form from Chihuahua and southern New Mexico but smaller than those of *aztecus*. These have been separated as a subspecies, "*deserti*" by Dr. Allen on the basis of an alleged difference in the relative length of body and tail. A careful comparison of measurements of adult specimens from the two regions, however, fails to show any appreciable differences in proportion. The apparent differences shown in Dr. Allen's published measurements probably are due in part to differences in methods of measurement and in part to the inclusion of a greater number of immature examples in the series from New Mexico and Utah. The cranial differences are considered too slight and inconstant to warrant recognition of the form by name.

A large series from the Colorado River, Sonora, at Monument No. 204, Mexican boundary, are practically typical *megalotis*. Two individuals from Volcano Lake, head of Hardy River, Lower California, are very small, but no smaller than an individual in the series from Casas Grandes, Chihuahua, quite close to the type locality.

A large series from various places in northwestern Nevada and a small series from Salt Lake Valley, Utah, are fairly typical *megalotis*, having slightly smaller skulls than the Death Valley series and thus showing no approach to *aztecus*.

Intergradation with *longicaudus* is perfectly shown by a large series from the Mojave Desert in southern California. In color these specimens are intermediate between the two races, but rather nearer to *megalotis*, while in skull characters they most resemble *longicaudus*. Some individuals in the series much resemble *nigrescens*, but are generally more suffused with buff. A series from the south fork of Kern River, Cal., are nearly typical *megalotis* but slightly browner.

In New Mexico the typical form occurs only in the extreme southern part, near the Mexican boundary, a gradual increase in size of skull being observed as we proceed northward toward the range of *aztecus*. Southward over the Mexican table-land there is no perceptible change in color as far as Zacatecas. Specimens from northwestern Durango, described by Allen under the name "*sestinensis*," do not differ appreciably from the typical form.

Specimens examined.—Total number, 415, from the following localities:

Idaho: American Falls, 2; Swan Lake, 1.

California: Amedee, 2; Argus Mountains, 1; Barstow, 12; Bishop Creek, 1; Cartago, Owens Lake, 10; Colorado River (opposite Parker, Ariz.), 4; Emigrant Spring, 1; Fort Yuma, 1; Furnace Creek, Death Valley, 5; Grapevine Spring, 4; Keeler, 4; Lone Pine, 30; Long Valley (Lassen County), 4; Mojave, 3;¹ Olanche, Owens Lake, 22; Owens Valley, 8; Onyx, south fork of Kern River, 19;¹ Panamint Mountains, 7; Panamint Valley, 2; Pilot Knob, 8; Resting Spring, 3; Saratoga Spring, 3; Shepherd Canon, Argus Mountains, 1; Tehachapi, 20;¹ Twelve Mile Spring, Inyo County, 1; Victorville, 1.^{1, 2}

Nevada: Ash Meadows, 30; Carson Sink, 1; Fallon, 5; Gardnerville, 1; Grapevine Mountains, 2; Oasis Valley, 16; Pahrnatag Valley, 4; Pahrump Valley, 11; Panaca, 1; Pine Forest Mountains, 7;³ Quinn River Crossing, 20;³ St. Thomas, 1; Smoky Creek, 1; Vegas Valley, 5; Verdi, 3; Virgin Valley, 1.³

Arizona: Colorado River at Monument No. 204, Mexican boundary, 27; Fairbank, 2; Grand Canyon (Indian Gardens), 2; Lee's ferry, 1; Parker, 5; St. Johns, 2; Winslow, 17; Zuni River, 1.

New Mexico: Animas Valley, 1; Deming, 3; Dry Creek, Socorro County, 3; Fairview, 1; Gallo Canyon, 35 miles southeast of Corona, 1; Gila, Grant County, 1; Glenwood, 1; Jicarilla Mountains, 1; Kingston, 2; Las Cruces, 3; Las Palomas, 5; Mesa Jumanes, 2; Monument No. 15, Mexican boundary, 1; Monument No. 40, Mexican boundary, 3; Organ Mountains, 3; Pleasanton, 1; Redrock, Grant County, 1; Roswell, 1; San Andreas Mountains, 2; San Mateo Mountains, Socorro County, 2; Silver City, 3; Tularosa, 5.

Texas: Alpine, 1; 25 miles west of Fort Stockton, 1; Franklin Mountains, 1; Guadalupe Mountains, 1; Pecos City, 1.

Lower California: Gardners Lagoon, 1; Seven Wells, 2.

Sonora: Cienega Well, 30 miles south of Monument No. 204, Mexican boundary, 1.

Chihuahua: Casas Grandes, 4; Chihuahua, 2.

Coahuila: Saltillo, 1; Sierra Guadalupe, 1.

Durango: Rio Sestin, 4.⁴

Zacatecas: Zacatecas, 2.

¹ Approaching *longicaudus*.

² Received from Jos. Grinnell.

³ Collection Mus. Vert. Zool., Univ. of Cal.

⁴ Collection Amer. Mus. Nat. Hist.

REITHRODONTOMYS MEGALOTIS AZTECUS Allen.

AZTEC HARVEST MOUSE.

Reithrodontomys aztecus Allen, Bull. Am. Mus. Nat. Hist., V, 1893, p. 79.

Type locality.—La Plata, N. Mex.

Distribution.—Northern New Mexico, northeastern Arizona, southeastern Utah, and western Colorado, north to Grand Junction and Rifle.

Characters.—Similar to *megalotis* but with larger ears and skull.

Color.—Not appreciably different from that of *megalotis*; ears sometimes with irregular dusky blotches.

Skull.—Decidedly larger than that of *megalotis*.

Measurements.—Average of 7 adults from La Plata and Aztec, N. Mex., and Noland Ranch, Utah: Total length, 144 (133–155); tail vertebræ, 68 (62–73); hind foot, 18 (17–19); ear from notch, 13.8 (12–15.5). Skull (see table, p. 81).

Remarks.—This subspecies does not differ from *megalotis* in color, but its skull is so much larger that it seems desirable to recognize the race. The ears average larger, also, in the series from the type region. Dr. Allen provided the form with a provisional name many years ago, but later placed it in synonymy.

This race is connected with *megalotis* by a complete series of intergrades from New Mexico and Arizona. The specimens from Datil and Manzano Mountains are too young to be satisfactorily identified, but are provisionally referred to *aztecus*.

Specimens examined.—Total number, 143, from the following localities:

New Mexico: Aztec, 39; Espanola, 8; Farmington, 4; Fruitland, 6; Gallup, 1; Guadalupita, 1; La Plata, 32; Las Vegas, 2; Manzano Mountains, 1; Rinconada, 1; Rio Puerco, 4; Wingate, 2.

Arizona: Canyon de Chelly, 1.

Utah: Bluff City, San Juan River, 4; Noland Ranch, San Juan River, 5.

Colorado: Arboles, 1; Ashbaugh's Ranch, Montezuma County, 2; Cortez, 1; Grand Junction, 26; Rifle, 2.

REITHRODONTOMYS MEGALOTIS DYCHEI Allen.

PRAIRIE HARVEST MOUSE.

(Pl. I, fig. 7; Pl. IV, fig. 7.)

Reithrodontomys dychei Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 120.

Reithrodontomys dychei nebrascensis Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 122 (Kennedy, Nebr.).

Reithrodontomys griseus Ruthven & Wood, Proc. Iowa Acad. Sci., XIX, 1912, p. 204 (not of Bailey).¹

Type locality.—Lawrence, Kans.

¹ Misidentification of specimen by the present writer.

Distribution.—Greater part of Kansas, Nebraska, Iowa, Missouri, and South Dakota; southern North Dakota; southeastern Montana; eastern Colorado and eastern Wyoming.

Characters.—Similar to *megalotis*, but black of upperparts more extensive and ochraceous shades more intense; ears slightly smaller; tail shorter.

Color.—*Full winter pelage* (topotypes): Upperparts mixed black and light ochraceous-buff; in some specimens the median dorsal area is noticeably darker, in others the color is nearly uniform over the whole back; sides clear buff, the lateral line sometimes, though not always, well-marked; ears hair-brown externally, thinly clothed with buffy hairs on inner surface, and with a tuft of ochraceous-buff hairs at anterior base; feet and underparts white; tail sharply bicolor, dark hair-brown above, white beneath.

Skull.—About same size as that of *megalotis* (smaller than that of *aztecus*); rostrum shorter and broader.

Measurements.¹—Type: Total length, 133; tail vertebræ, 52; hind foot, 15.5. Average of 6 nearly adult specimens from eastern Nebraska (Neligh and Verdigris): Total length, 135 (130–142); tail vertebræ, 61 (57–65); hind foot, 17.5 (16.5–18); ear from notch, 10.5 (10.3–11.1). Average of 8 adults from Kennedy, Nebr.: 133; 63; 17.5; 10.8. Skull: (See table, p. 81).

Remarks.—This form clearly belongs in the *megalotis* group and apparently intergrades with *aztecus*, as indicated by specimens from central Colorado (Loveland, Greeley, and Canon City). These average slightly paler and grayer than the typical form and their skulls are intermediate in size, with somewhat longer rostri than in typical *dychei*.

The series from Kennedy, Nebr., on which Dr. Allen based the subspecies "*nebrascensis*" seem to be indistinguishable from specimens of typical *dychei* in comparable pelage. At many localities in Nebraska and Kansas *R. albescens griseus* occurs with the present species, and although occasional specimens are hard to distinguish by color alone, yet in size and cranial characters the species are distinct. Dr. Allen confused the two in his original description of *dychei*, the series listed from Onaga, Kans., and London, Nebr., being referable to *griseus*. The latter race may be distinguished from *dychei* by its smaller size, shorter tail, and smaller skull with short rostrum and short palatal foramina. In coloration *dychei* is more intensely ochraceous than *griseus* and often not conspicuously darkened on the dorsal area; *griseus* is distinctly grayer and the ochraceous-buff of the sides is paler and less extensive.

¹ The great variation in the measurements of this species given by Dr. Allen in the original description indicates that probably many of the specimens were immature and the average therefore too small.

Specimens examined.—Total number, 153, from the following localities:

- North Dakota:** Ellendale, 2; Fort Clark, 4; Hankinson, 4; Ludden, 2; Oakes, 1.
South Dakota: Clay County, 2.
Montana: Billings, 5; Fort Custer, 4.
Wyoming: Arvada, 4; Casper, 1; Meadow, 1; Pole Creek, Laramie County, 1; Splitrock, 3; Sun, 3.
Colorado: Boulder, 1; Canon City, 5; Denver, 2; Golden, 2; Greeley, 1; Loveland, 14; Valmont, 1.
Kansas: Cloud County, 2;¹ Lawrence, 9;² Neosho Falls, 1; Onaga, 18; Pen-dennis, 5.
Nebraska: Alliance, 2; Beemer, 1; Callaway, 3; Cherry County, 1; 10 miles south of Cody, 1; Columbus, 3; Ewing, 1; Glen, Sioux County, 1; Haigler, 2;³ Kearney, 2; Kennedy, 12; 18 miles northwest of Kennedy, 5; Neligh, 9; Norfolk, 1; Two Mile Lake, Cherry County, 1; Valentine, 2; Verdigris, 2.
Iowa: Atlantic, 2; Hillsboro, 2; Palo Alto County, 1.⁴
Missouri: St. Louis, 1; Thayer, 2.

REITHRODONTOMYS MEGALOTIS NIGRESCENS subsp. nov.

DUSKY HARVEST MOUSE.

Type from Payette, Idaho. No. 201616, U. S. Nat. Mus., Biological Survey Collection, ♂ adult, June 9, 1913; L. E. Wyman. Original No. 98.

Distribution.—Eastern Oregon and western Idaho; north to Prescott, Wash., south to Bieber, Cal.

Characters.—Similar to *megalotis*, but upperparts more blackish and less buffy; grayer and less ochraceous than *longicaudus*.

Color.—*Winter pelage:* Upperparts mixed blackish and pale ochraceous-buff, the black predominating on dorsal area; lateral line of buff only faintly indicated; ears hair-brown, clothed with ochraceous hairs; tail blackish brown above, white below; feet and underparts white. *Summer pelage* (July): General tone of upperparts more brownish and less blackish than in winter pelage.

Skull.—Closely similar to that of *megalotis*, but with slightly longer nasals.

Measurements.—Average of 7 adults from Idaho: Total length, 144 (140–153); tail vertebrae, 68 (63–75); hind foot, 17 (16–18). Skull: (See table, p. 81).

Remarks.—This race occupies the extreme northwestern part of the range of the species, chiefly in a region of old lava beds where the soil is richer and vegetation more abundant than in the more arid deserts to the southward. It is most nearly related to *megalotis*, but probably intergrades also with *longicaudus*.

¹ Collection Kansas Univ. Mus.

² Collection Am. Mus. Nat. Hist.

³ Collection Univ. of Nebraska.

⁴ Collection Univ. of Michigan.

Specimens examined.—Total number, 36, from the following localities:

Washington: Prescott, 7.

Oregon: Narrows, Malheur County, 11; Vale, 1.

California: Bieber, 1; Brownell, 4.

Idaho: Nampa, 5; Payette, 5; Weiser, 2.

REITHRODONTOMYS MEGALOTIS LONGICAUDUS (Baird).

CALIFORNIA HARVEST MOUSE.

Reithrodon longicauda Baird, Mamm. N. Am., 1857, p. 451.

Ochetodon longicauda Coues, Proc. Acad. Nat. Sci. Phila., 1874, p. 186; Mon. N. Am. Rodentia, 1877, p. 126.

Reithrodontomys pallidus Rhoads, Am. Nat., XXVII, 1893, p. 835 (Santa Ysabel, Cal.).

Reithrodontomys longicauda Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 129.

Reithrodontomys klamathensis Merriam, N. Am. Fauna No. 16, 1899, p. 93 (Shasta Valley, Cal.).

Reithrodontomys megalotis longicauda Grinnell, Proc. Cal. Acad. Sci., Ser. 4, III, 1913, p. 303.

Type locality.—Petaluma, Cal.

Distribution.—Greater part of western California, east to the foothills of the Sierra Nevada, San Bernardino, and San Jacinto Ranges; north to Grants Pass, Oreg., and south into northwestern Lower California to about latitude 32°.

Characters.—Slightly smaller than *megalotis*; colors darker and more intense.

Color.—*Fresh winter pelage:* Upperparts mixed blackish and ochraceous-buff, the black predominating on dorsal area, shading to nearly pure ochraceous-buff on sides; lateral line of buff often well defined; ears same color as back, clothed with scattering ochraceous hairs; feet grayish white; tail sharply bicolor, hair-brown or fuscous above, grayish white below; underparts grayish white, usually with a tinge and often with a strong wash of ochraceous-buff. *Fresh summer pelage:* Similar to the winter pelage, but decidedly paler and lacking most of the black on the dorsal area.

Skull.—Similar to that of *megalotis*, but smaller.

Measurements.—Adult topotype: Total length, 152; tail vertebræ, 75; hind foot, 17.5. Average of 13 specimens (mostly young adults) from vicinity of San Francisco Bay: 139 (130–146); 73 (68–79); 17 (16–18). Skull: (See table, p. 81).

Remarks.—This form has a wide range on the Pacific coast and intergrades with *megalotis* at various points along the edge of the deserts. Intermediate specimens have been examined from Barstow, Mojave, Tehachapi, Santa Paula, Kern River, Bieber, etc. The form from Shasta Valley described under the name "*klamathensis*" is likewise intermediate between *longicaudus* and *megalotis*, specimens from there agreeing exactly in color with summer specimens of *longicaudus* from

Petaluma, while their skulls can be matched very closely in the series of *megalotis*. The type of "*klamathensis*" is a very old individual and has a skull as large as that of *R. m. aztecus*. Skulls of topotypes, however, do not differ appreciably from skulls of *megalotis* from the Death Valley region. *Reithrodontomys "pallidus"* of Rhoads is a pure synonym of *longicaudus*, neither the type nor topotypes being distinguishable from typical specimens of this race. Color variation in this subspecies is considerable and the winter and summer pelages are strikingly different.

Specimens examined.—Total number, 555, from the following localities:

Oregon: Grants Pass, 1.¹

California: Adobe Station, 1;² Alton Junction, Humboldt County, 3; Aptos, 15; Armona, 1; Arroyo Seco, 10 miles south of Paraiso Springs, 4; Arroyo Seco Canyon, near Pasadena, 1;³ Ballena, San Diego County, 3; Banta, 8; Bear Valley, head of Carmel River, 2; Bear Valley, San Benito County, 1; Bergman, Riverside County, 1; Berkeley, 31; Boulder Creek, 2; Briceland, 2; Burbank, 4; Calabasas, 1; Cameron's Ranch, San Diego County, 1; Campo, San Diego County, 1; Carlsbad, San Diego County, 3; Carpenteria, 2; Chico, 6; Chinese Camp, 1; Church Ranch, 5 miles north of Tassajara Springs, 2; Dulzura, 1; El Nido, Jamul Creek, 9; Elsinore, 2; Eshom Valley, Tulare County, 1; Fairfield, 3; Fort Bragg, 1; (old) Fort Tejon, 1; Freestone, 2; Fremont Peak, Gabilan Range, 3; Fresno, 3; Fresno Flat, 4; Gaviota Pass, 5; Gilroy, 2; Glen Ellen, 10; Hueneme, 3; Humboldt Bay, 3; Jackson, 1; Jacumba, 8; Jamesburg, 5; Jolon, 4; King City, 1; Lagunitas, 1; Las Virgenes Creek, 2; Laytonville, 1; Lebec, 1; Leesville, 6; Lemoore, 2; Los Banos, 1; Los Olivos, 2; Lower Lake, 3; Lytle Creek, Los Angeles County, 2; Martinez, 1; Marysville, 6; Marysville Buttes, 12; Mendota, 2; Milpitas Ranch, south base Santa Lucia Peak, 3; Milquay Valley, 1; Modesto, 1; Mono Flats, Santa Ynez River, 2; Montalvo, 3; Monterey, 16; Morro, 2;² Mountain Spring, San Diego County, 3; Mount George, 2; Mount St. Helena, 2; Nelson, Butte County, 2; Nicasio, 5; Novato, 3; Oakland, 1; Oceanside, 1; Orosi, 2; Pacheco Pass, Santa Clara County, 1; Pacific Grove, 3; Pacific Ocean, near Mexican boundary, 6; Palo Alto, 1; Paraiso Springs, 8;² Paso Robles, 5; Petaluma, 6;¹ Petrolia, 9; Pine Valley, Monterey County, 1; Point Reyes, 19; Porterville, 1; Posts, 5; Pozo, 3;² Radec, Riverside County, 2; Riverside, 5; Rockport, 5; Salinas, 4; San Bernardino, 13;² San Bernardino Mountains (altitude 5,200 feet), 6; San Diego, 6; San Emigdio Canyon, 7; San Fernando, 7; San Jacinto, 1; San Luis Obispo, 5;² San Marcos, 1; San Mateo, 15; San Pasqual Valley, 1; San Pedro, 1; San Simeon, 5; Santa Barbara, 2; Santa Maria, 3; Santa Monica, 4; Santa Paula, 17;² Santa Ynez Mission, 4; Santa Ysabel, 5; Santiago Springs, San Luis Obispo County, 1;² San Ygnacio Valley, San Diego County, 1; Shasta Valley, 7;² Soledad, 2;² Stanford University, 22; Strawberry Valley, San Jacinto Mountains, 3; Sur, 6; Sur River, 6; Tecate Valley, 3; Tecelote Canyon, 1; Tehama, 4; Tejon Canyon, 3; Temescal, 2; Three Rivers, 1; mouth Tia Juana River, 1; Tracy, 10; Twin Oaks, 1; Ventura River, 2; Walnut Creek, 20; Warren's Ranch, Riverside County, 1; Westport, 2.

Lower California: El Rayo, Hanson Laguna Mountains, 1; La Huerta, Hanson Laguna Mountains, 1; Nachoguero Valley, 2; Rancho Viejo, 15 miles east of Alamos, 1; San Isidro Ranch, near monument No. 250, Mexican boundary, 5.

¹ Collection Field Mus. Nat. Hist.

² Approaching *megalotis*.

³ Collection of Joseph Grinnell.

REITHRODONTOMYS MEGALOTIS PENINSULÆ Elliot.

PENINSULA HARVEST MOUSE.

Rhithrodontomys peninsulæ Elliot, Pub. Field Columb. Mus., Zool. Ser., III, 1903, p. 164.

Type locality.—San Quintin, Lower California.

Distribution.—West coast of Lower California, between latitude 30° and 31°; southern limit of range not definitely known.

Characters.—Similar to *longicaudus*, but with larger ears and longer tail.

Color.—*Fresh pelage* (October to January): Similar to corresponding pelage of *longicaudus*, but averaging richer and redder, and less brownish on the back; underparts white with a tinge of ochraceous-buff. *Worn summer pelage*: Specimens not appreciably different from *longicaudus* in same pelage.

Skull.—Similar to those of *megalotis* and *longicaudus*.

Measurements.—Average of 11 specimens (adult and subadult) from type locality: Total length, 154 (140–170); tail vertebræ, 84 (78–91); hind foot, 17.4 (16–18). Skull: (See table, p. 81).

Remarks.—This form has a rather restricted range on the Pacific coast of Lower California. It is closely related to *longicaudus*, with which it intergrades in the vicinity of San Telmo.

Specimens examined.—Total number, 32, from the following localities:

Lower California: Pozo Luciano (northwest slope San Pedro Martir Mountains), 1; Rosario, 20;¹ San Quintin, 8; San Telmo, 1; Socorro, 2.

REITHRODONTOMYS MEGALOTIS CINEREUS Merriam.

ASHY HARVEST MOUSE.

Reithrodontomys saturatus cinereus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 556.

Type locality.—Chalchicomula, Puebla, Mexico.

Distribution.—Southern portion of Mexican table-land in the States of Hidalgo, Puebla, and Tlaxcala.

Characters.—Slightly larger and darker than *megalotis* with much darker ears and tail; paler than *saturatus*.

Color.—Upperparts mixed black and light ochraceous-buff; darkest in the median line where the black sometimes appears as a broad band; sides light ochraceous-buff; underparts grayish white with a tinge of ochraceous-buff and sometimes with one or more small blotches of the same color, chiefly in the pectoral region; ears fuscous, with a large blackish patch on the inferior inner margin and another on the superior outer margin; tail, fuscous, darker than in *megalotis*.

Skull.—Practically the same as that of *saturatus*, possibly a little shorter.

¹ Including 9 from Collection Mus. Comp. Zool.

Measurements.—Average of 5 adults from type locality: Total length, 148 (142–151); tail vertebræ, 74 (71–78); hind foot, 19 (18.5–19.5). Skull: (See table, p. 81).

Remarks.—This form is intermediate between *megalotis* and *saturatus*, being slightly larger externally than *megalotis*, with skull about the size of that of *saturatus*. One of the topotype series matches *megalotis* very closely in color, but the others are much darker; all have darker ears, tail, and underparts.

The range of *cinereus* is apparently not extensive and is nearly surrounded by that of *saturatus*, at least on the east, south, and west.

Specimens examined.—Total number, 11, from the following localities in Mexico:

Puebla: Chalchicomula, 5; Mount Orizaba, 1.

Tlaxcala: Apixaco, 2; Huamantla, 1.

Hidalgo: Real del Monte, 2.

REITHRODONTOMYS MEGALOTIS SATURATUS Allen & Chapman.

DUSKY HARVEST MOUSE.

(Pl. I, fig. 8; Pl. IV, fig. 8.)

Reithrodontomys saturatus Allen and Chapman, Bull. Am. Mus. Nat. Hist., IX, 1897, p. 201.

Type locality.—Las Vigas, Vera Cruz.

Distribution.—From Jalisco (Ocotlan), Hidalgo, and Vera Cruz south to Oaxaca; altitudinal range approximately from 6,000 to 10,000 feet.

Characters.—Larger and darker (blacker and more intensely ochraceous) than *cinereus*.

Color.—Upperparts mixed black and ochraceous-buff, the black predominating; sides with less black but without a distinct ochraceous line; underparts grayish white, often strongly suffused with ochraceous-buff; ears blackish, or fuscous with a large blackish patch on the inner posterior margin; tail sharply bicolor, fuscous-black above, whitish beneath; feet grayish white.

Skull.—Similar in proportions to that of *megalotis* but decidedly larger; zygomata parallel or slightly contracted anteriorly; closely similar to those of *tenuis* and *difficilis*, but averaging larger, with larger bullæ and longer palatal foramina.

Measurements.—Average of 7 adults from type locality: Total length, 162 (158–169); tail vertebræ, 87 (80–95); hind foot, 19 (18–19.5). Skull: (See table, p. 81).

Remarks.—This is the largest and darkest form in the *megalotis* group. It occupies the humid mountain slopes of southern Mexico, intergrading with *cinereus* along the edge of the table-land and with *zacatecæ* in Michoacan. Its range meets that of *R. fulvescens*

difficilis in Vera Cruz, and the two may occur together in some localities. They are closely similar in general appearance, but *saturatus* may be distinguished by its blacker ears and back, whiter underparts, and larger skull. Specimens from Oaxaca City are redder than typical specimens, with less black on the dorsal area, but two from the mountains west of Oaxaca are typical.

Specimens examined.—Total number, 68, from the following localities in Mexico:

Vera Cruz: Huauchinango, 1; Las Vigas, 11; Mount Orizaba, 2;¹ Perote, 6; Xuchil, 7.¹

Hidalgo: Tulancingo, 1.

Mexico: Salazar, 6; Toluca Valley, 2; Volcan Toluca, 1.

Morelos: Huitzilac, 3.

Michoacan: Nahuatzin, 9.

Jalisco: Ocotlan, 3.

Oaxaca: Mount Zempoaltepec, 4; mountains 15 miles west of Oaxaca, 2; mountains near Ozolotepec, 1; Oaxaca City, 6; Tamazulapam, 1; Tlapancingo, 2.

REITHRODONTOMYS MEGALOTIS ALTICOLUS Merriam.

CERRO SAN FELIPE HARVEST MOUSE.

(Pl. I, fig. 12; Pl. IV, fig. 12.)

Reithrodontomys megalotis alticolus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 556.

Type locality.—Cerro San Felipe, Oaxaca, Mexico (altitude 10,000 feet).

Distribution.—Known only from vicinity of type locality.

Characters.—Similar to *saturatus*; tail shorter; skull with larger bullæ and more inflated braincase.

Color.—Upperparts mixed black and ochraceous-buff, darkest on the dorsal area; ears fuscous, with a blackish patch on lower inner margin; feet buffy white; ankles with a dusky streak; tail hair-brown above, grayish white beneath.

Skull.—Similar in size and proportions to that of *saturatus*; braincase more inflated (subglobular); bullæ larger and more inflated; nasals narrowed to a point posteriorly.

Measurements.—Type (♂ ad.): Total length, 153; tail vertebræ, 75; hind foot, 19. Average of two adults from La Parada, Oaxaca: 152; 78.5; 18.5. Skull: (See table, p. 81).

Remarks.—This subspecies is a slightly differentiated form, very closely related to *saturatus*, from which it differs chiefly in shorter tail and in slight cranial characters. It seems to be confined to the Cerro San Felipe and its environs. Specimens from La Parada, at the base of the mountain, are not quite typical.

Specimens examined.—Total number, 3, from the following localities in Mexico:

Oaxaca: Cerro San Felipe, 1; La Parada, 2.

REITHRODONTOMYS MEGALOTIS ARIZONENSIS Allen.

CHIRICAHUA HARVEST MOUSE.

Reithrodontomys arizonensis Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 134.

Type locality.—Rock Creek, Chiricahua Mountains, Ariz. (altitude about 8,000 feet).

Distribution.—Known only from the type locality.

Characters.—About the size of *megalotis*; tail averaging slightly longer; colors much darker and more ochraceous. Very similar to *longicaudus*, but a little redder on the head, ears blacker, and tail paler (hoary gray instead of brown).

Color.—Upperparts ochraceous-buff, heavily mixed with black; front and sides of face nearly pure buff; ears dark hair-brown, with darker patches on both inner and outer margins; feet white; ankles dusky; underparts white, with an ochraceous patch on the breast between the fore legs; tail mouse-gray above, grayish white below, clothed all around with scattered whitish hairs.

Skull.—Closely similar to that of *megalotis*.

Measurements.—Average of 4 adults from type locality: Total length, 149 (145–152); tail vertebræ, 78 (74–80); hind foot, 17 (16–18); ear, 13 (12.5–14). Skull: (See table, p. 81).

Remarks.—This subspecies, as noted by the original describer, bears a surprising resemblance to *R. megalotis longicaudus* of California, but the ranges of the two forms are separated by an extensive area occupied by *R. m. megalotis*, and the present form is probably more closely related to *R. m. zacatecæ* of the mountains of western Mexico, the range of which is known to extend north at least to southern Chihuahua. The latter differs from *arizonensis* chiefly in its more ochraceous underparts.

No intergrades between *arizonensis* and *megalotis* are known, but quite probably such will later be found. Likewise the present form is so close to *zacatecæ* that the two will probably be found to intergrade. Mr. W. W. Price, who collected the type series, thus describes its habitat:

Five specimens of this species were trapped on Rock Creek, in the Chiricahua Mountains, July 7–8, at an elevation of about 8,000 feet. Two were in rocks and dry soil away from the bed of the creek, and the others were caught under logs and brush near the water.¹

Specimens examined.—Four, from type locality.²

¹ Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 235.

² Two in Am. Mus. Nat. Hist., 2 in Field Mus. Nat. Hist.

REITHRODONTOMYS MEGALOTIS ZACATECÆ Merriam.

MOUNTAIN HARVEST MOUSE.

(Pl. I, fig. 11; Pl. IV, fig. 11.)

Reithrodontomys megalotis zacatecæ Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 557.*Reithrodontomys megalotis obscurus* Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 558 (Sierra Madre, near Guadalupe y Calvo, Chihuahua).*Reithrodontomys colimæ* Allen, Bull. Am. Mus. Nat. Hist., XXII, 1906, p. 249 (not of Merriam; specimens from Volcan de Fuego, Jalisco).*Type locality*.—Valparaiso Mountains, Zacatecas, Mexico.*Distribution*.—Mountains of Western Mexico, from southern Chihuahua to Michoacan.*Characters*.—Very similar to *arizonensis*, but with darker underparts; smaller and paler than *saturatus*, with less black on upperparts.*Color*.—*Adults*: Upperparts ochraceous-buff, heavily mixed with black, the ochraceous color most pronounced on head and sides; the black predominating on dorsal area but not forming a distinct band; underparts washed with ochraceous-buff, this color usually most intense between the fore legs; ears fuscous or dark hair-brown, usually with a blackish patch on lower inner margin; feet whitish or buffy white, ankles dusky; tail sharply bicolor, dark hair-brown above, grayish white beneath. *Young*: Paler and grayer on upperparts; sides with a well-marked lateral line of light ochraceous-buff; underparts whiter.*Skull*.—Similar to that of *megalotis* but smaller; rostrum slenderer, narrowed at the tip; zygomata slightly narrower anteriorly; nasals narrowed to a point posteriorly, ending on a line with premaxillæ.*Measurements*.—Average of 3 adults from type locality: Total length, 154; tail vertebræ, 84; hind foot, 18.5. Average of 3 adults from Guadalupe y Calvo, Chihuahua: 160; 85; 18. Skull: (See table, p. 81).*Remarks*.—This subspecies is a small, dark-colored race of *megalotis* inhabiting the mountains of western Mexico. No specimens have been seen indicating intergradation between *megalotis* and *zacatecæ*, but very likely such material may in the future be secured. Intergradation with *saturatus* is indicated by specimens from the State of Mexico (Salazar, Toluca Valley, etc.) which resemble *saturatus* in color but have smaller ears and skulls intermediate in size between the two forms. From Nahuatzin, Michoacan, specimens nearly typical of both forms are at hand. Some are larger with larger, darker ears and large skulls (as in *saturatus*), but at least 2 adult individuals, by reason of small size, small skull, small ears, and ochraceous underparts, must be referred to *zacatecæ*. Specimens from Patamban, Michoacan, average more intensely ochraceous, especially on the underparts, and have more black on the ears, but are otherwise typical. The

series from Guadalupe y Calvo, Chihuahua, forming the basis of "*obscurus*", is too slightly different to warrant recognition. The coloration of the two series is practically the same, and the skulls of "*obscurus*" average only slightly larger.

This subspecies bears a striking resemblance to *longicaudus* from California, but differs in having ochraceous underparts, slightly longer tail, and a little more ochraceous color on the head.

Specimens examined.—Total number, 27, from the following localities in Mexico:

Chihuahua: Sierra Madre, near Guadalupe y Calvo, 3.

Durango: El Salto, 2.

Zacatecas: Valparaiso Mountains, 14.

Michoacan: Nahuatzin, 2; Patamban, 4.

Jalisco: Volcan de Fuego, 2.¹

REITHRODONTOMYS AMOLES sp. nov.

QUERETARO HARVEST MOUSE.

Type from Pinal de Amoles, Queretaro, Mexico. No. 81234, U. S. Nat. Mus., Biological Survey Collection, ♀ adult, September 20, 1896; E. W. Nelson and E. A. Goldman. Original No. 10169.

Characters.—Similar in color to *R. m. saturatus*, but very much smaller.

Color.—*Worn pelage*: Upperparts mixed blackish and ochraceous-buff; underparts whitish, strongly tinged on pectoral region with ochraceous-buff; tail fuscous above, grayish white below; hind feet whitish; fore feet white with a pronounced dusky stripe on upper surface; ears dark brown (much mutilated, and size not known).

Skull.—Similar to that of *R. m. megalotis* but much smaller; zygomata parallel; bullæ smaller and rather flat.

Measurements.—*Type*: Total length, 154; tail vertebræ, 83; hind foot 16.5. Skull: (See table, p. 81.)

Remarks.—On geographical grounds this form ought to be close to *R. m. saturatus*, but it differs markedly in size from that race. It is even smaller than *R. m. zacatecæ* of the Sierra Madre, which it somewhat resembles in color.

Specimen examined.—One, the type.

REITHRODONTOMYS CATALINÆ Elliot.

CATALINA HARVEST MOUSE.

Rhithrodontomys catalinæ Elliot, Pub. Field Columb. Mus., Zool. Ser. III, 1903, p. 246.
Reithrodontomys megalotis catalinæ Grinnell, Proc. Cal. Acad. Sci., Ser. 4, III, 1913, p. 304.

Type locality.—Santa Catalina Island, Cal.

Distribution.—Santa Catalina Island, Cal.

¹ Collection Am. Mus. Nat. Hist.

Characters.—Similar to *longicaudus* but larger and slightly paler.

Color.—*Worn spring pelage*:¹ Upperparts mixed light ochraceous-buff and blackish brown, darkest on back, but without a distinct dorsal stripe; underparts white, tinged with buff in pectoral region; tail dark hair-brown above, white beneath; ears hair-brown, clothed with ochraceous hairs.

Skull.—Larger than that of *R. m. longicaudus*, but not otherwise different.

Measurements.—Average of 10 adults from type locality: Total length, 169 (165–175); tail vertebræ, 94 (90–99); hind foot, 18.6 (18–19.5). Skull: (See table, p. 81).

Remarks.—So far as known this is the only insular species in the genus. Mr. C. P. Streater, who collected a series in 1892, found the mice abundant on the island in brush and cactus.

Specimens examined.—Twenty-eight, from type locality.

REITHRODONTOMYS RAVIVENTRIS RAVIVENTRIS Dixon.

RED-BELLIED HARVEST MOUSE.

(Pl. I, fig. 9; Pl. IV, fig. 9.)

Reithrodontomys raviventris Dixon, Proc. Biol. Soc. Wash., XXI, 1908, p. 197.

Type locality.—Redwood City, Cal.

Distribution.—Salt marshes of San Francisco Bay, Cal.

Characters.—Similar to *R. megalotis longicaudus* but upperparts darker and underparts reddish; skull larger; tail slightly shorter.

Color.—Upperparts mixed black and pinkish cinnamon, the black predominating on dorsal area; sides pale tawny in some individuals; underparts pinkish cinnamon (rarely with a small white spot on chin); ears black or fuscous on both surfaces, with a tuft of ochraceous hairs at anterior base; hind feet and tail usually very dark, varying from fuscous to clove-brown or sepia, the tail slightly paler beneath, but feet usually darker beneath; toes whitish; front feet sepia, often tinged with buffy white.

Skull.—Decidedly larger than that of *R. m. longicaudus*; with relatively shorter rostrum; nasals and palatal foramina shorter; zygomatica more widely expanded anteriorly.

Measurements.—Average of 21 from type locality: Total length, 130.7 (120–142); tail vertebræ, 64.8 (56–74); hind foot, 16.6 (15–18). Average of 8 from Melrose Marsh, Alameda County: 137; 66; 17.7. Skull: (See table, p. 81).

Remarks.—This species is remarkable on account of its peculiar characters and limited distribution. It is the darkest form found in the United States and the only one having reddish underparts. In color it most nearly resembles *R. australis* of Costa Rica, but the underparts are even darker than in that species.

¹ Fresh pelage not seen.

It is apparently confined to the salt marshes in the southern part of San Francisco Bay and although in many places its range abuts on that of *longicaudus*, no evidence of intergradation between them has been discovered. Two specimens—one from Palo Alto and one from Berkeley—have whitish underparts but in other respects are typical *raviventris*. Intergradation with *halicætes* seems probable. The pelage of both of these marsh forms is longer and seemingly thicker than that of *longicaudus*.

Specimens examined.—Total number, 44, from the following localities:

California: Berkeley, 2; Elmhurst, 1;¹ Melrose Marsh, Alameda County, 13;¹ Palo Alto, 4;² Redwood City, 24.¹

REITHRODONTOMYS RAVIVENTRIS HALICÆTES Dixon.

PETALUMA MARSH HARVEST MOUSE.

(Pl. I, fig. 10; Pl. IV, fig. 10.)

Reithrodontomys halicætes Dixon, Univ. Cal. Pub. in Zool., V, 1909, p. 271.

Type locality.—Salt marsh 3 miles south of Petaluma, Cal.

Distribution.—Salt marshes of San Pablo Bay, Suisun Bay, and the lower San Joaquin and Sacramento Rivers.

Characters.—Similar in color to *raviventris* but larger; underparts white; ears and feet paler; tail more distinctly bicolor. Compared with *R. m. longicaudus*: Decidedly larger and darker, with a large white patch on the throat; skull larger, with more widely spreading zygomata.

Color.—*Fresh pelage*: Upper parts ochraceous-buff, heavily mixed on the back with black; sides ochraceous-buff without a well-defined lateral line; underparts white (the bases of hairs plumbeous), sometimes irregularly blotched with ochraceous-buff; throat and sides of mouth pure white to base of hairs; sides of nose and eye ring blackish; ears and upper surface of tail fuscous or fuscous-black; underside of tail dull grayish white with a buffy tinge; feet white or buffy white.

Worn pelage: Decidedly more ochraceous, the black tips of the hairs seemingly worn off.

Skull.—Similar to that of *raviventris*; larger than that of *R. m. longicaudus*; zygomata usually (at least in adults) widely expanded anteriorly.

Measurements.—Average of 13 from type locality: Total length, 156 (149–64); tail vertebræ, 82 (75–85); hind foot 17.7 (17–19). Skull: (See table, p. 81).

Remarks.—This form, although living only a short distance from *raviventris* and under seemingly identical conditions, is readily separable from it. Nor is it in any sense a connecting form between

¹ Collection Mus. Vert. Zool., Univ. of Cal.

² Three from Collection Mus. Vert. Zool.

raviventris and *longicaudus*, being larger than either with upperparts fully as dark as *raviventris*. The underparts are whiter than in *longicaudus*, the latter usually being more or less tinged with pale ochraceous-buff. The close resemblance between *halicetes* and *raviventris* in skull characters and the fact that nearly half of the specimens of *halicetes* examined from Petaluma are more or less suffused beneath with ochraceous (though never so completely as in *raviventris*) leads to the belief that the two are subspecifically related. Specimens of *halicetes* in worn pelage are much redder (less blackish) than those in fresh pelage, thus rather closely resembling in color certain specimens of *longicaudus*.

Mr. Joseph Dixon, who collected the type series of this mouse, states:

This mouse seems to be restricted to the salt marsh, its range being coextensive with that of the "pickle grass" (*Salicornia*). Diligent search and trapping failed to reveal its presence outside the *Salicornia* and no specimens of *R. longicauda* could be caught in the *Salicornia*. The harvest mice use the runways of *Microtus* extensively.¹

Specimens examined.—Total number, 56, from the following localities:

California: Brentwood, 1; Cordelia, Solano County, 6;² Grand Island (2 miles north of Knights Landing, Yolo County), 1,² Grizzly Island, Solano County, 27;² Petaluma, 21.²

REITHRODONTOMYS FULVESCENS GROUP.

REITHRODONTOMYS FULVESCENS FULVESCENS Allen.

SONORAN HARVEST MOUSE.

Reithrodontomys mexicanus fulvescens Allen, Bull. Am. Mus. Nat. Hist., VI, 1894, p. 319.

Reithrodontomys fulvescens Allen, Ibid., VII, 1895, p. 138.

Type locality.—Oposura, Sonora, Mexico.

Distribution.—Mountainous parts of southern Sonora, western Chihuahua, and northern Durango.

Characters.—Size medium—a little larger than *R. m. megalotis*, with decidedly longer tail; prevailing color of upperparts ochraceous-buff with a pronounced lateral line.

Color.—Upperparts light ochraceous-buff, sparingly mixed with blackish brown; buff color most strongly marked on sides where it frequently forms a pronounced lateral line, unmixed with brown; front and sides of face tinged with grayish; underparts white, sometimes faintly tinged with pale buff; feet buffy white; ears hair-brown externally, clothed on inner surface with ochraceous-tawny hairs; tail hair-brown above, grayish white beneath.

Skull.—Similar to that of *R. m. megalotis* but slightly larger; interpterygoid fossa broader.

¹ Univ. of Cal. Pub. in Zool., V, 1909, p. 271.

² Collection Mus. Vert. Zool., Univ. of Cal.

Measurements.—Type: Total length, 183; tail vertebræ, 102; hind foot, 19. One specimen (subadult) from Providencia Mines, Sonora: 158.5; 84; 20.5. Average of 4 (adult and subadult) from Casas Grandes, Chihuahua: 165 (157–174); 93 (84–97); 20. Skull: (See table, p. 81).

Remarks.—The mice of this group may be distinguished from *R. m. megalotis* by their greater size, longer tails, and more intensely ochraceous coloration. The present form resembles *megalotis* more closely than do any of the other subspecies and certain specimens of the two forms are colored almost alike on the back. The sides of *fulvescens*, however, are more extensively buffy and less mixed with brown than those of *megalotis*. The skulls of *fulvescens* may usually be distinguished from those of any member of the *megalotis* group by the greater breadth of the interpterygoid fossa.¹ The ranges of the two species meet along the eastern border of the Sierra Madre in Chihuahua, but there is no indication of intergradation between them.

This subspecies was the first member of the group to be described and the third distinctively Mexican species to receive recognition. Although described in 1894, it is still imperfectly known, only a small number of specimens having been collected in the type region. At the time of naming this form Dr. Allen considered it a subspecies of *mexicanus*² and noted its close relationship to the Rio Grande form. Later he accorded it specific rank. The abundant material now available from Mexico shows clearly that *fulvescens*, *tenuis*, and *intermedius* are closely related subspecies, connected through central Mexico by a perfect series of intergrades. The present form apparently intergrades, also, with *toltecus*, as indicated by a specimen from Inde, Durango, which agrees with *fulvescens* in color, but has a long tail like *toltecus*, and skull intermediate in size between the two forms. The series from Casas Grandes, Chihuahua, agrees with the type series in external characters, except for a more pronounced grayish wash on the head and shoulders, but the single adult in the series has a somewhat larger skull than any in the Oposura series. In this character it is matched by a specimen from Parral, Chihuahua.

Specimens examined.—Total number, 12, from the following localities in Mexico:

Sonora: Oposura, 3;³ Providencia Mines, 2.⁴

Chihuahua: Casas Grandes, 5; Parral, 1.

Durango: Inde, 1.⁵

¹ Skulls of *R. m. saturatus* are sometimes difficult to distinguish by this character from those of *R. f. tenuis*.

² The name *mexicanus* at that time was applied to all the mice of this group from Texas and Mexico.

³ Collection Am. Mus. Nat. Hist.

⁴ Collection Field Mus. Nat. Hist.

⁵ Approaching *toltecus*.

REITHRODONTOMYS FULVESCENS TENUIS Allen.

MEXICAN HARVEST MOUSE.

(Pl. II, fig. 7; Pl. V, fig. 7.)

Reithrodontomys tenuis Allen, Bull. Am. Mus. Nat. Hist., XII, 1899, p. 15.*Reithrodontomys griseoflavus* Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 553 (Ameca, Jalisco).*Type locality*.—Rosario, Sinaloa, Mexico. FIG. 3.—Distribution of *Reithrodontomys fulvescens* and subspecies.

Distribution.—Greater part of Mexico, except extreme northern and southern portions; from southern Sonora, Durango, Zacatecas, San Luis Potosi, Nuevo Leon, and central Tamaulipas, south to southern Jalisco, Michoacan, and the coast region of Vera Cruz.

Characters.—Similar to *fulvescens*, but colors darker and more intensely ochraceous.

Color.—Upperparts and sides rich ochraceous-buff; head and shoulders strongly ochraceous, without trace of grayish; back more heavily mixed with black than in *fulvescens*; ears slightly darker; underparts usually grayish white, sometimes faintly tinged with buff; tail hair-brown above, grayish white below.

Skull.—Closely similar to that of *fulvescens*.

Measurements.—Average of 3 adults from Mazatlan, Sinaloa: Total length, 169 (163–177); tail vertebræ, 98 (96–102); hind foot, 20.8 (20.5–21). Average of 5 adults from Chacala, Durango: 177; 105; 21.3. Skull: (See table, p. 81).

Remarks.—This is the most widely distributed member of the *fulvescens* group and over its extensive range shows remarkably little variation. Specimens from opposite sides of the continent can not be distinguished by characters either of skin or skull. There is considerable individual variation in both color and cranial characters, but none which is correlated with distribution.

The subspecies intergrades with *fulvescens* in southern Sonora, with *intermedius* in Nuevo Leon and Tamaulipas, with *difficilis* in Vera Cruz and with *toltecus* in Michoacan. Direct comparison with the type has not been possible, but specimens in the Biological Survey Collection from Mazatlan, forwarded to Mr. G. S. Miller, jr., while he was in London, were compared by him with the type in the British Museum and found to agree very closely with it. Mr. Miller states: "I should say there is no question of the identity of the Mazatlan specimens with *tenuis*." In making comparisons these specimens have been chiefly used.

Specimens from Ameca, Jalisco, forming the basis of "*griseoflavus*," show in comparison with *tenuis* a very slight cranial difference, consisting of a more inflated braincase. In this character they resemble *helvolus*, although on geographical grounds they should be approaching *toltecus*. In color and size they agree closely with *tenuis*. The type is decidedly more grayish on the back and less intensely buffy on the sides than is usual in this subspecies, but two topotypes agree perfectly with the Mazatlan specimens of *tenuis*. A series from Chacala, Durango, is a little darker and more richly colored, as well as slightly larger than the typical form. Specimens from the arid coast region of Vera Cruz (Carrizal, Santa Maria, and Catemaco) are clearly intermediate between *tenuis* and *difficilis*, the ears and tails being noticeably darker than in *tenuis* but the underparts and backs paler than in *difficilis*.

Specimens from as far north as Cerro de la Silla and Santa Catarina, Nuevo Leon, are referable to *tenuis*, though those from Santa Catarina might almost as well be considered *intermedius*. Specimens from Acambaro, Michoacan, are intermediate in size between *tenuis* and *toltecus*.

Specimens examined.—Total number, 127, from the following localities in Mexico:

Sinaloa: Sinaloa, 2; Altata, 1; Culiacan, 1; Mazatlan, 4; Rio Mazatlan, 1.

Sonora: Alamos, 6.¹

Jalisco: Ameca, 3; Atemajac, 2; Estancia, 1;² Etzatlan, 6;³ Lagos, 1; Las Canoas, 2;² Los Masos, 1;² Mascota, 1; Ocotlan, 2; Plantinar, 2; San Sebastian, 8;³ Talpa, 1; Zapotlan, 7.

Tepic: Tepic, 2.

Durango: Chacala, 8; Durango, 3.

Zacatecas: Berriozabal, 1; Valparaiso, 5.

San Luis Potosi: Hacienda La Parada, 3.

Queretaro: Jalpan, 2; Tequisquiapan, 2.

Michoacan: Acambaro, 2.

Morelos: Cuernavaca, 1.⁴

Guanajuato: Santa Rosa, 1; Silao, 2.

Vera Cruz: Carrizal, 4; Catemaco, 1; San Carlos, 2;⁵ Santa Maria, 4.

Tamaulipas: Alta Mira, 11; Hidalgo, 9; Jaumave, 1; Victoria, 5.

Nuevo Leon: Cerro de la Silla, 3; Santa Catarina, 3.

REITHRODONTOMYS FULVESCENS INTERMEDIUS Allen.

RIO GRANDE HARVEST MOUSE.

Ochetodon mexicanus Allen, Bull. Am. Mus. Nat. Hist. III, 1891, p. 223 (not *Reithrodon mexicanus* Sauss.)

Reithrodontomys mexicanus intermedius Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 136.

Reithrodontomys laceyi Allen, Bull. Am. Mus. Nat. Hist., VIII, 1896, p. 235 (Watson's Ranch, 15 miles south of San Antonio, Tex.).

Reithrodontomys intermedius Bailey, N. Am. Fauna No. 25, 1905, p. 104.

Type locality.—Brownsville, Tex.

Distribution.—Southern Texas and adjacent parts of Mexico from Del Rio to Brownsville; east to Bexar and Bee Counties; north to Wichita Mountains, Okla.

Characters.—Very similar to *tenuis* but averaging duller and less intensely ochraceous above, and sides paler. Compared with *fulvescens*: Upper parts, particularly head and shoulders, deeper ochraceous.

Color.—*Winter pelage* (February): Ground color of upperparts light ochraceous-buff, brightest on sides, strongly mixed with blackish brown on the back; ears hair-brown, usually tinged with ochraceous on inner surface; tail hair-brown above, grayish white beneath; feet white; underparts white, sometimes faintly tinged with buff. *Summer (worn) pelage*: Decidedly redder on back and sides, some specimens approaching dull orange-cinnamon. *Young*: Colors grayer and less ochraceous.

¹ Approaching *fulvescens*.

² Collection Am. Mus. Nat. Hist.

³ Approaching *nelsoni*.

⁴ This specimen seems best referable to this subspecies, although on geographical grounds it should be either *toltecus* or *helvolus*.

⁵ Collection Field Mus. Nat. Hist.

Skull.—Very similar to that of *tenuis*, but braincase averaging slightly larger.

Measurements.—Average of 8 adults from Rio Grande Valley (Matamoras and Camargo, Tamaulipas): Total length, 169 (160–181); tail vertebræ, 98 (88–103); hind foot, 20.8 (20–21.5). Skull: (See table, p. 81).

Remarks.—This subspecies is most nearly related to *tenuis*, than which it has a much less extensive range. The differences between *intermedius* and *tenuis* are really very slight, consisting in a more intense suffusion of ochraceous-buff in *tenuis*, especially noticeable on the sides. Specimens from Bexar and Kerr Counties—the type region of “*laceyi*”—average slightly grayer and less ochraceous than specimens from the mouth of the Rio Grande, but individuals in each series may be matched by those from the other and the differences seem too slight to warrant recognition of the form. If both *intermedius* and “*laceyi*” were to be recognized, the former would be nothing more than a series of intermediates between *tenuis* on the one side and “*laceyi*” on the other.

Specimens examined.—Total number, 65, from the following localities:

Oklahoma: Mount Scott, 9.

Texas: Brownsville, 26; Corpus Christi, 2; Del Rio, 2; Lacey's Ranch, near Kerrville, 4; Padre Island, 1; Rio Grande City, 1; San Antonio, 3; San Diego, 5; Santo Tomas, 2.

Tamaulipas: Camargo, 4; Matamoras, 6.

REITHRODONTOMYS FULVESCENS AURANTIUS Allen.

GOLDEN HARVEST MOUSE.

Reithrodontomys mexicanus aurantius Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 137.

Reithrodontomys chrysotis Elliot, Field Columb. Mus., Zool. Ser., I, 1899, p. 281 (Dougherty, Okla.).

Reithrodontomys aurantius Bailey, N. Am. Fauna No. 25, 1905, p. 105.

Type locality.—Lafayette, La.

Distribution.—Louisiana (west of the Mississippi River), southern and east-central Arkansas, eastern Texas, and eastern Oklahoma; north to southwestern Missouri (Carthage). Confined to Lower Austral Zone.

Characters.—Colors decidedly richer and darker than in *intermedius*; skull slightly larger.

Color.—Adults in unworn pelage: Upperparts varying from pinkish cinnamon to ochraceous-tawny, usually heavily mixed with blackish brown; sides of head and body usually rich ochraceous or tawny but without a pronounced lateral line where the color of the sides meets that of the underparts; dark markings of back frequently forming a

distinct median band; ears dull sepia, clothed on inner surface with tawny hairs; underparts grayish white, often with a distinct tinge of pale buff. *Immature pelage*: Decidedly more grayish, often lacking entirely the bright tawny shades. *Variation*: There is considerable variation in color in this subspecies, even among adult specimens. This consists both in the intensity of the ochraceous shades and in the amount of blackish suffusion on the back and sides. Some individuals have the whole back heavily sprinkled with blackish hairs, while others show only a rather narrow band down the median line. A specimen from Matagorda Island (March 31) is quite exceptional in being intensely tawny over the entire upperparts with only faint indications of black hairs on the back, thus closely resembling specimens of *Peromyscus nuttalli*. Other individuals from the same island are normal in color.

Skull.—Very similar to that of *intermedius*, but braincase averaging a little broader.

Measurements.—Adult from Houma, La.: Total length, 176; tail vertebræ, 100; hind foot, 20. Average of 5 adults from Velasco, Tex.: 170; 97; 21. Average of 9 young adults from Sour Lake, Tex.: 162 (154–170); 89 (83–94); 20 (19–21). Skull: (See table, p. 81).

Remarks.—This subspecies is a well-marked race, occupying the humid or Austroriparian division of the Lower Austral Zone, west of the Mississippi River. Although it shows considerable individual variation and occasional specimens—chiefly immature ones—are hardly distinguishable from specimens of *intermedius*, the general intensity of coloration shown by any series of specimens makes identification possible at a glance. The type and topotypes of "*chrysotis*" have been examined and found to agree perfectly with specimens of *aurantius* from eastern Texas.

Specimens examined.—Total number, 88, from the following localities:

Louisiana: Avery, 5; Belcher, 1; Foster (5 miles east of Shreveport) 1; Houma, 1; Iowa Station, 1; Lafayette, 2; Leconte, 1 (skull); Mer Rouge, 4; Natchitoches, 1.

Arkansas: Beebe, 2; Delight, 4.

Missouri: Carthage, 2.

Oklahoma: Dougherty, 3;¹ Stilwell, 3.

Texas: Barnard Creek, west of Columbia, 6; East Caranchua Creek, Matagorda County, 2; Elliott, Matagorda County, 1; Hempstead, 8; Joaquin, 7; Matagorda, 5; Matagorda Island, 5; Nacogdoches, 2; Selkirk Island, Matagorda County, 1; Sour Lake, 10; Texarkana, 1; Velasco, 9.

¹ Collection Field Mus. Nat. Hist.

REITHRODONTOMYS FULVESCENS DIFFICILIS Merriam.

ORIZABA HARVEST MOUSE.

(Pl. II, fig. 8; Pl. V, fig. 8.)

? ? *Reithrodon sumichrasti* De Saussure, Rev. Mag. Zool., 2d Ser., XIII, 1861, p. 3.¹
Ochetodon mexicanus Coues, Proc. Acad. Nat. Sci. Phila., 1874, p. 186; Mon. N. Am.

Rodentia, 1877, pp. 128-130. (Not *Reithrodon mexicanus* Sauss.)

Reithrodontomys mexicanus Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 135; IX, 1897, p. 199 (not *Reithrodon mexicanus* Sauss.).

Reithrodontomys difficilis Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 556.

Type locality.—Orizaba, Vera Cruz.

Distribution.—Interior mountain slopes along the southern end of the Mexican table-land in the States of Vera Cruz and Puebla.

Characters.—Similar to *tenuis*, but colors decidedly darker; ears and tail blacker, and underparts more ochraceous.

Color.—Upperparts pinkish cinnamon mixed with blackish brown, in some specimens the brown prevailing, in others the cinnamon; sides of face and body usually clear pinkish cinnamon, though in certain worn or immature specimens this color is nearly absent; ears fuscous or sepia, usually with more or less tawny hairs on inner surface; tail fuscous above, grayish white below; underparts grayish, with a strong wash of light pinkish cinnamon, the latter color prevailing in the majority of the individuals; feet grayish white; ankles dusky.

Skull.—Closely similar to that of *tenuis*; braincase averaging a trifle broader. Compared with *R. megalotis saturatus*: Skull shorter and relatively broader, with shorter nasals and broader interpterygoid fossa.

Measurements.—Average of 5 (subadult) from type locality: Total length, 170 (162-177); tail vertebræ, 96.6 (88-101); hind foot, 19.5 (19-20). Adult from Maltrata, Vera Cruz: 172; 97; 21. Skull: (See table, p. 81).

Remarks.—This is the darkest of the races of *fulvescens*. Although rather restricted in range, it is a well-marked form, easily distinguished from *tenuis* by its darker colors, but intergradation is clearly shown by specimens from the coast region of Vera Cruz (Carrizal and Santa Maria). From *R. megalotis saturatus*, the range of which is adjacent to that of *difficilis* in Vera Cruz, it differs in more tawny coloration, ochraceous instead of grayish underparts, and smaller and paler ears.

¹ When the type of *R. "sumichrasti"* can be compared with modern material it may be possible to identify the species and use the name. I have seen photographs of the type skull, which clearly show it to belong in the typical subgenus, and the original description agrees best with the present form; but as no definite type locality is assigned and the description is inadequate for subspecific determination, it seems best to let the name remain in synonymy.

Specimens examined.—Total number, 36, from the following localities in Mexico:

Vera Cruz: Maltrata, 1; Orizaba, 18; Mirador, 2; Jalapa, 14.¹

Puebla: Tehuacan, 1.

REITHRODONTOMYS FULVESCENS TOLTECUS Merriam.

TOLTEC HARVEST MOUSE.

(Pl. II, fig. 10; Pl. V, fig. 10.)

Reithrodontomys levipes toltecus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 555.

Rhithrodontomys inexpectatus Elliot, Field Columb. Mus., Zool. Ser., III, 1903, p. 145 (Patzcuaro, Michoacan).

Type locality.—Tlalpam, Federal District, Mexico.

Distribution.—Table-land region of southern Mexico, from southern San Luis Potosi to Michoacan and the Valley of Mexico.

Characters.—Similar to *tenuis*, but decidedly larger and slightly darker.

Color.—Upperparts mixed black and rich ochraceous-buff, with a cinnamon tinge, the black usually showing a tendency to form a median band on the back from nose to tail; sides pure ochraceous-buff or sparingly mixed with black; underparts with a slight tinge of pale buff; tail fuscous or hair-brown above, grayish white below.

Skull.—Similar in shape to that of *tenuis* but decidedly larger; braincase somewhat more inflated, and evenly rounded; rostrum long and relatively slender; zygomata nearly parallel to axis of skull.

Measurements.—Average of 2 adults from type locality: Total length, 193 (189–196); tail vertebræ, 106 (104–108); hind foot, 21.5 (21–22). One adult from Patzcuaro, Michoacan: 180; 105; 21. Average of 2 adults from Rio Verde, San Luis Potosi: 192; 110; 21.8. Skull: (See table, p. 81).

Remarks.—This is a well-marked form of the *fulvescens* group, occupying the higher parts of the Mexican table-land. It is poorly represented in the material at hand, and its characters and exact distribution are not well known. Skulls from the same or near-by localities show an unusual amount of variation in size.

Intergradation apparently takes place between *toltecus* and *tenuis* and between *toltecus* and *helvolus*, but the material at hand is too scanty to show this clearly. Specimens from Rio Verde, San Luis Potosi, and from Zamora and Los Reyes, Michoacan, are considered intermediates between this form and *tenuis*, and specimens from Huajuapam, Oaxaca, and Chilpancingo, Guerrero, intermediates between it and *helvolus*. The series from Los Reyes is very puzzling. In color the specimens are all exactly alike, being a little darker and redder than either *tenuis* or typical *toltecus*. One speci-

¹ Collection Am. Mus. Nat. Hist.

men, an adult male, equals *toltecus* in size and agrees perfectly with it in skull characters. Several other skulls in the series, however, equally old, are very much smaller—as small, indeed, as typical *tenuis*, while between the two extremes is a nearly perfect series of intergrades.

Two specimens from Patzcuaro, Michoacan, including the type of "*inexpectatus*," do not differ appreciably from *toltecus*. The topotype has the underparts strongly suffused with ochraceous and has no white on the tail. This species differs widely in skull characters from *levipes*, with which it was originally associated as a subspecies.

Specimens examined.—Total number, 30, from the following localities in Mexico:

Mexico: Tlalpam, 3.

Hidalgo: Marques, 1 (skull); Zimapan, 1.

San Luis Potosi: Rio Verde, 6.

Michoacan: Los Reyes, 13; Patzcuaro, 2;¹ Zamora, 4.

REITHRODONTOMYS FULVESCENS HELVOLUS Merriam.

OAXACA HARVEST MOUSE.

(Pl. II, fig. 9; Pl. V, fig. 9.)

Reithrodontomys griseoflavus helvolus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 554.

Type locality.—Oaxaca City, Oaxaca, Mexico.

Distribution.—Interior plateau of Oaxaca, Guerrero, and Puebla.

Characters.—About the size of *toltecus* but differing in paler colors, larger ears, and smaller skull; very similar to *tenuis*, but color of back and sides more pinkish (less ochraceous) and belly whiter.

Color.—Upperparts light ochraceous-salmon, sparingly lined with black but without a distinct median band; underparts white, often with a slight yellowish tinge, but never (in type series) with any suffusion of ochraceous. Ears dark hair-brown, clothed on inner surface with ochraceous hairs; tail fuscous or hair-brown, soiled whitish below.

Skull.—Smaller than that of *toltecus* and slightly larger than that of *tenuis*; braincase rounded and moderately inflated, narrowed posteriorly; rostrum rather short; interpterygoid fossa actually and relatively broader than in either *toltecus* or *tenuis*.

Measurements.—Average of 11 adults from type locality: Total length, 189 (181–200); tail vertebræ, 110 (104–116); hind foot, 20.5 (20–21); ear, 13.2 (12.5–13.7). Skull: (See table, p. 81).

Remarks.—This subspecies agrees in size with *toltecus*, but most nearly approaches *tenuis* in color and cranial characters. No intermediate specimens between *helvolus* and *tenuis* have been examined, however, and our present knowledge of the distribution indicates a

¹ Including type of "*inexpectatus*" from Collection Field Mus. Nat. Hist.

gap between the ranges of these two forms, but further collecting in Michoacan and Guerrero may show that they intergrade. From *toltecus* this form differs, as already pointed out, in having a decidedly smaller skull, larger ears, and whiter belly. A specimen from Huajuapam, Oaxaca, is intermediate in characters between the two forms.

Specimens examined.—Total number, 22, from the following localities in Mexico:

Oaxaca: Huajuapam, 1; Oaxaca, 18; Yalalag, 1.

Guerrero: Tlalixtaquilla, 1; Tlapa, 1.

REITHRODONTOMYS FULVESCENS CHIAPENSIS subsp. nov.

CHIAPAS HARVEST MOUSE.

Type from Canjob, Chiapas, Mexico. No. 132865, U. S. Nat. Mus., Biological Survey Collection, ♂ adult, May 2, 1904; Nelson and Goldman. Original No. 16741.

Distribution.—Highlands of Chiapas.

Characters.—Similar to *helvolus* but darker and smaller, with smaller ears.

Color.—Upperparts ochraceous-salmon heavily lined on back with black hairs; lateral line of salmon moderately well defined; ears fuscous; underparts grayish white; tail fuscous above, soiled whitish below; feet grayish; ankles fuscous.

Skull.—Not appreciably different from that of *helvolus*.

Measurements.—Average of 8 adults from type locality: Total length, 169 (163–183); tail vertebræ, 96 (92–102); hind foot, 20.1 (20–20.5); ear, 14. Skull: (See table, p. 81).

Remarks.—This is a small dark form apparently most nearly related to *helvolus*. In size and general color it resembles *tenuis* rather closely, but is darker, especially on the head and ears. It is almost as dark above as *difficilis*, but has whiter underparts. It closely resembles *aurantius* also, but the underparts are more nearly pure white (never tinged with buff), and the general tone of the upperparts is slightly paler. The skull of *chiapensis* averages a little broader with flatter braincase and shorter nasals than that of *aurantius*.

Specimens examined.—Total number, 17, from the following localities in Mexico:

Chiapas: Canjob, 9; Comitán, 4; San Bartolome, 3; San Vicente, 1.

REITHRODONTOMYS FULVESCENS NELSONI subsp. nov.

NELSON HARVEST MOUSE.

Type from Colima, Colima, Mexico. No. $\frac{33409}{45432}$, U. S. Nat. Mus., Biological Survey Collection, ♀ adult, Mar. 9, 1892; E. W. Nelson. Original No. 2050.

Distribution.—Coast region of Colima (and Jalisco?).

Characters.—Similar to *tenuis*, but smaller; colors brighter and more intensely ochraceous.

Color.—*Adults*: Upperparts varying from deep ochraceous-buff to pinkish cinnamon, mixed on top of head and back with black; underparts suffused (sometimes heavily) with pinkish buff; ears dusky hair-brown; tail dark hair-brown or fuscous above, grayish white below; fore feet pale buff; hind feet soiled whitish. *Young*: Colors less intensely ochraceous; underparts whiter.

Skull.—Similar to that of *tenuis*, but smaller; zygomata more contracted anteriorly.

Measurements.—Type: Total length, 173; tail vertebræ, 95; hind foot, 19. Average of 5 from type locality: 166; 92; 19.2. Skull: (See table, p. 81).

Remarks.—This subspecies is a small, bright-colored form occupying the coast plain of Colima and perhaps of adjacent States. Specimens from San Sebastian and Etzatlan, Jalisco, are intermediate between this form and *tenuis*, but seem to be nearer to the latter. A single specimen from Acaponeta, Tepic, is very small, and clearly referable to *nelsoni*, although on geographical grounds it might be expected to be *tenuis*.

Specimens examined.—Total number, 8, from the following localities in Mexico:

Colima: Colima, 7.

Tepic: Acaponeta, 1.

REITHRODONTOMYS FULVESCENS MUSTELINUS subsp. nov.

BUFF-BELLIED HARVEST MOUSE.

Type from Llano Grande, Oaxaca, Mexico. No. 71549, U. S. Nat. Mus., Biological Survey Collection, ♀ adult, February 18, 1895; E. W. Nelson and E. A. Goldman. Original No. 7483.

Distribution.—Coast region of Oaxaca and Guerrero.

Characters.—Similar to *helvolus* but colors darker and richer; underparts buffy.

Color.—Upperparts varying from ochraceous-salmon to rich pinkish cinnamon, heavily mixed on head and back with black; underparts strongly suffused with pinkish buff; ears hair-brown; tail fuscous above, whitish beneath; fore feet buffy white; hind feet grayish white.

Skull.—Similar in size and proportions to that of *helvolus*; nasals longer, narrowed to a point posteriorly; palatal foramina short, not reaching plane of molars; bullæ small.

Measurements.—Type: Total length, 184; tail vertebræ, 105; hind foot, 20. Adult from Chilpancingo, Guerrero: 198; 110; 20. Skull: (See table, p. 81).

Remarks.—This subspecies is most nearly related to *helvolus*, differing from it in much deeper coloration. It resembles *R. levipes* rather closely in external appearance, but differs widely from it in skull characters. A specimen from Chilpancingo, Guerrero, has a longer skull than the type, somewhat suggesting the skull of *toltecus*.

Specimens examined.—Total number, 4, from the following localities in Mexico:

Oaxaca: Llano Grande, 2.

Guerrero: Acapulco, 1; Chilpancingo, 1.

REITHRODONTOMYS AMÆNUS Elliot.

TEHUANTEPEC HARVEST MOUSE.

(Pl. II, fig. 1; Pl. V, fig. 1.)

Rhithrodontomys amœnus Elliot, Proc. Biol. Soc. Wash., XVIII, 1905, p. 234.

Type locality.—Reforma, Oaxaca, Mexico.

Distribution.—Known only from the type locality.

Characters.—Size very small; tail moderate; similar in color to *R. f. helvolus* but upperparts deeper ochraceous.

Color.—Upperparts bright ochraceous-buff, becoming tawny-ochraceous on middle of the back, where indistinctly lined with black; underparts and feet white; tail hair-brown above, paler below.

Skull.—Small, with short heavy rostrum; braincase moderately flat and narrowed posteriorly; zygomata slightly contracted anteriorly; bullæ small and flat; interpterygoid fossa very broad; palatal foramina long, reaching behind plane of molars.

Measurements.—Type: Total length, 141; tail vertebræ, 81; hind foot, 18.5. Skull: (See table, p. 81).

Remarks.—This species, known from only a single specimen, seems not to be closely related to any of the recognized forms. It most nearly resembles *R. f. helvolus* in color, but differs widely from it in size and cranial characters, being decidedly smaller than any other species in southern Mexico. It inhabits the low coast plain bordering the Gulf of Tehuantepec in southern Oaxaca.

Specimen examined.—One, the type.

REITHRODONTOMYS OTUS Merriam.

BIG-EARED HARVEST MOUSE.

(Pl. II, fig. 2; Pl. V, fig. 2.)

Rhithrodontomys levipes otus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 555.

Type locality.—Sierra Nevada de Colima, Jalisco, Mexico (altitude 6,500 feet).

Distribution.—Known only from the type locality.

Characters.—Similar to *R. f. toltecus*, but tail longer and ears larger; colors more ochraceous and less blackish.

Color.—Upperparts pinkish cinnamon with an ochraceous tinge, mixed with brownish black; underparts heavily washed with light pinkish cinnamon; sides without a distinct lateral line of ochraceous; ears between fuscous and hair-brown with scattering ochraceous hairs on inner surface; front feet dull buffy white; hind feet grayish, with a tinge of buff; ankles dark hair-brown; tail hair-brown above, soiled whitish below.

Skull.—Similar in size and shape to that of *R. f. toltecus* but brain-case flatter and zygomata narrowed anteriorly; nasals and premaxillæ as in *toltecus*; audital bullæ also similar (larger than in *R. levipes*); foramen magnum very large; molars with simple enamel pattern, as in the *fulvescens* group.

Measurements.—Type: Total length, 202; tail vertebræ, 120; hind foot, 22. Skull: (See table, p. 81).

Remarks.—This seems to be a well-marked species, but as only a single specimen is known its relationships are not clear. In skull characters it resembles *R. f. toltecus* rather closely and differs from *R. levipes* in having a longer, narrower skull, with larger bullæ and no subsidiary enamel loops on the upper molars, being therefore in the typical subgenus. The ground color of the upperparts is similar to that of *toltecus*, but is a little duller and the blackish median band is lacking; the underparts are decidedly more ochraceous. There is no evidence to show that it intergrades with *toltecus*, so for the present it seems best to consider it a distinct species. The simple enamel pattern of the molars shows it to be not closely related to *levipes*, which is in the subgenus *Aporodon*.

Specimen examined.—One, the type.

REITHRODONTOMYS RUFESCENS GROUP.

REITHRODONTOMYS RUFESCENS RUFESCENS Allen & Chapman.

RUFESCENT HARVEST MOUSE.

Reithrodontomys rufescens Allen & Chapman, Bull. Am. Mus. Nat. Hist., IX, 1897, p. 199.

Type locality.—Jalapa, Vera Cruz, Mexico.

Distribution.—Mountain slopes of eastern Mexico in the States of Queretaro, Hidalgo, Puebla, Vera Cruz, and Oaxaca.

Characters.—Larger than *R. fulvescens difficilis* and much darker; sides lacking the bright ochraceous line characteristic of the *fulvescens* group; tail blackish, unicolor.

Color.—*Fresh pelage* (April specimens, Jalapa, Vera Cruz): Upperparts tawny, strongly mixed with black over the entire dorsal area from nose to tail; sides nearly pure tawny; ears varying from fuscous to fuscous-black; feet buffy white washed with fuscous; tail fuscous, nearly unicolor, clothed with scattered grayish hairs; underparts

heavily washed with pinkish cinnamon. *Worn pelage* (July specimens, Jico, Vera Cruz): Underparts somewhat paler; ears and tail blacker.

Skull.—Larger than that of *R. fulvescens difficilis*, with longer and relatively slenderer rostrum; braincase usually subglobular (occasionally moderately flattened); nasals long and narrowed posteriorly to a point, ending about on a line with premaxillæ; zygomatica moderately contracted anteriorly; audital bullæ relatively small; palatal foramina long, reaching to or beyond plane of first molars. Enamel pattern of upper molars in some specimens simple, in others showing incomplete subsidiary loops and small accessory tubercles.

Measurements.—Average of 10 adults from Jico and Jalapa, Vera Cruz: Total length, 176 (168–182); tail vertebræ, 98 (93–104); hind foot, 20 (18–21). Skull: (See table, p. 81).

Remarks.—This subspecies is one of the darkest forms in the genus. It has a rather limited range in the humid mountainous parts of eastern Mexico, intergrading with *luteolus* in Oaxaca and Guerrero. Its range overlaps slightly that of *R. fulvescens difficilis* (both species occurring at Jalapa, Vera Cruz), but it does not intergrade with any member of the *fulvescens* group. It is readily distinguished from them by its dark tawny coloration and unicolor tail.

In dental characters this species is quite inconstant, as pointed out above; it is considered an aberrant member of the subgenus *Reithrodontomys*, bridging the gap between it and *Aporodon* in much the same way that *levipes* does.

Specimens examined.—Total number, 15, from the following localities in Mexico:

Vera Cruz: Jalapa, 10;¹ Jico, 8.

Puebla: Huauchinango, 3.

Queretaro: Pinal de Amoles, 1.

Oaxaca: Reyes, 1.

REITHRODONTOMYS RUFESCENS LUTEOLUS subsp. nov.

YELLOW HARVEST MOUSE.

(Pl. II, fig. 6; Pl. V, fig. 6.)

Type from Juquila, Oaxaca, Mexico (altitude 5,000 feet). No. 71558, U. S. Nat. Mus., Biological Survey Collection, ♀ adult, Feb. 28, 1895; E. W. Nelson and E. A. Goldman. Original No. 7579.

Distribution.—Mountains of Oaxaca and Guerrero.

Characters.—Similar to *rufescens* but colors brighter and less blackish; ears larger and tail longer; skull with flattened braincase; molars without accessory cusps.

Color.—Upperparts and sides rich ochraceous-buff, varying to pinkish cinnamon, more or less darkened on the back with blackish

¹ Collection Am. Mus. Nat. Hist.

brown; underparts light pinkish cinnamon; tail usually bicolor, fuscous above, soiled whitish below; fore and hind feet whitish, tinged with buff; ankles dusky; ears fuscous on both surfaces.

Skull.—Similar to that of *rufescens* but averaging broader; brain-case very flat; nasals decidedly narrow posteriorly, ending on a line with premaxillæ; audital bullæ rather small (as in *rufescens*).

Measurements.—Average of 8 adults from type locality: Total length, 181 (169–199); tail vertebræ, 103 (92–112); hind foot, 20.4 (20–21). Skull: (See table, p. 81).

Remarks.—This subspecies is a well-marked race of *rufescens*, occupying the mountains of the west coast of southern Mexico. It closely resembles *R. colimæ nerterus* in color, but differs from it

FIG. 4. Distribution of *Reithrodontomys rufescens*, *R. dorsalis*, *R. australis*, *R. colimæ*, *R. alleni*, and subspecies.

in skull characters. Additional material, however, may show that *nerterus* intergrades with the present form.

Specimens from Omilteme, Guerrero, are slightly darker than the type series and one of them has a unicolor tail, as in *rufescens*. These specimens, as also one from the mountains west of Oaxaca City, are considered intermediate between *rufescens* and *luteolus*. Specimens from the type locality of this form show no approach to the subgenus *Aporodon*, but in the series from Omilteme is one specimen having well-developed subsidiary tubercles, as is frequently seen in the subspecies *rufescens*.

Specimens examined.—Total number, 15, from the following localities in Mexico:

Oaxaca: Juquila, 11; mountains 15 miles west of Oaxaca, 1.

Guerrero: Omilteme, 3.

REITHRODONTOMYS ALLENI sp. nov.

ALLEN HARVEST MOUSE.

Type from mountains near Ozolotepec, Oaxaca, Mexico (altitude 10,000 feet). No. 71563, U. S. Nat. Mus., Biological Survey Collection, ♂ adult, Mar. 27, 1895; E. W. Nelson and E. A. Goldman. Original number 7749.

Distribution.—Known only from the type locality.

Characters.—Externally similar to *R. c. colimæ* but back darker, underparts whiter, and tail longer; skull apparently nearest to that of *R. rufescens luteolus*.

Color.—Upperparts mixed black and light pinkish cinnamon; darkest along the median line; sides without a lateral line, less richly colored than in *colimæ* and much less so than in *luteolus*; underparts white; ears pale fuscous; tail fuscous above, slightly paler beneath; front feet buffy white; hind feet grayish white, washed with hair-brown; ankles dusky.

Skull.¹—Apparently similar to that of *luteolus*, but smaller; bullæ similar; rostrum short and broad; nasals longer than premaxillæ and narrowed to a point at posterior end; zygomata standing out rather squarely; molars without accessory enamel loops.

Measurements.—Type: Total length, 182; tail vertebræ, 100; hind foot, 19. Skull: (See table, p. 81).¹

Remarks.—This species, although living at a high altitude and somewhat resembling in color one of the members of the *chrysopsis* group, nevertheless seems to be most nearly related to *R. rufescens luteolus*, which occupies the lower foothill country below the range of *alleni*. The skull of *alleni* resembles that of *luteolus* in having small bullæ and long nasals narrowed posteriorly. Externally *alleni* is paler than *luteolus* and has white underparts. Additional material may show it to be a subspecies of the latter. The species is named for Dr. J. A. Allen, in recognition of his extensive work on the genus.

Specimen examined.—One, the type.

REITHRODONTOMYS COLIMÆ COLIMÆ Merriam.

COLIMA VOLCANO HARVEST MOUSE.

(Pl. II, fig. 5; Pl. V, fig. 5.)

Reithrodontomys colimæ Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 551.

Type locality.—Sierra Nevada de Colima, Jalisco, Mexico (altitude, 12,000 feet).

Distribution.—Known only from the type locality.

Characters.—Externally similar to *R. c. chrysopsis*, with long, woolly pelage, but smaller and paler; skull similar to that of *R. c. tolucae*, but smaller and with simple enamel pattern.

¹ Type and only specimen badly broken; shape of braincase not known.

Color.—Upperparts dull ochraceous-buff (slightly paler than in *chrysopsis*), sparingly mixed with black on the back, the median dorsal band only faintly indicated; sides paler but without lateral line of buff; ears fuscous; underparts pinkish buff; fore feet buffy white, washed with brownish; hind feet hair-brown, becoming white toward the toes; tail pale fuscous above, grayish white beneath.

Skull.—Similar in shape to that of *R. c. tolucæ*, but slightly smaller, with less inflated braincase; rostrum a little shorter and broader; zygomata standing out a little more squarely anteriorly; nasals long, ending on plane of premaxillæ; interpterygoid fossa rather wide (as in *chrysopsis*); bullæ intermediate in size between those of *chrysopsis* and *tolucæ*; palatal foramina short and widely open; enamel pattern of upper molars simple, with only a trace of a subsidiary enamel loop.

Measurements.—Average of 2 specimens from type locality: Total length, 165.5; tail vertebræ, 90; hind foot, 20. Skull: (See table, p. 81).

Remarks.—This species resembles externally the members of the *chrysopsis* group, but the absence of subsidiary loops on the upper molars makes it necessary to place it in the *rufescens* group in the typical subgenus. It is apparently a connectant species between the two subgenera.

Specimens examined.—Two, from type locality.

REITHRODONTOMYS COLIMÆ NERTERUS Merriam.

COLIMA HARVEST MOUSE.

Reithrodontomys colimæ nerterus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 551.

Type locality.—Sierra Nevada de Colima, Jalisco, Mexico (altitude, 6,500 feet).

Distribution.—Known only from the type locality.

Characters.—Similar to *colimæ*, but ochraceous color more intense, pelage shorter, and tail longer; skull slightly smaller.

Color.—Upperparts deep ochraceous-buff, nearly pure on sides, mixed with black on median dorsal area; underparts heavily washed with light ochraceous-buff; ears fuscous, shading to fuscous-black; tail indistinctly bicolor, pale fuscous above, dusky drab below; feet buffy white, shaded with dusky; ankles dark hair-brown.

Skull.—Slightly smaller than that of *colimæ* but of essentially similar shape; nasals considerably shorter; interpterygoid fossa relatively wide; enamel pattern of upper molars simple. Compared with *luteolus*: Braincase narrower and higher; rostrum slenderer; nasals broader at posterior end; bullæ smaller but more inflated (rounder); palatal foramina shorter. Compared with *R. r. rufescens*: Braincase higher; rostrum and nasals shorter; bullæ more inflated.

Measurements.—Type (♀ ad.): Total length, 190; tail vertebræ, 110; hind foot, 20; ear from notch, 14.5; topotype (♂ ad.): 182; 99; 21. Skull: (See table, p. 81).

Remarks.—This form closely resembles *R. rufescens luteolus*, both in color and in the character of the pelage, which is shorter and less wooly than in *R. colimæ colimæ*, which lives at higher altitudes. Compared with *luteolus* the present form is a slightly paler shade of ochraceous-buff. Its skull characters indicate close relationship to *colimæ* and necessitate its separation from *luteolus*, but additional material may serve to connect the two groups, making *luteolus* a subspecies of *colimæ*.

Specimens examined.—Two, from type locality.

REITHRODONTOMYS DORSALIS Merriam.

BLACK-BACKED HARVEST MOUSE.

(Pl. II, fig. 4; Pl. V, fig. 4.)

Reithrodontomys dorsalis Merriam, Proc. Wash. Acad. Sci, III, 1901, p. 557.

Type locality.—Calel, Guatemala.

Distribution.—Highlands of Chiapas and Guatemala.

Characters.—Smaller than *R. rufescens luteolus*, with blacker back and paler sides; skull with higher braincase.

Color.—*Fresh pelage* (January): Upperparts ochraceous-buff, mixed with black, with a well-defined median band or stripe of black; sides varying from ochraceous-buff to pinkish cinnamon, sometimes with a rather pronounced lateral line next to the belly; underparts washed with light ochraceous-buff; ears fuscous-black, darker than in *luteolus*; tail bicolor, fuscous above, grayish white beneath; hind feet grayish white; front feet buffy with a dusky stripe reaching halfway to the toes. *Worn pelage*: General tone redder (pinkish cinnamon to pale tawny); black dorsal area much less clearly defined.

Skull.—Resembling that of *R. r. rufescens* in general shape, but averaging smaller, with larger bullæ. Compared with *R. r. luteolus*: Smaller; braincase decidedly more inflated; interpterygoid fossa much narrower. Compared with *saturatus*: Larger, with heavier rostrum and more widely expanded zygomata. The upper molars in a majority of the specimens examined have a simple enamel pattern, but some specimens show an incomplete subsidiary loop and well-developed accessory tubercles on the outer border, thus completely bridging the gap between the two subgenera.

Measurements.—Average of 10 specimens (adult and subadult) from type locality: Total length, 167.5 (160–175); tail vertebræ, 90 (82–96); hind foot, 19.3 (19–20). Skull: (See table, p. 81).

Remarks.—This species, although clearly belonging to the *rufescens* group, seems not to intergrade with *luteolus*, its nearest neighbor on

the north. The low country on the Isthmus of Tehuantepec apparently is an effective barrier separating the ranges of these two mountain-loving species.

The species exhibits considerable individual and seasonal variation in color. Specimens in worn pelage very much resemble similar specimens of *rufescens*, but the ears and tail are paler.

Specimens examined.—Total number, 154, from the following localities:

Guatemala: Calel, 23; Hacienda Chancol, 29; Jacaltenango, 1; Todos Santos, 10; Volcan Santa Maria, 4; Zunil, 3.

Chiapas: Canjob, 2; Comitán, 27; Pinabete, 8; San Cristobal, 5; Tenejapa, 3; Teopisca, 6; Tumbala, 33.

REITHRODONTOMYS AUSTRALIS AUSTRALIS Allen.

IRAZU HARVEST MOUSE.

(Pl. II, fig. 3; Pl. V, fig. 3.)

Reithrodontomys australis Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 328.

Reithrodontomys australis vulcanius Bangs, Bull. Mus. Comp. Zool., XXXIX, 1902, p. 38 (Volcan de Chiriqui, Panama).

Type locality.—Volcan de Irazu, Costa Rica.

Distribution.—Mountains of Costa Rica and western Panama.

Characters.—Similar to *R. dorsalis*, but slightly smaller, with smaller ears; tail less sharply bicolor; ochraceous colors slightly deeper and black dorsal band less clearly defined.

Color.—Upperparts ochraceous-buff, varying to pale orange-cinnamon, rather heavily mixed on back with black; median dorsal band usually very indistinct; underparts washed with light pinkish cinnamon; ears pale fuscous to fuscous-black; tail fuscous above, grayish white beneath; feet buffy white, shaded with hair-brown; wrists and ankles hair-brown.

Skull.—Slightly smaller than that of *dorsalis*, with flatter braincase; bullæ rather flat, averaging smaller than in *dorsalis*; ascending arms of premaxillæ projecting a little beyond end of nasals; upper molars simple, without accessory tubercles.

Measurements.—Type: Total length, 169 (160–179); tail vertebrae, 84.5 (82–92); hind foot, 18.5 (18–19). Skull: (See table, p. 81).

Remarks.—This species belongs in the *rufescens* group, being apparently the most southerly ranging member of the group and of the subgenus. It closely resembles *dorsalis* both in color and cranial characters, and additional material from Central America may make it necessary to unite the two as a single species.

The type of "*vulcanius*" from Panama has been examined and found to agree closely with topotypes of *australis* in the Biological Survey Collection.

Specimens examined.—Total number, 18, from the following localities:

Costa Rica: Volcan de Irazu, 17.

Panama: Volcan de Chiriqui, 1.¹

REITHRODONTOMYS AUSTRALIS MODESTUS Thomas.

NICARAGUA HARVEST MOUSE.

Reithrodontomys modestus, Thomas, Ann. Mag. Nat. Hist., Ser. 7, XX, 1907, p. 163.

Type locality.—Jinotega, Nicaragua.

Distribution.—Known only from vicinity of type locality.

Characters.—Closely similar to *australis*, but underparts whiter and tail darker.

Color.—Upperparts mixed black and dull ochraceous-buff, with a fairly well-defined median band of blackish; underparts grayish white, rarely with a faint tinge of light ochraceous-buff and a pectoral spot of the latter color; tail distinctly bicolor, except at the tip, fuscous above, soiled whitish below; ears fuscous; hind feet grayish white; ankles dusky; front feet buffy, with a dusky stripe.

Skull.—Not seen. Apparently slightly smaller than that of *australis*, with smaller audital bullæ.

Measurements.—Type: "Head and body, 59; tail, 70; hind foot (s. u.), 16.5; ear, 12.5." Skull: (See table, p. 81).

Remarks.—This form appears to be very closely related to *australis*, but the material at hand is too scanty to show clearly its characters. The color description above is from specimens taken by Mr. William B. Richardson at San Rafael del Norte and kindly loaned by Dr. J. A. Allen of the American Museum of Natural History. These differ from Thomas's description of the type in having ochraceous instead of "drabby" sides and pectoral spot, and tail distinctly whiter beneath. The Richardson specimens are without complete skulls, so a study of the cranial characters has not been possible. Mr. W. H. Osgood, who compared the type specimen with material from the Biological Survey Collection, notes that its skull is slightly smaller than that of *australis*, the premaxillæ shorter, and the audital bullæ somewhat smaller.

Specimens examined:

Nicaragua: San Rafael del Norte, 8.²

Subgenus APORODON nobis.

Type.—*Reithrodontomys tenuirostris* Merriam.

Subgeneric characters.—Upper molars with subsidiary enamel loops in the outer primary reëntrant angles, these loops in most species reaching the outer border of the tooth and appearing, when viewed

¹ Collection Mus. Comp. Zool.

² Collection Am. Mus. Nat. Hist.

in profile, as prominent accessory tubercles; in other species (*chrysopsis* group) the enamel loops sometimes do not reach the outer border of the tooth and the accessory tubercles are often absent or much reduced.

Remarks.—The subgenus *Aporodon*, while not sharply set off from *Reithrodontomys* by any constant external characters, differs so widely in the molar pattern as described above that its segregation seems desirable.

It includes several well-marked groups, some of which possess striking characters, both cranial and external, while other species resemble the typical subgenus in all but the tooth characters.

The *tenuirostris-microdon* group (including also *creper*) and the *mexicanus* group (including *milleri*, *söderströmi*, and *gracilis*) show the greatest amount of differentiation from typical *Reithrodontomys*. These agree in having the outer wall of the anteorbital foramen relatively narrow (usually much narrower than width of interpterygoid fossa), broad interpterygoid fossa, short palatal foramina, unicolor tail, and dense pelage (rather woolly in most species) of a uniform tawny or ochraceous color, without pronounced darker grizzling. In all species in these groups the subsidiary enamel loops of the upper molars are well-developed and in unworn specimens appear as prominent tubercles.

The *chrysopsis* group approaches the typical subgenus in having the outer wall of anteorbital foramen broader, interpterygoid fossa narrower and palatal foramina longer. The subsidiary enamel loops of the upper molars are always well developed, but are usually (except in *perotensis*) not continuous to the outer edge of the tooth and the accessory tubercles are absent or much reduced. The pelage is long and full, and somewhat more silky than in *tenuirostris*; the upperparts are more or less varied with black, and the tail is bicolor.

R. levipes and *R. hirsutus* seem to be aberrant members of the subgenus, agreeing in the character of the pelage with the members of the typical subgenus, but having the subsidiary enamel loops of the upper molars well developed.

REITHRODONTOMYS LEVIPES GROUP.

REITHRODONTOMYS LEVIPES Merriam.

SAN SEBASTIAN HARVEST MOUSE.

(Pl. III, fig. 2; Pl. VI, fig. 2; Pl. VII, figs. 3, 5.)

Reithrodontomys levipes Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 554.

Type locality.—San Sebastian, Jalisco, Mexico.

Distribution.—Known only from the type locality.

Characters.—About the size of *R. fulvescens toltecus*; color more decidedly tawny than any members of the *fulvescens* group; skull relatively short and broad.

Color.—Upperparts ochraceous-salmon, sparingly mixed on back with black; general tone of sides between ochraceous-salmon and ochraceous-orange; underparts strongly suffused with light pinkish cinnamon; fore and hind feet grayish white, sometimes tinged with the color of the sides; ears pale fuscous, with ochraceous hairs on inner surface; tail pale fuscous above, grayish white below. Compared with *toltecus*, the ochraceous color is more intense, there is much less darkening on the middle of the back, and the underparts are more intensely buffy.

Skull.—About the size of that of *R. f. toltecus* but shorter and broader; braincase rather flat; zygomata narrowed anteriorly; nasals short; ascending arms of premaxillæ extending about 1 mm. beyond end of nasals; audital bullæ very small; interpterygoid fossa broad; palatal foramina short and widely open. First and second upper molars with accessory enamel loops in primary reëntrant angles.

Measurements.—Average of 3 adults from type locality: Total length, 190 (188–192); tail vertebræ, 110.5 (110–111); hind foot, 20.8 (20.5–21). Skull: (See table, p. 81).

Remarks.—This species is remarkable not only for its peculiar characters but because of its (seemingly) restricted range. It resembles somewhat in color and character of pelage certain members of the *fulvescens* group, but its skull characters place it in the subgenus *Aporodon*. It seems to be most nearly related to the much larger *hirsutus*, known only from Ameca, Jalisco.

At the type locality of *levipes* occurs another much smaller species—*R. fulvescens tenuis*—a member of the typical subgenus. In the series referred to this species are three specimens which combine in a remarkable manner the characters of the two species. Externally they differ very little from *levipes* except in being somewhat less intensely ochraceous, both above and below, and in having rather shorter tails (103 and 104 mm.). Their skulls, however, are decidedly narrower than those of *levipes* and about intermediate in size between skulls of the latter and of *tenuis*. The upper molars have small accessory tubercles present in the principal angles, but the enamel pattern is practically the same as in *tenuis*. Another much smaller (adult) skull in the series shows a strong tendency to develop the accessory enamel loop characteristic of the subgenus *Aporodon*. This skull (No. 88056, U. S. Nat. Mus.) is smaller than those of typical *tenuis*. Anomalous as this situation may be, there seems to be no other explanation than that these specimens are hybrids between *levipes* and *tenuis*.

Specimens examined.—Three, from type locality.

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REITHRODONTOMYS HIRSUTUS Merriam.

GIANT HARVEST MOUSE.

(Pl. III, fig. 1; Pl. VI, fig. 1.)

Reithrodontomys hirsutus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 553.*Type locality*.—Ameca, Jalisco, Mexico.*Distribution*.—Known only from the type locality.*Characters*.—Size very large; colors much as in *R. f. tenuis*, paler than in *R. levipes*.*Color*.—Upperparts ochraceous-buff, brightest on sides, sparingly mixed on the back with blackish brown; underparts grayish white, usually with a distinct tinge of light buff; fore feet whitish, washed with light buff; hind feet grayish white, tinged with dusky; ankles fuscous; tail pale fuscous above, grayish white below; ears brownish drab.*Skull*.—Large and robust with a well-defined supra-orbital bead which extends back to the parietals; braincase rather flat and somewhat narrowed posteriorly; zygomata contracted anteriorly; rostrum and nasals short; ascending arms of premaxillæ extending back of end of nasals; audital bullæ very small; palatal foramina short and wide; upper molars with subsidiary enamel loops.*Measurements*.—Average of 5 adults from type locality: Total length, 211 (203–233); tail vertebræ, 127 (122–143); hind foot, 21.8 (21–22). Skull: (See table, p. 81).*Remarks*.—This species is one of the largest in the genus, being exceeded in size of skull only by *R. tenuirostris*, a widely different species. So far as known, it has no near relative except *levipes*, and from that it differs both in size and color. It agrees with it, however, in every important cranial character—heavy rostrum, short and wide palatal foramina, broad interpterygoid fossa, and small bullæ.In color, *hirsutus* bears a remarkable resemblance to *R. f. tenuis*, which inhabits the same region, but is hardly more than half the size of the present species.*Specimens examined*.—Six, from type locality.

REITHRODONTOMYS CHRYSOPSIS GROUP.

REITHRODONTOMYS CHRYSOPSIS CHRYSOPSIS Merriam.

VOLCANO HARVEST MOUSE.

(Pl. III, fig. 3; Pl. VI, fig. 3; Pl. VII, fig. 6.)

Reithrodontomys chrysopsis Merriam, Proc. Biol. Soc. Wash., XIII, 1900, p. 152.*Type locality*.—Mount Popocatepetl, Mexico (altitude 11,500 feet).

Distribution.—High mountains around the valley of Mexico; Mount Patamban and Mount Tancitaro in Michoacan. Altitudinal range from 9,000 feet to 13,500 feet (timber line).

Characters.—Size large (almost equaling *R. hirsutus*); tail long; pelage very long, soft, and silky; ears black or blackish; tail bicolor; skull with rounded and much inflated braincase; bullæ large.

Color.—Upperparts a rich shade of ochraceous, between ochraceous-buff and orange-buff, rather heavily mixed on back with black, the latter color usually forming an indistinct median band; general tone of sides near pinkish cinnamon; ears fuscous-black; tail sharply bicolor, fuscous above, grayish white beneath; feet grayish white; ankles fuscous; underparts strongly suffused with light pinkish cinnamon.

Skull.—Of large size (considerably exceeding that of *R. r. rufescens*); braincase subglobular, usually much inflated, sometimes moderately

FIG. 5.—Distribution of *Reithrodontomys chrysopsis*, *R. perotensis*, *R. levipes*, *R. hirsutus*, and subspecies.

flattened; zygomata slender, strongly contracted anteriorly; outer wall of anteorbital foramen broad; rostrum slender, narrowing gradually to the tip; audital bullæ very large and moderately inflated; interpterygoid fossa relatively narrow (compared with *R. levipes*); palatal foramina long (as in *rufescens*); upper molars with subsidiary enamel loops in primary angles, but these usually not reaching outer border of tooth; accessory tubercles absent or much reduced.

Measurements.—Type: Total length, 194; tail vertebræ, 108; hind foot, 21. Average of 5 specimens from Ajusco, Salazar, and Huitzilac: Total length, 185 (177–188); tail vertebræ, 106 (98–111); hind foot, 20.8 (20–21). Skull: (See table, p. 81).

Remarks.—This handsome and striking species is an inhabitant of the upper slopes of the mountains about the valley of Mexico and on more or less isolated mountains in western Michoacan. It is the first-described and best-known member of a subalpine group of species found on most of the higher mountains of southern Mexico

and is apparently the only form having an extensive range. Specimens from Mount Tancitaro and Patamban show no characters to distinguish them from the typical form. From *R. f. toltecus*, which occupies the valley of Mexico, *chrysopsis* differs in larger size, richer colors, longer pelage, and blacker ears, as well as in cranial characters.

On Mount Popocatepetl, Nelson and Goldman found this species occurring sparingly in grassy places in the open forest from the base of the mountain up to 12,000 feet. On Mount Patamban it was most numerous at about 11,000 feet in the upper part of the Canadian Zone, a few ranging to the extreme summit above 12,000 feet. In the upper part of its range it was found among grass and brush.

Specimens examined.—Total number, 25, from the following localities in Mexico:

Mexico: Ajusco (11,000 feet), 3; Mount Iztaccihuatl (13,500 feet), 1; Mount Popocatepetl (11,500 feet), 3; Salazar (9,000 feet), 1.

Morelos: Huitzilac (10,000 feet), 1.

Michoacan: Mount Tancitaro (10,000–12,000 feet), 7; Patamban (11,000 feet), 9.

REITHRODONTOMYS CHRYSOPSIS TOLUCE Merriam.

TOLUCA HARVEST MOUSE.

Reithrodontomys chrysopsis tolucæ Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 549.

Type locality.—North slope of Volcan Toluca, Mexico (altitude, 11,500 feet).

Distribution.—Known only from the type locality.

Characters.—Similar to *chrysopsis*, but slightly smaller and much less intensely ochraceous; skull slenderer.

Color.—*Worn pelage*: Upperparts mixed black and ochraceous-tawny with a well-defined black median band, as in *chrysopsis*, but lacking almost entirely the bright golden color shown by the latter; ears fuscous; front feet buffy white, with a band of hair-brown reaching half way to the toes; hind feet soiled whitish, tinged with dusky; ankles fuscous; ring around eye blackish; underparts grayish with scarcely a trace of buff; tail hair-brown above, grayish white below.

Skull.—Slightly smaller than that of *chrysopsis*; braincase narrower; rostrum slenderer, much narrowed at the tip; bullæ much smaller; subsidiary enamel loops of upper molars low and slightly developed; accessory tubercles absent.

Measurements.—Type: Total length, 180; tail vertebræ, 98; hind foot, 21. Skull: (See table, p. 81).

Remarks.—This form, known from only a single specimen, has rather pronounced characters. On account of the worn condition of the type specimen, the colors can not be satisfactorily described. Specimens in fresh pelage will doubtless prove less different from

chrysopsis than is this worn individual, but the underparts apparently are distinctly whiter.

Specimen examined.—One, the type.

REITHRODONTOMYS CHRYSOPSIS ORIZABÆ Merriam.

MOUNT ORIZABA HARVEST MOUSE.

Reithrodontomys orizabæ Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 550.

Type locality.—Mount Orizaba, Puebla, Mexico (altitude, 9,500 feet).

Distribution.—Known only from the type locality.

Characters.—Externally the same as *chrysopsis*; skull narrower and bullæ smaller.

Color.—As in *chrysopsis*.

Skull.¹—Apparently smaller than that of *chrysopsis*, but length of skull and shape of zygomata not known; braincase narrower, audital bullæ decidedly smaller; molar series and nasals shorter; subsidiary enamel loops of m^2 well developed, of m^1 present but shorter. Compared with *tolucæ*: Braincase and bullæ similar; rostrum broader.

Measurements.—Type: Total length, 182; tail vertebræ, 105; hind foot, 20. Skull: (See table, p. 81).

Remarks.—This form so closely resembles *chrysopsis* in color that it seems best to consider it a subspecies of the latter; in cranial characters it more nearly resembles *tolucæ*. Additional material is necessary to determine its true relationship.

Specimen examined.—One, the type.

REITHRODONTOMYS PEROTENSIS Merriam.

PEROTE HARVEST MOUSE.

Reithrodontomys perotensis Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 550.

Type locality.—Cofre de Perote, Vera Cruz, Mexico (altitude, 9,500 feet).

Distribution.—Known only from the type locality.

Characters.—Externally similar to *chrysopsis*, but color of upperparts less intensely ochraceous; skull smaller with much smaller bullæ.

Color.—Upperparts cinnamon with strong tinge of ochraceous, extensively mixed with black and with a distinct median band of the latter color; ears fuscous, somewhat paler than in *chrysopsis*; underparts strongly washed with light pinkish cinnamon; tail pale fuscous above, slightly whitened beneath.

Skull.—Smaller than that of *R. c. chrysopsis*, with flatter braincase and smaller bullæ; zygomata squarely spreading anteriorly, nearly

¹ The type and only known specimen is badly broken.

parallel to axis of skull; subsidiary enamel loops in upper molars well developed, reaching outer border of tooth.

Measurements.—Type: Total length, 176; tail vertebræ, 119; hind foot, 19. Skull: (See table, p. 81).

Remarks.—This species differs widely in cranial characters from the other members of the *chrysopsis* group. Indeed, its skull somewhat resembles that of *R. megalotis saturatus* (which occupies the low country around the base of the Cofre de Perote), especially in the widely spreading zygomata and in the shape and size of the audital bullæ. It differs from *saturatus*, however, in having a much broader and flatter braincase, longer and slenderer rostrum, buffy instead of white underparts, and in dental characters.

Specimen examined.—One, the type.

REITHRODONTOMYS MEXICANUS GROUP.

REITHRODONTOMYS MEXICANUS MEXICANUS (De Saussure).

SAUSSURE HARVEST MOUSE.

(Pl. III, fig. 4; Pl. VI, fig. 4; Pl. VII, figs. 4, 9, 10, 11.)

Reithrodon mexicanus De Saussure, Rev. Mag. Zool., 2d ser., XII, 1860, p. 109.

Ochetodon mexicanus Coues, Proc. Acad. Nat. Sci. Phila., 1874, p. 186.

Reithrodontomys costaricensis jalapæ Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 552 (Jalapa, Vera Cruz).

Reithrodontomys cherriei jalapæ Miller, Bull. 79, U. S. Nat. Mus., 1912, p. 130.

Type locality.—Mountains of Vera Cruz, Mexico.

Distribution.—From Jalapa, Vera Cruz, south to Chiapas and Guatemala.

Characters.—Size rather large (about like *R. f. toltecus*); tail long, concolor; color uniform tawny above, white below; hind feet, ears, and tail dark; skull short, broad, and flat.

Color.—Upperparts varying from tawny to pinkish cinnamon, sparingly darkened on the back with blackish hairs; general tone of back varying from cinnamon-brown to Prout's brown; an indistinct blackish ring around eye; tail nearly unicolor, fuscous or clove-brown to fuscous-black, in some specimens slightly paler beneath; upper surfaces of both fore and hind feet dark hair-brown; toes usually buffy or grayish white; ears fuscous or fuscous-black; sides of nose, upper lips, and underparts white.

Skull.—Short and relatively broad, with very short, broad rostrum and short nasals; braincase squarish, rather flat, depressed posteriorly; zygomata slender, contracted anteriorly; nasals ending behind rather squarely, on a line with ends of premaxillæ or slightly anterior to them; outer wall of anteorbital foramen narrow; interpterygoid fossa broad; palatal foramina short, ending at or slightly in front of plane of first molars; audital bullæ small.

Measurements.—Adult male (Jalapa, Vera Cruz): Total length, 197; tail vertebræ, 119; hind foot, 21. Average of 2 adults from Toton-tepec, Oaxaca: 193; 117; 21. Average of 3 adults from Jacalte-nango, Guatemala, and Tumbala, Chiapas: 194; 117; 20.2. Skull: (See table, p. 81).

Remarks.—This species, although described over 50 years ago, is still imperfectly known, and the name *mexicanus* has been misapplied by all authors since De Saussure. Three distinct species of *Reithrodontomys* occur in the mountains of Vera Cruz and a fourth (*R. megalotis saturatus*) not far away on the table-land. These (using the modern names) are *R. rufescens rufescens*, *R. fulvescens difficilis*, and *R. "cherrii jalapæ."*¹

The original description² is so complete and agrees so perfectly with the last of these that there appears to be not the slightest doubt that the species now known as "*jalapæ*" should be referred to *mexicanus*. The combination of tawny upperparts, white belly, dark feet, and unicolor tail is possessed by no other species in this region.

Through the kindness of M. Maurice Bedot, director of the Geneva Museum, who has furnished the Biological Survey with photographs and measurements of the type skull, I am able to present additional evidence corroborative of the above decision. The photographs clearly show the relatively narrow outer wall of the anteorbital foramen and the broad interpterygoid fossa, characteristic of the sub-genus *Aporodon*, and the measurements agree closely with those of specimens of "*jalapæ*" from Jalapa, Vera Cruz.

The type of *R. mexicanus*, with the skull inside the skin, was borrowed in 1890 from the Geneva Museum and examined in Washington by Drs. Allen, Merriam, and True. Comparison was made with a specimen³ (No. 7007a, U. S. Nat. Mus.) from Tehuacan, Puebla, at that time practically the only available specimen from southern Mexico. Dr. Allen in referring this specimen to *mexicanus* stated that it agreed with the type.⁴ Dr. Merriam's notes, however, taken at the same time, indicate some important differences. These are as follows:

No. $\frac{4}{11}$. This specimen is the type of De Saussure's description. *Measurements*.—Hind foot, 18.5. Ear from crown, 10; from anterior base, 13. The upper-

¹ All of these have been taken at Jalapa, Vera Cruz.

² Following is a translation of the pertinent portions:

"The size of this animal is nearly exactly that of the European field-mouse (*Mus silvaticus*), though its forms are somewhat more thick set. * * * Tail very long, its length exceeding that of the body and head. The color of the pelage is tawny brown, on the sides becoming absolutely tawny, or even orange-tawny. The tawny color becomes fainter toward the line where it comes in contact with the white of the belly. The lips, lower part of cheeks, chin, throat, and entire underparts are almost pure white, here and there slightly washed with a tawny tint, especially on the breast and throat. * * * The hairs are slate gray, the tips only passing into russet, or white. The ears are brown * * *. The fore feet are white, except above, as far as the root of the digits, where they are gray. The tail is blackish, scaly, unicolor, and covered with rather dark gray hairs; it is especially hairy toward the tip; at its base the hairs are scanty and very short; but they become longer toward the tip."

³ Referred by the writer to *R. fulvescens difficilis*.

⁴ Bull. Am. Mus. Nat. Hist., VII, 1895, p. 136.

parts are so thoroughly suffused with fulvous that it can almost be called a "red mouse." The upper surface of the hind foot is dark brown to base of toes. The toes are whitish. The skull has never been removed from the skin. There is a skin of this species or a closely related subspecies in the United States National Museum (No. 7007a) collected at Tehuacan, Puebla, Mexico, by Sumichrast. Upperparts rusty fulvous, but not quite so deep or bright as in the mounted specimen [the type]. The only departure of importance from the type is the color of the upper surface of the hind foot, which is soiled whitish instead of dark brown, and the color of the underside of the tail, which is whitish instead of being concolor with the upper surface.

These differences—whiter feet and bicolor tail—are sufficient to show that the Tehuacan specimen can not be referred to *mexicanus*. No mention is made, either by Allen or Merriam, of the color of the underparts, but taking into consideration the soiled and faded condition of the Tehuacan specimen (and probably, also, of the type) this omission is not strange.

On the evidence of this determination the name *mexicanus* was used by Allen for the dark form of the *fulvescens* group later described from Orizaba by Merriam as *R. difficilis*, but, as shown above, it properly applies to the species now under consideration—a member of the subgenus *Aporodon*.

The species exhibits considerable individual variation in color. One specimen from Totontepec, Oaxaca, is fairly typical, while another from the same place is considerably darker, with darker ears and tail. A specimen from Jacaltenango, Guatemala, is considerably paler than Vera Cruz specimens, but agrees with them in other characters.

Intergradation with *goldmani* on the north and with *cherrii* in Central America seems fairly certain to be established.

Specimens examined.—Total number, 10, from the following localities in Mexico and Guatemala:

Vera Cruz: Jalapa, 2.¹

Oaxaca: Totontepec, 2.

Chiapas: Comitán, 1; Tenejapa, 1; Tumbala, 3.

Guatemala: Jacaltenango, 1.

REITHRODONTOMYS MEXICANUS GOLDMANI Merriam.

GOLDMAN HARVEST MOUSE.

(Pl. III, fig. 6; Pl. VI, fig. 6.)

Reithrodontomys goldmani Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 552.

Type locality.—Metlatoyuca, Puebla, Mexico (altitude 800 feet).

Distribution.—Known only from northern Puebla.

Characters.—Similar to *mexicanus*, but smaller and paler.

Color.—Upperparts pinkish cinnamon, faintly darkened on top of head and back with brownish hairs; general tone of back about snuff-brown; sides of nose, upper lips, and underparts white, the

¹ One in Collection Am. Mus. Nat. Hist.

latter with a faint tinge of pale buff; ears dark hair-brown; tail fuscous, nearly unicolor or slightly paler beneath; fore and hind feet grayish white, tinged with dusky; ankles hair-brown.

Skull.—Longer and relatively narrower than that of *mexicanus*; braincase flattened, and narrowed posteriorly; rostrum and nasals longer, the latter narrowed to a point posteriorly; audital bullæ slightly larger; palatal foramina wide.

Measurements.—Type: Total length, 190; tail vertebræ, 109; hind foot, 21.5. Skull: (See table, p. 81).

Remarks.—This subspecies is the most northerly ranging member of the group. It occupies the low, arid, coast region of northern Puebla and probably adjacent States. It is distinctly paler than *mexicanus* and the skull of the type shows pronounced characters,

FIG. 6.—Distribution of *Reithrodontomys mexicanus*, *R. gracilis*, and subspecies.

some of which, however, may not prove to be constant. Two specimens from Huauchinango, Puebla (altitude 5,000 feet) are intermediate between *goldmani* and *mexicanus*, the skulls being nearer to the latter form, the skins nearer *goldmani*.

Specimens examined.—Total number, 3, from the following localities in Mexico:

Puebla: Huauchinango, 2; Metlatoyuca, 1.

REITHRODONTOMYS MEXICANUS CHERRII (Allen).

CENTRAL AMERICAN HARVEST MOUSE.

(Pl. III, fig. 5; Pl. VI, fig. 5.)

Hesperomys (Vesperimus) cherrii Allen, Bull. Am. Mus. Nat. Hist., III, 1891, p. 211.

Sitomys cherriei Allen, Ibid., V, 1893, p. 238.

Reithrodontomys costaricensis Allen, Ibid., VII, 1895, p. 139 (La Carpintera, Costa Rica).

Reithrodontomys cherriei Osgood, Proc. Biol. Soc. Wash., XX, 1907, p. 50 (type fixed).

Type locality.—San Jose, Costa Rica.

Distribution.—Costa Rica and Chiriqui, Panama.

Characters.—Similar to *mexicanus*, but colors brighter (more tawny, less blackish); ears paler; skull larger.

Color.—Upperparts varying from bright tawny to hazel, more or less mixed with black on dorsal area; ears dusky hair-brown, scantily haired; underparts white (rarely washed with yellowish buff); tail fuscous, unicolor, clothed with short, bristly hairs; fore and hind feet pale sepia, broadly edged with whitish; toes buffy white.

Skull.—Larger than that of *mexicanus*, with longer rostrum; brain-case more inflated.

Measurements.—Average of 7 adults from Costa Rica (San Pedro and La Carpintera): Total length, 191 (182–198); tail vertebræ, 111 (103–123); hind foot, 20 (19.5–20.5). Average of 13 adults from Boquete, Chiriqui: Total length, 207 (192–227); tail vertebræ, 126 (115–140); hind foot, 20 (19–22). Skull: (See table, p. 81).

Remarks.—Through an unfortunate mixing of skulls this species was originally described as a *Hesperomys* [= *Peromyscus*] and a few years later, before the mistake was discovered, redescribed as *Reithrodontomys* "*costaricensis*," by which name it has usually been known. Osgood has shown the pertinence of the original description to the present species and has selected a type specimen from the original series.¹

The species is one of the larger members of the genus, though not so large as *R. t. tenuirostris* and *R. hirsutus*. Intergradation with *mexicanus* seems probable, though not perfectly shown by the material at hand. A specimen from Jacaltenango, Guatemala, is somewhat intermediate in characters, but apparently nearest to *mexicanus*. Specimens from Boquete, Chiriqui, have somewhat longer tails than the series from Costa Rica. A single specimen from Nicaragua is much less tawny than the type series, somewhat resembling the Guatemala specimen.

Specimens examined.—Total number, 21, from the following localities:

Costa Rica: La Carpintera, 3;² San Jose, 2;² San Pedro, 3.²

Panama: Boquete, Chiriqui, 13.³

REITHRODONTOMYS MILLERI Allen.

COLOMBIAN HARVEST MOUSE.

Reithrodontomys milleri Allen, Bull. Am. Mus. Nat. Hist., XXXI, 1912, p. 77.

Type locality.—Munchique, Cauca, Colombia (altitude, 8,325 feet).

Distribution.—Known only from Colombia (altitude 6,000 to 10,300 feet).

¹ Proc. Biol. Soc. Wash. XX, 1907, p. 50.

² Eleven in Collection Mus. Comp. Zool.

³ Collection Am. Mus. Nat. Hist.

Characters.—Paler and less tawny than *R. m. cherrii*; tail shorter.

Color.—Upperparts varying from light ochraceous-salmon, extensively mixed with brownish to nearly pure tawny, with slight admixture of brown; lateral line only faintly indicated; underparts white, sometimes with a faint tinge of light buff; ears and tail dark hair-brown, the latter almost unicolor, but slightly paler beneath; feet hair-brown, sometimes edged with grayish white.

Skull.—Very similar to that of *R. m. cherrii*, with short, heavy rostrum, broad frontals, and short palatal foramina.

Measurements.—Ten adults: Total length, 181 (169–190); tail vertebræ, 107 (98–116); hind foot, 19 (18–20). Skull: (See table, p. 81).

Remarks.—This species is rather closely related to *R. m. cherrii*, from which it differs in browner, less tawny coloration and shorter tail. No intermediate specimens are known, but further collecting in Panama may result in securing such.

Specimens examined.—Total number, 7, from the following localities:¹

Colombia: Cocal, 1; El Roble (7,000 feet), 5; La Guneta, 1; Munchique, 5; San Augustin, Huila (10,300 feet), 1.

REITHRODONTOMYS SÖDERSTRÖMI Thomas.

ECUADOR HARVEST MOUSE.

Reithrodontomys söderströmi Thomas, Ann. Mag. Nat. Hist., ser. 7, I, 1898, p. 451.

Type locality.—Quito, Ecuador.

Distribution.—Known only from the type locality and from Valle de las Papas, southern Colombia.

Characters.—Apparently in the *cherrii* group and closely related to *milleri*; colors less tawny above and more buffy or fawn-colored below; hind foot, ear, and skull larger.

Color.—"Dull grayish fawn, not nearly so rufous as in *costaricensis* [*cherrii*]. Brighter lateral line little developed. Under surface not sharply defined, its color much less bright than in *costaricensis*, the tips of the hairs more or less buffy or fawn-colored. Ears thinly haired, brown, little darker than the general color. Hands and feet white, without darker markings on the metapodials. Tail pale brown above and below, the tip white."² A series of 4 specimens from Valle de las Papas, central Andes, Huila, Colombia,³ may be described as follows: Upperparts mixed blackish brown and ochraceous-salmon; ears clove-brown; tail dark mummy-brown; hind feet soiled whitish, with a broad band of mummy-brown reaching nearly to the toes;

¹ All in Collection Am. Mus. Nat. Hist.

² Thomas, loc. cit.

³ Compared by Dr. J. A. Allen and Mr. Oldfield Thomas with the type and 12 topotypes in the British Museum and said to agree perfectly with them.

front feet similar, but with less brown; underparts white, strongly tinged with pale ochraceous-salmon. With regard to the color of the hind feet in the typical series, Mr. Thomas writes me as follows:

Of 20 specimens, 12 have large metapodial patches [of brown], 7 have smaller ones down to quite minute ones (often not the same on both sides) and the type has practically none at all—though even there a few hairs are dark on each foot, making a minute spot.

Skull.—Similar to that of *milleri*, but larger. "Low, with a flat superior profile. Palatal foramina short, barely reaching backward to the level of the front of *m*."¹ More recently Mr. Thomas has compared the topotype series with specimens of *R. m. cherrii* and states:² "I can find no skull difference of any importance or constancy."

Measurements.—Type (from dry skin): "Head and body, 72; tail (tip doubtfully perfect), 83; hind foot (wet) without claws, 19; ear (wet), 14. Skull: Back of parietal to nasal tip, 21.1; greatest breadth, 11.5; nasals 8.9 x 2.6; interorbital breadth, 3.7; palate from hensenion, 9.2; diastema, 5.9; palatal foramina, 4.1 x 1.6; upper molar series, 3.8."³ Skull of fully adult topotype (measured by Mr. Thomas): Greatest length 24.2; breadth of braincase, 11.5; length of nasals, 9.1; width of outer wall of anteorbital foramen, 1.9.

Remarks.—This species, so far as known, is the most southerly ranging member of the genus. I have not been able to examine the type series of 20 specimens in the British Museum, but I have seen a small series from southern Colombia, kindly loaned by Dr. Allen, and which both he and Mr. Thomas consider typical of this species. From an examination of this series it is clear that *söderströmi* is a member of the *mexicanus* group and rather closely related to *milleri*, but whether it is connected with the latter by intermediate forms can not at present be determined.

Its habits are described by Mr. L. Söderström, the collector of the type series, as follows: "Feeds on flowers and seeds in the gardens. Comes out from among the climbing plants every evening at about 7 p. m."

Specimens examined.—Four, from Valle de las Papas, Huila, Colombia (central Andes, altitude 10,000 feet).⁴

REITHRODONTOMYS GRACILIS Allen & Chapman.

YUCATAN HARVEST MOUSE.

(Pl. III, fig. 7; Pl. VI, fig. 7.)

Reithrodontomys mexicanus gracilis Allen and Chapman, Bull. Am. Mus. Nat. Hist., IX, 1897, p. 9.

Type locality.—Chichen Itza, Yucatan, Mexico.

Distribution.—Yucatan and Campeche.

¹ Original description by Thomas.

² In epistle, Oct. 21, 1913.

³ Thomas, loc. cit.

⁴ Collection Am. Mus. Nat. Hist.

Characters.—Size small; similar in color to *R. m. goldmani*, but brighter; skull much smaller with narrow braincase.

Color.—Upperparts pinkish cinnamon, sparingly lined on dorsal surface with blackish brown; color brightest on sides next to the belly, sometimes forming an indistinct lateral line (as in the *fulvescens* group); ears dark hair-brown; tail fuscous, slightly paler beneath; fore feet buffy white; hind feet grayish white; ankles fuscous; underparts white, sometimes with a slight yellowish cast; less white on sides of nose than in *mexicanus* and *goldmani*.

Skull.—Decidedly smaller than that of either *mexicanus* or *goldmani*; similar in size and general proportions to that of *difficilis*, but differing in the characters of the subgenus; rostrum short and broad; braincase narrow and moderately flat; nasals short; zygomatica nearly parallel to axis of skull (much less contracted anteriorly than in *mexicanus*); palatal foramina very short; bullæ rather small.

The outer wall of the anteorbital foramen, although much narrower than in skulls of *R. fulvescens difficilis*, is relatively broader than in the other members of the subgenus and may slightly exceed the width of the interpterygoid fossa. The subsidiary enamel loops are present on the upper molars, but the accessory tubercles are rather low.

Measurements.—Type (immature): Total length, 165; tail vertebrae, 98; hind foot, 16. Average of 2 topotypes (immature): 169; 100; 18. A somewhat older (subadult) specimen from Yohaltun, Campeche: 191; 113; 20. Skull: (See table, p. 81).

Remarks.—This is the smallest member of the *mexicanus* group. Externally it bears a striking resemblance to *R. fulvescens tenuis*, differing chiefly in darker and more nearly unicolor tail and more uniform ochraceous color (less grizzled with black) on the upperparts. In skull characters the two differ widely, *gracilis* clearly belonging in the subgenus *Aporodon*.

From *R. m. mexicanus*, its nearest relative, it differs in much smaller size, paler coloration, and narrower skull. Judging from the very limited material at hand, it seems to be specifically distinct from the other members of the group. One specimen from Yohaltun, Campeche, differs from the type series in being somewhat darker, with blacker, more nearly unicolor tail.

Specimens examined.—Total number, 9, from the following localities in Mexico:

Yucatan: Chichen Itza, 6;¹ Progreso, 1.

Campeche: Apazote, 1; Yohaltun, 1.

¹ Four in Collection Am. Mus. Nat. Hist.

REITHRODONTOMYS TENUIROSTRIS GROUP.

REITHRODONTOMYS TENUIROSTRIS TENUIROSTRIS Merriam.

WOOLY HARVEST MOUSE.

Reithrodontomys tenuirostris Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 547.

Type locality.—Todos Santos, Guatemala (altitude 10,000 feet).

Distribution.—Known only from the type locality.

Characters.—Size very large (equaling *R. hirsutus*, except in length of tail); pelage long, soft, and wooly; color rich tawny; tail unicolor; skull with much swollen braincase and narrow rostrum.

Color.—*Adults*: Upperparts deep tawny, darkest on the dorsal area where the color becomes hazel; an indistinct blackish ring around eye; underparts light pinkish cinnamon; ears and tail fuscous; ankles and hind feet clove-brown; tips of toes whitish; upper surface of fore feet hair-brown; toes buffy. *Young*: Upperparts Prout's brown, with a tinge of tawny; underparts paler than in the adult; toes buffy white.

Skull.—Braincase broad, much inflated, depressed posteriorly; anterior portion of frontals abruptly depressed, forming a shallow sulcus at posterior end of nasals; rostrum long and narrow; nasals narrowed to a point posteriorly, ending on a line with premaxillæ; zygomata slender, slightly contracted anteriorly; palatal foramina relatively short, not reaching plane of first molars; interpterygoid fossa broad (about as wide as outer wall of anteorbital foramen); bullæ small and rather flat.

Measurements.—Type (♂ ad.): Total length, 210; tail vertebræ, 124; hind foot, 23. Skull: (See table, p. 81).

Remarks.—This is one of the largest and most striking members of the genus. Resembling *R. m. mexicanus* in the color of the upperparts, it is readily distinguished by its cinnamon belly. Its skull is so peculiar that it is placed in a different group from the latter.

Specimens examined.—Two, from type locality.

REITHRODONTOMYS TENUIROSTRIS AUREUS Merriam.

CALEL HARVEST MOUSE.

(Pl. III, fig. 8; Pl. VI, fig. 8; Pl. VII, fig. 2.)

Reithrodontomys tenuirostris aureus Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 548.

Type locality.—Calel, Guatemala (altitude 10,200 feet).

Distribution.—Known only from the type locality.

Characters.—Slightly smaller and paler than *tenuirostris*.

Color.—*Adults*: Upperparts ochraceous-tawny moderately darkened on dorsal area with black; underparts light ochraceous-buff (a little yellower than in *tenuirostris*); ears fuscous-black; tail fuscous, slightly paler beneath; fore feet dark hair-brown; hind feet clove-brown, both edged with white; toes whitish. *Young*: Upper-

parts Prout's brown, faintly tinged with ochraceous; underparts white.

Skull.—Slightly smaller than that of *tenuirostris*, with flatter braincase and more inflated bullæ; palatal foramina longer and slightly broader, extending behind plane of first molars.

Measurements.—Adult female: Total length, 196; tail vertebræ, 112 hind foot, 22.5. Skull: (See table, p. 81).

Remarks.—This subspecies lives at about the same altitude as does *tenuirostris* and only a short distance away. With the very limited amount of material at hand, it is impossible to say whether the characters distinguishing the two forms will prove to be constant.

Specimens examined.—Two, from type locality.

REITHRODONTOMYS CREPER Bangs.

CHIRIQUI HARVEST MOUSE.

Reithrodontomys creper Bangs, Bull. Mus. Comp. Zool., XXXIX, 1902, p. 39.

Type locality.—Volcan de Chiriqui, Panama (altitude, 11,000 feet).

Distribution.—Known only from the type locality.

Characters.—Size large; colors very dark (similar to *R. a. australis* above, but darker beneath); skull similar to that of *R. t. tenuirostris*, but smaller.

Color.¹—Type: Upperparts mummy-brown, varying on sides to Mars brown; sides of face blackish; underparts russet; ears dark sepia; tail dusky—almost clove-brown—all around, except terminal fourth which is whitish; feet whitish, palest on toes.

Skull.—Similar in shape to that of *R. t. tenuirostris*, but smaller; braincase narrowed posteriorly; palatal foramina expanded in the middle, narrowing anteriorly; zygomata much contracted anteriorly. Compared with *R. t. aureus*: Skull slightly shorter and much narrower; bullæ smaller.

Measurements.—Type (♀ ad.): Total length, 215; tail vertebræ, 130; hind foot, 23. Skull: (See table, p. 81).

Remarks.—This very distinct species is known only from a single specimen, "caught on the cold barren summit of the Volcan de Chiriqui".² It seems to be nearest related to *R. tenuirostris*, from Guatemala.

Specimen examined.—One, the type.³

¹ Comparisons with Ridgway's "Nomenclature of Colors" (1896).

² Bangs, loc. cit.

³ Collection Mus. Comp. Zool.

REITHRODONTOMYS MICRODON MICRODON Merriam.

SMALL-TOOTHED HARVEST MOUSE.

(Pl. III, fig. 9; Pl. VI, fig. 9.)

Reithrodontomys microdon Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 548.*Type locality*.—Todos Santos, Guatemala.*Distribution*.—Highlands of Guatemala; limits unknown.*Characters*.—Closely similar in color to *R. t. tenuirostris*, but very much smaller.*Color*.—*Adults*: Upperparts tawny, brighter on the sides next to the belly, darkened on back and head with black, where the tone becomes hazel; blackish ring around eye; underparts light pinkish cinnamon; ears and tail fuscous, the latter slightly paler beneath; hind feet dark hair-brown edged with whitish; toes white; fore feet buffy white with a patch of dusky. *Subadults*: Upperparts browner (about Prout's brown) and less mixed with tawny; underparts white.*Skull*.—Similar in general shape to that of *R. t. tenuirostris*, but very much smaller; braincase moderately inflated, narrowed and depressed posteriorly; zygomata slender, decidedly contracted anteriorly; rostrum narrow; palatal foramina ending on plane of front molars; interpterygoid fossa very broad; bullæ rather large and inflated; outer wall of anteorbital foramen very narrow.*Measurements*.—Type (♀ ad.): Total length, 185; tail vertebræ, 113; hind foot, 21. Topotype (♂ subadult): 180; 112; 21. Skull: (See table, p. 81).*Remarks*.—This little species is in every way a miniature of the large *tenuirostris*, which lives in the same region.*Specimens examined*.—Total number, 3, from the following localities:

Guatemala: Todos Santos, 2; Volcan Santa Maria 1.

REITHRODONTOMYS MICRODON ALBILABRIS Merriam.

WHITE-LIPPED HARVEST MOUSE.

Reithrodontomys microdon albilabris Merriam, Proc. Wash. Acad. Sci., III, 1901, p. 549.*Type locality*.—Cerro San Felipe, Oaxaca, Mexico (altitude, 10,000 feet).*Distribution*.—Known only from the type locality.*Characters*.—Similar to *microdon*, but paler; underparts white; closely similar in color to *R. mexicanus goldmani*.*Color*.—Upperparts pinkish cinnamon, darkened on dorsal area with black, where the tone becomes snuff-brown; blackish ring around eye; ears, tail, and hind feet fuscous, the last edged with whitish; toes whitish; fore feet buffy, with a dusky patch; underparts white.*Skull*.—Very similar to that of *microdon*; braincase slightly broader and more inflated; interpterygoid fossa narrower; bullæ slightly smaller; nasals ending on a line with premaxillæ; zygomata decidedly

SKULLS OF REITHRODONTOMYS.

1. *R. h. humulis*,
2. *R. h. merriami*,
3. *R. a. griseus*,
4. *R. a. albescens*,

5. *R. montanus*,
6. *R. m. megalotis*,
7. *R. m. dychei*,
8. *R. m. saturatus*,

9. *R. r. raviventris*,
10. *R. r. halicotes*,
11. *R. m. zacatecae*,
12. *R. m. alticola*,

PLATE I.

[Twice natural size.]

- FIG. 1. *Reithrodontomys humulis humulis*. Raleigh, N. C. (No. 189304, U. S. Nat. Mus., Merriam Coll.)
2. *Reithrodontomys humulis merriami*. Austin Bayou, Tex. (No. 44849, U. S. Nat. Mus., Biological Survey Coll.)
3. *Reithrodontomys albescens griseus*. Type, San Antonio, Tex. (No. 87852, U. S. Nat. Mus., Biological Survey Coll.)
4. *Reithrodontomys albescens albescens*. Type, Kennedy, Nebr. (No. 116358, U. S. Nat. Mus., Biological Survey Coll.)
5. *Reithrodontomys montanus*. Medano Ranch, Costilla County, Colo. (No. 150714, U. S. Nat. Mus., Biological Survey Coll.)
6. *Reithrodontomys megalotis megalotis*. Dry Creek, Socorro County, N. Mex. (No. 158319, U. S. Nat. Mus., Biological Survey Coll.)
7. *Reithrodontomys megalotis dychei*. Onaga, Kans. (No. 147132, U. S. Nat. Mus., Biological Survey Coll.)
8. *Reithrodontomys megalotis saturatus*. Las Vigas, Vera Cruz. (No. 54434, U. S. Nat. Mus., Biological Survey Coll.)
9. *Reithrodontomys raviventris raviventris*. Berkeley, Cal. (No. 93208, U. S. Nat. Mus., Biological Survey Coll.)
10. *Reithrodontomys raviventris halicastes*. Type, Petaluma, Cal. (No. 7146, Mus. Vert. Zool., Univ. California.)
11. *Reithrodontomys megalotis zacatecae*. Valparaiso Mountains, Zacatecas. (No. 91912, U. S. Nat. Mus., Biological Survey Coll.)
12. *Reithrodontomys megalotis alticolus*. Type, Cerro San Felipe, Oaxaca. (No. 68392, U. S. Nat. Mus., Biological Survey Coll.)

SKULLS OF REITHRODONTOMYS.

1. *R. amoenus*.
2. *R. otus*.
3. *R. a. australis*.
4. *R. dorsalis*.

5. *R. c. colimæ*.
6. *R. r. luteolus*.
7. *R. f. tenuis*.

8. *R. f. difficilis*.
9. *R. f. helvolus*.
10. *R. f. toltecus*.

PLATE II.

[Twice natural size.]

- FIG. 1. *Reithrodontomys amoenus*. Type, Reforma, Oaxaca. (No. 14064, Field Mus. Nat. Hist.)
2. *Reithrodontomys otus*. Type, Sierra Nevada de Colima, Jalisco. No. 45705, U. S. Nat. Mus., Biological Survey Coll.)
3. *Reithrodontomys australis australis*. Volcan Irazu, Costa Rica. (No. 116614, U. S. Nat. Mus., Biological Survey Coll.)
4. *Reithrodontomys dorsalis*. Type, Cael, Guatemala. (No. 77009, U. S. Nat. Mus., Biological Survey Coll.)
5. *Reithrodontomys colimæ colimæ*. Type, Sierra Nevada de Colima, Jalisco. (No. 45706, U. S. Nat. Mus., Biological Survey Coll.)
6. *Reithrodontomys rufescens luteolus*. Type, Juquila, Oaxaca. (No. 71558, U. S. Nat. Mus., Biological Survey Coll.)
7. *Reithrodontomys fulvescens tenuis*. Mazatlan, Sinaloa. (No. 96713, U. S. Nat. Mus., Biological Survey Coll.)
8. *Reithrodontomys fulvescens difficilis*. Orizaba, Vera Cruz. (No. 58268, U. S. Nat. Mus., Biological Survey Coll.)
9. *Reithrodontomys fulvescens helvolus*. Type, Oaxaca, Oaxaca. (No. 68387, U. S. Nat. Mus., Biological Survey Coll.)
10. *Reithrodontomys fulvescens toltecus*. Type, Tlalpam, D. F., Mexico. (No. 50746, U. S. Nat. Mus., Biological Survey Coll.)

SKULLS OF REITHRODONTOMYS.

1. *R. hirsutus*.
2. *R. levipes*.
3. *R. c. chrysopsis*.

4. *R. m. mexicanus*.
5. *R. m. cherrii*.
6. *R. m. goldmani*.

7. *R. gracilis*.
8. *R. t. aureus*.
9. *R. m. microdon*.

PLATE III.

[Twice natural size.]

- FIG. 1. *Reithrodontomys hirsutus*. Type, Ameca, Jalisco. (No. 82200, U. S. Nat. Mus., Biological Survey Coll.)
2. *Reithrodontomys levipes*. Type, San Sebastian, Jalisco. (No. 88057, U. S. Nat. Mus., Biological Survey Coll.)
3. *Reithrodontomys chrysopsis chrysopsis*. Type, Mount Popocatepetl, Mexico. (No. 52031, U. S. Nat. Mus., Biological Survey Coll.)
4. *Reithrodontomys mexicanus mexicanus*. Jalapa, Vera Cruz. (No. 108538, U. S. Nat. Mus., Biological Survey Coll.)
5. *Reithrodontomys mexicanus cherrii*. La Carpintera, Costa Rica. (No. 7898, Am. Mus. Nat. Hist.)
6. *Reithrodontomys mexicanus goldmani*. Type, Metlatoyuca, Puebla. (No. 93096, U. S. Nat. Mus., Biological Survey Coll.)
7. *Reithrodontomys gracilis*. Chichen Itza, Yucatan. (No. 108143, U. S. Nat. Mus., Biological Survey Coll.)
8. *Reithrodontomys tenuirostris aureus*. Type, Calel, Guatemala. (No. 76939, U. S. Nat. Mus., Biological Survey Coll.)
9. *Reithrodontomys microdon microdon*. Type, Todos Santos, Guatemala. (No. 76923, U. S. Nat. Mus., Biological Survey Coll.)

SKULLS OF REITHRODONTOMYS.

1. *R. h. humilis*.
2. *R. h. merriami*.
3. *R. a. griseus*.
4. *R. a. albescens*.

5. *R. montanus*.
6. *R. m. megalotis*.
7. *R. m. dychei*.
8. *R. m. saturatus*.

9. *R. r. raviventris*.
10. *R. r. halicetes*.
11. *R. m. zacatecae*.
12. *R. m. alticola*.

PLATE IV.

[Twice natural size.]

- FIG. 1. *Reithrodontomys humulis humulis*. Raleigh, N. C. (No. 189304, U. S. Nat. Mus., Merriam Coll.)
2. *Reithrodontomys humulis merriami*. Austin Bayou, Tex. (No. 44849, U. S. Nat. Mus., Biological Survey Coll.)
3. *Reithrodontomys albescens griseus*. Type, San Antonio, Tex. (No. 87852, U. S. Nat. Mus., Biological Survey Coll.)
4. *Reithrodontomys albescens albescens*. Type, Kennedy, Nebr. (No. 116358, U. S. Nat. Mus., Biological Survey Coll.)
5. *Reithrodontomys montanus*. Medano Ranch, Costilla County, Colo. (No. 150714, U. S. Nat. Mus., Biological Survey Coll.)
6. *Reithrodontomys megalotis megalotis*. Dry Creek, Socorro County, N. Mex. (No. 158319, U. S. Nat. Mus., Biological Survey Coll.)
7. *Reithrodontomys megalotis dychei*. Onaga, Kans. (No. 147132, U. S. Nat. Mus., Biological Survey Coll.)
8. *Reithrodontomys megalotis saturatus*. Las Vigas, Vera Cruz. (No. 54434, U. S. Nat. Mus., Biological Survey Coll.)
9. *Reithrodontomys raviventris raviventris*. Berkeley, Cal. (No. 93208, U. S. Nat. Mus., Biological Survey Coll.)
10. *Reithrodontomys raviventris halicetes*. Type, Petaluma, Cal. (No. 7146, Mus. Vert. Zool., Univ. California.)
11. *Reithrodontomys megalotis zacatecæ*. Valparaiso Mountains, Zacatecas. (No. 91912, U. S. Nat. Mus., Biological Survey Coll.)
12. *Reithrodontomys megalotis alticolus*. Type, Cerro San Felipe, Oaxaca. (No. 68392, U. S. Nat. Mus., Biological Survey Coll.)

SKULLS OF REITHRODONTOMYS.

1. *R. amoenus*.
2. *R. otus*.
3. *R. australis*.
4. *R. dorsalis*.

5. *R. e. colimæ*.
6. *R. r. luteolus*.
7. *R. f. tenuis*.

8. *R. f. difficilis*.
9. *R. f. helvolus*.
10. *R. f. toltecus*.

PLATE V.

[Twice natural size.]

- FIG. 1. *Reithrodontomys amoenus*. Type, Reforma, Oaxaca. (No. 14064, Field Mus. Nat. Hist.)
2. *Reithrodontomys otus*. Type, Sierra Nevada de Colima, Jalisco. (No. 45705, U. S. Nat. Mus., Biological Survey Coll.)
3. *Reithrodontomys australis*. Volcan Irazu, Costa Rica. (No. 116614, U. S. Nat. Mus., Biological Survey Coll.)
4. *Reithrodontomys dorsalis*. Type, Cateel, Guatemala. (No. 77009, U. S. Nat. Mus., Biological Survey Coll.)
5. *Reithrodontomys colimæ colimæ*. Type, Sierra Nevada de Colima, Jalisco. (No. 45706, U. S. Nat. Mus., Biological Survey Coll.)
6. *Reithrodontomys rufescens luteolus*. Type, Juquila, Oaxaca. (No. 71558, U. S. Nat. Mus., Biological Survey Coll.)
7. *Reithrodontomys fulvescens tenuis*. Mazatlan, Sinaloa. (No. 96713, U. S. Nat. Mus., Biological Survey Coll.)
8. *Reithrodontomys fulvescens difficilis*. Orizaba, Vera Cruz. (No. 58268, U. S. Nat. Mus., Biological Survey Coll.)
9. *Reithrodontomys fulvescens helvolus*. Type, Oaxaca, Oaxaca. (No. 68387, U. S. Nat. Mus., Biological Survey Coll.)
10. *Reithrodontomys fulvescens toltecus*. Type, Tlalpam, D. F., Mexico. (No. 50746, U. S. Nat. Mus., Biological Survey Coll.)

SKULLS OF REITHRODONTOMYS.

1. *R. hirsutus*.
2. *R. levipes*.
3. *R. c. chrysopsis*.

4. *R. m. mexicanus*.
5. *R. m. cherrii*.
6. *R. m. goldmani*.

7. *R. gracilis*.
8. *R. t. aureus*.
9. *R. m. microdon*.

PLATE VI.

[Twice natural size.]

- FIG. 1. *Reithrodontomys hirsutus*. Type, Ameca, Jalisco. (No. 82200, U. S. Nat. Mus., Biological Survey Coll.)
2. *Reithrodontomys levipes*. Type, San Sebastian, Jalisco. (No. 88057, U. S. Nat. Mus., Biological Survey Coll.)
3. *Reithrodontomys chrysopsis chrysopsis*. Type, Mount Popocatepetl, Mexico. (No. 52031, U. S. Nat. Mus., Biological Survey Coll.)
4. *Reithrodontomys mexicanus mexicanus*. Jalapa, Vera Cruz. (No. 108538, U. S. Nat. Mus., Biological Survey Coll.)
5. *Reithrodontomys mexicanus cherrii*. La Carpintera, Costa Rica. (No. 7898, Am. Mus. Nat. Hist.)
6. *Reithrodontomys mexicanus goldmani*. Type, Metlaltoyuca, Puebla. (No. 93096, U. S. Nat. Mus., Biological Survey Coll.)
7. *Reithrodontomys gracilis*. Chichen Itza, Yucatan. (No. 108143, U. S. Nat. Mus., Biological Survey Coll.)
8. *Reithrodontomys tenuirostris aureus*. Type, Cabel, Guatemala. (No. 76939, U. S. Nat. Mus., Biological Survey Coll.)
9. *Reithrodontomys microdon microdon*. Type, Todos Santos, Guatemala. (No. 76923, U. S. Nat. Mus., Biological Survey Coll.)

MOLAR TEETH AND SKULLS OF REITHRODONTOMYS.

1. *R. m. megalotis*.
2. *R. t. aureus*.
3. *R. levipes*.

4. *R. m. mexicanus*.
5. *R. levipes*.
6. *R. c. chrysopsis*.

7. *R. m. megalotis*.
8. *R. h. merriami*.
9. 10. 11. *R. m. mexicanus*.

PLATE VII.

[Teeth about 10 times natural size; skulls twice natural size.]

FIGS. 1, 7. *Reithrodontomys (Reithrodontomys) megalotis megalotis*.

Fig. 1. Side view of upper molars. (No. 167353, U. S. Nat. Mus., Biological Survey Coll.)

Fig. 7. Worn crowns of upper molars. (No. 58090, U. S. Nat. Mus., Biological Survey Coll.)

2. *Reithrodontomys (Aporodon) tenuirostris aureus*. Side view of upper molars. (No. 77008, U. S. Nat. Mus., Biological Survey Coll.)

3, 5. *Reithrodontomys (Aporodon) levipes*.

Fig. 3. Worn crowns of lower molars. (No. 88057, U. S. Nat. Mus., Biological Survey Coll.)

Fig. 5. Worn crowns of upper molars. (No. 88057, U. S. Nat. Mus., Biological Survey Coll.)

4, 9, 10, 11. *Reithrodontomys (Aporodon) mexicanus mexicanus*.

Fig. 4. Worn crowns of upper molars. (No. 68684, U. S. Nat. Mus., Biological Survey Coll.)

Figs. 9, 10, 11. Skull of type. (No. $\frac{519}{100}$, Geneva Museum.)

6. *Reithrodontomys (Aporodon) chrysopsis chrysopsis*. Worn crowns of upper molars. (No. 125883, U. S. Nat. Mus., Biological Survey Coll.)

8. *Reithrodontomys (Reithrodontomys) humulis merriami*. Worn crowns of upper molars. (No. 178261, U. S. Nat. Mus., Biological Survey Coll.)

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