

Article XVII.—ON MAMMALS FROM THE SANTA CRUZ MOUNTAINS, CALIFORNIA.

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The collections forming the basis of the present paper were made at Portola and La Honda, in San Mateo County, California, two small towns in the Santa Cruz or Coast Range of mountains. Portola is on the western slope, La Honda is on the eastern slope, the two localities being only about ten miles apart. The La Honda Collection was made during the week ending Jan. 2, 1895, by Messrs. W. W. Price and R. L. Wilbur, and numbers 236 specimens; the Portola Collection was made March 13 to April 16 (both inclusive), 1895, by Messrs. R. L. Wilbur and J. Diefenbach, for Mr. Price, and numbers about 400 specimens. I am indebted to Mr. Price for the opportunity of studying the entire series of about 650 specimens, of which about one-third was purchased by the Museum.

As the number of species contained in these collections is small, the common species are represented in large series, thus furnishing valuable information respecting the range of individual variation. The annotations given below relate mainly to this feature.

1. *Lepus trowbridgei* Baird.—Six specimens, collected at Portola, March 24–26.

2. *Perognathus californicus* Merriam.—Two specimens, Portola, March 25.

3. *Thomomys bottæ* (E. & G.).—Six specimens from Portola, collected March 23–April 3, present the following measurements :

	Total Length.	Tail Vertebrae.	Hind Foot.	Ear.
4 ♂♂ ..	.244 (215–270)	66 (56–82)	30 (28–33)	7.4 (5–10.5)
2 ♀♀ ..	.208 (206–210)	51.5 (51–52)	25.5 (25–26)	8 (8– 8)

4. *Neotoma fuscipes* Baird.—This series includes about 50 specimens from La Honda, taken Dec. 25–Jan. 3, and about 100 from Portola, taken March 15–April 17. The La Honda specimens are all adult; the Portola series includes 4 immature examples, one of which is very young (less than one-fourth grown), and the other three are still in the plumbeous pelage, though nearly full grown.

This series of 150 specimens, from practically the same locality and taken at nearly the same season, is of interest as throwing light on the normal range of variation in respect to coloration, size, etc. The series from the two localities are practically indistinguishable as regards coloration; the slight apparent difference in measurements is doubtless due to the fact that the measurements of the two series were taken by different persons.

The larger or Portola series will be taken as the basis of the following comment.

Young.—The single very young specimen is similar in coloration to the nearly full-grown young, except that the dorsal surface is more profusely lined with black, giving a more blackish general effect. The full-grown young (total length, 335 to 359) vary from ashy plumbeous to dusky plumbeous, with a faint wash of pale buff on the sides and over the abdomen.

Adult.—Between the young examples just described and the next stage there is a wide gap as regards age, the rest of the series being all 'adult,' but the specimens may perhaps be roughly distinguished as 'young' adults, 'middle-aged' adults, and 'old' adults, on the basis of size and coloration. The smaller specimens, as a rule, are less rufous above, and less washed with fawn or reddish buff over the abdominal region. The younger specimens are generally yellowish brown above strongly lined with black, the middle of the dorsal area being often quite blackish, and the rest of the upper surface rather faintly yellowish brown. Below, the breast and anal region are white with a faint yellowish cast; abdominal area more or less washed with fawn color, the fur dusky at base. From this phase there is every gradation to the obviously 'old' adults, in which the whole upper surface is more or less strongly reddish brown,

with much less black, and the lower surface, particularly the abdominal area, is rather strong fawn color, or even ochraceous buff. It is evident, however, that while this rather wide variation in color is largely due to age, there is also a wide range of individual variation, as some of the young adults are quite strongly reddish brown above, while some very old specimens almost altogether lack the reddish suffusion above and the fawn color below. Thus in some obviously old specimens the lower parts are white, or yellowish white, while in others the whole lower parts, including the breast, throat and anal region, as well as the abdomen, are deeply suffused with fawn, with in some cases the abdomen strongly ochraceous buff.

Feet.—The fore feet as a rule are white to the wrists, and the hind feet have the toes white to the base; but the white on the upper surface of the hind feet is frequently restricted to the apical half of the toes, but also frequently extends over the whole upper surface of the metatarsus, which is thus white or grayish white, with, of course, in different specimens, every intermediate stage.

There is no appreciable sexual difference in coloration, although the brightest colored specimens seem to be more frequently males than females. There is, however, a slight sexual difference in size, as shown by the following summary of measurements.

Measurements.—The series falls about equally on either side of a dividing line based on a total length of 420 mm. Of the La Honda series of 46 specimens—29 males and 17 females—25 exceed a total length of 420, and 21 fall below this measurement, divided sexually as follows: above 420, 20 males and 5 females; below 420, 9 males and 12 females.

Of the Portola series of 87 specimens—47 males and 40 females—39 exceed 420 and 48 fall below 420, divided sexually as follows: above 420, 27 males and 12 females; below 420, 20 males and 28 females.

La Honda Series.—The La Honda series presents the following averages and extremes:

	Total Length.	Tail Vertebrae.	Hind Foot.	Ear.
29 ♂ ♂ . . .	429 (388-480)	213 (192-230)	44 (41-46)	31.6 (30-35)
17 ♀ ♀ . . .	408 (382-445)	198 (177-220)	42 (41-45)	31 (29-34)

Of the 29 males, 8 exceed a total length of 440; 3 reach or exceed 450; 9 fall to or below 420, and 7 to or below 410.

Of the 17 females, 1 only exceeds 440; 5 exceed 420; 12 fall below 420, and 7 below 400.

Portola Series.—The Portola series presents the following averages and extremes:

	Total Length.	Tail Vertebrae.	Hind Foot.	Ear.
47 ♂♂ ...	423 (385-461)	217 (185-230)	41.5 (37-45)	31.5 (29-34)
40 ♀♀ ...	403 (380-456)	209 (182-230)	40 (36-46)	31 (29-34)

Of the 47 males, 8 exceed a total length of 440; 6 reach or exceed 450; 4 reach or exceed 460; 27 exceed 420; 20 fall below 420; 13 fall to or below 410; and 5 fall to or below 400.

Of the 40 females, 1 only exceeds 440; 12 reach or exceed 420; 28 fall below 420; 14 fall below 400.

Both Series.—Of the total of 133 adults—76 males and 57 females—48 males range between 400 and 440, and 28 fall outside these limits, of which 16 exceed 440 and 12 fall below 400; 34 females range between 400 and 440, and 21 fall outside these limits, of which only 2 exceed 440 and 21 fall below 400.

5. *Peromyscus californicus* (Gambel).—A series of 207 specimens, about one-third from La Honda and two-thirds from Portola, consist largely of adults, with, however, many nearly full-grown young of the preceding year. The variation in color among adults is not great, as regards the dorsal aspect of the animal; the ventral surface varies from clear ashy white with a trace of fulvous over the pectoral region (sometimes very pale but rarely wholly absent) to specimens in which the whole pectoral area is not only deep tawny ochraceous, but this color is prolonged medially to the abdomen, or even the whole ventral surface is strongly washed with ochraceous, most intense along the median line. About 20 per cent. of the specimens (40 out of 207) have the tip of the tail more or less white, the amount of white varying from a slight pencil of white at the tip to a white tip varying from half an inch to an inch in extent.

As regards measurements, specimens apparently fully adult present a considerable range of variation, as shown by 20 males

and 10 females (the males outnumber the females as about 10 to 1) selected at random, as follows :

	Total Length.	Tail Vertebrae.	Hind Foot.	Ear.
20 ♂ ♂	255 (244-270)	137 (125-156)	30 (28-31)	24 (22-26)
10 ♀ ♀	260 (245-285)	142 (126-155)	28.5 (27-30)	25 (23-27)

The females thus average slightly larger than the males.

6. *Peromyscus gilberti* Allen.—A series of 14 specimens (8 adults, 3 young adults, and 3 young in plumbeous coat) bear out the characters given in the original description (this Bulletin, V, 1893, p. 188). The adults all have a fulvous pectoral spot, varying in different specimens from a slight trace of fulvous to a very large and distinct spot of buffy ochraceous.

The adults measure as follows :

	Total Length.	Tail Vertebrae.	Hind Foot.	Ear.
3 ♂ ♂	210 (201-220)	110 (105-117)	25 (25-26)	22 (22-23)
5 ♀ ♀	206 (200-215)	108 (101-114)	24 (23-25)	22 (21-23)

As before said, this species is in nearly all respects externally a miniature of *P. californicus*.

7. *Peromyscus texanus gambelii* (Baird).—This species is represented by 163 specimens, of which 44 were taken at La Honda, Dec. 23-31, and 119 at Portola, mostly during the last week in March. Throwing out all specimens obviously not adult, the collector's measurements of these two series present the averages and extremes given in the following table :

	Total Length.	Tail Vertebrae.	Hind Foot.	Ear.
La Honda, 17 ♂ ♂	161 (150-177)	71.4 (61-85)	21.2 (20-23)	16.8 (16-18.5)
“ 14 ♀ ♀	162 (147-181)	70 (63-80)	21 (19-23)	16.7 (16-18)
Portola, 26 ♂ ♂	165 (153-179)	75.5 (67-85)	20.6 (19-23)	17.1 (15.5-19)
“ 22 ♀ ♀	163 (150-180)	75.4 (64-86)	20.3 (18-22)	16.7 (15-18)

The following will show the nature of the wide variation indicated in the above table :

Total length, 165 mm. or more	18 ♂ ♂, 11 ♀ ♀
“ “ 175 “ “	5 ♂ ♂, 3 ♀ ♀
“ “ 160 “ or less	11 ♂ ♂, 15 ♀ ♀
“ “ 160 “ to 170 mm.	21 ♂ ♂, 15 ♀ ♀

Thus 50 per cent. of the males and 42 per cent. of the females fall between 160 and 170 mm. (both numbers inclusive) in total length, and only $1\frac{1}{8}$ per cent. of the males, and rather less than 1 per cent. of the females, exceed a total length of 175.

As regards variations in color among adults, 'young adults' are darker and more heavily washed with blackish over the dorsal area than 'old adults,' about nine-tenths of which are very uniform in coloration, while about one in ten differs markedly from the average style. The variation is mainly in two directions—(1) toward excessive pallor or grayness; (2) toward a rufescent shade, in which the dorsal area is more or less strongly suffused with cinnamon rufous, varying much in intensity in different individuals. The rufescent phase is about twice as frequent in the present series as the pallid phase. Extreme examples, considered by themselves, might prove quite misleading.

8. *Reithrodontomys longicauda* (Baird).—A series of 16 males and 24 females, collected at La Honda, Dec. 23–31, give the following measurements :

	Total Length.	Tail Vertebrae.	Hind Foot.	Ear.
16 ♂ ♂ . . .	137 (125–150)	70 (64–76)	17.5 (17 –18)	13.5 (12.5–15)
24 ♀ ♀ . . .	138 (124–154)	70 (63–80)	17.4 (16.5–18.5)	13 (12.5–14.5)

About 5 per cent. of the series range in total length from 124–130 mm. ; these are probably young of the preceding year ; but they differ in coloration from adults only in being more varied with blackish on the dorsal area. Throwing out these 'young adults' would raise the average total length to about 140 mm.

9. *Microtus edax* (Baird).—A series of 8 adults (2 ♂ ♂, 6 ♀ ♀) from La Honda, Dec. 25–Jan. 2, measure as follows : Total length, 170 (161–172, one specimen 198) ; tail vertebrae, 47 (42–50, one specimen 58) ; hind foot, 21.5 (19–23) ; ear, 14.7 (13–17).

10. *Tamias pricei* Allen.¹—A series of 45 specimens, apparently all practically adult, taken at Portola by Wilbur and Diefenbach, March 23–April 15, and consisting of about an equal number

¹*Tamias pricei* Allen, Bull. Am. Mus. Nat. Hist., VII, 1895, p. 333.

of males and females, is remarkably uniform in coloration, there being no variation in this respect calling for remark. In measurements, throwing out a few specimens with obviously mutilated tails, the variation is shown by the following :

	Total Length.	Tail Vertebræ.	Hind Foot.	Ear.
23 ♂ ♂	252 (234-278)	119 (109-130)	37 (34-39)	21.5 (19-23)
17 ♀ ♀	256 (241-271)	122.5 (113-130)	35 (32-37)	22 (20.5-24)

The females thus average slightly the larger, except in respect to the hind foot, which, according to the collector's measurements, is slightly longer in the male.

11. *Mus musculus* Linn.—A series of 8 specimens is included in the La Honda series.

12. *Sciurus fessor* Peale.—One specimen, La Honda, Dec. 24.

13. *Sorex montereyensis* Merriam.—A series of 18 specimens (5 ♂ ♂, 13 ♀ ♀), collected at La Honda, and 15 specimens (6 ♂ ♂, 9 ♀ ♀) taken at Portola, measure as follows :

	Total Length.	Tail Vertebræ.	Hind Foot.	Ear.
Portola. 6 ♂ ♂,	109 (102-117)	46.3 (44-48)	13 (12-14)	8.3 (8-9)
" 9 ♀ ♀,	112 (105-120)	49 (45-53)	13.4 (12-14)	7.3 (7-9)
La Honda. 5 ♂ ♂,	122 (118-127)	48 (46-51)	15 (14-15.5)	7.5 (7-8)
" 13 ♀ ♀,	116 (111-125)	48 (44-52)	14.5 (14-15)	7.8 (7-8)

For some not very evident reason the Portola specimens fall considerably below the La Honda series. There is no appreciable difference in other characters.

Of the 34 Shrews taken at these localities, all but one appear to be *S. montereyensis*; the other is referable to *S. californicus*.

14. *Sorex californicus* Merriam.—La Honda, ♂ ad., Dec. 28, Price and Wilbur. Total length, 95; tail vertebræ, 33; hind foot, 12; ear, 6.

15. *Neurotrichus gibbsii* (Baird).—An adult female, collected at Portola, April 6, by J. Diefenbach, carries the range of

the species considerably farther south than is indicated by previously published records. The specimen measures : Total length, 117 ; tail vertebræ, 38 ; hind foot, 14.

16. *Scapanus townsendii* (*Bachman*).—A single specimen is contained in the collection from Portola.