

**Article VI.—ON A COLLECTION OF MAMMALS FROM  
ARIZONA AND MEXICO, MADE BY MR. W. W.  
PRICE, WITH FIELD NOTES BY THE COLLECTOR.**

By J. A. ALLEN.

The collection on which the present paper is based numbers about 1500 specimens, collected mainly from January to September,<sup>1</sup> 1894, by Mr. W. W. Price, with the assistance of Mr. B. C. Condit and others, as noted below. The collection was made chiefly in Cochise County, Arizona, but includes several outlying localities in Pima, Graham and Apache Counties, Arizona, and in northern Sonora. The whole collection was sent to the American Museum, but later one-half of it was purchased by the Field Columbian Museum of Chicago, the other half remaining here.

I am greatly indebted to Mr. Price for the field notes incorporated in the present paper, and for his account of the physical characteristics of the areas visited, including an itinerary of the trip and a descriptive list of the localities where collections were made. Also for a supplementary list of species observed but not represented in the collection. The field notes are presented in connection with the technical remarks on the species to which they relate, and are distinguished by being enclosed in marks of quotation, and by the initials "W. W. P." The more general matter furnished by Mr. Price is given under special headings, bearing his name.

In this connection it gives me pleasure to acknowledge my indebtedness to Dr. C. Hart Merriam, Chief of the Division of Ornithology and Mammalogy, United States Department of Agriculture, for the loan of material to aid in the identification of some of the more obscure species.

The collection here under notice is exceptionally important for the large series of many of the species represented, and for the large number of specimens gathered from a few limited areas.

<sup>1</sup> About 25 specimens, collected in November and December, 1894, at Sentinel and Phoenix, have come to hand just as this paper goes to press, adding two species to the Price Collection.

The principal localities at which collections were made appear to have been very thoroughly worked, so far as the smaller mammals are concerned, though perhaps none of them exhaustively, owing to the small amount of time spent at each.

The following communication from Mr. Price contains important information respecting the localities visited and the general character of the region.<sup>1</sup>

## I.—ITINERARY OF THE EXPEDITION, AND DESCRIPTION OF THE REGION EXPLORED.

By W. W. PRICE.

*Itinerary*.—On the 3d of January, 1894, in company with Mr. B. C. Condit and Mr. M. P. Anderson, I arrived at Tucson, Arizona, and began an extended collecting trip in southern Arizona and northern Sonora, Mexico. For eight months we were continually in the field, covering a distance on long and short trips of over 2000 miles, the greater part of the way with pack animals and through almost impassable mountains. From March to September we were assisted in our work by Mr. L. H. Miller. The mammal part of our collection consists of about 1500 specimens collected in various parts of the region.

A brief itinerary of our expedition is as follows: We began work at Fort Lowell, a deserted military post, about seven miles east of Tucson, on the Rillito Creek. We remained in the neighborhood of Fort Lowell until January 25, when we moved camp to the Huachuca Mountains, about ten miles north of the Mexican line. From this point we made various excursions through the mountains and one ten-days' trip into the Santa Cruz Mountains, Sonora, near the town of Santa Cruz. On the 20th of February we moved to Fairbank on the San Pedro River, remaining there until March 16, with the exception of four days spent at Fort Lowell, March 6–10. On the 16th of March we went by team to Camp Rucker, in the Chiricahua Mountains, about 75 miles east

<sup>1</sup> To prevent incongruity in nomenclature, the scientific names of genera and species in Mr. Price's contributions to the present paper have been changed, where necessary, to make them conform to those herein adopted. Otherwise his notes are published as written.

of Fort Lowell. From that point Mr. Condit went south to San Bernardino Ranch, on the Mexican border, about 10 miles west of the New Mexico line. I remained in the Chiricahua Mountains, when not on excursions to and from San Bernardino Ranch and the Huachuca Mountains, until July 10. Mr. Miller remained at Fort Lowell until May 18, when he moved to the Huachuca Mountains; from there he moved to the Chiricahua Mountains, July 8. Here he stayed until September 5. May 12 Mr. Condit broke camp at San Bernardino Ranch, went into Sonora as far south as Oposura, returning to my camp in the Chiricahua Mountains the latter part of June. On July 10 Mr. Condit and I began our trip north, a distance of over 200 miles, to Holbrook, a station on the Atlantic and Pacific Railway, making various side excursions *en route* into the Graham and White Mountains. Our work ended at Holbrook, Arizona, September 1.

*Characteristics of the Region.*—Briefly, Arizona is divided by a great plateau extending across the entire Territory from northwest to southeast. Here are found the two most lofty groups of mountains in Arizona, the San Francisco Mountains in the northwest and the White Mountains in the southeast portion of the plateau. This height of land, usually called the Mogollon Mesa, slopes gradually on the north into the desert of the Little Colorado River; on the south it drops abruptly from 3000 to 5000 feet into the desert region of the Colorado and Gila Rivers. It is with this southern half of the Territory that we have most to do.

Southeastern Arizona and northeastern Sonora are made up of narrow alluvial river bottoms, plains more or less level and sandy, destitute of trees and often of brush, and irregular mountain ranges, indescribably abrupt and jagged. The Gila River with its two main branches, the Salt and San Pedro Rivers, drains southern Arizona; the Rios Yaqui and Sonora drain northeastern Sonora, flowing into the Gulf of California. The chief mountain ranges in southeastern Arizona are the Santa Catalina, Santa Rita, Rincon, Huachuca, Chiricahua and Graham Mountains; in northeastern Sonora are the Sierra Canonca, Sierra Azula, Sierra Ajos, Sierra Huasavas, and the great backbone of western Mexico, the Sierra Madre, which begins near the United States border. The

general trend of these mountains is from north to south, and they are lifted from 4000 to 6000 feet above the plains at their base.

*Climate*.—The climate of Arizona is excessively dry, the rain falling chiefly during the months of July and August. There is also a scanty and irregular rainfall during January, February and March, but the summer rains are most to be depended upon. However, some years it is exceedingly scanty. During 1891 and 1892 a drought prevailed over Arizona and Sonora; hundreds of thousands of cattle died, and even the people in the latter country were reduced almost to starvation. In the Huachuca Mountains the streams had mostly dried up, and many pines and oaks on the hillsides died for want of water. There are no general rainstorms during the summer, but intense thunderstorms occur, usually very local in character, and centering about the mountains. Rains may water abundantly one district and grass be luxuriant, while five miles away the ground may be as dry and bare as a floor. Cloudbursts are of frequent occurrence, happening usually in the mountains. After the summer rains the whole country is transformed. On the hot, bare plains suddenly appear luxuriant grasses and beautiful plants, changing the region into a veritable garden. The winter storms are different, usually beginning after a cold south wind has blown for several days; the sky is leaden gray. These storms of sleet and rain continue for two days at a time. However, little rain falls and spring pasture upon the plains amounts to very little.

In summer, on the lower plains and deserts, the heat is intense, often reaching  $110^{\circ}$  to  $115^{\circ}$  F. in the shade. In the mountains, above 6000 feet elevation, the weather is delightful. The coldest weather recorded at 6000 feet elevation, at the base of the Huachuca Mountains during February, was  $18^{\circ}$  above zero.

*Life Areas*.—South of the Gila River, there appear to be *five* pretty well-defined life zones. Too much confidence, however, must not be placed in the figures, for what is true in one range may be greatly varied in another. Considering the wide extent of territory and its conformation, it is impossible to map it in any but a very general way.

1. This is the desert zone proper, reaching an elevation of about 3000 feet. The characteristic plants are cacti in great abundance and variety. *Lepus alleni* and *Spermophilus* [= *Anisonyx*] *tereticaudus* are characteristic mammals.

2. The upper desert zone, ending at about 5500 feet elevation, includes most of the grassy plains of southern Arizona. The cacti are here few in species and number. The Prairie Dog (*Cynomys*), and two small *Spermophiles* (*S. macropsilotus* and *S. cryptospilolus*) are characteristic of this region.

3. This zone extends from about 5500 to about 7000 feet above sea level. This is the black oak, juniper, and piñon zone. In it is found *Sitomys* [= *Peromyscus*] *rowleyi pinalis*; it is the highest limit of the Common Jack-rabbit (*Lepus texianus eremicus*).

4. The pine zone extends to nearly 9000 feet, and is characterized by the yellow pine, white oak, and maple. In the Huachuca Mountains, *Sciurus arizonensis huachuca* is found in this zone, and *S. rowleyi pinalis* finds its limit in the lower portions.

5. The fir and aspen belt reaches the summit of the mountains, above 9500 feet in elevation. This is practically the Canadian life-zone. Some Canadian plants are found here, and the Ruby-crowned Kinglet and Pine Siskin breed commonly. The characteristic mammals are White-footed Mice (*S. a.* [= *P. leucopus*] *rufinus*), and a species of *Sorex*.

*List of Chief Localities from which Collections were obtained.—*

*Fort Lowell.*—This is a deserted military post on the Rillito Creek, about seven miles east of Tucson. It is equally distant from the base of the abrupt Santa Catalina Mountains. On the south, the great plain of Tucson, bare or covered with brushy *Larrea* or mesquite, stretches away for scores of miles; on the north rise gravelly hills which slope up to the mountains. These hills are covered with giant cacti and other desert shrubs. Along the bed of the Rillito grow cottonwood, willow, mesquite, walnut and ash trees.

*Fairbank.*—A. town, 3800 feet elevation, on the San Pedro River, about thirty miles north of the Mexican border. The river

bottom is alluvial at this point, and many gardens and fields of alfalfa flourish. Bare hills and plains stretch down to the river on each side. A few cottonwoods and willows are found along the river.

*San Bernardino Ranch.*—A cattle ranch on the Mexican border about ten miles west of the New Mexican line. Large springs, which are the headwaters of the Yaqui River, rise here, furnishing much water for the irrigation of alfalfa fields. The surrounding country is of a black malpais or lava formation.

*Oposura.*—A town of considerable importance on the Yaqui River in Sonora, about 150 miles south of the border. It is at an elevation of about 1800 feet, and closely shut in by rocky hills. Some mining is carried on, and the river-bottom is cultivated, sugar cane being one of the principal productions.

*Willcox.*—A small town on the Southern Pacific Railway, in the center of the Sulphur Spring Valley, at an elevation of about 4000 feet. The surface of the surrounding country is level, and in places covered with mesquite brush. There are several alkali flats near the town, destitute of any vegetable life, and covered with water during the rainy season.

*Showlow.*—The name of a settlement on Showlow Creek, at the edge of the pine belt, on the northern slope of the Mogollon Mesa. There are grain and corn fields along the creek, and sheep are pastured in the woods.

*Holbrook.*—A station on the Atlantic and Pacific Railway near the junction of the Little Colorado and Puerco Rivers. The flats along the river are intensely alkaline and sandy. A bluff of red sandstone and cemented pebbles extends along the right bank of the river, a half mile distant from the station. The elevation is about 4000 feet.

*Cooley's Ranch.*—The name of a ranch on the White Mountain divide, between Fort Apache and Holbrook. It is in the midst of a luxuriant forest of yellow pines, and at an elevation of about 7000 feet.

*Huachuca Mountains.*—A range of mountains in southern Arizona, lying west of the San Pedro River. They are about 25 miles in length, 5 to 8 miles in width, and reach an elevation of about 10,000 feet. The range is surrounded on all sides by rather level, grassy plains.

*Huasavas Mountains.*—A range of mountains lying about 20 miles northeast of the town of Oposura, Sonora. The surrounding country is exceedingly rough, and the summit is reached by one steep trail. Mr. Condit spent several days in these mountains, and from him I learn that the summits are well wooded with yellow pine, and that the highest peaks are probably 8500 feet above sea level.

*Chiricahua Mountains.*—This range is situated in the southeastern corner of Arizona, and is the most extensive range in the region. The Sulphur Spring Valley bounds the range on the west, and the San Simon Plains touch it on the east. The lower slopes are heavily wooded with juniper and oak, and the upper regions with pine, fir and aspen.

*Graham Mountain.*—This is one huge mountain, with lower spurs, rising nearly 11,000 feet above the sea level, and fully 6500 feet above the plains at its base. The range is about 20 miles in length and 12 or 15 across. The lower slopes are covered with oak and pine, and on the comparatively level summit are deep forests of fir and aspen. This mountain appears to be a continuation of the Chiricahua range, though geologically it is different, being formed almost entirely of granite.

*White Mountains.*—This was the loftiest and most extensive range of any of the mountains visited. This group is one of the two lofty projections from the great Mogollon Mesa; the San Francisco group to the northeast is the other. The elevation is about 12,000 feet, and the highest peaks reach timberline. Immense forests of Douglas fir stretch down the ridges. In its recesses are found Rocky Mountain Jays, Grouse, and a few bands of Elk.

## II.—ANNOTATED LIST OF THE MAMMALS COLLECTED.

[The external measurements given in the following list are the collector's measurements taken from the specimens before skinning, unless otherwise stated, and are of course in millimeters.]

### 1. *Dorcelaphus*<sup>1</sup> *couesi* (*Coues* & *Yarrow*). SONORAN DEER.

*Cervus mexicanus* BAIRD, Mam. N. Am. 1857, p. 653 (excluding synonyms); in part only or not at all the *Cervus mexicanus* of Gmelin and later authors, Baird excepted.

*Cariacus virginianus* var. COUES & YARROW, Wheeler's Geog. and Geol. Surv. West of rooth Merid. V, 1875, p. 72.

"*Cariacus virginianus* var. *Couesi* ROTHROCK MSS." *ibid.* p. 72, and, by implication, in text, p. 75.

A small Deer, evidently the same as *Cervus mexicanus* Baird, is represented by seven specimens in the Price Collection, six of which were taken in the Santa Cruz Mountains, Sonora, Feb. 12-15 (B. C. Condit), and the other in the Huachuca Mountains, Jan. 28 (Price and Condit). They agree essentially with Professor Baird's description, based on a female taken at San Luis Springs, Sonora, so far as the description goes. It may be the same also as Lichtenstein's *Cervus mexicanus*, described from specimens sent alive to Berlin, in 1825, by Herr Graf, from "Mexico," without indication of the exact locality at which they were taken. The *Cervus mexicanus* of Gmelin, however, is a vague composite species, only in part referable to Deer from Mexico, and in all probability has no relation to the little Sonoran Deer described by Baird. The specimens here under consideration are from a point probably not more than fifty miles from the type locality of Baird's *Cervus mexicanus*. As this name is clearly untenable in the present connection, the name *couesi*, proposed by Rothrock, may be employed for its designation.

Above grayish brown, rather paler than the winter coat of *virginianus*, the hairs being broadly banded with blackish brown subterminally, and tipped with whitish; darkest along the middle region of the back, paler and slightly yellowish on the sides; belly white; axillar region pale buffy; ears dusky, the

<sup>1</sup> According to Mr. Oldfield Thomas, *Dorcelaphus* Gloger (1841) "equals and antedates" *Cariacus* Lesson (1842). Cf. Thomas, Ann. and Mag. Nat. Hist., (6) XV, p. 193, Feb., 1895.



hairs tipped with gray ; a narrow blackish nose band, and a small spot of blackish on each side of the lower jaw near the end. Tail yellowish brown above (the hairs brownish dusky at base) ; below white ; no black anywhere at the surface of the hairs. Distal half of legs yellowish brown in front, lighter behind.

Antlers of the *D. virginianus* style, but much smaller, with much shorter tines. The basal point (in four full-grown bucks) varies from one to two inches in length, and the longest point varies from three to four inches.

*Measurements.*—The only external measurements available are : " Ear, 140 mm. ; tail, 225." The skull of an old male (largest of the series) measures as follows : Total length, 246 ; basilar length, 227 ; zygomatic breadth, 115 ; lower jaw, length, 188 ; height at coronoid, 95 ; height at condyle, 61 ; distance between base of antlers, 66 ; distance between points of antlers, 283.

" Common in brushy tracts of country. On Feb. 12-15 a half-dozen deer were shot in the Santa Cruz Mountains in Sonora. I shot a young buck April 2 in the Chiricahua Mountains which was shedding, having lost the greater part of its winter coat."—W. W. P.

A very good account of this little deer can be found in Coues and Yarrow (l. c.), quoted from Rothrock.

## 2. *Lepus alleni* Mearns. ALLEN'S JACK RABBIT.

*Lepus alleni* MEARN'S, Bull. Am. Mus. Nat. Hist. II, No. 4, 1890, p. 294. Rillito, Pima Co., Arizona.

Represented by 13 fully adult specimens, taken at Fort Lowell, Jan. 5-21, by Price and Condit. The collector's measurements from the fresh specimens may be summarized as follows : Total length, 626 (600-700) ; tail vertebræ, 70 (45-90) ; hind foot, 136 (130-145) ; ear, 160 (156-165). Two specimens, both females, measure respectively in total length 680 and 700, but no others exceed 630, and none fall below 600, five ranging between 600 and 630.

"This splendid hare is abundant about Tucson and in lower portions of the desert belt. It is found both on the gravelly hills bordering the Rillito at Fort Lowell, and on the immense mesquite and *Larrea* plains of Tucson. It is somewhat shy, and hard to secure, except with a rifle. One rarely comes upon it suddenly. I have never seen it start up with the quick rapid flight of *L.*

*texianus*. It has a slow, apparently awkward gait, but its leaps are long, and it gets over the ground with surprising rapidity. In color and habits it is so very different from any other American hare, the wonder is that it should have so long remained undescribed."—W. W. P.

**3. *Lepus texianus eremicus* Allen.** ARIZONA JACK RABBIT.

*Lepus texianus eremicus* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 347. Separates issued Dec. 7, 1894.

Five Fort Lowell specimens and three Fairbank specimens (taken Jan. 11 to April 18), present the following measurements: Total length, 576 (565–625); tail vertebræ, 78 (72–95); hind foot, 128 (123–138); ear, 134 (128–140).

"The common Jack Rabbit is abundant over the entire region to about 7000 feet elevation. In the desert region about Tucson, this species is somewhat supplanted by *Lepus alleni*. In the White Mountain region they occasionally wander from the piñon belt up into the pines as far as Cooley's Ranch."—W. W. P.

**4. *Lepus sylvaticus pinetis* Allen.** MOUNTAIN WOOD HARE.

*Lepus sylvaticus pinetis* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 348. Separates issued Dec. 7, 1894.

Represented by 2 specimens from the White Mountains, as already described (l. c.). It differs from the Cottontail of the lowlands by its darker coloration, much smaller ears, and much more heavily clothed ears and feet.

"Two specimens only were taken by Mr. Condit in White River Cañon, in the White Mountains, at about 8000 feet elevation. A few others were seen in the same locality among oak scrub."—W. W. P.

**5. *Lepus sylvaticus arizonæ* Allen.** ARIZONA SAGE HARE.—Represented by 22 specimens, taken as follows: Fairbank, 1 ♀ ad., March 5 (Price and Condit); San Bernardino Ranch, 2 ♂♂ ad., April 8 and 16, and 2 ♀♀ ad., March 24–25

(B. C. Condit); Fort Lowell, 2 ♂♂ and 3 ♀♀, Jan. 8-18, and 2 ♀♀ and 3 ♂♂, March 21-25 (Price, Condit and Miller); Chiricahua Mountains, 6 ♀♀, April, June, July and August (Price and Miller); Huachuca Mountains, 1 ♀ juv., May 21 (Price and Miller).

These specimens appear to be all referable to the large-eared Arizona 'Cottontail.' Winter specimens (January and March examples) are purer gray on the rump and more heavily lined with black than the worn summer specimens. The Fort Lowell series of 10 adults (5 taken Jan. 8 and 5 taken March 21-25) give the following measurements: Total length, 357 (340-371); tail vertebræ, 42 (35-50); hind foot, 80 (76-88); ear, 73 (69-78).

"Common over the entire region up to about 7000 feet (except in the White Mountains), and occasional in the Huachuca and Chiricahua ranges to 8500 feet elevation. About Fort Lowell it is exceedingly common, a dozen or more often being seen during an evening's walk. Common also about the deserted stables and buildings of the post, furnishing fine sport for moonlight hunts."—W. W. P.

## 6. *Thomomys cervinus*, sp. nov.

### FAWN-COLORED GOPHER.

Above fawn-colored,<sup>1</sup> clearer on the sides, more or less obscured by dusky over the middle of the back; below gray, the fur plumbeous at base with long whitish tips. Ears black, enclosed in a blackish area; sides of the nose and muzzle blackish; inside of cheek pouches entirely pure white; feet dull whitish; tail thinly haired, pale grayish fawn color above, slightly lighter below.

*Measurements.*—Type (Price Collection), total length, 228; tail vertebræ, 63; hind foot, 28. Two other specimens measure as follows: Length, 228 and 263; tail vertebræ, 63 and 79; hind foot, 28 and 32.

*Type*, No.  $\frac{10277}{8690}$ , Am. Mus. Nat. Hist., ♂ ad., Phoenix, Arizona, Oct. 20, 1894; J. Diefenbach.

The species is represented by three specimens, collected for Mr. Price by J. Diefenbach at Phoenix, Arizona, Oct. 30, 1894, and were not received for examination till May, 1895. They were not marked for sex by the collector, but are apparently all males.

<sup>1</sup> Ridgway, *Nomen. Colors*, pl. iii, fig. 22.

*Thomomys cervinus* is very different in coloration from any phase of *T. fulvus* I have ever met with. It is a large, pale form, about the size of *T. fossor* and *T. aureus*, but very different in color

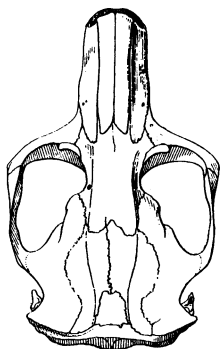


Fig. 1.

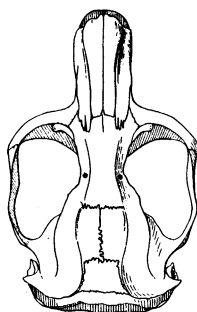


Fig. 2.

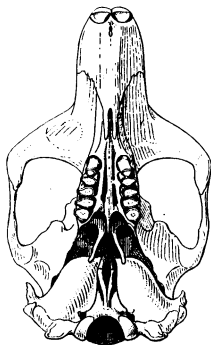


Fig. 1a.

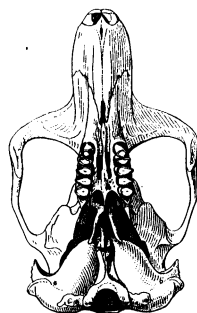


Fig. 2a.

Fig. 1. *Thomomys cervinus*. Type, No. 10277, ♂ ad., Phoenix, Arizona. Natural size.

Fig. 2. *Thomomys fulvus*. No. 8344, ♂ ad., San Bernardino Ranch, Cochise Co., Arizona. Natural size.

from either. In fact, in coloration, it bears a very close resemblance to *Geomys lutescens* from Phillips Co., Kansas, but the pelage is longer, coarser, and less glossy. In cranial characters it is allied to *T. aureus*. The rostral portion of the skull is especially broad and heavy, and the whole skull massive in comparison with *T. fulvus* (compare Figures 1 and 2).

7. **Thomomys fulvus** (Woodh.). ARIZONA GOPHER.—The series of *Thomomys* numbers 112 specimens, all but three of which (as noted above) seem to be referable to *T. fulvus*. The localities represented are as follows: Fairbank, Feb. 22 to March 14, 29 specimens; San Bernardino Ranch, March 27 to April 22, 33 specimens; Fort Lowell, March 8–17, 7 specimens; Huasava Mountains, Sonora, June 25, 26, 3 specimens; Huachuca Mountains, Feb. 20, 1 specimen; Chiricahua Mountains, March 14 to April 23, and June 4 to July 20, 24 specimens; Graham Mountain, July 19, 3 specimens; White Mountains, July 28 to August 5, 8 specimens. They vary in age from half-grown young to very old adults; representing, as they do, a period of over six months, the variation in color and character of pelage is also very great. Many of them are in molt, and thus often represent two phases of pelage in the same individual. Aside, however, from differences plainly due to either age or season, there is a wide range of purely individual variation in both coloration and cranial characters. It thus becomes necessary to consider somewhat in detail several of the larger series, as those from Fairbank, San Bernardino Ranch, Fort Lowell, and the Chiricahua Mountains, in connection with much material from other localities, numbering altogether nearly 200 specimens that seem referable to what is here called *Thomomys fulvus*, including several specimens from San Francisco Mountain, the type locality of the species.

EXTERNAL CHARACTERS.—(1) *Fairbank Series*.—Three rather young specimens, for the most part in their first pelage, are dusky brown, slightly tinged with fulvous gray, darker (in one specimen black) along the middle of the back, more or less fulvous on the cheeks and sides of the shoulders, and blackish below, the hairs slightly tipped with ashy fulvous, or extensively tipped with yellowish. Other more or less immature specimens are dusky yellowish brown, more strongly dull yellowish brown on the sides, and whitish below, from the long whitish tipping of the hairs. Others are similar above to the last, but are strong rusty or fulvous gray below. From this pelage the animal molts into that of the adult, as shown by several specimens in changing pelage.

The adults are strongly yellowish brown, sometimes more or less rufescent, the intensity of the tint varying in different individuals, with generally a slight admixture of blackish tipped hairs along the middle of the back, increasing in some specimens so as to form a more or less broad median dorsal band. Two specimens, both old males, of the Fairbank series, are everywhere intense glossy plumbeous black, except the feet (and in one specimen the apical fourth of the tail), which are whitish, and the inside of the cheek-pouches, which are pure white. These specimens are doubtless simply melanistic, and are the only melanistic examples I have met with in a series of hundreds of specimens of the genus *Thomomys*.

(2) *San Bernardino Ranch Series*.—This, as regards the ages represented and the amount and character of the color variations, is almost an exact duplicate of the Fairbank series just described. The adults, however, average slightly more rufescent, several of them being strongly ferrugineous.

(3) *Fort Lowell Series*.—These are also in general very much like the Fairbank specimens. The adults, however, average a little paler, as though somewhat bleached or faded, a difference probably attributable to the fact that they were taken somewhat later in the season.

(4) *Chiricahua Mountains Series*.—These differ quite strongly from the others in being darker, through a much stronger admixture of blackish tipped hairs, and the shorter and darker shade of the fulvous apical portion of the pelage. Several of the middle-aged specimens are quite dusky brown with a slight tipping of dark yellowish brown. The young of this series, which includes a specimen not more than one-fourth grown, are not appreciably different from the young examples in the other series, as both the lightest and the darkest half-grown young are found in the present series.

The specimens from the Graham and White Mountains correspond very closely in every respect with those from the Chiricahua Mountains.

For comparison with these, good series are available from Fort Verde and Bradshaw, Arizona, from Santa Ysabel and Dulzura, San Diego Co., Cal., and from San Pedro Martir, Lower Cali-

foria. Specimens from any of the series can be almost exactly matched by specimens from each of the other series, except perhaps the San Bernardino Ranch series, which differs as a whole from any of the others in being less grizzled and redder. In general effect there is scarcely any appreciable difference between the Bradshaw, Santa Ysabel, and San Pedro Martir series, and between these again and those from the mountains of southeastern Arizona, including also those from the Graham and White Mountains to the northward.

*Measurements.*—Of this series of 109 specimens only 75 can be considered as sufficiently adult to be made the basis of comparative measurements. Females greatly preponderate in all of the series, so that out of the 75 specimens, of which measurements are given below, only 25 are males. The males average larger than the females, but old females often equal or exceed in size the smaller males.

MEASUREMENTS (AVERAGES AND EXTREMES) OF 75 SPECIMENS  
OF *Thomomys fulvus*.

Locality.	Sex and No. of Specim.	Total length.	Tail vertebræ.	Hind foot.	Ear.
Fairbank.....	9 ♂	235 (217-264)	71 (62-90)	32 (29-33.5)	7.2 (7-8)
".....	15 ♀	219 (195-245)	61 (49-71)	29 (28-31.5)	7 (6.5-7)
S. B. Ranch ..	5 ♂	226 (205-239)	67 (58-74)	27.2 (25-29)	7 (6.5-8)
".....	15 ♀	203 (193-221)	58 (56-62)	27 (26-28)	7 (6.5-8)
Fort Lowell ..	2 ♂	223 (220-227)	63 (62-64)	27.5 (27-28)	7.5 (7-8)
".....	3 ♀	212 (210-214)	62 (60-65)	28 (25-30)	6 (6-6.5)
Chiricahua Mts	7 ♂	211 (201-218)	62 (50-68)	28 (27-30)	6.7 (6-7.5)
".....	11 ♀	198 (171-225)	58 (50-68)	28 (25-31.5)	6.6 (5.5-7.5)
White Mts .....	1 ♂	202 (.....)	58 (.....)	28 (.....)	7 (.....)
".....	6 ♀	194 (183-213)	59.3 (52-64)	28 (26-30)	6 (6-6.5)

The Fairbank and San Bernardino Ranch series average larger than either of the other series. An examination of the skulls shows that these two series contain a larger proportion of very old specimens than the others, which latter happen to consist almost wholly of young and middle-aged adults.

CRANIAL CHARACTERS.—A comparison of the skulls of these several series reveals no appreciable differences by which one set can be distinguished from the others. There is a wide variation

in size, besides that evidently due to age, and striking differences in certain structural details. The remarks which follow will be based wholly on the San Bernardino series, and mainly on the females of that series.

*Variation due to Age.*—The youngest specimen is a third-grown female. The skull is very short in proportion to its width, the shortness being due mainly to the comparative non-development, at this age, of the rostral and interorbital portions. The interorbital breadth is relatively very great, often actually greater than in the fully adult, and the zygomatic arches are relatively narrow. The interparietal is also relatively very large. This is well shown by the following comparative measurements and figures (Figs. 3-5):

No.	Total length.	Pre-parietal length.	Rostral length.	Mastoid breadth.	Zygomatic breadth.	Inter-orbital breadth.	Interparietal.	
							Width.	Length.
6803 ♀ juv. .	29	17.5	8	16	19	6.5	6	3
6799 ♀ juv. . .	30	18.5	8.3	16	18	6	5	3
6794 ♀ juv. . .	33	21	11	18	21.5	6	3.5	2
6797 ♀ ad. . .	37	24	12	18.5	24.5	6	3	3
6767 ♂ ad. . .	38.5	23.5	12	21	25	6	2.5	3.5
6753 ♂ ad. . .	42	26.5	14	21	26	6	4.5	3.3

The skulls given above as 'adults' are only middle-aged, there being no very old skulls in the series. The last one given is a somewhat older male from Fairbank.

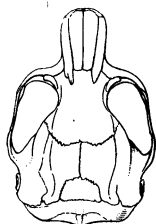


Fig. 3.

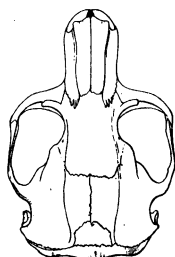


Fig. 4.

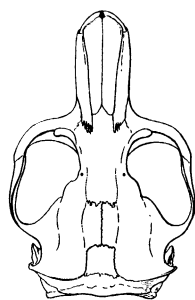


Fig. 5.

Figs. 3-5. *Thomomys fulvus*. Natural size.

Fig. 3. No. 8464, ♀ juv., San Bernardino Ranch, Arizona.

Fig. 4. No. 8467, ♀ ad., San Bernardino Ranch, Arizona.

Fig. 5. No. 8468, ♀ old ad., San Bernardino Ranch, Arizona.



In old individuals the zygomatic arches are sharply angular both anteriorly and posteriorly, with the sides straight and parallel to the axis of the skull. In younger skulls they may be more or less convex, but are generally slightly more expanded posteriorly than anteriorly. In the young the interparietal is much larger than in the very old adults, its lateral borders becoming, with increased age, more or less overgrown by the encroachment of the parietals, as has already been noted in the case of *Neotoma micropus* (see this Bulletin, VI, 1894, pp. 233-246, Pl. iv). In young and middle-aged individuals the interparietal is usually quadrate and nearly twice as broad as long. In very old examples it becomes more or less wedge-shaped, and longer than broad. In extreme old age sometimes little or no trace of it remains, it having become wholly buried. This, however, is much more frequently the case in *T. bottæ* than in *T. fulvus*. In several old examples from Fairbank it has the form of an obtuse wedge, which is apt to be more or less truncate in front, widening gradually backward to very near the posterior border, where it widens rapidly so as to form on each side a narrow, pointed, latero-posterior angle.

From middle age on, a slight temporal ridge is developed, which in old age becomes strongly marked on each side of the interparietal area. In none of the specimens, however, is there a single median sagittal crest. The superior border of the temporal muscle is outlined on the skull quite early in life by a slight, raised line, which later on becomes pushed nearer the median line by the continued deposition of osseous matter, till in old age the two lines are only from 1 to 2 mm. apart. They are generally parallel, and extend from the front of the brain-case to the occipital crest; later they become continuous with the slightly raised edges of the interorbital area. As these ridges thicken and move toward the median line they encroach posteriorly upon the interparietal, the lateral edges of which become buried beneath them, thus greatly altering the shape of its visible portion. As already intimated, this process is frequently carried so far in *T. bottæ* as to give rise to a well-defined sagittal crest, thus entirely concealing the interparietal.

*Sexual Variation.*—The skulls of males are generally larger than those of females of corresponding age, and more heavily ossified, but in other respects there seems to be no very appreciable difference.

*Individual Variation.*—In skulls of the same sex, and apparently of the same age, there is quite a range of variation in size, so that large females may exceed the dimensions of small males. Thus in old males from Fairbank the length of the skull varies from 38 to 42 mm., and the zygomatic breadth from 24 to 26 mm.; in old females from the same series the length varies from 36 to 39 mm., and the breadth from 22 to 24 mm.

The width of the nasal bones, and correlatively the width of the rostrum, varies considerably in individuals of the same sex and age. But the most variable feature is the size and form of the interparietal, which may be twice or three times as large in some specimens as in others. While usually quadrate, and nearly as long as wide, it may be more or less convex on the posterior border, or, in rare cases, regularly convex anteriorly from the nearly straight posterior border. As these variations (see Figs. 3-8) occur in each of the large series at hand, and in about the same proportion, they cannot be considered as other than individual. In probably 75 per cent. the interparietal is distinctly four sided, with nearly straight outlines, except for a tendency

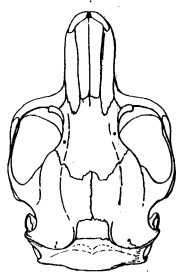


Fig. 6.

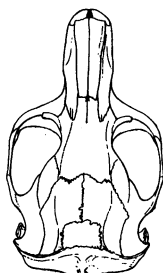


Fig. 7.

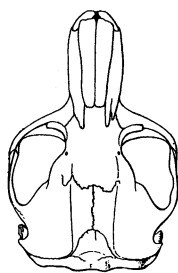


Fig. 8.

Figs. 6-8. *Thomomys fulvus*. Natural size.

Fig. 6. No. 8498, ♀ ad., San Bernardino Ranch, Arizona.  
 Fig. 7. No. 8499, ♀ ad., San Bernardino Ranch, Arizona.  
 Fig. 8. No. 8500, ♀ ad., San Bernardino Ranch, Arizona.

to slight irregularity on the front border. The variation from this is toward a convex outline in front, the convexity varying from a slight rounding of the antero-lateral corners to one involving the whole of the lateral edges, resulting in a uniform convex outline extending to the posterior border, as in *T. toltecus*. In case, under these circumstances, the interparietal is also small and narrow, it closely resembles the same bone in *T. bottae*.

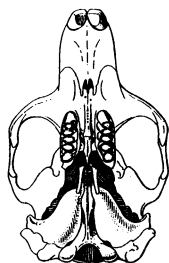


Fig. 9.

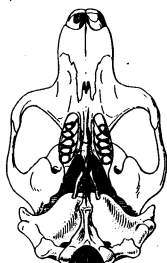


Fig. 10.

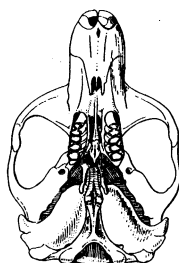


Fig. 11.

Figs. 9-11. *Thomomys fulvus*. Natural size.

Fig. 9. No. 8475, ♀ ad., San Bernardino Ranch, Arizona.

Fig. 10. No. 8481, ♀ ad., San Bernardino Ranch, Arizona.

Fig. 11. No. 8479, ♀ ad., San Bernardino Ranch, Arizona.

The lower surface of the skull also presents much variation in details in specimens from the same locality strictly comparable as to age and sex. A single feature—the pterygoid hamuli—is here selected for illustration. As shown in Figs. 9-11, these vary in respect to the angle of divergence of the processes and in their conformation.

In consequence of these variations it is almost impossible to point out any single cranial character that may be relied upon as absolutely diagnostic. The rostral and interorbital portions of the skull are broader than in *T. bottae*, and the general form of the skull is quite different in the two species. On the other hand, the rostral portion is less developed than in the *T. aureus* group.

“This gopher was the most generally distributed of any of the mammals taken during the expedition. It was found almost everywhere from Fort Lowell to the summits of the Huachuca,

Chiricahua, Graham and White Mountains. It apparently does not hibernate at all. I have known it to throw up earth under several inches of snow. It was especially abundant on the summit of Chiricahua Mountains during June and July. At a particular glade covered with grass and iris, often a half-dozen might be seen at once at nightfall raising their curious mounds of damp earth."—W. W. P.

**8. *Dipodomys deserti* Stephens.** DESERT KANGAROO RAT.—Two specimens from Sentinel, Maricopa Co. (J. Diefenbach, Dec. 20) are referable to this species. Another specimen from Phoenix (J. Diefenbach, Nov. 20) is intermediate in coloration between *D. deserti* and *D. spectabilis*, but in cranial characters is similar to the specimens from Sentinel.

These localities carry the range of *D. deserti* much to the eastward of former records. The Phoenix specimen differs so much in coloration from the others, and also from true *D. deserti*, as to suggest that it may represent a strongly-marked local form of the *deserti* group.

**9. *Dipodomys spectabilis* Merriam.** BANNER-TAILED KANGAROO RAT.—Represented by 20 specimens from Fairbank, Feb. 26-March 14 (Price and Condit); and 5 from San Bernardino Ranch, March 28-April 1 (B. C. Condit). All except 3 are fully adult. Of these latter one is nearly fully grown, and two are about one-third grown. They are very similar in coloration to the adults, but the tail, though white at the tip, is not bushy.

The adults are very uniform in coloration, allowing for the wearing off of the tips of the fur in a few of the specimens. The white at the tip of the tail, however, varies in extent in different specimens from about 45 to 85 mm.

The females average slightly smaller than the males, as shown by the following measurements of 14 males and 8 females.

*Males* : Total length, 344 (330-363); tail vertebræ, 198 (188-208); hind foot, 53 (49-56); ear, 17 (15-19).

*Females* : Total length, 322 (302-345); tail vertebræ, 185 (168-205); hind foot, 51 (48-57); ear, 16.5 (15-17).

"These beautiful Kangaroo Rats are pretty well distributed in colonies over the entire southern part of Arizona. They have hillocked towns not unlike those of *Cynomys*, and well-beaten trails from one hillock to another. The entrances, however, are horizontal, and usually enter the mound just above the level of the surrounding ground. This is no doubt a wise provision against rain, which often falls in terrific showers, and would otherwise flood the nest. One moonlight night at Willcox I had an opportunity of watching their habits. Secreting myself by a large hillock from which several trails radiated, I had not long to wait before I heard a slight noise on the gravel. It was a Rat approaching from another hillock, perhaps thirty yards away. It made low leaps of from one to several feet, and, as nearly as I could distinguish, ran, or alighted only on its hind feet. Several were sometimes leaping about the hillock at the same time. Some had ventured a dozen feet or more away, as if searching for seeds. During all the time I heard no sound of any kind, except a low chuckle uttered at intervals. They are difficult to secure with baited traps, but are readily caught in steel traps placed in the runways or entrances to their homes. They breed early, for half-grown young were caught March 1."—W. W. P.

**10. *Dipodomys merriami* Mearns.** MERRIAM'S KANGAROO RAT.—This species is represented by 156 specimens, collected as follows: Fairbank, Feb. 22–March 12, Price and Condit, 93 specimens; San Bernardino Ranch, March 22–May 1, B. C. Condit, 33 specimens; Fort Lowell, Jan. 19 and March 8–April 20, L. Miller, 25 specimens; Phoenix, November 5–Dec. 12, J. Diefenbach, 5 specimens.

The Fairbank and San Bernardino Ranch series are practically indistinguishable in respect to both size and coloration, but the Fort Lowell series averages appreciably smaller and more yellow. As usual with the Kangaroo Rats, the females average considerably smaller than the males. For comparison the measurements of the several series are given separately, as follows:

MEASUREMENTS (AVERAGES AND EXTREMES) OF 112 SPECIMENS  
OF *Dipodomys merriami*.

## MALES.

Locality.	No. of specimens.	Total length.	Tail vertebræ.	Hind foot.	Ear.
Fairbank.....	41	246 (232-264) <sup>1</sup>	139 (120-152)	39.4 (36-42)	13.7 (13-15)
S. B. Ranch.....	12	248 (232-261)	142.6 (129-154)	38.4 (37-40)	14 (13-15)
Ft. Lowell.....	12	233.5 (222-255)	136.5 (122-165)	36.6 (35-38)	14 (12-15)

## FEMALES.

Fairbank.....	30	238 (223-264)	137 (124-150)	38.2 (36-40.5)	13.5 (12.5-15)
S. B. Ranch.....	11	236 (222-248)	140 (124-146)	38 (35-40)	13.5 (13-14.5)
Ft. Lowell.....	6	227 (215-246)	131.6 (126-147)	36.6 (36-38)	13.7 (12.5-15)

<sup>1</sup> For one specimen the total length is given as 271.

Young specimens, one-fourth to two-thirds grown, do not differ appreciably in coloration from adults.

"This is the most abundant Kangaroo Rat in southern Arizona where it bears the same relation to the kangaroo rats as *Perognathus obscurus* does to the pocket mice. It apparently does not hibernate at all, as specimens were caught on the coldest and most stormy nights. Its burrows, placed anywhere in sandy soil, are often closed during the daytime."—W. W. P.

**II. *Perodipus chapmani* (Mearns).** CHAPMAN'S KANGAROO RAT.—Of this species Messrs. Price and Condit collected 17 specimens at Fairbank, Cochise County, Feb. 22-28, the only locality at which they seem to have met with it. It was taken with *Dipodomys merriami*, 32 specimens of which were collected at Fairbank between the same dates, and many others at the same locality later, as well as at other points in Cochise County. The two species greatly resemble each other in size and coloration, and are readily distinguished externally only by the presence of the rudimentary fifth toe on the hind foot of *P. chapmani*.

Of these 17 specimens 14 are males and 3 females; all are practically adult except two, which are but little more than half-grown. The 11 fully adult males measure as follows: Total length, 232 (223-247); tail vertebræ, 127 (120-136); hind foot, 38 (36-40); ear, 14 (13-15). Three fully adult females measure:

Total length, 231 (227-237); tail vertebræ, 123 (119-130); hind foot, 38.5 (38-39); ear, 14 (13.5-15).

I also refer to this species two specimens from Fronteras, Sonora, taken May 15, by Mr. B. C. Condit. One is a nearly adult female, the other a nursling, apparently not more than a few days old. The young specimen is very dark—almost black, with a very faint fulvous tipping to the hairs on the flanks and across the shoulders. All the white markings shown in the adult are, however, present, and being pure white are very sharply defined against the blackish ground color.

"This species was not uncommon at Fairbank, where it was found associated with *Dipodomys merriami* in the proportion of about one to three of the latter. They apparently live together, as specimens of each were caught from the same hole.

"Mr. Condit shot at Fronteras, Sonora, May 15, a female carrying a young in its mouth during the daytime. This was the only specimen taken, besides those at Fairbank. So far as we could determine, its habits are identical with those of *Dipodomys merriami*."—W. W. P.

## 12. *Perognathus flavus* Baird. YELLOW POCKET-MOUSE.—

Of the 10 specimens representing this species, 4 were collected at Fairbank (Feb. 28-March 2, Price and Condit), and 4 at Fort Lowell (April 5 to May 9, L. H. Miller). Three very young specimens (about half grown) from the Chiricahua Mountains (July 4-21) are also referred here.

"Quite common in fine sandy soil among bunches of sacaton grass at Fairbank. Its burrows, no larger than a little finger, usually ran horizontally into a small mound, and were often closed during the day with fine sand. It readily ate rolled oats, but was rather difficult to catch in our cyclone traps, owing to its small size and light weight. Mr. Miller found it not uncommon in the sandy fields about Fort Lowell. A single specimen was caught alive in a field at the western base of the Chiricahua Mountains, on July 4. It was said to be quite common, being often turned up in plowing."—W. W. P.

**13. *Perognathus bimaculatus*<sup>1</sup> Merriam.** ARIZONA POCKET-MOUSE.—This species is represented by 11 specimens, all from Holbrook, collected August 25–29, by Price and Diefenbach. Three are quite young, one being little more than half grown. In this specimen the general color above is pale yellowish drab, with a pale yellow lateral line, and a broad yellowish band on each side of the head, extending from the nose to the ear, the eye being at about the centre of this area.

“Found only at Holbrook, where the species was not uncommon on the sand flats along the Little Colorado River.”—W. W. P.

**14. *Perognathus apache* Merriam.** APACHE POCKET-MOUSE.—Represented by an adult female taken at Fort Lowell, April 8, by Mr. L. H. Miller, and by two specimens from Holbrook, taken August 26 and 27, by Price and Diefenbach. One is an adult female; the other consists of the head and front half of the body and the skull, of unknown sex.

“Two specimens were taken on sandy flats at Holbrook on August 26 and 27. They were found in company with *Perognathus bimaculatus*. A single specimen was caught by Mr. Miller in sandy soil at Fort Lowell, on April 8. These three are the only specimens obtained.”—W. W. P.

**15. *Perognathus obscurus* Merriam.** BROWN POCKET-MOUSE.

*Perognathus obscurus* MERRIAM, N. Am. Fauna, No. 1, p. 20, pl. iii, fig. 14 and pl. iv. Oct. 1889. Camp Apache, Grant Co., N. Mex.

*Perognathus pricei* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 318 (young). Oposura, Sonora.

This species is represented by 168 specimens, collected at the following localities:

Fairbank, Feb. 22 to March 15, Price and Condit, 57 specimens, of which 41 are males and 16 females. All are adult, as regards coloration, but about one-fourth are not quite fully

<sup>1</sup> A large part of the specimens from Riverview, Utah, referred in a former paper (this Bulletin, V, p. 71) to *P. apache* prove on examination to be *P. bimaculatus*, both species being represented in the series.



grown, as shown by the measurements and the character of the skulls.

Fort Lowell, March 8 to May 10, L. H. Miller, 46 specimens, of which 29 are males and 17 females. Very nearly all are fully adult.

San Bernardino Ranch, March 22 to May 4, B. C. Condit, 38 specimens, of which 32 are males and 6 females. All are adult as regards coloration, and with few exceptions also as regards size.

Oposura, Sonora, May 30 to June 2, B. C. Condit, 16 specimens, of which 12 are males and 4 females; 11 are adult and 5 are young.

Willcox, July 15, Price and Condit, 9 specimens, of which 3 are nursing females and 5 are young males; some of the latter are less than half grown, and all are in first pelage except one, which has begun to acquire the adult dress.

Sentinel, Dec. 20, J. Diefenbach, 2, adult.

From the foregoing it would seem that the young are born late in the season, apparently not till May or June, as the only very young examples, and the only females giving evidence of nursing young were the Oposura specimens taken the last of May, and the Willcox specimens taken July 15. It is also noteworthy that the number of males at all of the localities largely exceeds that of the females.

The type locality of *Perognathus obscurus* is the southwestern corner of Grant County, New Mexico, but a few miles from San Bernardino Ranch, in the southeastern corner of Cochise County, Arizona. I am indebted to Dr. C. Hart Merriam for the loan of three 'topotypes' of *P. obscurus*, taken in April and May, 1886, for comparison with the Arizona series. They are slightly more fulvous than the average of the specimens from either of the localities mentioned above, but can be closely matched by examples from either series, while the Fort Lowell specimens are practically indistinguishable as a series from the Grant County specimens.

The young in first pelage are nearly uniform dark gray above, with a slight tinge of brownish, sparsely lined with blackish hairs; below white, as in the adult. There is barely a trace of a very

pale yellowish lateral line. Young adults are grayer and less fulvous than the fully mature individuals.

The specimens from Oposura are all flat skins, so that the coloration is more condensed and the pelage apparently thicker than would be the case were the skins filled to life size. The young specimens from Oposura thus look very different from the young specimens from Willcox. On careful reëxamination of all the material it is evident that the young examples from Oposura, taken as the basis of my *Perognathus pricei* (l. c.) are not separable from *P. obscurus*.

From the following summary of the measurements taken by the collectors from the fresh specimens, it will be seen that the Fort Lowell and Oposura (adult) specimens average slightly larger than those from the other localities; they are also more strongly fulvous.

SUMMARY OF MEASUREMENTS (AVERAGES AND EXTREMES) OF  
130 ADULT SPECIMENS OF *Perognathus obscurus*.

Locality.	Sex and No. of Specimens	Total length.	Tail vertebræ.	Hind foot.	Ear.
Fairbank. . .	32 ♂	180 (165-196)	87 (80-105)	23 (22-24)	9 (8-10)
" "	14 ♀	170 (160-178)	86 (82-94)	23 (22-24)	8.6 (8-9)
Fort Lowell..	27 ♂	182 (170-200)	93 (88-110)	23 (21.5-24.5)	8.7 (8-9.5)
" "	14 ♀	173 (160-192)	86 (82-103)	22.6 (21-24)	8.3 (8-9)
S. B. Ranch..	25 ♂	177 (166-190)	92 (81-107)	23 (22-24.5)	9 (8-9.5)
" "	5 ♀	173 (164-183)	91 (89-96)	23 (22-25)	8.7 (8-10)
Oposura.....	7 ♂	188 (177-197)	98 (78-105)	23 (22-24.5)	9 (8-10)
" .....	3 ♀	177 (165-190)	94 (88-100)	22.5 (21-23)	9 (9-9.5)

Of the whole series of 130 specimens, 12 males and 4 females reach or exceed 190 mm. in total length; and 16 males and 4 females reach or exceed 100 mm. in the length of tail vertebræ. Fourteen males and 16 females fall below a total length of 170 mm.; and 5 males and 6 females fall below 85 mm. in length of tail vertebræ.

"This is the common Pocket-mouse of the region south of the Mogollon Mesa, where it outnumbers all the others, three to one. We found it especially abundant at Fort Lowell, Fairbank, Willcox, San Bernardino Ranch, and at several points in Sonora. It was abundant at Fairbank as early as February 22, but as none

were obtained at Fort Lowell in January, it is not unlikely that it hibernates during the colder months. The holes sometimes descend perpendicularly into the ground, but usually enter horizontally into mounds heaped under mesquite bushes by wind; during the hot weather it often closes the entrance with fine sand. These animals were caught readily with rolled oats. I often found seeds of various plants and mesquite beans in their pockets."—W. W. P.

**16. *Perognathus conditi* Allen.** CONDIT'S POCKET-MOUSE.

*Perognathus conditi* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 318.  
(Separates published Nov. 7, 1894.)

This species, as already noted (l. c.), was based on 3 specimens, taken at San Bernardino Ranch, March 23, 1894, by Mr. Condit.

"On March 23 and 24 Mr. Condit caught two adult specimens of this brightly-colored Pocket-mouse in a boggy patch of ground thickly grown with sacaton grass. Later, on May 1, he obtained a third specimen in sandy soil among mesquite trees."—W. W. P.

**17. *Microtus leucophæus* (Allen).** WHITE-BELLIED MEADOW MOUSE.

*Arvicola leucophæus* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 320.  
(Separates published Nov. 7, 1894.)

The four specimens of a very white-bellied *Microtus* from Graham Mountain have already been recorded (l. c), and do not require further comment.

"Four specimens were taken near the summit of Graham Mountain, at an elevation of about 10,000 feet, on July 18, 19. They were all found along boggy streams shaded with dwarf alders. There were no traces of runways in any of the surrounding meadows."—W. W. P.

**18. *Microtus alticolus* (Merriam).** MOUNTAIN MEADOW MOUSE.

*Arvicola (Mynomes) alticolus* MERRIAM, N. Am. Fauna, No. 3, 1890, p. 67, pl. v, figs. 1 and 2, and pl. vi, figs. 1-4. San Francisco Mountain, Ariz.

Two specimens of a *Microtus* from the White Mountains (Aug. 3 and 8, B. C. Condit), an adult female and a young male, are pro-

visionally referred to this species. The adult female measures : Total length, 168; tail vertebræ, 50; hind foot, 21; ear, 17.

"These specimens were obtained in the White Mountains at an elevation of about 9000 feet. They were trapped among fallen logs along creeks where no runways were apparent. On a grassy meadow near the summit of the mountains, the well-beaten runways of an *Arvicola* were abundant. Several hundred must have comprised the colony. Though a dozen traps were set for them, not one specimen was taken."—W. W. P.

**19. *Sigmodon minimus* Mearns.** MEARN'S COTTON RAT.

*Sigmodon minima* MEARN'S, Proc. U. S. Nat. Mus. XVII, 1894, p. 130. Upper Corner Monument, New Mexico.

Represented by two old males, taken at San Bernardino Ranch, April 11 and May 9 (B. C. Condit), less than fifty miles west of the type locality of the species. These specimens measure : Total length, 246 and 241; tail vertebræ, 95 and 99; hind foot, 28 and 25; ear, 19 and 18. They are slightly larger than the two specimens on which Dr. Mearns (l. c.) based the species, his examples, also "adult males," measuring respectively as follows : Total length, 223 and 223; tail vertebræ, 94 and 91; hind foot, 28 and 27; ear, "above crown," 14 and 12; "above notch," — and 16.

"Two specimens of this species were taken by Mr. Condit at San Bernardino Ranch. They were found in a boggy patch of ground, a half-acre or so in extent, thickly grown with coarse sacaton grass. Careful search failed to show traces of any others. Curiously enough, this species, which has just been described by Dr. E. A. Mearns from southern New Mexico, was found associated so closely with the new pocket mouse *P. conditi* that specimens of both were caught in the same spot."—W. W. P.

**20. *Sigmodon hispidus arizonæ* Mearns.** ARIZONA COTTON RAT.—The only locality represented is Fairbank, where a series of 12 specimens was taken by Price and Condit, Feb. 25 to March 15. Five are adult males and 7 are females, one of

which is quite young, and several others appear not to have quite reached mature growth, as shown by the subjoined measurements:

No. of specimens.	Sex.	Total length.	Tail vertebræ.	Hind foot.	Ear.
5	♂	250 (238-300)	111 (98-120)	34.6 (33.5-36)	20 (19-21)
5	♀	249 (232-277)	99 (90-104)	33.6 (31.5-37)	20 (19-21)

"We found this species common in swampy localities along the San Pedro River at Fairbank. Nearly a dozen were trapped in a small patch of tules, where they had beaten runways in all directions. Associated with them were *Peromyscus arizonæ* and *Reithrodontomys arizonensis*. A Cotton Rat, probably of this species, is found at Igo's Ranch, at the north end of the Huachuca Mountains. It was said to be common in a moist garden plot. However, I had no opportunity of visiting the place."—W. W. P.

**21. *Neotoma mexicana* Baird.** MEXICAN WOOD RAT.—Represented by 58 specimens, taken as follows: Fairbank, Feb. 25-March 3 (Price and Condit), 5 specimens; San Bernardino Ranch, March 25-27 (B. C. Condit), 4 specimens; Fort Lowell, March 7 (L. H. Miller), 2 specimens; Oposura, Sonora, May 30 (B. C. Condit), 1 specimen; Huachuca Mountains, Jan. 28, Feb. 12, and May 21 to July 3 (Price and Condit), 18 specimens; Chiricahua Mountains, March 21, April 14, and June 17 to July 24 (Price and Condit), 18 specimens; Graham Mountain, Aug. 7 (Price and Condit), 1 specimen; White Mountains, Aug. 1-4 (B. C. Condit), and Sept. 12, 7 specimens; Showlow, Aug. 22 (B. C. Condit), 2 specimens.

The series presents considerable variation in both external and cranial characters, but the variations are so inconstant, as shown by the large series from single localities, that it is difficult to consider them as not due to age and individual variation. Dr. Merriam has kindly sent me a number of specimens for examination, of what he considers to be true *N. mexicanus*, as restricted in his later papers, and I see no impropriety in referring all of the 58 specimens in the Price Collection to this form.

The coloration varies greatly with age and season. In fairly well-grown specimens the color of the upper parts ranges from a pale yellowish gray, more or less lined with black along the middle of the back, and with a decided wash of pale buffy on the sides (young adults) to a stronger yellowish gray quite heavily lined with black on the back, and with a stronger wash of buff on the sides (middle-aged specimens), and even to strongly rufescent brown above, heavily lined with black (old individuals). This variation is, however, obviously (in part) individual and not wholly due to age. The whiteness of the lower parts varies with age, season and the length of the coat, the plumbeous basal zone being much broader when the pelage is fully developed than at earlier stages following the molt.

In respect to the skull, the posterior branch of the intermaxillary usually extends considerably beyond the nasals, but in a small percentage of the skulls the intermaxillaries and nasals terminate on the same line, although in other respects the skulls are practically similar. The interparietal varies greatly with age, but to a rather less extent than in *N. micropus*<sup>1</sup>—about as in *N. floridana*.

The teeth vary of course with age in respect to the character of the enamel folds, but also in specimens of corresponding age. Thus  $M^1$  shows generally two deep sulci on the antero-internal border, of similar depth and character in comparatively unworn teeth. In old examples the anterior of these two sulci becomes more or less obliterated, sometimes wholly so, through the growth and wearing down of the tooth, while in very much worn teeth the other may also disappear. In  $M_I$  the change due to growth and wear in the front border of the tooth is even more striking than in  $M^1$ , the deep antero-internal sulcus seen in the young tooth becoming wholly obliterated in old age.

In  $M_3$  the anterior loop is usually, or at least often, regularly convex on its anterior border, barely touching at its greatest convexity the tooth in front of it. In other specimens this anterior loop is flattened against the tooth in front, so that its front border is not only more or less flattened, but not unfrequently its antero-external border is developed into a slight angle, adding another (incipient) angle to the outer margin of the anterior loop.

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<sup>1</sup> See this Bulletin, VI, pp. 233-246, pl. iv.

Judging from the description, figure, and from topotypes of *Neotoma albigula* Hartley,<sup>1</sup> from Fort Lowell, it is not separable from *N. mexicana*. *N. pinctorum* Merriam and *N. m. bullata* Merriam are unrepresented in the present series.

"Wood Rats were abundant over the entire country visited, from the summits of the Huachuca, Graham and Chiricahua Mountains to the lower desert regions. About Fort Lowell they were exceedingly abundant, having numerous nests among cactus beds, brush fences, and in willows along the Rillito. They appear equally at home among rocks, cactus, or oak brush, for, wherever we were, traces of Wood Rats were common."—W. W. P.

NOTE ON ECCENTRICITIES IN THE TEETH OF NEOTOMA.—Several specimens of *Neotoma* in the Museum collection present eccentricities that seem worthy of note.

***Neotoma californica* Price.**—One of two topotypes of this species presents the following extraordinary deviations in  $M_3$ . It is an adult male (No.  $\frac{6149}{4826}$ ) from Bear Valley, Cal. The last lower molar on each side has an extra enamel loop on the inner side, as though an attempt were made to reproduce the middle loop, normally developed in  $M_1$  and  $M_2$ . A slight supernumerary cusp is also seen on the outer side of  $M_1$  and  $M_3$  of both rami, and two on the outer side of  $M_2$ . They are all merely incipient points arising from the cingulum, but are not without morphologic interest. (See Fig. 12.)

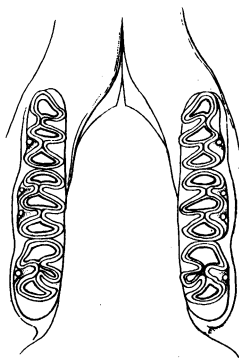


Fig. 12. *Neotoma californica*. Lower molar series, three times natural size.

***Neotoma floridana* (Ord).**—A male from Enterprise, Florida, (No.  $\frac{7869}{6215}$ ) has normal dentition, except with respect to  $M_3$  of the right side, which has an extra circular loop of enamel on the outer side opposite the middle of the tooth. When worn down it might give the appearance of an additional loop on the outer side of the tooth, but has

<sup>1</sup> Proc. Cal. Acad. Sci., (2) IV, pp. 156-160, pl. xii.

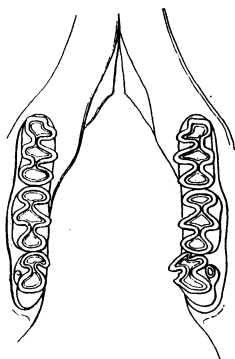


Fig. 13. *Neotoma floridana*. Lower molar series, three times natural size.

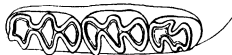


Fig. 14. *Neotoma floridana*. Left lower molar series, three times natural size.



Fig. 15. *Neotoma micropus*. Left lower molar series, three times natural size.



Fig. 16.



Fig. 17.

Figs. 16 and 17. *Neotoma cinerea occidentalis*. Left lower molar series, three times natural size.

now the form of a flat-topped or truncated cone. In the corresponding molar of the opposite side there is a tendency to the same condition. (See Fig. 13.)

Another specimen (No.  $\frac{1855}{1128}$ , ♀ ad., Gainesville, Fla.) has a well-developed angle at the antero-internal border of the posterior loop of  $M_3$  (Fig. 14). In still another specimen (No.  $\frac{4280}{3309}$ , ♂ ad., Hancock Co., Miss.) a well-defined angle is developed at the antero-external border of the anterior loop of  $M_3$ .

A similar variation is seen in a specimen of *N. micropus* (No.  $\frac{7234}{5838}$ , ♂ ad., Rockport, Texas, Fig. 15). Less marked variations are not infrequent in *N. floridana*, *N. micropus* and *N. mexicana*, as already noted in regard to the latter.

In *N. cinerea occidentalis* this aberration is frequently well marked, as shown in No.  $\frac{2096}{1463}$  (Fig. 16), in comparison with No.  $\frac{1458}{1458}$  (Fig. 17). Fig. 17 may be considered as representing the more usual or normal form.

While these variations are in the main to be regarded as abnormal, they indicate tendencies to a more varied tooth-pattern, past or to come.

## 22. *Onychomys torridus* Coes.

ARIZONA SCORPION MOUSE. — To this species are referred 43 specimens, collected mostly within about 50 miles of the type locality (Camp Grant, Arizona), as follows: 26 specimens from Fairbank, Feb. 21 to March 14 (Price and Condit); 14

from Camp Lowell, Jan. 19 and March 8 to April 18 (Price and Miller); 3 from San Bernardino Ranch, March 27 and 31 and May 1 (B. C. Condit); and 1 from Phoenix, Dec. 10 (J. Diefen-



bach). Of the Fairbank series all but two are adult ; of the Camp Lowell series 8 are adult and 5 are about half-grown young ; of the three San Bernardino Ranch specimens, the two March examples are adult, and the May specimen is only about one-third grown.

The adults are for the most part very uniform in coloration. The white tip to the upper surface of the tail usually occupies the apical fourth or third, but is occasionally almost wholly lacking. The lower parts are pure white (not "yellowish white, or an extremely pale buff or fawn," as originally described from an alcoholic specimen), with more or less of the extreme basal portion of the fur pale plumbeous or ashy. The young are ashy gray above, more or less varied with blackish ; below as in the adults.

The eight adults from Camp Lowell measure as follows : Total length, 148 (142-153); tail vertebræ, 52 (47-55); hind foot, 22 (19.5-22.5); ear, 17 (15-19).

The 24 adults from Fairbank average slightly smaller, as follows: Total length, 144 (134-157); tail vertebræ, 43 (40-49); hind foot, 22 (20-23.5); ear, 17.5 (16-18.5). In total length 5 exceed 150 and 5 fall below 140; in length of tail only 3 exceed 45 and only 5 fall below 42; in length of hind foot 5 exceed 23 and 3 fall below 21; in length of ear only 2 exceed 18 and only 3 fall below 17.

"This form appears to be abundant south of the Mogollon Mesa wherever there are sandy mesquite covered plains and river-bottoms. We found it abundant at Fort Lowell, Fairbank and Willcox. It lives in holes under bushes and brush-heaps, and is partially carnivorous, for we frequently found the stomachs filled with scorpions, insects, and the hair and flesh of mice. They would often drag off our traps containing small mammals. We sometimes found a trap containing a half-eaten mouse lodged in the opening of this animal's burrow."—W. W. P.

**23. *Onychomys leucogaster pallescens* Merriam.** DESERT SCORPION MOUSE.—A series of 7 specimens, 4 of them not quite adult, taken at Holbrook, Apache Co., Arizona, Aug. 26-29, by Messrs. Price and Diefenbach, are referable to Dr. Merriam's *O. pallescens*, which appears to be essentially a pale desert form [June, 1895.]

of *O. leucogaster*. The 5 oldest specimens (mostly 'young adults') measure as follows: Total length, 145 (135-151); tail, 40 (37-45); hind foot, 21 (19.5-22.5); ear, 19 (16-20).

"This species was found only at Holbrook. It was common on the sandy flats along the little Colorado, having holes in the sand heaped about bushes. It is a powerful little rodent, and was troublesome in carrying off our traps and their contents—White-footed Mice and Pocket-mice. They have a very peculiar musky odor."—W. W. P.

**24. *Peromyscus eremicus* (Baird). DESERT MOUSE.**—

This species is represented by 7 specimens—2 adults from Fairbank, Feb. 23-26; 1 adult from Fort Lowell, March 7; 2 adults from Phoenix, Dec. 12-14, and 1 adult and 1 nearly full-grown young from Oposura, Sonora, May 31. The young one has a fluffy fulvous patch on each side of the abdomen, and is otherwise strongly suggestive of *Hesperomys (Vesperimus) anthonyi* Merriam (Proc. Biol. Soc. Wash., IV, 1887, p. 5), based on a series of immature specimens from Fort Apache, Grant Co., New Mexico.

"Found sparingly at several places; three or four specimens were trapped by brush fences at Fort Lowell, and in open fields at Fairbank. Mr. Condit found a few about the buildings at San Bernardino Ranch, and in fields below the town of Oposura."—W. W. P.

**25. *Peromyscus auripectus* Allen. SILKY CLIFF MOUSE.**

*Sitomys auripectus* ALLEN, Bull. Am. Mus. Nat. Hist. V, 1893, 75. Bluff City, Utah.

Represented by 14 specimens from Holbrook, Apache Co., collected Aug. 26-29, by Messrs. Price and Condit. Two are quite young, 4 are adults, and the others 'young adults,' still in more or less grayish pelage. Only two show any trace of the salmon-colored pectoral spot, usually present in adults. The 4 adults of the series measure as follows: Total length, 192 (184-210); tail vertebræ, 100 (91-107); hind foot, 23 (22-24); ear, 20.5 (20-21).

This species has the soft, silky pelage, and nearly the size and proportions of *S. eremicus*, from which it is readily separable by its very hairy, heavily penicillate tail, and hairy heels, and when adult, by its lighter yellowish coloration above, and usually by the presence of a fulvous pectoral spot.

"We found this form not uncommon among the sandstone ledges and cliffs along the Little Colorado River at the town of Holbrook. We caught them readily in traps baited with rolled oats or raisins. In some places they undoubtedly inhabited the nests of *Neotoma* (sp.)."—W. W. P.

**26. *Peromyscus rowleyi* Allen.** ROWLEY'S WHITE-FOOTED MOUSE.

*Sitomys rowleyi* ALLEN, Bull. Am. Mus. Nat. Hist. V, 1893, p. 76. Nolan's Ranch, Utah.

To this species are referred 2 specimens from Showlow, and 2 from the White Mountains, Apache Co., Arizona. All are adult, and were taken respectively Aug. 22 and July 28. They measure: Total length, 207 (198-210); tail vertebræ, 106 (104-107); hind foot, 22.7 (22-24); ear, 20 (19.5-21).

"Two specimens were taken at Showlow, just at the overlapping of the pine and juniper belts. Two were taken on White River, in the White Mountains, a few miles east from Fort Apache, July 27."—W. W. P.

**27. *Peromyscus rowleyi pinalis* (Miller).** MILLER'S WHITE-FOOTED MOUSE.

*Sitomys rowleyi pinalis* MILLER, Bull. Am. Mus. Nat. Hist. V, 1893, p. 331. Granite Gap, Grant Co., New Mexico.

This subspecies is represented by 132 specimens, of which 74 are from the Chiricahua Mountains, collected May 14 to July 21, by Price, Condit and Miller; 40 from the Huachuca Mountains, collected Jan. 28 to Feb. 20, and May 21 to May 27, by Price and Condit; 11 from Huasava Mountains, collected May 24-27 by B. C. Condit, and 6 from Oposura, Sonora, collected May 30

by B. C. Condit. The adults are very uniform in coloration, but the immature specimens present every phase from the ashy gray young, washed strongly with black on the back, to the fully adult. The adults, however, vary much in general size, in the relative length of the tail, and especially in the size of the ears, which, however, seem to keep pace with the general size in the increase with age from 'young adults' to very old adults.

A series of 46 adults from the Chiricahua collection measure as follows: Total length, 199 (185-225); tail vertebræ, 98 (87-115); hind foot, 22 (20-24); ear, 19.6 (17-24). In total length 4 exceed 220, and 12 fall below 190; in length of tail 7 exceed 110, and 8 fall below 95; in length of hind foot 8 exceed 23 and 3 fall below 21; in length of ear 9 exceed 20 and 8 fall below 19. The smaller specimens are in many instances not fully adult in size, though practically so in coloration.

The Huachuca series averages a little less, 16 adults measuring as follows: Total length, 192 (189-206); tail vertebræ, 92 (89-109); hind foot, 22 (20-24); ear, 19 (17-21). In total length 6 only exceed 200, but only 1 falls below 190; in length of tail only 1 exceeds 105 and 5 fall below 95; in length of hind foot only 1 exceeds 23 and 4 fall below 21; in length of ear only 1 exceeds 20 and only 3 exceed 19.

The Oposura series runs still smaller, 10 adults measuring as follows: Total length, 192 (184-195); tail vertebræ, 94 (90-99); hind foot, 21 (20-22); ear, 19.5 (17.5-20).

"This mouse is found in the region intermediate between [*Peromyscus leucopus*] *rufinus* of the higher altitudes and [*Peromyscus leucopus*] *arizonæ* of the plains. It was rarely found above 7500 or 8000 feet, and only at one place below 5000 feet. This was about 10 miles south of Oposura, Sonora, at an elevation of about 1000 feet. There Mr. Condit found it not uncommon among brush fences and brush heaps along cultivated fields. This, with two specimens of *P. eremicus*, were the only forms of *Peromyscus* found in the region. It has all the habits of the genus, being found everywhere, among rocks, brush heaps and logs, and is also very troublesome about camp and in the houses of miners and prospectors."—W. W. P.

**28. *Peromyscus megalotis* (Merriam).** LEAF-EARED CLIFF MOUSE.

*Hesperomys megalotis* MERRIAM, N. Am. Fauna, No. 3, 1890, p. 64. Black Tank, Desert of the Little Colorado, Arizona.

Represented by a single adult male, taken at Holbrook, Aug. 29, by Messrs. Price and Diefenbach. The measurements from the fresh specimen, as recorded on the label, are: Total length, 185 mm.; tail vertebræ, 90; hind foot, 25; length of ear, 28; height of ear, 28.

This specimen is slightly smaller than *P. megalotis*, as described by Dr. Merriam from the Little Colorado Desert, but is otherwise similar. On the other hand, it differs from a series of 8 specimens of *P. truei*, taken near the type locality in New Mexico, in being less yellow and more tawny, in its much larger ears, larger size, and longer tail. The 8 specimens of *P. truei* measure as follows: Total length, 177 (165-184); tail vertebræ, 87 (71-100); hind foot, 23 (22-23.6). The ears in *truei* average fully one-fourth smaller than in *megalotis*.

"A single specimen of this huge-eared mouse was caught in sandstone cliffs along the Little Colorado at Holbrook on Aug. 29. Specimens of *P. auripectus* were caught commonly within a few feet of this one."—W. W. P.

**29. *Peromyscus leucopus sonoriensis* (Leconte).** SONORA WHITE-FOOTED MOUSE.

*Hesperomys sonoriensis* LECONTE, Proc. Acad. Nat. Sci. Phila. VI, 1853, p. 413. "In provincia Sonoræ"=Santa Cruz, Sonora.<sup>1</sup>

*Hesperomys sonoriensis* BAIRD, Mam. N. Am. 1857, p. 474 (in part; only the Sonoran specimens); Mex. Bound. Surv. Zoölogy, 1859, Mam. p. 43.

*Hesperomys (Vesperimus) leucopus sonoriensis* COUES, Proc. Acad. Nat. Sci. Phila. 1874, p. 179 (in small part—only the Sonoran reference); Mon. N. Am. Roden. 1877, p. 79 (Sonoran reference only).

*Sitomys americanus arizonæ* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 321.

In preparing the present paper it has seemed necessary to once more take up the question of Leconte's *Hesperomys sonoriensis*, in consequence of the light thrown upon the general subject of the short-tailed mice of the middle region of the continent by the

<sup>1</sup> "In Sonora, south-southwest [lege south-southeast] of Tucson. About lat. 31° 00', long. 122° 00'." Baird, Mam. N. Am., p. 713.

very large series of these mice in the Price Collection, and from other sources, available for study in the present connection. As a result of this revision of the subject, I am led to consider that the form recently described by me as *Sitomys americanus arizonæ* is to be taken as the true *sonoriensis* of Leconte, using the name in a restricted sense for the short-tailed grayish brown form of *Peromyscus* of the open plains and semi-desert areas of southern Arizona and adjoining portions of northern Sonora.

As is well known, the type locality of *Hesperomys sonoriensis* Leconte was Santa Cruz, Sonora, and that the type itself was an immature example in the plumbeous phase of pelage, and thus not readily distinguishable from specimens of the short-tailed group of corresponding age from other localities further north. Hence, Professor Baird, in 1857, applied the name collectively to all of the short-tailed mice from the "Upper Missouri, and Rocky Mountains to El Paso and Sonora." In this he was followed by Dr. Coues in 1874 and 1877, and by authors generally till 1890, when Dr. Mearns<sup>1</sup> "found that no less than five very distinct types are represented from the interior region of North America, viz.: a very dark arctic race; a pale grayish form from the treeless plains of the north; a more reddish or cinnamon-colored race from the treeless regions of the south; a darker and browner southern alpine form; and a pallid race from the desert regions of California and Arizona." Three of these had already received names; to the other two new names were given, only one of which (*Hesperomys leucopus deserticolus*) requires consideration in the present connection. Dr. Mearns, however, redefined the other three, and the types of his diagnoses are before me. With Dr. Mearns's material in hand, I am able to intelligently consider his work and allocate the forms he recognized. Unfortunately the name *sonoriensis* was restricted to the "darker and browner southern alpine form," described soon after by Dr. Merriam as *Hesperomys leucopus rufinus*,<sup>2</sup> and what was then and subsequently recognized as *sonoriensis* by other authors was re-named *deserticolus*. I now propose to restrict *sonoriensis* to the form I recently named *arizonæ*, and to let *deserticolus* stand for the "pallid race

<sup>1</sup> Bull. Am. Mus. Nat. Hist., II, Feb., 1890, p. 284-287.

<sup>2</sup> N. Am. Fauna, No. 3, Aug., 1890, p. 65.

from the desert regions of California and [immediately contiguous desert regions of] Arizona," which seems to be clearly separable from the *sonoriensis* (as now restricted) of southern Arizona and northern Sonora.

My *Sitomys americanus arizonæ* (now *Peromyscus leucopus sonoriensis*) was based on a series of 42 specimens taken at Fairbank, Cochise Co., Arizona, Feb. 22 to March 15, 1894, by Messrs. Price and Condit. To the same form are referred 26 specimens, mostly immature, from San Bernardino Ranch, collected by Mr. B. C. Condit, March 21 to May 4. Also a specimen taken at Fort Lowell, Jan. 5; another taken at Willcox, July 15; and another from Fronteras, Sonora, taken May 16, also by Mr. Condit. The Willcox specimen is very gray and faded; the Fronteras specimen is like many of the examples from Fairbank.

Nearly all of these specimens came from within 30 to 50 miles of Santa Cruz, Sonora, the type locality of *sonoriensis*.

"This mouse was abundant at Willcox, Fairbank and San Bernardino Ranch, having habits like those of *S. sonoriensis* [= *P. leucopus deserticolus*], though at Fairbank some were trapped in boggy patches of tule."—W. W. P.

### 30. *Peromyscus leucopus deserticolus* (Mearns). DESERT WHITE-FOOTED MOUSE.

*Hesperomys leucopus deserticolus* MEARN'S, Bull. Am. Mus. Nat. Hist. II, No. 4, Feb. 1890, p. 285. Type, No. 1175, Am. Mus., ♂ ad., Mojave Desert, California; F. Stephens.

*Hesperomys leucopus sonoriensis* MERRIAM, N. Am. Fauna, No. 3, Sept. 1890, p. 66. (Only in part of previous authors.)

*Vesperimus americanus sonoriensis* ALLEN, Bull. Am. Mus. Nat. Hist. III, Aug. 1891, p. 302.

To this form I refer a series of 18 specimens from Holbrook (Aug. 26-29), and 6 specimens from Showlow (Aug. 20-22). Two of the Holbrook specimens (Aug. 23) are in the light reddish phase of coloration characteristic of autumn and winter, of which others show slight traces. A few are in the dusky ashy pelage of the young, but the greater part present a brownish mouse-color tint, much like that of the winter pelage of *sonoriensis*. A series of 12 adults from Holbrook measure as follows: Total length, 154 mm.; tail vertebrae, 64; hind foot, 20; ear, 18.

"This was the most abundant mammal on the sandy flats about Holbrook, where it was associated with *Perognathus* and *Onychomys*. All three genera frequently have holes under the same bush. A few specimens were found at the edge of the pine belt below Showlow. This species was not found south of the great San Francisco or Mogollon divide."—W. W. P.

**31. *Peromyscus leucopus rufinus* (Merriam).** ALPINE WHITE-FOOTED Mouse.

*Hesperomys leucopus rufinus* MERRIAM, N. Am. Fauna, No. 3, 1890, p. 65, pl. iii, figs. 5-8. San Francisco Mountain, Arizona.  
*Sitomys sonoriensis* ALLEN, Bull. Am. Mus. Nat. Hist. V, 1893, p. 74. (Not typical.)

To this subspecies I refer all of the mountain races of the short-tailed *Peromyscus* represented in the present collection. Unfortunately the several series are not all comparable as regards season and condition of pelage. They include (1) a series of 68 specimens from the White Mountains, taken by Mr. B. C. Condit, Aug. 2-18, and 4 taken Sept. 2-18; (2) a series of 25 specimens from the Graham Mountain, taken by Messrs. Price and Condit, July 18-19; (3) a series of 89 specimens from the Chiricahua Mountains, taken by Messrs. Price and Condit, June 11 to July 9; forming a total of 182 specimens. I would also now refer to the same form the large series (130 specimens) collected by Mr. Charles P. Rowley in the mountains of Colorado and New Mexico, which I recently referred (this Bulletin, V, 1893, p. 74) provisionally to *Sitomys sonoriensis*. There are slight shades of difference between the series from the different localities represented, but there is also such a wide range of individual variation in color, size and proportions, and such an endless and complicated variation resulting from season and age, that apparently nothing is to be gained by attempting to recognize in nomenclature the slight average differences in coloration or other features that may possibly exist in the various more or less isolated mountain ranges of Arizona, New Mexico and adjoining regions. This is at least my present view of the case, with some 600 specimens of the *sonoriensis* group before me for examination. With larger series from these and numerous additional localities, collected throughout the year,



it might be possible to predicate slight shades of difference for each isolated area, but the practicability of attempting such fine discriminations must be left to future research, and more abundant and better material, for determination.

The White Mountain series seems not to differ appreciably from specimens of *rufinus* from the San Francisco Mountains, the type locality of the subspecies. They are mostly immature or in changing pelage, but a considerable number have so far acquired the fall dress as to show satisfactorily the deep tawny brown characteristic of typical *rufinus*. A series of 18 fully adult specimens give the following measurements: Total length, 153 (144-164) mm.; tail vertebræ, 61.7 (52-69); hind foot, 19.6 (18-20); ear, 18.3 (17-19).

The adults of the Graham Mountain series are in worn, transition pelage, and present, with few exceptions, a broad blackish dorsal area, with the rump and sides tawny brown, paler and more mixed with blackish than the White Mountain series, apparently a seasonal feature. A series of 16 adults average slightly larger than the adults of the White Mountain series, measuring as follows: Total length, 159 (150-170); tail vertebræ, 68 (65-73); hind foot, 21.7 (21-22.5); ear, 18 (17-20). This is, hence, a large form, and should the dark band along the dorsal region prove a fairly constant feature at all seasons, would well merit recognition in nomenclature. But this does not seem probable, as one specimen shows a narrow transverse line of tawny red hairs behind the shoulders, and another has the whole top of the head and nape red—remnants, evidently, of a tawny red pelage of earlier date.

The Chiricahua Mountains series is quite similar to the Graham Mountain series; the adults are mostly in change, blackish along the median line of the back (but not so uniformly so, the blackness of this area appearing often in patches), and of a paler tawny on the sides of the body and lower back than the White Mountain series. In size they are just intermediate between the White Mountain and Chiricahua series, 66 adults measuring as follows: Total length, 155 (142-170); tail vertebræ, 65 (53-75); hind foot, 21 (19-22.5); ear, 19 (17.5-20.5).

A series of 16 specimens of *rufinus* from the type locality, as given by Dr. Merriam (N. Am. Fauna, No. 3, Aug., 1890, p. 66),

measures as follows: Total length, 160 (150-170); tail vertebrae, 68 (56-75); hind foot, 20 (19-21).

A series of 20 adults from La Plata, New Mexico (altitude, 6100 feet), measures as follows: Total length, 153 (145-179); tail vertebrae, 68 (60-79); hind foot, 21 (19-22).

For convenience of comparison, these measurements may be tabulated as follows:

MEASUREMENTS (AVERAGES AND EXTREMES) OF 136 SPECIMENS  
OF *Peromyscus leucopus rufinus*.

Locality.	No. of specimens.	Total length.	Tail vertebrae.	Hind foot.	Ear.
San Fran. Mts.	16	160 (150-170)	68 (56-75)	20 (19-21)	
White Mts.	18	153 (144-164)	61.7 (52-69)	19.6 (18-20)	18.3 (17-19)
Graham Mts.	16	159 (150-170)	68 (55-73)	21.7 (21-22.5)	18 (17-20)
Chiricahua Mts.	66	155 (142-170)	65 (53-75)	21 (19-22.5)	19 (17.5-20.5)
La Plata, N.M. <sup>1</sup>	20	153 (145-179)	68 (60-79)	21 (19-22)	

<sup>1</sup> The apparently relatively longer tail in the La Plata series is probably due to difference in methods of measuring.

From the above it appears that the White Mountain series averages a little smaller than the others, but it is geographically most nearly related to typical *rufinus*, as it is also in coloration, as nearly as can be judged from the material at hand.

"This form belongs to high elevations, and was exceedingly abundant on the summits of the Chiricahua and Graham Mountains, where they were the only *Sitomys* obtained. In the White Mountains it was abundant from the summit down as low as 6500 feet, but in the Chiricahua Mountains it was not found below 8000 feet. It is found everywhere—in boggy flats filled with fallen logs, on bare, rocky hillsides, in thick brush—equally at home."—W. W. P.

**32. *Reithrodontomys megalotis* (Baird).** BIG-EARED HARVEST MOUSE.—Five specimens from Fairbank, March 2-14 (Price and Condit), seem distinctly referable to Baird's *R. megalotis*, the type locality of which is not far to the southeastward of Fairbank. Three of the specimens are adult, and give the follow-

ing measurements: Total length, 143 (141-146); tail vertebræ, 66 (62-72); hind foot, 18.5 (18-19); ear, 14 (14-14).

I also refer to this species a single adult male from San Bernardino Ranch (April 20, B. C. Condit), which differs from the others in being somewhat larger, but especially in having much larger ears. This specimen measures: Total length, 150; tail, 74; hind foot, 19.5; ear, 17.5.

"This species was found at Fairbank, in marshy places along the San Pedro River, where five specimens were trapped, March 2-14."—W. W. P.

### 33. *Reithrodontomys fulvescens* (Allen). SONORAN HARVEST MOUSE.

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

*Reithrodontomys fulvescens* ALLEN, *ibid.* VII, May, 1895, p. 138.

There is at present nothing to add to the accounts already given (l. c.) of the three adult specimens from Oposura on which this species was based.

"This species was taken by Mr. Condit, May 31, ten miles south of Oposura, Sonora, Mexico, in the valley of the Yaqui River. They were found along brush fences and shrubby mesquite trees."—W. W. P.

### 34. *Reithrodontomys arizonensis* Allen. CHIRICAHUA HARVEST MOUSE.

*Reithrodontomys longicauda* ALLEN (nec BAIRD), Bull. Am. Mus. Nat. Hist. VI, 1894, p. 320 (in text).

*Reithrodontomys arizonensis* ALLEN, *ibid.* VII, May, 1895, p. 134.

The 5 specimens (of which 4 are adult) on which this species is based, are from the Chiricahua Mountains (July 7-9, B. C. Condit). At first they were provisionally referred to *R. longicauda* of California, with which they have many points of relationship. The 4 adults measure as follows: Total length, 149 (145-152); tail vertebræ, 78 (74-80); hind foot, 17 (16-18); ear, 14 (13.5-14).

"Five specimens of this species were trapped on Rock Creek, in the Chiricahua Mountains, July 7-8, at an elevation of about 8000 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."—W. W. P.

ADDITIONAL NOTE ON REITHRODONTOMYS.—I received from Dr. C. Hart Merriam, just too late for notice in the preceding paper on the genus *Reithrodontomys* (antea, pp. 107-143), some forty specimens of this genus, representing three species and various localities. Among them is a series of 10 specimens from Mason, Mason Co., Texas, and one or two specimens from Gainesville, Cooke Co., Texas. These localities are of special interest, as they indicate the probable continuous distribution of the genus southward throughout the greater part of Oklahoma, the Indian Territory and Texas.

The specimens from Gainesville and Mason, Texas, seem distinctly referable to the *R. dychei* group, and, judging from present material, are not even subspecifically separable from Kansas specimens. The Mason specimens are rather small, but as most of them are more or less immature, their exact status may be left for future decision. These localities thus extend the distribution of *R. dychei* from 200 to 500 miles south of its previous known range—from southeastern Kansas to west-central Texas, or to within about one hundred miles of the known northern limit of *R. mexicanus intermedius*.

**35. *Mus musculus* Linn.** HOUSE MOUSE.—Represented by 18 specimens: 1 from Holbrook, 1 from Showlow, 1 from Fort Lowell, 1 from Willcox, 6 from Fairbank, 1 from the Chiricahua Mountains, and 7 from Phoenix.

"The House Mouse was found to be common in several localities, as Fort Lowell, Holbrook, Fort Apache, Fairbank, Willcox, and any place where much teaming was done. A single specimen was caught at a house in the Huachuca Mountains. Three years before a wagon load of seed grain had been brought there, and of two house mice nesting in the grain one had escaped. The one I caught was in all probability the one that escaped."—W. W. P.

**36. *Cynomys arizonensis* Mearns.** ARIZONA PRAIRIE DOG.

*Cynomys arizonensis* MEARNs, Bull. Am. Mus. II, No. 4, 1890, p. 305. Near Willcox, Cochise Co., Arizona.

Represented by a single specimen (♂ ad.) from the Huachuca Mountains, taken Jan. 28 (Price and Condit).

"A single specimen was shot January 28, on the plain at the base of the Huachuca Mountains. It was a warm day after a cold rain, and the animals were scratching out their burrows, and feeding on the dwarfed grass roots. We saw about twenty, and, by the number of hillocks, estimated the colony to number about 200 individuals. To the next town east it was nearly a dozen miles. Old settlers know of a time when no Prairie Dogs could be found about the Huachuca Mountains. These people thought that the dogs had emigrated from northern Sonora, Mexico. In the Sulphur Spring and San Simon Valleys, Prairie Dogs are found in numerous colonies, especially about Willcox and on the plain along the east base of the Graham Mountain. They evidently do not hibernate at all during the winter. *Cynomys* are found in large colonies on the Ash Fork plains north of the Gila Range.

"The *Cynomys* found about Snowflake and Holbrook are probably *Cynomys gunnisoni*. In places large colonies were found, but unfortunately no specimens were obtained."—W. W. P.

**37. *Anisonyx*<sup>1</sup> (*Otospermophilus*) *grammurus* (Say).**

LINE-TAILED SPERMOPHILE.—Represented by 1 specimen from Fairbank (♂ ad., March 1, Price and Condit); 3 from the Chiricahua Mountains (2 ♂♂, 1 ♀, all adult, April 17 and May 29, W. W. Price); 1 from Fort Lowell (♀ ad., March 18, L. H. Miller); 2 from the Huachuca Mountains (♂ and ♀ ad., June 18 and 21, L. Miller); and 1 from the White Mountains (Cooley's Ranch, Sept. 15). Total, 8 specimens.

"This is the common ground squirrel of Arizona; it is found everywhere over the entire region up to about 9000 feet. At Fort Lowell, during the summer of 1892, it was common in brush fences, and many had their dens under the roots of cottonwood and walnut trees. They were injurious to the growing crops of

<sup>1</sup> Cf. Merriam, Science, new Ser., I, No. 1, p. 18, Jan. 4, 1895.

the Mexican settlers along the Rillito. I did not notice any during my stay at Fort Lowell in January, 1894. It is probable that they hibernate during the colder part of the year, as the first specimens seen were on a warm day, Feb. 7, at the mouth of a cañon in the Huachuca Mountains.

"At our camp in the Huachuca Mountains, during 1893, they were very troublesome. A few minutes after our leaving the cabin they would swarm down from the cañon sides and carry off everything that was not securely boxed—bread, pork, dried fruit and potatoes; nothing came amiss to them. On our return they would scatter to the rocks, and for long after there would be a chorus of shrill chattering calls. At Showlow and Snowflake they were troublesome to the farmers, but were got rid of by poison. At Cooley's they were quite common among rocks and about fences."—W. W. P.

**38. *Anisonyx (Ictidomys) tereticaudus* (Baird).** ROUND-TAILED SPERMOPHILE.—Represented by 13 specimens taken at Fort Lowell, by L. H. Miller, March 7 to April 30. Of this series 3 are males and 10 are females; all are fully adult. The early March specimens show no signs of molting; the pelage above is rather short and close, but soft; below it is thinner, longer, much softer, dusky or blackish basally, and whitish at the ends of the hairs. The late April specimens have completed the spring molt. In these the pelage is everywhere short and close, slightly rufescent or of a pale cinnamon cast above, and clear silvery white below, becoming blackish as the hairs increase in length.

The 3 males measure as follows: Total length, 238 (231–251); tail vertebræ, 71 (65–78); hind foot, 33.5 (32–35); ear, 6. The 10 females measure: Total length, 243 (227–263); tail vertebræ, 79 (70–92); hind foot, 35.2 (33–37); ear, 5.6 (5–6.5).

"Found only at Fort Lowell, where they were abundant everywhere. They are shy and in such color harmony with the soil that they might pass for a rare species upon casual observation. Throughout May and June, 1893, I had an opportunity for observing them at leisure. It was hard to come upon them unawares, but by secreting myself in bushes near their burrows,

I often saw them come out, ten or a dozen, one after another, and feed upon small seeds and mesquite beans. They would hurry silently away to their holes at the first noise. They are silent animals, rarely uttering an alarm note. The young are much less shy, and can sometimes be surprised away from their holes and caught in the hand. My companion had a pet one that ran at will about the rooms and fed greedily on raisins and rolled oats. It slept at night in the warm ashes of the fireplace."—W. W. P.

**39. *Anisonyx (Xerospermophilus)* *canescens* (Merriam).**  
HOARY SPERMOPHILE.—Represented by a single specimen from Willcox, the type locality of the species. It is an adult female, taken July 15, by Price and Condit. It gives evidence of having recently nursed young. It measures as follows: Total length, 220; tail vertebræ, 64; hind foot, 34; ear, 10.

"A female of this species was taken at Willcox, Arizona, July 15, in a thicket of mesquite bushes. Several others were noticed."—W. W. P.

**40. *Anisonyx (Xerospermophilus)* *spilosoma macrospilotus* (Merriam).**—Four specimens are provisionally referred to this subspecies, originally based (N. Am. Fauna, No. 4, 1890, p. 38) on specimens from Oracle, Pinal County, Arizona. Two, both adult males, are from Fairbank (Feb. 23 and March 11, Price and Condit); one, an adult male, is from the San Bernardino Ranch (May 4, B. C. Condit), and the other from the Chiricahua Mountains (May 4, W. W. Price). This last is indistinguishable from the Fairbank specimens; the San Bernardino Ranch specimen has a slightly hoary tint, due perhaps to the incoming post-breeding pelage. Hence in general effect it somewhat resembles the Willcox specimen, referred above to *S. canescens*.

The four specimens measure as follows:

	Sex.	Total length.	Tail vertebræ.	Hind foot.	Ear.
Fairbank.....	♂	195	60	33	9
".....	♂	198	61	31	
Chiricahua Mts.....	♂	210	64	32.5	8.5
S. B. Ranch.....	♂	217	72	35	8

<sup>1</sup> Cf. Merriam, Proc. Biol. Soc. Wash., VII, 1892, p. 27, footnote.

"This species is rather common about Fairbank among mesquite thickets in sandy soil. The animals are shy, and in habits are much like *A. tereticaudus*. Their burrows are often placed at the roots of mesquite bushes, the beans of which form a large part of their food. Along the west base of the Chiricahua Mountains in the Sulphur Spring Valley are several large colonies. Here they have hillocked towns not unlike those of the Prairie Dogs. They can often be seen sitting upright above their burrows. A single specimen was taken from a small colony in the Sulphur Spring Valley. It is probable that the habitats of this form and that of *A. cryptospilotus* overlap, for only a level plain of 20 or 30 miles separates the two forms. Mr. Condit found a small colony at San Bernardino Ranch and collected a single specimen."—W. W. P.

**41. *Anisonyx (Xerospermophilus) cryptospilotus* (Merriam).**—A single specimen, ♀ ad., from Holbrook (Aug. 27, Price and Diefenbach) is provisionally referred to this species. It is very pale in coloration, with very faint whitish spots. Total length, 216; tail vertebrae, 65; hind foot, 31.5; ear, 9.

"A single specimen was taken on the sandy alkaline plain bordering the Little Colorado River at Holbrook, August 28. No others were seen."—W. W. P.

**42. *Anisonyx (Ammospermophilus)* leucurus cinnameus (Merriam).** WHITE-TAILED CHIPMUNK.—One specimen, ♂ ad., Holbrook, August 28, Price and Diefenbach.

"We trapped a single specimen in the sandstone cliffs near Holbrook. It was in what I supposed to be a nest of *Neotoma*. No others were seen."—W. W. P.

**43. *Anisonyx (Ammospermophilus) harrisii* (Aud. & Bach).** HARRIS'S CHIPMUNK.—Six specimens, of which 5 are from Fort Lowell (Jan. 8–11, Price and Condit), and 1 from Phoenix (Dec. 12, J. Diefenbach).

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<sup>1</sup> Cf. Merriam, Proc. Biol. Soc. Wash., VII, 1892, p. 27, footnote.



"This species is rather common in the lower desert region of southern Arizona. It was taken at Fort Lowell on rocky hills, east of the Rillito, on January 8. Several specimens were seen, and a female containing nine embryos was obtained. On the cactus-covered plain stretching down to the Gila River from Graham Mountain, I found this species abundant on July 20. They were feeding on the seeds of the screw-pod mesquite, and one specimen shot had his cheek pouches distended with the shelled beans. Owing to the excessively hot weather no specimens were preserved."—W. W. P.

**44. *Tamias lateralis* (Say).** SAY'S GROUND SQUIRREL.—Represented by 17 specimens, all taken in the White Mountains in August and September (Aug. 2-12, Price and Condit, 14 specimens; Sept. 4-13, Diefenbach, 3 specimens). All are adult except two, of which 9 are males and 8 are females. The August females are still in worn breeding dress, with traces of the incoming post-breeding pelage. The August males are somewhat advanced in molt, but in none is it more than half completed; the September specimens have all completed the molt.

Six fully adult males measure as follows: Total length, 270 (250-279); tail vertebræ, 94 (80-109); hind foot, 41 (40-43); ear, 21.5 (20-23). In one specimen the tail vertebræ measure 109 mm.—11 mm. longer than in any other specimen in the series.

Four old females give the following: Total length, 271 (255-288); tail vertebræ, 88.5 (85-92); hind foot, 41 (41-42); ear, 22 (21-24).

"This species was common about Cooley's Ranch, where they frequented rock piles, rubbish heaps and fallen logs; some even had holes in the open woods. They were very tame, sometimes coming into my camp picking up crumbs. They do not resemble the *Tamias* proper in habits, but, being terrestrial, they are more like the small *Spermophiles*. Mr. Condit found them to be common in the White Mountains to near the summit."—W. W. P.

**45. *Tamias dorsalis* Baird.** GILA CHIPMUNK.—Represented by 105 specimens, 3 of which are from the Santa Catalina Mountains (Jan. 16), 2 from the Graham Mountain (July 19), [June, 1895.]

and 100 from the Chiricahua Mountains. Of the latter, 5 were taken March 29 to April 6, and the remainder May 31 to August 16. The sexes are not quite equally represented, there being 43 males and 57 females. Nearly all are adult.

The measurements of 22 adult males and 28 adult females furnish the following summary : 22 males—total length, 224 (215-236) ; tail vertebræ, 100 (90-110) ; hind foot, 34 (32-36) ; ear, 21 (19-22) : 28 females—total length, 233 (220-247) ; tail vertebræ, 103 (94-114) ; hind foot, 34 (32-36) ; ear, 21 (19-23).

Three males (14 per cent.) and 10 females (36 per cent.) reach or exceed 235 mm. in total length ; 3 males and 13 females reach or exceed 105 mm. in length of tail vertebræ.

"I found *Tamias dorsalis* in the Chiricahua, Santa Catalina and Graham Mountains, and in the lower parts of the region drained by the Salt and White Rivers, which drain into the Gila. On the 14th of January, I shot three specimens high up in the Santa Catalina Mountains. One was at an elevation of nearly 8000 feet, and close to a snow field. This was enough to show that the species does not hibernate except perhaps for a few weeks during a heavy snow-fall. In the Chiricahua Mountains I found it continuously after my arrival there on March 19. It was common from the scrub-oaks at the base to the thick firs and aspens on the very summit, 10,000 feet elevation. In the Graham Range the species was common from the base to the summit. Two specimens were taken in fir woods at about 10,000 feet above sea level. In the open pine woods south of Fort Apache, I noticed this species several times. At Fort Apache they were abundant in the lava cliffs along White River, often venturing to the row of officers' quarters, placed close to the bank of the river. On warm days in August I have sometimes seen three or four together, sunning themselves on the ridge of a deserted house.

"In the Chiricahua Mountains, I had the opportunity to study them for several months. They were generally distributed in rocks, brush fences, thick woods and brushy hillsides. They are rather shy animals, not commonly found in trees, as is *Tamias cinereicollis* ; they have the usual chipmunk call. On warm days in June they were very abundant in Morse's Cañon in the Chiricahua

Mountains. Often as many as ten or twelve could be seen at once, playing among the rocks near my camp.

"One of the odd facts of distribution is that in the Huachucas the genus *Tamias* is entirely wanting, though the mountains in every particular appear to be as favorable a habitat as either of the other ranges mentioned."—W. W. P.

**46. *Tamias cinereicollis* Allen.** SAN FRANCISCO MOUNTAIN CHIPMUNK.—All of the 56 specimens were taken in the White Mountains August 6–20 and Sept. 2–19. Of this August<sup>1</sup> series, 30 are males and 17 are females; about one-half are fully adult, and the remainder immature, including a few less than half grown. The females average slightly larger than the males, as shown by the following summary of measurements: 16 males—total length, 217 (205–228); tail vertebræ, 96 (90–103); hind foot, 33 (32–36); ear, 19 (18–21): 12 females—total length, 224 (207–238); tail vertebræ, 99 (90–106); hind foot, 33 (31–34); ear, 19.5 (17–21).

Five (17 per cent.) of the males and 6 (30 per cent.) of the females exceed 223 mm. in total length; 5 males (17 per cent.) and 4 females (25 per cent.) reach or exceed 100 mm. in length of tail vertebræ.

"Found only in the White Mountains and in the heavy pine timber about Cooley's Ranch. Mr. Condit found it on the peaks of the White Mountains up to timber line. *T. cinereicollis* is arboreal, and rarely seen on the ground or in rocks. It is an active species, and has a rather loud, sharp call. It is confined to the pine and fir zone of the San Francisco plateau, and reaches the White Mountains from the Mogollon plateau. Near Cooley's the ranges of this species and that of *Tamias dorsalis* overlap, the former occupying a strip of country from 15 to 25 miles broad. At Cooley's nearly all the specimens taken were in oak trees, and they evidently feed largely on the acorns."—W. W. P.

**47. *Sciurus hudsonicus mogollonensis* Mearns.** MEARN'S CHICKAREE.—This form of the Chickaree is represented by 8

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<sup>1</sup> The September specimens are not labeled as to sex.

specimens, all adult females, from the White Mountains (Aug. 9-12, B. C. Condit). They seem quite indistinguishable from the series of 12 specimens collected by Dr. Mearns in the San Francisco Mountains, on which the subspecies was originally based. The White Mountain series measures: Total length, 322 (310-336); tail vertebræ, 131 (126-138); hind foot, 51 (49-53); ear, 26.5 (24-28).

"Abundant in the White Mountains above 7000 feet; probably extends to the limit of the fir zone. A noisy species, feeding largely on the cones of Douglass fir."—W. W. P.

**48. *Sciurus hudsonicus grahamensis* Allen.** MOUNT GRAHAM CHICKAREE.

*Sciurus hudsonicus grahamensis* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 350. (Separates issued Dec. 7, 1894.)

There is at present nothing to add to the description (l. c.) of this form, based on 3 specimens from Graham Mountain.

"This very restricted species is confined to the fir zone on the summit of Graham Mountain. Three specimens were obtained in dense fir woods on Aug. 17 and 19. Others were heard chattering."—W. W. P.

**49. *Sciurus aberti* Woodh.** ABERT'S SQUIRREL.—Represented by 6 specimens (1 ♂, 5 ♀♀, all adult), 5 of which were taken in the White Mountains, Aug. 1-8 and Sept. 17 (Price and Diefenbach), and 1 at Showlow. Four of the six measure as follows:

Sex.	Total length.	Tail vertebræ.	Hind foot.	Ear.
♂	500	238	65	41
♀	495	232	73	43
♀	515	235	75	43
♀	521	229	62	45
♀	498	221	63	41

"This handsome squirrel was common in the White Mountains, ranging from about 6000 feet up into the spruce belt to

about 9000 feet. It was more abundant between 7000 and 8000 feet elevation. It has a loud 'barking' call and feeds on cones of *Pinus ponderosa*, and usually builds its nest of branches in some lightning-blasted tree."—W. W. P.

**50. *Sciurus arizonensis* Coues.** ARIZONA SQUIRREL.—Represented by a single worn specimen from Fort Apache, taken by Mr. Price.

"A single specimen was shot in pine and oak woods near Fort Apache on Aug. 20. It is probably found all through the lower pine zone, usually not overlapping the range of *S. aberti*."—W. W. P.

**51. *Sciurus arizonensis huachuca* Allen.** HUACHUCA SQUIRREL.

*Sciurus arizonensis huachuca* ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, p. 349. (Separates published Dec. 7, 1894.)

In addition to the 4 specimens on which this subspecies was based (l. c.), 3 have been since received, all being from the Huachuca Mountains. These additional specimens, taken June 9 and 19 and July 3, by Mr. L. H. Miller, are in worn summer pelage, but otherwise similar to those already described.

"Common in the Huachuca Mountains from the highest peaks down to the base of the range, where I have found it feeding on walnuts in the cañons and ravines. During the summer of 1893, with Mr. R. L. Wilbur, I found it abundant in Ramsey Cañon, which that year had a good crop of walnuts. Often we would see two or three in one tree feeding on the partially ripe nuts. A series of over 40 specimens was secured. These squirrels often run upon the ground, but like best to jump from branch to branch. They have a call similar to that of Abert's Squirrel. They breed early, for by the middle of July we obtained young, nearly full grown."—W. W. P.

**52. *Nyctinomus nevadensis* (H. Allen).** NEVADA BAT.—One specimen from the Chiricahua Mountains, as already recorded (this Bulletin, VI, 1894, p. 326).

"A single specimen, a female, was taken on the ridge of the Chiricahua Mountains at a small meadow called Fly's Park, at about 9500 feet, on the evening of June 22. Another large bat, supposed to be of this species, was seen on the same evening. These bats were associated with large numbers of *N. brasiliensis*, and were flying from a dark cañon on the eastern slope of the range over the summit to the west."—W. W. P.

**53. *Nyctinomus brasiliensis* I. Geoff.** HOUSE BAT.—Represented by 7 specimens, collected as follows: Huachuca Mountains, ♀ ad., May 22 (Price and Miller); Chiricahua Mountains, 1 male and 5 females, all adult, June 19–23 (Price and Condit).

The single male measures: Extent, 305; length, 102. The females range as follows: Extent, 298 (290–308); length, 97 (94–100).

"These bats were abundant on the summit of the Chiricahua Mountains during June. From soon after sunset until too dark to see, a steady procession passed the summit from east to west. They had a rather steady flight, and did not appear to be feeding. Although they always appeared to fly from east to west, in the evening, it is likely they had a breeding place in the jagged cliffs on the east slope of the mountains, and returned there before daybreak, after feeding on the west slope. A single specimen was caught in a damp tunnel in the Huachuca Mountains on May 22. This species was exceedingly abundant at Fort Lowell through the month of May. Many specimens were taken in the cornice of the deserted hospital building."—W. W. P.

**54. *Atalapha borealis* (Müller<sup>1</sup>).** RED BAT. Represented by an adult female and two nursing young, taken in the Chiricahua Mountains, June 27 (Price and Condit).

"A nursing female with two young a few days old, was taken from the thick foliage of a peach tree at Wilgus P. O., at the west base of the Chiricahua Mountains, on June 26."—W. W. P.

<sup>1</sup> Cf. Rhoads, *Am. Nat.*, XXVIII, June, 1894, p. 523; Reprint of Ord's *Zoöl.*, 1894, App., p. 3.

**55. *Atalapha cinerea* (Beauv.).** HOARY BAT.—A specimen labeled: "Found on a wire fence, Huachuca Mountains, June 15, L. Miller," consists of the complete skeleton and the hair.

"A single specimen was found dead on a fence in Miller's Cañon in the Huachuca Mountains in May. This species was found to be not uncommon in the range of mountains during the summer of 1893."—W. W. P.

**56. *Vesperugo hesperus* (H. Allen).** PIGMY BAT.—One specimen, ♀ ad., Chiricahua Mountains, June 2 (W. W. Price). Expanse, 212; length, 77.

"A single specimen was shot flying over an alfalfa field at the mouth of Rucker Cañon on June 2. A small bat, supposed to be this species, was one of the earliest to be seen evenings at my camp in Rucker Cañon. They lived in cliffs on the cañon side and flew high, with a wavering flight."—W. W. P.

**57. *Adelonycteris fusca* (Beauv.).** BROWN BAT.—Represented by 38 specimens, nearly all adult, and equally divided as to sex. They were collected as follows: Chiricahua Mountains, May 31 to July 11 (B. C. Condit), 12 males, 18 females = 30 specimens; White Mountains, August 7–16 (W. W. Price), 6 males and 2 females. With the exception that the younger specimens are darker and smaller than the others, there is very little variation in coloration or size, there being no appreciable sexual variation in color, and very little in size. The females average slightly larger than the males, as shown by the following summary of measurements: 17 adult males, expanse, 326 (300–345); total length, 114 (104–120): 17 adult females, expanse, 334 (310–354); total length, 118 (111–125).

"Abundant everywhere, from the desert region about Fort Lowell, to the summit of the Chiricahua Mountains, 10,000 feet above sea level. A specimen taken May 30 contained several foetuses. At Fly's Park, on the summit of the Chiricahua range, bats of this species were the first to appear after sunset. They had homes in the dense forest of firs which walled one side of

the glade, and with *L. noctivigans* appeared to be the only bats that lived on the summit of the Chiricahua Mountains. At the saw mill on Rock Creek, on the west slope of the Chiricahuas, every evening these bats, singly and in companies of fours and fives, were seen flying down the cañon. At Cooley's Ranch this bat was abundant, outnumbering all the others. They appear to roost in all conceivable places, in cliffs, barns, hollow trees, tunnels and culverts."—W. W. P.

**58. *Lasionycteris noctivigans* (Leconte).** SILVERY-HAIRED BAT.—Three specimens, Chiricahua Mountains, June 11 and 23 (Price and Condit).

"Three specimens were taken and several others seen at Fly's Park, on the summit of the Chiricahua Mountains. They inhabited the forest of firs, and at nightfall came into the glade to feed."—W. W. P.

**59. *Vespertilio nitidus* H. Allen.** CALIFORNIA BAT.—Four specimens—♀ ad., Chiricahua Mountains, June 29 (Price and Condit). Forearm, 38; 3d metacarpal, 35; total length, 100; expanse, 260. White Mountains, August 8 (W. W. Price), 2 males, measuring respectively: forearm, 37 and 37; 3d metacarpel, 32 and 33; total length, 84 and 85; expanse, 245 and 250.

"Three specimens of this species were taken; one at the saw mill on Rock Creek, in the Chiricahua Mountains, on June 29, and two at Cooley's Ranch, in the White Mountains."—W. W. P.

**60. *Vespertilio melanorhinus* Merriam.** BLACK-NOSED BAT.—Two specimens are provisionally referred to this species, namely, an adult male taken in the White Mountains, August 2 (B. C. Condit), and a male (apparently young) taken at San Bernardino Ranch, May 4 (B. C. Condit). The White Mountain specimen is of the same golden-brown color above as the type; the other is darker, more resembling the ordinary dark phase of *V. nitidus*.

White Mts. ....	♂ ad.	Forearm, 32.5	Total length, 84	Expanse, 2.40
S. B. Ranch. . . .	♂ juv.	" 31.5	" —	" —



"Mr. Condit obtained a single specimen of this species in one of the buildings at San Bernardino Ranch on April 15, and on July 29 a second specimen under a stone in the White Mountains at an elevation of 9000 feet."—W. W. P.

**61. *Vespertilio evotus* H. Allen.** LONG-EARED BAT.—One specimen, Huachuca Mountains, ♂ ad., July 3 (L. H. Miller). Forearm, 35; 3d phal., met. I, 33; thumb, 6; total length, 85; expanse, 237; height of ear from crown (in dry skin), 14; height of tragus, 8. I also refer to this species an adult male from the White Mountains (August 8, W. W. Price), which resembles the other in size, color, and in all external features except that the tragus in each ear is defective, being square, hollowed at the top, and only about 2 mm. long. This strange condition may be due to malformation or to mutilation in life, as the two stumps are not quite symmetrical in outline, the upper border of the tragus having a different outline in the two ears.

"Mr. Miller obtained a single male from the thick branches of an oak in the Huachuca Mountains, and I collected one specimen at Cooley's Ranch on August 15, which flew into the house after dark attracted by the light."—W. W. P.

**62. *Vespertilio lucifugus* Leconte.** BLUNT-NOSED BAT.—Two specimens, from Cooley's Ranch, White Mountains, are here referred to what has usually passed current as *Vespertilio lucifugus*, of which species it seems to be a western form, the type locality of Leconte's *V. lucifugus* being South Carolina.

"A single specimen was shot at Cooley's Ranch, flying over a small pond by a house, feeding."—W. W. P.

**63. *Antrozous pallidus* (Leconte).** PALE BAT.—One specimen, ♂ ad., Cooley's Ranch, White Mountains, Aug. 15 (W. W. Price).

"A single specimen was taken at Cooley's Ranch in the White Mountains on Aug. 15. Bats supposed to be of this species were rather common flying high over the pines about the ranch build-

ings. They appeared early in the evening, but flew high and were difficult to secure."—W. W. P.

**64. *Procyon lotor hernandezii* (Wagl.).** BLACK-FOOTED RACCOON.—Two specimens, an adult male and an adult female, taken at La Noira (at head of Santa Cruz River, ten miles north of the Mexican town of Santa Cruz), Feb. 1 (Condit and Morgan), are provisionally identified as above. They represent the pale southern form of *P. lotor*. The measurements of these two specimens are as follows: Total length, ♂, 808, ♀, 815; tail vertebrae, ♂, 280, ♀, 328; hind foot, ♂, 120, ♀, 120; ear, ♂, 62, ♀, 55.

"Raccoons were common in willow thickets along the Rillito Creek at Fort Lowell, and about Fairbank on the San Pedro River. The tracks of a few were seen along the streams at the base of the Huachuca Mountains, and a male and female were taken from a hollow oak at the International Line just south of Huachuca Mountains. On the night previous there had been a light fall of snow, and the animals were easily tracked to the oak. I did not see any signs of them in the Chiricahua Mountains, and old settlers informed me that they were not found in the range. At Cooley's they were destructive to growing corn, pulling down the stalks, and eating the soft ears. The Apache Indians are in many places compelled to guard their fields during the corn season on account of the ravages of this pest."—W. W. P.

**65. *Mephitis estor* Merriam.** ARIZONA SKUNK.—Two specimens—a very old male and an old female—from Fairbank, taken respectively Feb. 27 and March 5 (Price and Condit) are referred to this species. They present extremes of variation in color, the male having the principal part of the dorsal area, including the upper surface of the tail, white, with the underfur from the shoulders posteriorly dingy gray. There is also a narrow white lateral line, and a median band of white on the ventral surface, broad over the pectoral region, narrower and somewhat interrupted posteriorly. The lower surface and apical portion of the tail is somewhat mixed with black, white prevailing. The usual frontal white stripe is reduced, however, to a narrow line.

The female is entirely black, except for a frontal stripe of white, and a white lateral line, very narrow anteriorly but widening posteriorly where it forms a broad band. The tail is black, with a small white terminal pencil, and much white at the base of the hairs, increasing in extent proximally, where many wholly white hairs are intermixed.

These specimens measure respectively : Total length, ♂, 545, ♀, 682; tail vertebræ, ♂, 268, ♀, 376; hind foot, ♂, 68, ♀, 60; ear, ♂, 34, ♀, 29. The skulls measure : Total length (front of base of incisors to posterior border of occipital condyles), ♂, 66, ♀, 61; greatest zygomatic breadth, ♂, 44, ♀, 39. In both the teeth are well worn, but more so in the male. In this specimen the tail is abnormally short.

Since the above was written three additional specimens have been received from Fort Lowell, two of them taken Jan. 9 and 16 (Price and Condit), and the other March 18 (Price and Miller). These measure as follows :

Orig. No.	Sex.	Total length.	Tail vertebræ.	Hind foot.	Ear.
382	♀	685	330	64	30
374	♂	675	355	65	28
2004	♂	630	280	72	32

The first two are without skulls; the skull of the other (No. 2004, ♂ ad.) measures 69 by 44. In this specimen the back is white with a narrow band of black posteriorly, and the tail is white at the base, along the sides, and at the tip. No. 382 (♀ ad.) has a lateral white stripe running from the ear to the base of the tail, very narrow for the anterior third of its length, with a narrow broken white line above it, at the shoulders. There is a well-developed frontal stripe, but no white on the nape or anywhere on the dorsal region between the white lateral bands. The tip of the tail has a long white pencil, and there is a tuft of white hairs on either side of the lower surface of the tail at its base. The other specimen (No. 374, ♂ ad.) has the usual frontal stripe, a broad white nape patch, continued posteriorly as far as the shoulders, and ending in a point. The rest of the body and tail

are entirely black, except a few white hairs (about ten) at the tip of the tail, and a small amount of concealed white at the base of the tail hairs for the entire length of the tail.<sup>1</sup>

"Two specimens of this species were taken at Fairbank during February and March. The species was common at Fairbank, and often during the night carried off many small traps containing kangaroo rats and mice. Specimens were also taken at Fort Lowell and in the Catalina Mountains. It is probably distributed over the entire region."—W. W. P.

**66. *Spilogale gracilis* Merriam.** LITTLE STRIPED SKUNK.—Represented by two adult females from the Huachuca Mountains, taken Jan. 28 (Price and Condit). They measure respectively as follows: Total length, 325 and 338; tail vertebrae, 125 and 116; hind foot, 38 and 40; ear, 28 and 26.

"Two specimens were trapped in a meat house at a ranch near my camp in the Huachuca Mountains in January. I obtained evidence of the occurrence of the Little Striped Skunk at many other places, but saw no other specimens."—W. W. P.

**67. *Bassariscus astutus*<sup>2</sup> (Licht.).** RING-TAILED CAT.—One specimen, ♂ ad., Huachuca Mountains, Feb. 1 (Price and Condit). Measurements: Total length, 720; tail vertebrae, 345; hind foot, 68; ear, 50.

"A single male was caught in a trap at my camp in the Huachuca Mountains, Jan. 31, 1894. This species is rare in the Huachucas, though a few are killed every year by the miners and wood-choppers. They sometimes come into the houses, and when young can be tamed, and are as playful as kittens. In the Chiricahua Mountains a single specimen had been killed several years previous to my visit, the only case of its capture of which I could find evidence."—W. W. P.

<sup>1</sup> For further notes on the variability of the Skunks of Arizona referred to *Mephitis estor*, see Mearns (this Bulletin, III, pp. 258-262) and Allen (this Bulletin, VI, pp. 194-196).

<sup>2</sup> Mr Rhoads has recently proposed (Proc. Acad. Nat. Sci. Phila., 1893, pp. 413-418—separates dated Jan. 27, 1894) to separate "the Bassarisks of Northern Mexico and the United States" from the true *B. astutus* of southern Mexico, under the name of *Bassariscus astutus flavus*.

**68. *Urocyon cinereo-argenteus scottii* (Mearns).** SCOTT'S FOX.

*Urocyon virginianus scottii* MEARN'S, Bull. Am. Mus. Nat. Hist. III, No. 2, 1891, p. 236. Pinal County, Arizona.

Two specimens, as follows : An adult female, Fairbank, March 1 (Price and Condit). Measurements : Total length, 925 ; tail vertebræ, 420 ; hind foot, 127 ; ear, 76. An adult male, Cooley's Ranch, White Mountains, Sept. 4 (J. Diefenbach). Measurements : Total length, 906 ; tail vertebræ, 363 ; hind foot, 121 ; ear, 79.

"Scott's Fox was seen over the entire region, but only two specimens were taken, one in March at Fairbank, and one at Cooley's Ranch in September by Mr. Diefenbach. They were heard howling nearly every night at my camp in the Huachuca Mountains during the summer of 1893."—W. W. P.

**69. *Lynx baileyi* Merriam.** PLATEAU LYNX.—Represented by two specimens : ♂ ad., Huachuca Mountains, Feb. 1 (Price and Condit); ♂ ad., Fairbank, March 12 (Price and Condit). The Huachuca specimen measures : Total length, 770 ; tail vertebræ, 155 ; hind foot, 165 ; ear, 80. The Fairbank specimen measures : Total length, 847 ; tail vertebræ, 147 ; hind foot, 172 ; ear, 86.

"Wild Cats were not uncommon over the entire country. Their tracks were seen on the summit of the Chiricahua Mountains, 10,000 feet above sea level. In the Huachuca Mountains a large male was caught in a trap in the day-time. Another was shot from a willow tree at Fairbank."—W. W. P.

**70. *Felis concolor* Linn.** PANTHER ; MOUNTAIN LION.—One skull, ♀ ad., Huachuca Mountains, Feb. 16.

"The 'Mountain Lion' is restricted to the brushy and timbered mountains of the entire region. Occasionally this beast travels across the valleys from one range to another. One was seen on the San Pedro River above the town of Fairbank in February. It killed a colt in a pasture, and was tracked by dogs a dozen

miles eastward into the Mule Mountains. In the Huachuca Mountains this animal is common. On Feb. 16, at nightfall near the summit of the range, two lions came mewling about the door of a miner's cabin. The man shot through the door, killing one, a gaunt female. The next day he threw the skinned carcass a short distance from the house. During the night the other lion came and ate nearly the whole of it; on the following evening the animal again returned, uttering a low peculiar cry. The miner wounded this one, but it escaped into the thick brush. In company with the man I trailed the beast some distance through the snow, but we finally lost the track. The man kindly gave me the skull of the female he had killed. In the Chiricahua Mountains lions are exceedingly troublesome to the raisers of colts and donkeys. In some cañons horse ranges have become nearly depopulated by the ravages of this animal. Just before my arrival in Rucker Cañon a lion killed a mare weighing over 1500 pounds. Mr. Condit found the tracks of this animal at timberline on the White Mountains."—W. W. P.

### III.—LIST OF MAMMALS OBSERVED IN THE REGION, BUT OF WHICH NO SPECIMENS WERE SAVED.

By W. W. PRICE.<sup>1</sup>

1. COYOTE. ***Canis latrans* Say.**—Abundant over the entire region. Scarcely a night passed that bands were not heard howling, or their tracks seen in the neighborhood of our camps.

2. GRAY WOLF. [***Canis lupus nubilus* (Say).** ? *Canis lupus mexicanus* (Linn.).]—This animal is the terror of the cattle and sheep men. A full-grown wolf is strong enough to pull down a cow, and stories are rife among the cattlemen of a band attacking and killing the strongest steer. It is found over the entire region, though more especially in the mountainous parts. We saw it on several occasions during our stay in the country.

<sup>[1</sup> In some instances Mr. Price, in the following list, omitted to supply scientific names, or used names recently supplanted by others; these I have supplied or changed, as the case may have required, changes from the manuscript being indicated by inclosing the names in brackets.—J. A. A.]

3. LONG-EARED FOX. [***Vulpes macrotis*** Merriam.]—This fox is not uncommon on the San Simon Plain east of the Chiricahua Mountains, judging from the reports given me by the cattlemen. I heard of one specimen being taken at Fort Lowell previous to my arrival. I saw what I supposed to be a fox of this species early one morning while riding from the Chiricahua Mountains to San Bernardino Ranch.

[There are two Arizona specimens in the Museum Collection—one from Tucson, collected by W. E. D. Scott, and one from near Maricopa, collected by Dr. E. A. Mearns.—J. A. A.]

4. BLACK BEAR. [***Ursus americanus*** Pallas].—Bears are found in all the mountainous and wooded regions of both Arizona and Sonora. At Rucker Cañon, in the Chiricahua Mountains, they were quite common during March and April. They had evidently left hibernation and were migrating. Bands of three or four, judging from the tracks, frequently passed through the cañon. They were common in the White Mountains during August, where several were seen in the glades digging for roots and bulbs. Mr. Condit killed one on Aug. 4.

5. SILVER-TIPPED BEAR. ***Ursus horribilis***?—This huge bear is said by the natives to inhabit all the mountains, but this needs verification. So far as I was able to learn, only one 'silver tip' had been killed in southern Arizona in recent years. The skin of this one is now in the possession of Mr. J. H. Slaughter, owner of San Bernardino Ranch, and was killed by one of his men near Guadaloupe Cañon.

6. **Sorex**, sp. ?.—A Shrew undoubtedly inhabits the fir belt of the principal mountain ranges. Dr. A. K. Fisher obtained two specimens on the summit of the Chiricahua Mountains near running water. I have seen its tracks on the Graham and the White Mountains. On one occasion I caught a tail of one in my trap.

7. WEASEL. **Putorius** — ?.—A weasel was taken at 9000 feet elevation in the Huachuca Mountains during 1893, and from

casual observation I supposed it to be *P. brasiliensis frenatus*. The odor of weasels was noticed in both the Chiricahua and White Mountains, but no specimens were seen.

8. BADGER. [***Taxidea taxus berlandieri* (Baird)**].—Badgers are common on the plains of the whole region. One was shot in 1893 at Fort Lowell, and is now in the collection at Stanford University. They are even found as high as Cooley's Ranch, in the White Mountains.

9. SPOTTED CAT. ***Felis***, sp. ?.—A spotted cat has been seen about the Chiricahua Mountains on several occasions, and I saw a Mexican who had a saddle-bag made of a skin of one taken near Guadalupe Cañon.

10. BEAVER. ***Castor canadensis Kuhl.***—The Beaver is still to be found along the San Pedro and Gila Rivers. On the headwaters of the San Pedro, in Sonora, a colony of a dozen or more had their lodges up to 1893, when a trapper nearly exterminated them. All the streams in the White Mountains have beaver dams in them, although most of the animals have been trapped.

11. PALLID MUSKRAT. ***Fiber zibethicus pallidus Mearns***.—Muskrats are found in the San Pedro River at Fairbank, and presumably at other points. A muskrat was common in Showlow Creek at Showlow, where were many trails leading from a pond up into an alfalfa field bordering it. Although we set traps for them, we did not secure any.

12. ***Sciurus***, sp. ?.—A large Red Squirrel is rare in the Chiricahua Mountains, where I heard of it on several occasions through the settlers. According to them the animal is found in very diversified situations. A pair lived in 1893 in dense fir woods at the head of Rucker Canon in the southern part of the range. In Morse's Cañon, in the central part of the range, in 1892-'93, they were not uncommon at a low elevation, feeding on the cones of *Pinus edulis*. I searched diligently in both of these localities,



but no traces of them could be found. However, in dense fir woods on the summit of the range, I found gnawed cones on several occasions, but I did not see the animals. Dr. A. K. Fisher, of the Agricultural Department at Washington, who was camping near me on the summit, had the good fortune to secure a single specimen in deep fir woods on June 17. Mr. Condit saw a large red squirrel in the pines on the north slope of the Mogollon Mesa near Showlow on August 22. He is familiar with the Red Squirrel of the Eastern States, and thought it was that. It could not be captured.

13. ANTELOPE. *Antilocapra americana* Ord.—Antelopes are still to be found on the plains of most of the region. Several bands were found along the bases of the Huachuca and Chiricahua Mountains. The most we saw in any band was twelve—a very different story from that told by old settlers of bands of hundreds, which in the early days trampled down the grass like sheep. We also found them in the juniper belt of the north slope of the Mogollon Mesa.

14. BLACK-TAILED DEER. [*Dorcelaphus hemionus* Raf.<sup>1</sup>].—Still to be found in the foothills and ravines of the lower mountain ranges. They prefer a rather open country with oak woods. They were formerly exceedingly abundant, but, like the Antelope, will soon become practically extinct. Some few bands still live along the west slope of the Huachuca Mountains. At a ranch house we saw some very fine antlers which had been taken during the fall of 1893.

15. ELK. *Cervus canadensis* Erxl.—So far as we could learn this animal is now confined to a small area in the higher

<sup>1</sup> [*Cervus hemionus* RAF., Am. Month. Mag., I, Oct., 1817, p. 436. Mule Deer of the Upper Missouri region.

*Cervus auritus* WARDEN, Descrip. statis. hist. et pol. des États-Unis de l'Amer., Sept., V, 1820, p. 640. The Mule Deer of Lewis and Clark. In the English ed., 1819, I, p. 245; and III, p. 172, it is mentioned simply as the Mule Deer.

*Cervus auritus* DESM., Mamm., II, 1822, p. 443. From Warden, as above.

*Cervus macrotis* SAY, Long's Exped., II, 1823, p. 88.

Rafinesque, on the basis of Le Raye's brief description of the Mule Deer of the Upper Missouri region, gives, under the name *Cervus hemionus*, a fair diagnosis of the Mule Deer of the early explorers of this region, to which Say in 1823 gave the name *Cervus macrotis*. There is also no question of the pertinency here of the name *Cervus auritus* given by Warden in 1820, over which, however, Rafinesque's name has three years' priority.—J. A. A.]

White Mountains. Several were seen, and a fine male was shot at about 9000 feet elevation, on August 10. They feed in the dense fir woods and glades which clothe the upper slopes of the mountains.

MOUNTAIN SHEEP. [*Ovis cervina* Desm.<sup>1</sup>].—Not uncommon on the bare rocky spurs of the Santa Catalina Mountains, where they were seen during 1894. Several were killed in the fall of 1893 by an Indian hunter, and the meat sold to settlers at the foot of the mountains. Some are also said to be found on the rocky eastern flanks of the Chiricahua Mountains, but I found no positive evidence of their occurrence there. They are said to be found in the White Mountains, but none were seen there by our party.

[<sup>1</sup> The proper specific designation of the Big-horn or Mountain Sheep has long been in doubt. In 1817 this animal was called by Cuvier *Ovis montana*, he at the same time wrongly attributing the name to Geoffroy. Although there was a prior *Ovis montana*, given by Ord in 1815 to the Rocky Mountain Goat, this name passed current for the Big-horn till 1880, when Alston (Biol. Centr.-Am. Mam., 1880, p. 111) revived for it *Ovis cervina* Desm., giving, however, not the place and date of its first publication. Mr. Rhoads has since reverted to the subject (Reprint of Ord's Zool., 1894, p. 25), and, among other things, says: "Shaw (Nat. Misc., XV, t. 610) figured and described this species under the name *Ovis canadensis*, but this work, being without any date whatever, the name is unavailable, though it probably has priority over any other." Very recently Mr. C. Davies Sherborn has published in the 'Annals and Magazine of Natural History' (April, 1895, pp. 375, 376) a short paper 'On the Dates of Shaw and Nodder's "Naturalist's Miscellany," from which it appears (granting that the work was published at the uniform rate supposed, of which proof is lacking), that plate 610 should have been published in December, 1803. If there was any delay, even of but a few weeks, the part containing this plate could not have appeared till early in 1804. On the other hand, there is no question of the publication of Desmarest's name *Ovis cervina* in 1804. There can be a difference at most of but a few months in the publication of two names. Obviously the name having a positive date should have preference. (See A. O. U. Code of Nomenclature, Canon XLX, second paragraph under 'Remarks.' Biddulph (P. Z. S., 1885, pp. 682-684), in 1885, supposing *O. cervina* Desm. to date from 1818, adopted Shaw's name *canadensis*, the date of which he gives as "in or about 1804.")

The history of this interesting case may be briefly presented as follows:

- Belier de Montagne*, E. GEOFFROY, Ann. du Mus. d'Hist. Nat., II, 1803, pp. 360-363, pl. 60. Canada, lat. 50°, long. 115° = Rocky Mountains, in southern part of present Alberta, Can. (No technical name given.)
- Ovis cervina* DESMAREST, Nouv. Dict. d'Hist. Nat., XXIV, 1804, p. 5. Based exclusively on the above, the species here first receiving a scientific name.
- Ovis cervina* DESMAREST, Nouv. Dict. d'Hist. Nat. (nouv. éd.), XXI, 1818, p. 553. Same in substance as the last, and is the reference usually cited. Desmarest here erroneously cites "*Ovis montana* Geoffr.," and gives the plate as "pl. 40" instead of pl. 60, and omits the page reference.
- "*Ovis cervina* DESMARESTS" RAFINESQUE, Am. Month. Mag., I, Oct., 1817, p. 436. Correctly attributes the name to Desmarest, but cites the date (by typographical error) as "1814" instead of 1804.
- Ovis cervina* ALSTON, Biol. Centr.-Am. Mam., 1880, p. 111 (ex Desmarest, at 1818).
- "*Ovis canadensis* SHAW, Nat. Misc., XV, pl. 60" (no date: about Jan., 1804). Apparently based also on the *Belier de Montagne* of Geoffroy. (I am unable to verify this reference; judging from contemporary literature, Shaw's name, description and figure were doubtless based on Geoffroy, as above cited.)
- Ovis canadensis* BIDDULPH, P. Z. S., 1885, p. 683 (in text). From Shaw, as above.
- Ovis montana* CUVIER, Règne An., I, 1817, p. 267. Cites Geoffroy, and wrongly attributes to him the name *Ovis montana*.—J. A. A.]