

Article XII.—ON A COLLECTION OF MAMMALS FROM
THE SAN PEDRO MARTIR REGION OF LOWER
CALIFORNIA, WITH NOTES ON OTHER SPECIES,
PARTICULARLY OF THE GENUS *SITOMYS*.

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The present paper is based on about 250 specimens collected by Messrs. E. C. Thurber and A. W. Anthony, chiefly during the month of May (April 30 to June 6), 1893. The bulk of the collection was made in the San Pedro Martir Mountains, but a few were taken at various points on the journey between San Diego, California, and San Pedro Martir. Through arrangements made before the expedition was undertaken, the entire collection of mammals obtained has been secured for the Museum. As would be expected, the collection is made up largely of a few common species (one-half of the specimens consist of a single species each of *Sitomys* and *Tamias*), but it contains, in all, representatives of 20 species, all but four or five of which are fairly well represented. Four are apparently new, namely, two species of *Sitomys*, one of *Tamias*, and one of *Scapanus*.

The general character of the country between San Diego, the starting point, and San Pedro Martir, is well known to be similar to that of the immediately adjoining portion of southern California. The San Pedro Martir Mountains, the objective point of the expedition, and where most of the collection was made, are thus described by Mr. A. W. Anthony: "About one hundred and fifty miles south of the United States boundary, and midway between the Pacific Ocean and Gulf of California, lies a range of mountains, which is marked upon the later maps of the peninsula as 'San Pedro Martir.' The region embraces a series of small ranges which rise from an elevated *mesa*, having a mean elevation of about 8000 feet, and an extent of sixty by twenty miles. In these mountains are born the only streams that this part of the peninsula affords, and an abundance of pine timber is found throughout the region. Many of the ranges on the eastern side of the San Pedro Martir rise to an elevation of 11,000 feet, or even, in one or two places, to 12,500 (?) feet.

“ Arising as the region does from the dry, barren hills of the lower country to an elevation higher than any other on the peninsula or in southern California, and presenting in its alpine vegetation and clear mountain streams features so different from the dry manzanita and sage-covered hills of the surrounding country, it is not unnatural to suppose that its animal life would be found to differ in some respects from that of the surrounding hills. It was not, however, until I had been in Lower California over two years that I was able to visit the locality and give it a little of the attention it deserves.”

Mr. Thurber informs me that the route taken was that of the old stage road from Tia Juana (the custom house, sixteen miles south of San Diego) to Ensenada, and thence by a poor wagon road to Colnett, on the coast, about 100 miles south of Ensenada, and about due west of the San Pedro Martir. The principal localities at which specimens were taken are the following: Carriso Creek, in a small valley about 22 miles south of Tia Juana; Gato Creek, 36 miles south of Tia Juana; Ensenada, 50 miles south of Tia Juana; Guadaloupe Valley, 35 miles south of Ensenada; Salado Cañon, 15 miles north of Colnett; Cape Colnett, on the coast; San Telmo and Valladares, about 45 miles east of Colnett, and near the western base of the San Pedro Martir.

From Mr. Thurber's letters I extract the following, as well as the few field notes given in the following list of the mammals taken on the expedition: “On the west the San Pedro Martir Mountains drop off by a series of benches, 300 or 400, to about 1500 feet in height. I think we went up six of these benches before we reached ‘La Grulla’ (a large meadow, about three miles long, where we made our third camp); from there to our last camp was about three miles, with a gradual rise of about 300 feet. From our last camp it was about two miles to a pass in the hills from which we could look down into the Gulf of California, distant about 25 miles. The eastern slope was very different from the western—quite precipitous, but broken up by ‘hog-backs’ running down six or eight miles. At the eastern foot is one of the most barren of deserts, cut off from the shore by a range of low, desert mountains. Our first and second camps were made

¹ Proc. California Acad. Sci., 2d Ser., Vol. II, 1889, p. 73.

on the second and fourth benches, respectively. Encantado Peak was about ten miles northwest of our last camp. The mountains themselves are rather barren—rocky in the extreme, with very little water.”

In working out the forms of *Sitomys* it became necessary to give some attention to the group as a whole as represented in the region immediately to the northward. In this connection I am indebted to the kindness of Mr. F. W. True, Curator of the Department of Mammals in the United States National Museum, for the opportunity to examine the types of the species described by Professor Baird in 1855-57, and other historic material used by the same author, and later by Dr. Coues. These include the types or co-types of Baird's *Hesperomys eremicus*, *H. gambelii*, *H. boylii*, and *H. austerus*, the relations and characters of which it was important to establish, in relation not only to the present collection, but for the proper determination of several hundred specimens of the genus received during recent years at the Museum from various parts of California.

I am also indebted to Professor Charles H. Gilbert, of the Leland Stanford Junior University, Palo Alto, California, for the loan of the entire series of the specimens of *Sitomys* contained in the collection of the University. They have proved of special interest and value, coming as they do mostly from the vicinity of the coast region of central California, which includes the type localities of both *S. californicus* (Gambel) and *S. gambelii* (Baird). This collection was also unexpectedly found to include a considerable series of specimens of a species of this genus thus far undescribed.

1. *Thomomys fulvus* (Woodh.)—Eleven specimens, San Pedro Martir, at altitudes varying from 7000 to 8200 feet; Gato Creek, one specimen.

These specimens are instructive as showing variations due to age, in respect to both coloration and cranial characters. Most of the specimens are middle-aged or rather young, but several of the others are very old. The former present the usual coloration of *T. fulvus* from Arizona and southern California generally; the others are much paler and grayer, with a rather distinct dusky median dorsal streak, one of them presenting a striking resem-

blance to average adult examples of *T. bottæ*. In respect to the skull, the younger and middle-aged specimens present the usual rather small quadrate interparietal so uniformly characteristic of *T. fulvous*; in the old specimens the sutures become less distinct, and strong ridges for muscular attachment begin to arise on the sides of the cranium, moving inward toward the median line as they increase in size, till finally they not only encroach upon the lateral borders of the interparietal, but extend inwardly much beyond its outer border. In the oldest specimen they nearly meet on the median line of the skull, and all trace of the interparietal as a distinct bone is lost, except for a slight indication of the suture on its front border. The skull is of course large and massive (total length, 48 mm., greatest zygomatic breadth, 26, as against 39.6 and 23.6 respectively for an average middle-aged adult). The peculiar coloration and the apparently small interparietal at first gave the impression that the series contained two very distinct species, but a detailed study of the skulls when properly cleaned shows that the peculiarities of two or three of them, as compared with the others, are due to old age.

2. *Perodipus agilis* (*Gamb.*).—Eight specimens, taken at Ensenada, Valladares and Gato Creek, May 29 to June 6. According to the measurements on the labels the 7 adult specimens vary as follows :

Sex, ♂	.....	Total length, 248 mm.	Tail vertebræ, 171 mm.
"	♂	.....	" 264 "
"	♂	.....	" 270 "
"	♂	.....	" 288 "
"	♂	.....	" 315 "
"	♀	.....	" 233 "
"	♀	.....	" 284 "
			" 143 "
			" 154 "
			" 165 "
			" 187 "
			" 163 "
			" 175 "

3. *Perognathus fallax* *Merriam.*—Four specimens, taken at the following localities: Cape Colnett, June 1; Guadaloupe Valley, June 5; Gato Creek, June 6.

4. *Arvicola edax* *Baird.*—Three specimens, one male and two females, fully adult, San Pedro Martir, altitude 8500 feet, May 26.

These specimens are provisionally and with much hesitation referred to *Arvicola edax* as defined by Baird, whatever the previously described *A. edax* of Leconte may have been. They

are very pale yellowish gray above, slightly varied with blackish ; below, lustrous silvery gray. Tail very scantily haired, a little darker above than below. These specimens are paler even than a series from Santa Ysabel, San Diego Co., Cal., but as the latter were taken in December, the difference may be in part seasonal.

Respecting these specimens Mr. Thurber writes me as follows : "*Arvicola* were common in one large meadow on the extreme eastern side of the mountains, but either our traps were too weak or we did not have the right bait, as three were all we could get, and those were caught the first day traps were put out. There were three large colonies in this meadow, and judging from the number of holes and runways there must have been a couple of hundred in each."

5. *Neotoma fuscipes* Cooper.—One ♀ ad. and two quarter-grown young, San Pedro Martir, altitude 8200 feet, May 18. The old female is marked "Parent of the young ; nursing teats $\frac{2}{2}$." These specimens agree very well with specimens from southern California (San Diego and San Bernardino Counties) which I provisionally refer to this species.

Mr. Thurber's notes state : "*Neotoma* not common. In smoking a bee-hive, the smudge was accidentally dropped into a rat's nest, and a female ran out with two young clinging to her and were secured by Mr. Anthony at one shot."

6. *Sitomys americanus thurberi*, subsp. nov.

Above grayish fulvous, strongly varied with black, the prevailing tint being often decidedly blackish, but without any well-defined darker dorsal area along the median line of the back ; sides rather more fulvous, but without a distinct fulvous lateral line ; whole lower surface and both fore and hind feet to considerably above the carpal and tarsal joints pure white, this color abruptly defined on the sides against the darker color of the upper parts. Ears dusky, with a narrow whitish rim, nearly naked, but with a prominent lanuginous tuft at the anterior base, colored like the fur of the surrounding parts. Posterior half of the soles very scantily furred for a member of the *americanus* group. Tail sharply bicolor, grayish white below, blackish above, thinly haired and with a slight terminal pencil ; tail vertebræ considerably less than half the total length.

Measurements.—Total length, 160 mm. ; tail vertebræ, 75 (average of 43 specimens measured in the flesh by the collectors) ; ear from crown, 13.5 ; ear from notch, 16 ; hind foot, 20 (last three measurements from skins).

Skull, total length, 26 ; basilar length, 22 ; greatest zygomatic breadth, 12.7.

Type, No. $\frac{4884}{4871}$, ♂ ad., San Pedro Martir Mountains, Lower California, altitude 8200 feet, May 20, 1893 ; coll. E. C. Thurber, after whom this subspecies is named.

Young (about two-thirds grown) are pale plumbeous gray, strongly varied with black above ; below, pure white, with a tinge of plumbeous, due to the plumbeous basal portion of the fur tinging the general color of the surface.

Sitomys americanus thurberi is based on a series of about 70 specimens, collected in May, 1893, by Messrs. E. C. Thurber and A. W. Anthony, in the San Pedro Martir region of Lower California. The series shows considerable variation in coloration, a small proportion of the specimens tending more or less strongly toward *S. americanus sonoriensis*, and a small number of others towards *S. a. gambelii*. In other words, about one specimen in ten shows a strong suffusion of fulvous pervading the whole dorsal region ; a much smaller proportion present a slightly reddish or bay tinge. The younger specimens, though adult in size, are rather light gray, faintly suffused with pale fulvous, and strongly varied with black.

The strong feature of this well-marked form is the pale grayish fulvous of the upper parts strongly varied with black. In the large admixture of black hairs in the dorsal surface, and somewhat in other features, this may be considered as a parallel form in the *americanus* group to the *fraterculus* form of the *eremicus* group of the same general region.

A large series of *Sitomys* in the Museum collection from Santa Ysabel, San Diego Co., Cal., collected by Mr. F. Stephens, are fairly intermediate between *sonoriensis* and *thurberi*, and seem almost distinct enough from either to require a name, but for the present are provisionally referred to *sonoriensis*.

7. *Sitomys californicus* (*Gambel*).—One specimen, a nearly adult female, San Pedro Martir (altitude 4300 feet), May 5, 1893.

Through the kindness of Prof. C. H. Gilbert of the Leland Stanford Junior University, I have before me a series of 9 specimens of *S. californicus* from San Mateo and Santa Clara Counties, California, and hence from near the type locality (Monterey) of the species. There are also in the Museum collection 11 specimens

from Santa Ysabel and 12 from Dulzura, in San Diego County. The southern specimens seem at first sight a little darker and somewhat smaller than the northern, but the series are too small to be decisive. It is to be noted, however, that 7 out of 9 northern specimens have the tail conspicuously tipped with white, the amount of white varying from a slight pencil to a tipping of three-fourths of an inch, while of the 23 southern specimens only *one* has the tail tipped with white. The measurements, as given by the collectors on the labels, and selecting only the fully adult specimens from each series, average as follows :

	No. of spec.	Total length.	Tail vert.	Collector.
San Mateo and Santa Clara Counties.	4	247	131	Gilbert and Price.
Dulzura, San Diego County.....	8	245	135	Chas. H. Marsh.
Santa Ysabel, San Diego County.....	7	229	129	F. Stephens.

I am informed by Mr. Stephens that Dulzura and Santa Ysabel are practically similar as regards geographical conditions, Dulzura being about thirty miles south of Santa Ysabel, a little nearer the coast, and at a slightly higher altitude.

8. *Sitomys fraterculus* (Miller). — Five specimens, San Pedro Martir, altitude 8200 feet, May 13-16, and one specimen, Valladores, altitude 2500 feet, May 30.

These specimens do not appear to differ appreciably from a large series from Santa Ysabel, San Diego Co., Cal., situated about 30 miles north of the type locality of the species.

9. *Sitomys martirensis*, sp. nov.

Similar in coloration and in the size and character of the ears to *S. truei*, but with longer tail and less heavily-clothed soles. Above grayish fulvous or pale yellowish brown, finely varied with blackish; sides washed with bright tawny, forming a broad lateral line. Below pure white, the basal portion of the fur blackish plumbeous, with sometimes a wash of tawny on the middle of the breast. A narrow blackish eye-ring; feet white to above the carpal and tarsal joints; ears dusky, nearly naked; tail sharply bicolor, above blackish (in one specimen intense black), grayish white below, well haired and terminating in a heavy pencil, the vertebræ alone rather longer than head and body.

Measurements.—Total length, 195 mm.; tail to end of vertebræ, 102 (average of 4 specimens measured by the collector before skinning); terminal pencil,

5 ; ear from crown, 16 ; ear from notch, 20 ; hind-foot, 22 (last four measurements from the skins).

Skull, total length, 28 mm. ; basilar length, 23.4 ; greatest zygomatic breadth, 12.7.

Type, No. $\frac{6815}{4049}$, ♀ ad., San Pedro Martir Mountains, altitude 7000 feet, May 8, 1893, coll. A. W. Anthony.

This species is based on four specimens, two males and two females, all fully adult, collected in the San Pedro Martir Mountains, at an altitude of 7000 feet, May 6, 1893, by Mr. A. W. Anthony. They are very uniform in size and coloration.

Sitomys martirensis apparently finds its nearest relative in *Sitomys megalotis* (Merriam), which it closely resembles in size and coloration, but has smaller ears.

Another large-eared species of *Sitomys*, as yet undescribed, is represented by a series of 18 specimens from San Benito Co., California, mostly from Bear Valley and Mount Hamilton, kindly loaned me for examination by Prof. C. H. Gilbert from the collection of the Leland Stanford Junior University. Fourteen of them are fully adult and four are young. By the courteous permission of Prof. Gilbert I subjoin the following description :

Sitomys gilberti,¹ sp. nov.

Similar in size and proportions to the preceding (*S. martirensis*), but much darker in coloration. Above dark yellowish brown, strongly varied with blackish ; sides more strongly washed with fulvous, with a deep fulvous lateral line separating the white of the lower parts from the dark color of the upper surface, in some (November) specimens this line taking on a strong salmon tint. Below white ; with (in some specimens) a more or less distinct wash of salmon across the breast ; fore feet white as far as the wrists, and the hind feet nearly or quite to the tarsal joint, the dark color of the dorsal surface usually reaching the joint and sometimes extending slightly on to the upper surface of the foot proximally. A rather distinct blackish eye-ring, in some specimens very pronounced ; ears dusky, thin, papery, and nearly naked ; soles nearly naked to the heel ; tail rather scantily haired and with a thin pencil at the tip, distinctly bicolor, the upper surface varying in different specimens from dusky brown to blackish or even black, the lower surface dull whitish, varying to nearly clear white.

¹ Named for Professor Charles H. Gilbert, the eminent ichthyologist, who is of late devoting much attention to the study of California mammals, and to whom I am greatly indebted for the loan of material in the present connection.

Measurements (average of 11 adults, from measurements taken by the collector before skinning).—Total length, 190 mm.; tail vertebræ, 98; "ear," 22; hind foot, 23.

Skull, total length, 28 mm.; basilar length, 23.4; greatest zygomatic breadth, 12.7.

Type, No. 329, Leland Stanford Junior University, ♂ ad., Bear Valley, San Benito Co., Cal., April 1, 1893, coll. C. H. Gilbert and W. W. Price.

The *young* are blackish plumbeous above, pure white below, the dark color of the upper parts extending slightly past the tarsal joint on the hind feet. Later the sides become yellowish gray or grayish fulvous, brighter or clear fulvous at the lower edge adjoining the white of the lower parts.

Sitomys gilberti is in many respects a miniature of *S. californicus*. Although only about half the size of *S. californicus* (as regards actual bulk), it closely resembles it in coloration, comparing adults of corresponding season, or young of corresponding ages, although *californicus* will average much darker, and has a nearly unicolor tail. The dusky color of the upper parts extends similarly in both to or a little beyond the tarsal joint, and both have enormously large ears. The real relationship of *S. gilberti* is with the *S. truei* group, of which it is obviously a component, and its nearest affine is apparently *S. martirensis*, which it closely resembles in size and proportions, but from which it differs in many details of coloration.

Among the specimens of *Sitomys* loaned me by the United States National Museum for use in the present connection, is one specimen (No. 4706) from "California" referable to this species—the only specimen I have yet seen except the series above mentioned from San Benito County, on which the species is based. It is not quite adult, but is strictly comparable with several specimens in the San Benito series. This specimen is of special interest on account of the inscriptions on the labels attached to it. It appears to have been originally identified as "*Hesperomys californicus*" by Major Leconte, from whom the specimen was received. Dr. Coues has labeled it "*Hesperomys leucopus?*" but on the back of his label he has written "*californicus* apud Lec. nec Bd. Probably = *gambeli* Bd." And then later in pencil "near *astecus* Sauss." Thus Dr. Coues recognized it as something out of the usual run of California *Sitomys*,

and in his later opinion, in considering it "near *aztecus*," suggested its true affinities.

Having lately made a study of the types and other extant material on which Baird based his three West Coast species of *Hesperomys*, namely *austerus*, *boylii* and *gambelii*, a few words on these forms may not be out of place. First as to the southern form, *gambelii*.

***Sitomys americanus gambelii* (Baird).**

Hesperomys gambelii BAIRD, Mam. N. Am. 1857, p. 464. Type from Monterey, Cal.

Hesperomys gambelii Baird was based primarily on two mounted specimens (Nos. $\frac{368}{1282}$ and $\frac{369}{1283}$) from Monterey, California, of which No. 369 should probably be regarded as the type, as it is the only specimen specifically mentioned in the original account of the species. This specimen, Mr. F. W. True informs me (in a letter dated June 8, 1893), is not now extant, and has not been in the collection for many years. No. 368, which may be considered as a co-type, is, through the kindness of Mr. True, now before me. It is, however, almost valueless for purposes of comparison, having become greatly faded from long exposure to light as a mounted specimen; it has also lost its ears, and is in a sad plight generally. The color above is now brownish yellow, and the tail is uniform pale yellowish buff—not bicolor. This is the only skin extant positively referred by Baird in his original account of the species to *H. gambelii*. A single skin from Santa Barbara (No. 7184), labeled sometime later by Prof. Baird as "*Hesperomys gambelii*, juv.," is a youngish adult of the common short-tailed Santa Barbara style of *Sitomys a. sonoriensis*. His No. 810, from Astoria, Oregon (also before me), referred doubtfully by Baird both to *H. gambelii* and *H. boylii*, I should refer to *S. a. austerus*. Some "Posa Creek, Cal.," specimens he also referred provisionally to this species. A skin (No. 284) from San Francisco, an alcoholic series of six specimens from Petaluma, and an alcoholic series of four specimens from Tomales Bay, were, however, also positively referred by Baird to *H. gam-*

belii. It is safe therefore to consider Monterey¹ as the type locality of *H. gambelii*, and that the vicinity of Monterey and the region thence northward along the coast to Tomales Bay, forty miles north of San Francisco, are within the area of typical *H. gambelii*.

As 13 out of 15 of Baird's positively identified specimens of his *H. gambelii* came from points near the coast of California, only 30 to 40 miles north of San Francisco, it seems proper to assume that a large series of specimens in the Museum collection from Nicasio, Marin Co., Cal., collected by Mr. C. A. Allen, typically represent Baird's *Hesperomys gambelii*, they agreeing also with his description of the species. Other specimens from Lake, San Benito and Santa Clara Counties, received for examination from the Leland Stanford Junior University collection, are also similar. This gives a series of about 40 specimens from the typical region, representing adults and young, and various seasons of the year. From this material I propose to redescribe the subspecies, as follows :

Sitomys americanus gambelii.—*Adult* : Above mixed dark brown and yellowish brown, bordering on bay, generally rather darker along the middle line of the back (but not forming a dorsal band as in the eastern forms of *americanus*) and grayer on the nape and crown ; sides less mixed with blackish and hence more yellowish, but without forming a fulvous lateral line ; beneath clear grayish white. Ears moderate, dusky, rather thinly haired, and with a narrow silvery border ; tail strongly bicolor, dusky or blackish above and grayish white below, about equal in length to head and body. Fully adult specimens average (15 specimens, from collector's measurements) : total length, 164 mm. ; tail vertebræ, 80 ; ear, 12.5.²

Young : At first very dark slaty plumbeous above, later becoming blackish, at one stage the whole central portion of the dorsal area being nearly black ; later still the yellowish brown comes in, young adults being dusky yellowish brown, through the abundance of intermixed blackish hairs. In old specimens there is only a slight mixture of black, the prevailing tint being yellowish brown, with occasionally a slight reddish cast, resulting in a pale bay tint.

¹ It might be thought necessary to take as the type the first specimen enumerated by Baird in his table of specimens under *H. gambelii*, which is No. 663, from "Natchess Pass, Cascade Mountains, W. T." It must be remembered, however, that it was the custom of Prof. Baird, as it is of most writers, to tabulate his specimens in some geographical sequence, beginning usually with the most northern locality represented ; and in a case like the present one of the most aberrant examples might thus be the first on the list. In the present case, however, a Monterey specimen is particularly mentioned in the description, while No. 663 is not. It may be further added that No. 663, as Mr. True informs me, cannot now be found.

² Dr. Coues (Mon. N. Am. Roden., p. 70) gives measurements of the nine alcoholic specimens from Petaluma and Tomales Bay which average as follows : Head and body, 70 mm. ; tail vertebræ, 67 ; total length, 137 mm. ; the series probably including some specimens not fully adult.

Sitomys americanus austerus (*Baird*).

Hesperomys austerus BAIRD, Proc. Acad. Nat. Sci. Phila. 1855, p. 336 (Fort Steilacoom and Spokane Plains); Mam. N. Amer. 1857, p. 466.

Hesperomys austerus Baird was based on specimens "collected at Fort Steilacoom, Puget Sound, by Dr. Geo. Suckley, U. S. A., and by Dr. Cooper on the Spokane Plains" (Baird, orig. descrip.). As Fort Steilacoom is first mentioned, it is proper to take this locality as the type locality of the species, whence came also all of the specimens except one mentioned by Baird in his second and more detailed account of the species. Of the seven skins enumerated by Baird in 1857, only one, Mr. True informs me (in a letter of date June 18, 1893), is at present in the National Museum collection. This (No. 1964, U. S. Nat. Mus., "Fort Steilacoom, W. T., March 15, Dr. Geo. Suckley, U. S. A.") is now before me and is marked as the type of the species. This is an adult, and is therefore probably not the real type, as the original description was obviously based on an immature example, as shown both by the measurements and the coloration given in the original diagnosis.

There is little to add to Baird's later (1857) account of the species. It is apparently a little larger than *gambelii*, with a relatively much longer tail. In coloration *austerus* differs from *gambelii* (judging from a series of specimens from the coast of British Columbia, about 125 miles north of Fort Steilacoom) in being much darker and browner, the general color above varying from yellowish brown (nearly as in average specimens of *gambelii*) to deep bay or dark chestnut finely mixed with black, averaging many shades darker than in *gambelii*.

Sitomys boylii (*Baird*).

Hesperomys boylii BAIRD, Proc. Acad. Nat. Sci. Phila. 1855, p. 355 (El Dorado Co., Cal.); Mam. N. Am. 1857, p. 471.

Hesperomys boylii Baird was based on a single specimen (afterwards mounted) "collected on the middle fork of the American River [in El Dorado Co.], California, by Dr. C. C. Boyle" (Baird, orig. descrip.). In his later (1857) account of the species he

referred to it a specimen (No. $\frac{578}{1701}$) from "Shoalwater Bay, W. T.," and another (No. 810) from "Astoria, O. T." Fortunately these last two specimens are extant, and, through the kindness of Mr. True, are both before me. After due consideration I have no hesitation in referring them both to Baird's *H. austerus*. The real type, No. $\frac{356}{1270}$, from El Dorado County, California, is also still extant and is before me. It is, however, in very bad condition, being evidently much faded from long exposure to light as a mounted specimen, and having also lost both its ears and being otherwise dilapidated. It is therefore nearly worthless, so far as throwing much light on the character of *H. boylii* is concerned.

The account of the coloration is too vague to be of much importance in such a group as the present. The measurements as given in the two descriptions are discrepant at several points, aside from an obvious important typographical error in each. In the first account the length of head and body is given as 3 and 4-twelfths inches (=85 mm.) and the tail to end of vertebræ as 3 and 9½-twelfths inches (=95.3 mm.), giving a total length of about 180.3 mm., which is considerably above the average for any member of the *S. americanus* group, with the tail vertebræ alone rather longer than head and body. In the second account the length of "nose to tail" is given as 5.25, which is probably a misprint for 3.25 (=82.5 mm.), and "tail to end of vertebræ" as 3.80¹ (=96.5 mm.), giving a total length of 179 mm., or practically the same as before. We thus have a rather large mouse, with the proportions of *austerus* and the coloration of *gambelii* (compare on this head Baird's descriptions of his *H. boylii* and *H. gambelii* in Mam. N. Am., pp. 465 and 471).

The skull, however, is much larger than that of any of the ordinary forms of the *americanus* group, quite equaling that of *S. martirensis* and other forms of the *truei* group. The facial portion of the skull is broad, and the cranium rather narrow and well rounded.

I have before me two specimens from Mt. Tallac, El Dorado

¹ This measurement is substantiated by the caudal vertebræ, still extant, preserved separately with the skull.

Co., Cal. (Coll. Stanford University), but one is quite young and the other apparently not fully adult; they do not appear to differ appreciably from examples of *gambelii* of corresponding ages from the adjoining coast district. They are rather small, short-tailed mice, and this seems to forbid their reference to "*boyliei*."

Under all the circumstances of the case it seems best to leave *Hesperomys boyliei* in abeyance until specimens answering to its peculiar characters have been obtained from the type locality. It may prove to be a southern mountain form of *austerus*, or, more probably, a very distinct type.

In further reference to Baird's West Coast species of *Hesperomys*, it may be added that Dr. Coues, in 1877 (Mon. N. Am. Roden., pp. 70, 71), gave a table of "Measurements of about fifty (and a list of [about fifty] other specimens purporting to be *Hesperomys 'gambeli'* from Washington and Oregon Territories and California." The table proves on examination to be a heterogeneous mixture of skins and alcoholics, all treated as of equal value for comparison, from localities almost as unlike in physiographic conditions as the continent affords, varying from the cool, rainy Puget Sound region to the arid, semitropical districts of Fort Mojave and San Diego in Southern California. Speaking generally, those given on p. 70 (l. c.) agree well in size and proportions with *gambelii* and those on p. 71 with *austerus*. Thus 9 alcoholics from Petaluma and Tomales Bay average in total length, 137 mm.; head and body, 70; and the tail vertebræ alone, 67; while the same measurements of 13 alcoholics from Puget Sound average respectively 164, 80, and 85—showing a marked difference in size and proportions. Ruling out all of the 'dry' specimens as wholly unreliable, we will merely note that Coues says (l. c., p. 72): "Simiahmoo specimens [skins] . . . are so much darker than 'gambeli' from the dry, open parts of California, that they stand rather nearer 'austerus' in color than the former examples of the species they are supposed to belong to!" Given, such an illogical basis as this, and the results reached in Dr. Coues's generalizations on the three forms *gambelii*, *austerus* and *boyliei* are not surprising.

In this connection a word on the value of measurements for purposes of comparison. It is now of course recognized that measurements from skins may be widely misleading and are wholly unreliable when nice points are at stake; and especially is this true of skins of small mammals made prior to the last few years. This is due partly to different methods of preparation, or to lack of care on the part of the collector, and partly to unequal skinking of different parts in drying. For illustration, I will take two series of measurements made by the same person of specimens taken at the same locality, the one from skins and the other from alcoholics, namely, Dr. Coues's measurements of 20 skins and 20 alcoholics of the common white-footed mouse of Massachusetts, all collected by Prof. J. P. W. Jenks at Middleboro', Mass., in 1855. I will simply premise that the skins were prepared with unusual care and skill for that early time, and were far better than the average of such material extant for the next thirty years:

	Head and body.		Tail vertebræ.		Total length.		Ratio of tail to total length.
	Mm.	Inches.	Mm.	Inches.	Mm.	Inches.	
Skins.....	91	3.59	75	2.95	166	6.54	45
Alcoholics....	84	3.31	78	3.08	162	6.39	48

It thus appears that what one might *a priori* suppose to occur is easily demonstrable—namely, that in skins the body is apt to be unduly lengthened and the tail somewhat shortened as compared with the true length.

The subjoined table gives a *résumé* of a very extensive and instructive table of measurements of a large number of *Sitomys americanus*, taken from specimens in the flesh, recently published by Mr. Gerrit S. Miller, Jr. (Proc. Biol. Soc. Washington, VIII, 1893, pp. 64-66), to which I have added, for comparison, those just cited from Dr. Coues. Mr. Miller's measurements are here arranged according to size, beginning with the smallest, which arrangement, it will be noted, brings about a curious juxtaposition of localities. The considerable variation in the four series from neighboring Massachusetts localities is also noteworthy.

MEASUREMENTS OF *Sitomys americanus* (KERR).

LOCALITY.	No. of Species.	Total Length.	Tail Vertebrae.	Ratio.	Measured by.
Haddonfield, N. J.	13	158	70	44.3	S. N. Rhoads.
Digby, N. S.	12	163	77	47.1	Outram Bangs.
Elizabethtown, N. Y.	20	167	73	43.6	G. S. Miller, Jr.
Liberty Hill, Conn.	17	168	72	42.8	Outram Bangs.
North Truro, Mass.	14	169	74	43.8	G. S. Miller, Jr.
West Dedham, Mass.	20	171	75	43.9	"
Peterboro', N. Y.	14	171	76	44.4	"
Seekonk, Mass.	15	184	79	42.9	"
Middleboro', Mass.	20 ¹	162	78	48.0	Elliott Coues.
" "	20 ²	166	75	45.0	"

But even under the most approved modern methods the element of personal equation may be an important matter for consideration, even when similar methods are supposed to be pursued in the preparation of skins, or in taking measurements before skinning. The same tension may not be employed in laying out the dead animal for measuring, or the same point chosen for the base of the tail. One person will thus get somewhat larger measurements than another, or a slightly different ratio of tail vertebrae to head and body. This is illustrated in the present collection, where two well-trained collectors working in company at the same localities, and measuring their specimens in the same manner, so far as can be judged by the labels, reach different average results in several cases where large series of specimens are taken of the same species. Thus, in the case of *Sitomys americanus thurberi*, described above, the measurements of a series of 43 adult specimens taken by one of the collectors averages for the total length 160 mm., and for the tail vertebrae 75 mm.; while in a series of 22 specimens taken by the other collector the corresponding measurements are respectively 170.4 mm. and 79 mm. Yet the dates and localities, and the general character of the specimens as to age and sex, are the same for each series. The same occurs also in the case of the large series of *Tamias obscurus* (see below, p. 198), where in one series the average length of head and body is 131 mm. and of tail vertebrae 87 mm., while the same measurements for the other

¹ Alcoholic.² Skins.

series are respectively 134 mm. and 99 mm. The variation in each case is parallel, in both instances one of the collectors getting larger measurements than the other.

As a further instance I may mention two large series of *Sitomys californicus* from southern California, taken by different collectors, both of the highest standing as regards the quality of their specimens, at localities not over thirty miles apart, and both similar as regards physiographic conditions, where the difference in the average measurements is even greater than in the two cases already cited. And possibly some of the differences shown in the above *résumé* of Mr. Miller's tables may be due more to the 'personal equation' element than to actual differences.

As is well known to those who have measured many specimens, of either birds or mammals, it is very difficult to repeatedly re-measure the same set of specimens and get always exactly the same results. The discrepancies, however, will ordinarily be small, and will rarely affect the average of a series. Hence measurements by the same person may be taken as strictly comparable; on the other hand, measurements by different persons are liable to vary, especially in the case of small mammals, though in each case measured with equal care, through slight, and probably unconscious, differences in methods, so that two persons measuring the same series of specimens independently of each other are pretty sure to obtain appreciable average differences in results. In other words, there is in our work the rather important element of *personal equation* to be on our guard against in dealing with series from different localities, when collected and measured by different collectors.

10. *Spermophilus grammurus beecheyi* (Rich.).—Two specimens, ♂ adult, altitude 7500 feet, May 11; ♀ ad., altitude 8200 feet, May 14. These specimens agree closely with examples from Alhambra, San Diego Co., Cal.

Mr. Thurber says: "Spermophiles were not common; saw perhaps twenty on the San Pedro Martir Mountains."

11. *Tamias leucurus peninsulæ*, subsp. nov.

General coloration much darker than in very dark specimens of *T. harrisi*. Top of head dark reddish brown strongly varied with black; nape and anterior

part of back gray, passing into dusky brownish over the pelvic region, like the crown; outside of fore legs and thighs reddish cinnamon, much brighter than the same parts in *T. leucurus*. Lower parts and a single stripe on each side, extending from the shoulder to the rump, white. Tail very short, iron gray above, white below, bordered subterminally with black.

Measurements.—Total length, 213 mm.; tail vertebræ, 50; hind foot, 35.5.

Type, $\frac{6814}{4948}$, ♂ ad., San Telmo, L. Cal., April 30, 1893, coll. A. W. Anthony.

Unfortunately this Ground Squirrel is represented by only a single specimen, an adult male. It differs from all of its allies in its relatively very short tail and very dark coloration.

Respecting this species Mr. Anthony, in reply to a letter of mine to him, writes me as follows: "I tried hard to get more of those *Tamias*, as I have always regarded them as different from *leucurus*, but we passed very hurriedly through their habitat, which, so far as I know, reaches from a point about forty miles south of the boundary line to a little below San Quintin, and not over thirty miles back from the coast, to about 2500 feet above the sea. I saw only three or four on this trip. They are common in places near San Quintin."

12. *Tamias obscurus* Allen.

Tamias obscurus ALLEN (ex TOWNSEND MS.), Bull. Am. Mus. Nat. Hist. III, p. 70, June, 1890.

This species, originally described from the San Pedro Martir Mountains, is represented by a series of 49 specimens, taken May 6 to 28, at altitudes varying from 7000 to 8500 feet. They include a number of half-grown young, but are mainly adults in very worn, ragged coat. A number are in molt, while a few have nearly fully acquired the post-breeding dress. So far as the majority of the specimens are concerned there is little to add to the original description, based on eight May specimens, taken by Mr. C. H. Townsend. The young specimens bear an unexpectedly close resemblance in coloration to the young of corresponding age of *Tamias merriami*, and among the adults there are also cases of close resemblance between the two forms. In fact, the present material seems to show that *T. obscurus* is a southern representative of *T. merriami* rather than a close ally of *T. dorsalis*, as

originally supposed. The three forms evidently form a group more closely related *inter se* than is either with any other form of the genus.

As already said, there is little to add to the original description of the *breeding pelage*, or to the comparisons based thereon, but the post-breeding pelage is so different as to require further description.

Post-breeding Pelage.—Dorsal streaks much more sharply defined than in the faded breeding pelage. Four light streaks, clear grayish white, separated by three dark streaks, with an additional outer dark streak outside of the outer light one. Central dark streak chestnut, mixed more or less from a point behind the shoulders posteriorly with black, in some specimens black prevailing; inner pair of dark streaks paler, yellowish chestnut, with little or no black; outer pair still paler and more yellowish. Post-auricular patches large, white or grayish white, instead of indistinct and dull grayish as in the faded breeding pelage. Flanks dull yellowish brown, varying in some specimens to quite strong reddish brown; sides of shoulders rather clear gray, sparsely mixed with black-tipped hairs. Below clear pure white instead of dull grayish white.

There is a wide range of individual variation, as there is also in *T. merriami*, and specimens of the two forms often agree closely in coloration. *T. obscurus*, however, is somewhat smaller, with a relatively much shorter tail. A large series of adults average 130 mm. in length of head and body and 87 in length of tail vertebræ, as against 135 and 115 respectively for the same parts in *T. merriami*, and 134 and 104 in specimens of *T. dorsalis* from northern Arizona.

This species, according to Mr. Thurber's notes, "was probably more abundant than any other. It is almost exclusively a rock dwelling species, every large mass of granite boulders, of which the country is full, having a family. I never saw them in trees, but sometimes they would get up in the bushes three or four feet from the ground to scold."

13. *Sciurus hudsonius californicus* Allen.—One specimen, ♀ ad., San Pedro Martir, altitude 8200 feet, May 18. This specimen is in very worn pelage, but as nearly as can be judged is referable as above.

14. *Scapanus anthonyi*, sp. nov.

A miniature of *Scapanus townsendii* with the pelage much darker (nearly black) and more lustrous. Length, 135 mm.; tail, 26.

Cranial characters.—Similar in general to those of *S. townsendii*, except that the interorbital and rostral portions of the skull are relatively broader. The fourth premolar on one side, however, is wanting and on the other is rudimentary; but this may be abnormal. Extreme length, 30 mm.; basilar length, 28.5; least interorbital breadth, 7.6; greatest mastoid breadth, 15.3; lower jaw, incisive border to condyle, 22.4.

Type, No. $\frac{6818}{1893}$, ♂ ad., San Pedro Martir Mountains (alt. 7000 ft.), May 8, 1893; coll. A. W. Anthony.

This species is based on a single male specimen, and although so small, the worn condition of the teeth show it to be an old individual.

In general bulk *S. anthonyi* is less than half the size of *S. townsendii* from Nicasio, California, adults of which average 185 mm. in total length, with the tail 38, while the skull measures 37 in total length, with a mastoid breadth of 17, and lower jaw (incisive border to condyle), 24.7.

Mr. Thurber says "moles were rare," and that this specimen was caught while burrowing.

There has been for some time a similar specimen in the Museum collection (No. $\frac{1187}{1887}$, ♂ ad.) from San Bernardino, California, collected by Mr. F. Stephens, April 16, 1887. This specimen is partly in molt, the patches of new coat being dark and the old coat much lighter, as though faded. It is slightly larger than the San Pedro Martir example, measuring: total length, 150, tail vertebræ, 28 (from collector's measurements before skinning).

***Scalops texanus* Allen.**

Scalops argentatus texanus ALLEN, Bull. Am. Mus. Nat. Hist. III, p. 221, April, 1891.

This Mole was originally described (l. c.) as a subspecies of *Scalops argentatus*, from a single specimen, labeled as from Presidio County, Texas. Recently the Museum has received a series of six specimens of a Mole evidently of the same species, from Rockport, Aransas Co., Texas, collected by Mr. H. P. Attwater.

These later specimens agree essentially with the type. The great difference in coloration and in size between this species and *S. argentatus* seem to indicate that the original reference of this form to *argentatus* as a subspecies was an error. This series of seven specimens agree in not only their small size but in the peculiar bronzy tint of the fur as compared with the silvery tint in *argentatus*. In *texanus* also there is a well-marked spot of orange on each side of the forehead and more or less orange-tinted fur at the base of the fore paws.

15. *Nyctinomus brasiliensis* Is. Geoffr.—A series of ten specimens is referred provisionally to this species. While of the *N. brasiliensis* type, they are much larger and lighter colored than examples from Florida and Cuba—the only alcoholic specimens available for comparison.

The following localities are represented: Carriso Creek, April 4, one specimen; San Telmo, April 10 and 29, four specimens; Valladares, May 3, two specimens; San Pedro Martir Mountains (altitude 8200 feet), one specimen. Eight are males and two are females. Of the males six have the gular sac and two are without it, while of the two females it is present in one and not in the other.

16. *Vesperus fuscus* (Beauv.)—Gato Creek, 3 specimens, and San Pedro Martir, 10 specimens, taken at altitudes ranging from 7000 to 8500 feet. They vary greatly in color, the Gato Creek specimens being much paler than those from the San Pedro Martir Mountains.

17. *Vesperugo hesperus* (H. Allen)—This species is represented by three specimens, taken as follows: Gato Creek, June 5, one specimen; Guadalupe Valley, April 27, two specimens.

18. *Atalapha cinerea* (Beauv.)—The 10 specimens representing this species were taken as follows: Carriso Creek, April 18, two specimens; Salado Valley, one specimen; San Pedro Martir, seven specimens, at altitudes varying from 7000 to 8200 feet.

19. *Vespertilio evotis* *H. Allen.*—Four specimens, San Pedro Martir Mountains, altitude 7000-8200 feet, April 17, 27, and 28.

20. *Vespertilio nitidus* *H. Allen.*—A series of 21 specimens of a small bat are provisionally referred to this species. They were taken May 15 to 28, in the San Pedro Martir Mountains at altitudes varying from 7000 to 8500 feet.

ADDENDUM.—Since the foregoing was put in type I have received, through the kindness of Mr. Walter E. Bryant, Curator of Mammals and Birds at the California Academy of Sciences, about 50 specimens of *Sitomys* from the collection of the Academy, which prove of exceptional interest. The greater part are from the southern part of the peninsula of Lower California. The remainder include a small series of *Sitomys americanus gambelii*, three specimens of *S. californicus*, and one of *S. gilberti*, mainly from the coast region of central California. Of the three specimens of *S. californicus*, two are from Monterey, the type locality of the species, and the other from Glenwood. The latter has the tail conspicuously tipped with white—the only one of the three thus marked. The specimen of *S. gilberti* is from Mount Hamilton, the type locality.

The Lower California specimens are about equally divided between two species, one of which, from the Sierra da la Laguna, I am unable to distinguish from my *S. martirensis*, described above (p. 187) from the San Pedro Martir Mountains. The other, from Comodu and San José de Cabo, is new to me, and is allied in general characters to *S. eremicus*. It is a fulvous mouse with a long naked tail and rather large ears.