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III

NOTES ON MAMMALS COLLECTED PRINCIPALLY  
IN WASHINGTON AND CALIFORNIA BETWEEN  
THE YEARS 1853 AND 1874 BY DR.  
JAMES GRAHAM COOPER

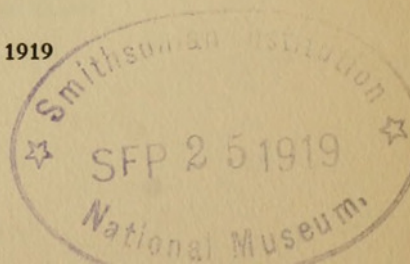
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INTRODUCTION AND ACKNOWLEDGMENTS

Dr. James Graham Cooper was one of the most active students of birds and mammals on the Pacific Coast in the middle nineteenth century. In view of the importance of his pioneer work in mammalogy, it has seemed desirable to list all the west coast specimens of mammals collected by him which are still extant and accessible, to note their condition, and to determine, so far as possible, their systematic status according to current conceptions.

The 114 specimens examined are distributed as follows: in the Museum of Vertebrate Zoology at the University of California, Berkeley, California, 57; in the United States National Museum, Washington, D. C., 45; and in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, 12.

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It is highly probable that a number of Dr. Cooper's specimens were deposited in the Museum of the California Academy of Sciences, San Francisco, California; but if so, they were destroyed in the great fire of 1906.

Doubtless a few of Dr. Cooper's mammal skins are still to be found in widely scattered places among the museums and colleges of this country and possibly Europe. Of 83 specimens of Cooper mammals listed in the catalogue of the United States National Museum, only 45 could be located on January 1, 1918. It is not unlikely that most of the missing specimens have been distributed to other institutions, in accordance with the policy of distribution and exchange followed by Professor Spencer F. Baird.

It is of interest to note that Dr. Cooper collected types or cotypes<sup>1</sup> of the following eight species of North American mammals, seven of which belong to the Pacific Coast (names given first are as used in publications by Cooper):

*Scalops Townsendii*=*Scapanus orarius orarius* True. Shoalwater Bay, Pacific County, Washington.

*Sorex vagrans*=*Sorex vagrans vagrans* Baird. Shoalwater Bay, Pacific County, Washington.

*Neosorex navigator*=*Neosorex palustris navigator* Baird. Fort Vancouver, Washington, according to label; actually, the headwaters of either the Naches River or the Yakima River, Washington.

*Lasiurus noveboracensis*=*Nycteris borealis teliotis* (H. Allen). Probably from southern California."

*Neotoma occidentalis*=*Neotoma cinerea occidentalis* Baird. Shoalwater Bay, Pacific County, Washington.

*Arvicola pauperrima*=*Lagurus pauperrimus* (Cooper). "Great Plains, W. T."

[?] *Spermophilus obsoletus*=*Citellus obsoletus* (Kennicott). Western Nebraska.

*Tamias Townsendii*=*Eutamias cooperi* (Baird). Klickitat Pass, altitude 4500 ft., Cascade Mts., Washington.

Four of the above species were described in manuscript by Cooper. These are *Sorex vagrans*, *Neosorex navigator*, *Neo-*

<sup>1</sup> Cotype used as designating one of two or more specimens together forming the basis of a species, no type having been selected, and the specimens having been collected at the same locality.



*toma occidentalis*, and *Arvicola pauperrima*. Of these the last-named only was actually published by him (1868c, p. 535), the others having been published by Baird on the basis of Cooper's notes and specimens (see Baird, 1855, p. 335; 1857, pp. 11, 15).

According to the standards of the day the specimens collected by Dr. Cooper were well prepared. The skull was always left within the skin, and stuffed with cotton, as with birds now. The fore feet were either disposed irregularly forward along the sides of the neck, or folded back on the breast and sewed to the skin. There was no uniformity in arrangement of the hind feet, which were usually folded forward beneath the belly, though sometimes crossed back of the body. The tail was never skinned, being disposed posteriorly, or if deemed too long for this, folded forward beneath the abdomen. The body was stuffed with cotton, and the belly slit was sometimes sewed up and sometimes not. These methods naturally did not make for either uniformity or durability. In spite of this, however, most of the material is in fairly good condition after an interval of nearly sixty years.

Dr. Cooper's usual method of labelling was as follows: On the front of the label he wrote, with pen or pencil, his running number, the scientific name of the animal, the sex (using ♂ for males and ♀ for females), the locality (usually including the state, but not in the case of specimens from the Colorado Valley), the date (the year indicated by an apostrophe and the two last figures, as '61 for 1861), and his initials. On the reverse side of the label he ordinarily entered eleven measurements, (nose to eye; nose to ear; head; head plus body; tail; tail plus hair; fore-foot; hind-foot; front, back, and width of ear).

A list of all of Dr. Cooper's published contributions to mammalogy which have been seen by the writer is included in the literature cited (p. 118).<sup>2</sup> All references published by Cooper to species of which I have examined specimens collected by him have so far as possible been referred to their proper places in this list according to current nomenclatural standards.

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<sup>2</sup> It is of interest to note that Dr. Cooper's most important work on the mammals of California does not appear over his name at all, being incorporated in Titus Fey Cronise's *The Natural Wealth of California* (Chapter VII, pp. 434-448).



I wish to make cordial acknowledgment for helpful suggestions and criticism to Messrs. E. W. Nelson, T. S. Palmer, and Edward A. Preble of the United States Biological Survey. For access to the collections in their charge, the loan of material, or for other courtesies I am indebted to Dr. Joseph Grinnell, Director of the Museum of Vertebrate Zoology, University of California; Mr. Gerrit S. Miller, Jr., Curator of Mammals, United States National Museum, and Mr. Samuel Henshaw, Director of the Museum of Comparative Zoology, Harvard University, as well as to Dr. Glover M. Allen, secretary of the Boston Society of Natural History. Mr. Vernon Bailey, Major Edward A. Goldman, and Dr. Hartley H. T. Jackson, of the Biological Survey, very kindly assisted in the identification of certain specimens. For information regarding the life and scientific activities of Dr. Cooper I am indebted to Dr. William H. Dall, of the U. S. National Museum, Washington, D. C.; Mr. James S. Cooper, of Oakland, California, and to Mr. W. Otto Emerson, Hayward, California. For valued advice in connection with the paper and for critical reading of the manuscript I am under obligation to Dr. Barton Warren Evermann, Director of the Museum, California Academy of Sciences.

#### HISTORICAL NOTES

James Graham Cooper was born June 19, 1830, in New York City. His father, William Cooper (1798-1864) was one of the most prominent of the earlier New York naturalists, having been an "Original Member" of the New York Lyceum of Natural History, now the New York Academy of Sciences, and an active scientific worker throughout his life. James G. Cooper graduated from the College of Physicians and Surgeons in 1851, spending the two years following in the hospitals of New York. The most active period of his life as a field naturalist was embraced in the 13 years from 1853 to 1866. It began on April 27, 1853, when he signed a contract with Governor Isaac I. Stevens, of Washington Territory, to act as one of the physicians to the Pacific Railroad Survey Expedition, which was detailed to explore the route along the Forty-seventh and Forty-ninth parallels; it



closed in 1866, when he settled down to the practice of his profession at Santa Cruz, California. In the year 1871 he located in Ventura County, where he remained until 1875. He then moved to Hayward, California, where he resided until his death on July 19, 1902.

A biographical account of Dr. Cooper has already been published (see Emerson, 1899 and 1902); it will nevertheless be profitable, so far as accessible records will permit, to make note of his movements year by year during the period when he was most active as a collector.

Dr. Cooper was assigned to the western division of the Pacific Railroad Survey Expedition to which allusion is made above, serving as surgeon and naturalist under Captain, later Major General, George B. McClellan. Cooper left New York May 5, 1853, in company with Lieutenant J. K. Duncan, reporting to Captain McClellan at Fort Vancouver, Washington Territory, on June 14, having made the trip by way of Panama. The expedition was organized at Fort Vancouver, and the actual exploration began July 18, 1853. The work was carried forward until the middle of the following November, the country traversed including the Klickitat Pass region between Mt. St. Helens and Mt. Adams, the eastern side of the Cascade Mountains, the Yakima Valley, the Okanagan River north at least to Lake Oyosa [= Lake Osoyoos] (see Cooper, W., 1860, p. 378), the Colville district, the Spokane Plains, and the vicinity of Fort Walla Walla. On November 15 the party reached Fort Dalles, Oregon (Suckley and Cooper, 1860, p. x), returning to Fort Vancouver soon thereafter.

The published writings of Dr. Cooper indicate that he made his headquarters at Fort Vancouver for nearly a year or until February 20, 1854. At this time he traveled to the mouth of the Columbia River<sup>3</sup> (1860a, p. 33), remaining there and at Shoalwater Bay during the following spring. On March 26, 1854, Cooper made an excursion in a sailboat up the "Willopah," [=Willapa] a river which empties into the north end of Shoalwater Bay (1860a, p. 20). Specimens are on record (Baird, 1858, pp. 777, 916) which he collected at Steilacoom in March and April of this year.

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<sup>3</sup> Specimens were collected at least at the Mouth of the Columbia, March 2 and 9; and Cape Disappointment, no date given (Baird, 1859, pp. 805, 882).



The Survey was disbanded on April 1, 1854, and Captain McClellan ordered Dr. Cooper to report to Governor Stevens at Fort Vancouver (see Emerson, 1899, p. 3). The specimens were sent to Professor Baird in Washington, D. C., and thither Cooper is erroneously said to have repaired "for the purpose of preparing his report." Cooper remained at Shoalwater Bay until July 18, 1854, ". . . collecting all that his private means would allow. He then crossed the unexplored Coast Range, on foot, with a party of citizens, and traveled to Puget Sound, where he remained a month, collecting specimens about Fort Steilacoom, in company with Dr. Suckley, returning to Shoalwater Bay in September by way of the Cowlitz and Columbia rivers" (Suckley and Cooper, 1860, p. x).

Specimens of birds taken by Cooper at Shoalwater Bay during the month of August as well as September are listed by Baird (1858, pp. 242, 405, 446, 570), so that his return to this locality may have been a few days earlier than is stated above.

The following winter (1854-1855) was spent on Shoalwater Bay, where, on October 7, 1854, he began to make meteorological observations.

"Late in February, 1855, Dr. Cooper went up the coast to Gray's Harbor and joining the Indian treaty commission under Gov. Stevens, on the Chehalis, ascended that river and proceeded again to Puget Sound, intending to accompany the Governor in May to the Blackfoot council at Fort Benton, and thence to return to the Atlantic Coast by way of the Missouri River. Meantime he made a voyage down the sound to the Straits of Fuca [=Juan de Fuca], spent a month collecting on Whitby's Island [=Whidby's Island] and another near Steilacoom. Unexpected disappointments and losses prevented the journey eastward which he had proposed, and he found it necessary to return to Shoalwater Bay in July. There he remained until October 4,<sup>4</sup> when, by the kind invitation of Captain Alden, he sailed in the Coast Survey steamer *Active* to San Francisco" (Suckley and Cooper, 1860, p. x).

Shortly afterward he spent six weeks collecting specimens in the Santa Clara Valley, California, later proceeding south-

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<sup>4</sup> During August he made a side trip to Astoria, Oregon (Baird, 1857, p. 303).



ward to Panama en route to New York; and he evidently remained in the east until the spring of 1857 (Suckley and Cooper, 1860, p. x). During these early explorations Cooper had spent six weeks in California and approximately two years and three months in Washington Territory.

On April 22, 1857, Dr. Cooper was appointed surgeon to the South Pass Wagon Road Expedition. The party of William M. Magraw, the Superintendent of the expedition to which Dr. Cooper was attached, left Independence, Missouri, about July 1 (See Campbell, 1859, pp. 5, 6), reaching the headwaters of Sweetwater River late in September, "too late to proceed with safety through the South Pass and into the Wasatch Range, in consequence of the severity of the winter in that region and the hostile attitude of the inhabitants of Utah toward the authorities of the United States at this time." In consequence of these considerations the party was disbanded on "Popo Agie, a tributary of Wind River." Some members of the expedition returned to the frontier, others accompanied the chief engineer, Mr. F. W. Lander, to Washington, a few were left on the Popo Agie River in charge of the public property, and a large number volunteered into the service of the army of Utah, selecting their superintendent as their captain. From records<sup>5</sup> of specimens collected by Dr. Cooper we learn that movements of the expedition were approximately as follows: The greater part of May and June was spent at Independence, Missouri, records of specimens collected at this point embracing the period between May 6 and June 30; July found the party moving in a general north-westerly direction toward Fort Kearney, Nebraska; Fort Laramie [Wyoming], the most westerly point reached by Cooper (see Suckley and Cooper, 1860, p. xi), was reached the latter part of August, the first specimens having been collected at this locality on August 27; the diminished expedition had not started on the return journey before October 5 (Baird, 1858, p. 322), but must have moved soon thereafter, for October 10 found the party at a point 100 miles east of Laramie; October 19, 40 miles west of Fort Kearney; October 28, 100 miles east of Fort Kearney; and November 5, 50 miles west of Leavenworth.

<sup>5</sup> In the mammal catalogs, U. S. National Museum; in Baird's *Mammals of North America*, 1857; and *Birds of North America*, 1858.



There ensues a period covering the years 1858-1859 for which I have not found any published summary of Dr. Cooper's activities. That he made a trip to Florida in 1859 is indicated by the fact that specimens of mammals numbered 145264-145269, United States National Museum, were collected by him in that State during that year, the only precise localities mentioned being New Smyrna [east coast of Florida, Volusia County] and the Miami River [Biscayne Bay, Dade County]. At the latter locality specimens were taken March 25 to 31, inclusive. While in New York and the east at this period his time was doubtless occupied in writing. Three reports, each of which must have entailed considerable labor, shortly appeared, comprising Cooper's accounts of the botany and mammals of the route of the western division of the Stevens Survey (see Cooper, 1860a and 1860b, and Suckley and Cooper, 1860).

In 1860 we find Dr. Cooper making his first real transcontinental trip, in the capacity of contract surgeon with a detachment of recruits from New York to "Fort Columbus, Department of Oregon."<sup>6</sup> This assignment occupied him until October 19, 1860, but his contract was continued until December 1 of that year. From Dr. Cooper's contributions to the *American Naturalist* under the title "The Fauna of Montana Territory,"<sup>7</sup> which deal with the observations and collections made by him on this trip, we learn that his itinerary in the Rocky Mountain and Pacific region included Fort Benton, Montana, and Forts Colville and Vancouver, Washington. On October 9, 1860, Dr. Cooper collected the type of *Lagurus pauperrimus*, one of the most interesting specimens he ever secured, on the Great Plains of the Columbia River. "Again as a student," says Emerson, "we find him collecting along the coast from San Francisco to San Diego (1899, p. 4)".

It was not long before Dr. Cooper was serving once more as contract surgeon in the Army, with headquarters at Fort Mojave,<sup>8</sup> on the Colorado River (See Cooper, 1869, pp. 182,

<sup>6</sup> Fort Vancouver.

<sup>7</sup> See *Amer. Nat.*, vol. 2, 1868, pp. 528-538, 596-600, vol. 3, 1869, pp. 31-35, 73-84, 124-127.

<sup>8</sup> Fort Mojave: Arizona side of the Colorado River, close to the point at which the boundary lines of Nevada, California and Arizona meet (see Whitney's Map of California and Nevada, State Geological Survey of California, 2nd ed., 1874).



470; 1870a, p. 66; 1871b, p. 756). The expedition left Los Angeles on December 4, 1860, arriving at the post two weeks later on December 19. While stationed at Fort Mojave Cooper undoubtedly collected on both sides of the Colorado River, usually labelling the specimens gathered "Fort Mojave, Col'do V." or "Fort Mojave, Col'do R." without distinction as to state or territory. In a few cases records of species actually collected or observed on the Arizona side only were without doubt credited to California (see Cooper, 1890, p. 215).

On May 28, 1861, Dr. Cooper started on his return journey to the coast (Cooper, 1869, p. 480; 1870a, p. 66) which was completed in approximately 14 days. May 29 found the party in the Providence Mountains (Cooper, 1870c, p. 252); on June 6 it had reached Camp Cady on the lower Mojave River (a specimen of *Peromyscus m. sonoriensis*, No. 5625, Univ. Calif. Mus. Vert. Zool., collected at this locality on June 6, is extant); on June 8 the expedition had arrived at the headwaters of the Mojave River near Cajon Pass (Cooper, 1861, p. 123); and presumably they reached Los Angeles about two days later.

Altogether Cooper spent more than five months at Fort Mojave; on the basis of the work at this point he described two new species of birds and one land tortoise, and listed five mammals, 16 birds, and three reptiles as new for California (Cooper, 1861; Grinnell, 1902, p. 104).

San Diego was evidently his next important collecting locality, though at this period he apparently spent a short time only at this point.

Late in 1860 the Geological Survey of California was organized by J. D. Whitney. The Department of Zoology of the Survey was instituted and Dr. Cooper appointed to the place of Zoologist (Whitney, 1865, p. xi) on July 1, 1861. Shortly after his appointment he traveled by land from San Diego to San Francisco. He remained in the city until August 9, on which date he made a trip to Monterey by water, where he was occupied in making collections from August 12 to September 26 (Cooper 1870b, p. 45; 1871b, pp. 756-757). About this time he must have worked in the



vicinity of Santa Cruz also; for several specimens of *Peromyscus californicus* (Nos. 8547-8549, U. S. Nat. Mus.) are labelled "Santa Cruz, 1861."

From November 4, 1861, to May 24, 1862, we again find him at San Diego (Cooper, 1870a, p. 68), and Whitney records the fact (1870c, pp. ix and x) that "Dr. Cooper was steadily employed in collecting from December, 1860, to April, 1862, and during a considerable portion of the year 1863, being assisted for six months of 1862 by Dr. Edward Palmer. The regions examined were chiefly the Colorado Valley near Fort Mojave, the route to the coast from that fort, the vicinity of San Diego and San Pedro, and Santa Barbara and the islands off the coast." The accessible data pertaining to the period in question consist of a few scattered specimens and published notes. From these we learn that Dr. Cooper was in Stockton in February, 1863; that he collected in Santa Clara and San Mateo counties in March, 1863; that he was at Oakland and Santa Barbara in April; at the latter locality again in May; at Santa Barbara Island<sup>9</sup> in May and June, where he spent six weeks during this and the succeeding month; on Catalina Island in June and July, as well as during the last days in October; on San Clemente and San Nicolas islands for a few days about the first of July; on the mainland in the neighborhood of San Pedro later in July; in the Sierran foothills in August; and for twenty days in September in the high Sierras between the altitudes of 5000 and 8000 feet, not far from Lake Tahoe (Cooper 1870a, p. 73).

"In 1864 portions of the Sierra Nevada and the coast from Baulines [=Bolinás] Bay to Santa Cruz were zoologically explored" (Whitney, 1870, p. x). On May 24 of this same year Governor Low commissioned Dr. Cooper Assistant Surgeon in the Second Cavalry, California Volunteers, with which regiment he served until its muster out (Emerson, 1899, p. 4).

According to Whitney (1870, p. x), Dr. Cooper was engaged in 1865 in the preparation of reports, and subsequent to that time he is said to have visited at the expense of the

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<sup>9</sup> That the entry "Santa Barbara I." on Cooper's specimen labels refers to Santa Barbara Island and not to the Santa Barbara group is indicated by a reference to the locality in one of his shell papers (1863a, p. 56). He says: "The island is about seventy-five miles from the town [of Santa Barbara], and thirty-five from the nearest main land."



Survey portions of the State not before sufficiently explored. Mention is made also that he did "a large amount of gratuitous work, in the way of elaborating the materials in various branches of the zoology of the Pacific Slope . . . ." In September, 1865, Dr. Cooper was at Tulare Lake (Cooper, 1870c, p. 107); and specimens collected by him in October and November, 1865, at Drum Barracks<sup>10</sup> and Wilmington have been examined and included among the "Specimens Examined," *postea*.

It is of interest<sup>11</sup> to note that while Cooper was stationed in the vicinity of San Pedro he entertained a notable visitor in the person of Elliott Coues, who travelled overland from Fort Whipple, Arizona, to the coast during the early fall of 1865 (Coues, 1866, pp. 259-275). Coues's opinion of Cooper is indicated in the following reference (l. c., p. 260). "Fort Mojave, on the Colorado River, in about lat. 35°, is interesting to us as the locality whence were lately procured two rare and curious new birds by Dr. J. G. Cooper, so well known as an indefatigable and accurate naturalist . . . ." On page 269 of the same contribution Coues writes of enjoying Cooper's hospitality during his stay at San Pedro, referring to Cooper's conversation as ". . . an encyclopedia of interesting biographies of the birds of the Pacific Coast."

Dr. Cooper was married January 9, 1866, to Miss Rosa M. Wells, in Oakland, California. Soon thereafter we find him at Santa Cruz (Cooper, 1870, p. 107), where he may have resided until 1871. It will be remembered that on this date or soon thereafter he moved to Ventura County, locating at Saticoy; and that in 1875 he returned to Hayward, in the San Francisco Bay region.

The examination of specimens extant shows that in the spring of 1866 Dr. Cooper did some collecting at Santa Cruz; that he made a trip to the foothills of Placer County, as well as to the high Sierras in the vicinity of Lake Tahoe, during

<sup>10</sup> Drum Barracks, Los Angeles County, California, about three miles northeast of Wilmington (see Whitney's map of California and Nevada, State Geological Survey of California, 2nd ed., 1874).

<sup>11</sup> It seems not improbable that the migration records for Santa Cruz published by Dr. Cooper in the *Proceedings of the U. S. National Museum* (1880, pp. 245-250) should be dated 1866 rather than 1865; for he was, for at least a part of that year, fully occupied elsewhere. If the records are bona fide personal observations made by Cooper at Santa Cruz in 1865, he must have been stationed there for a considerable period of time, the months from March to July in the spring, and September and October in the fall, being represented.



the spring and summer of 1870; and that he worked at Novato Point, Marin County, in November of the same year. In a paper published in the *American Naturalist* (1874, pp. 14-18) reference is made to "my late trip through the mountains [Cuyamacas, near San Diego]," but no specimens taken at this time have been found.

Dr. Cooper was one of the most active of the early members of the California Academy of Sciences, and was at different times connected with the institution in an official capacity. An inspection of the Proceedings shows that during the years 1862 to 1864, inclusive, Dr. Cooper was Curator of Zoology of the Academy; in 1868 he was named Curator of General Zoology; in 1869 he became Vice-President; during the two years following he was Librarian; on June 26, 1871, he was elected Corresponding Secretary; from 1887 to 1891 he was Director of the Museum; and from 1892 to 1896, Second Vice-President. In addition to these offices he was for some time Curator of Paleontology, and at the time of auxiliary clubs he was President of the Zoological Club (Emerson, 1899, p. 4).

From the published results of Cooper's early work, namely, that in Washington State (1853-1860) it appears that his earlier scientific interests were in general natural history. His later contributions (1861 and following), however, show a pronounced concentration of attention on zoological investigations, most of his work at this period having been done in ornithology and conchology. The number and quality of his published contributions demonstrate his merit as a scientific worker, always taking into consideration the standards of the day. His large accomplishments are all the more creditable in view of the handicap of a frame which was apparently never robust.

In Dr. Cooper's personality, activity and energy were associated with a becoming modesty and absence of a desire for self-aggrandizement. It might well be said of him, as it was of his father, that "With exceeding modesty and being, perhaps, over-cautious in naming new species, he generously permitted others to use his material, and sometimes to gain the credit that might have been his own (Fairchild, 1887, p. 72.)"



## RECORD OF SPECIMENS EXAMINED

**Scapanus latimanus latimanus** (Bachman)

"*Scalops Townsendii*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 441. (Said to be common and universally known.)

Specimens examined.—Two: Nos. 5654, 5655, Mus. Comp. Zool. Harvard Univ. No. 5654: obverse of label "*Scalops Townsendi* Cal Monterey May 12 '74, J. G. C." No. 5655: obverse of label "*Scalops Townsendii* Haywood Cal. Apr. '75"; reverse, "Western mole."

Both these skins have been made over into modern study skins. The skulls are removed. The entire posterior portion of each cranium was evidently cut off in the original process of preparation.

**Scapanus orarius orarius** True

"*Scalops Townsendii*, Bach." (part), Cooper, Pac. R. R. Expl. and Surv., 12, book 2, 1860, p. 73. (Reported not common in any part of Washington Territory visited by Cooper; includes note on habits).

Specimens examined.—Two: Nos. 621/1772, 1381/37434, U. S. Nat. Mus. No. 621/1772: original label lost; according to label attached the specimen is a "*Scalops townsendii*" from "Shoalwater Bay, W. T. Sept. 54. Dr. J. G. Cooper 17"; reverse side of label bears four measurements. No. 1381/37434: original label lost; obverse side of label attached reads "1381 *Scalops townsendii* [in ink] minimus [in pencil] ♀ Shoalwater Bay, Aug. 30, 55 Dr. J. G. Cooper"; reverse, four measurements.

These specimens have both been made over and their skulls removed. Skull No. 1772 is in fair condition, though its posterior portion is broken off and temporal bones somewhat loosened. No. 1381/37434 is the type of *Scapanus orarius*. For detailed remarks on the condition of the specimen see Lyon and Osgood (1909, p. 234).

**Sorex vagrans vagrans** Baird

"*Sorex*—————?" Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 441 (General note



on the shrews, on the systematic status and distribution of which Dr. Cooper evidently did not care to commit himself.)

"*Sorex vagrans* Cp." (probably part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 70 (Latitude of San Francisco said to be southern limit of distribution).

"*Sorex Suckleyi*, Baird" (probably part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 70 (Latitude of San Francisco said to be southern limit of distribution).

Specimens examined.—Two: No. 5629, Univ. Calif. Mus. Vert. Zool.; No. 1675, U. S. Nat. Mus. (in alcohol). No. 5629: obverse of label "Novato Point, Marin Co., Cal., Nov. 1st. 70 *Sorex* J. G. C."; reverse, ten measurements. No. 1675: original label missing; obverse of museum label attached reads "Smithsonian Institution, Washington, U. S. A. 1675 *Sorex vagrans* Shoalwater Bay W. T. Dr. J. G. Cooper."

No. 5629 prepared as study skin; skull inside; forefeet folded on breast, hind feet extended posteriorly; tail not skinned out, curled up posteriorly. No. 1675 is the type of the species; it is preserved entire in alcohol and is in good condition except that the hair has come off from the entire skin; for further remarks on the condition of the type, see Lyon and Osgood (1909, p. 251).

I am indebted to Dr. Hartley H. T. Jackson of the U. S. Biological Survey for confirming the identification of this specimen.

### ***Neosorex palustris navigator* Baird**

"*Neosorex navigator* Cooper," Pac. R. R. Expl. and Surv., 12, book 2, 1860, p. 36 (" . . . one seems to be peculiar to the Territory, the water shrew [*Neosorex navigator*], caught while swimming a foot below the surface of one of the lakes at the head of the Yakima river, and at least 2,500 feet above the ocean"); Same, p. 73 ("But one specimen of this species was obtained during the expedition; this, according to the label now attached, was found at Fort Vancouver, but I am inclined to consider this a mistake, and that it was really taken while swimming under water in a lake near the summit of the Cascade mountains, August 31, 1853").



Specimen examined.—One: No. 629/1780, U. S. Nat. Mus.; original label lost; A "N. Pac. R. R. Survey" label is attached, the obverse of which reads "N. Pacific R. R. Survey, Gov. . . Stevens 629/1780 *Neosorex navigator* Type Ft. Vancouver, Columbia R., W. T. Dr. J. G. Cooper."; measurements in pencil on the back of the label.

Specimen in bad condition; for details see Lyon and Osgood (1909, p. 246).

Merriam has discussed the type locality of this form in the following words:

"It is evident that the type specimen, like many other alcoholic mammals collected in the early days, was not labeled until long after its capture, and that little dependence can be placed on either of the alleged localities. Furthermore, since the subgenus *Neosorex* is unknown from the Cascade region, and probably does not inhabit western Oregon or Washington, which region is occupied by the allied subgenus *Atophyrax*, it is highly improbable that the specimen came from either of the alleged localities. It agrees closely with specimens from western Montana, and probably came from some point in northern Idaho or the mountains east of Fort Colville, in extreme northeastern Washington, which region was visited by Dr. Cooper during the same expedition (1895, p. 92)."

Several facts germane to this problem can now be cited as tending to fix the type locality more definitely. Though *Neosorex palustris navigator* has never been taken on the humid coast belt in Washington, in which lies Fort Vancouver, specimens have been secured by the Biological Survey at the following localities in the Cascade Mountains: Signal Peak (on the Yakima Indian Reservation east of Mt. Adams), Mt. St. Helens, Mt. Adams, and Mt. Rainier.

According to Cooper (1860b, p. 73), as quoted above, the specimen under consideration (which became the type) was "taken while swimming under water in a lake near the summit of the Cascade mountains on August 31, 1853." But in another place Cooper refers (1860a, p. 36) to the capture of this animal, of which only one specimen was taken, on one of the lakes at the head of the Yakima River. On August



31, Captain McClellan and a small party<sup>12</sup> were engaged in explorations of Naches River and Naches Pass, while the head of the main Yakima River and Lakes Keechelus, Kachess, and Clealum were explored September 4 to 12 (Stevens, 1860, pp. 139-141). Evidently the type came either from the headwaters of the Naches River or from one of the lakes at the head of the main Yakima River. Since these places are within twenty miles of each other, the type locality of *Neosorex p. navigator* may be regarded as fixed with a fair degree of precision.

***Myotis californicus* (subspecies indet.)**

?“*V[espertilio] nitidus*” (part) and “*V. obscurus*” (part), Cooper, Zoology, in *The Natural Wealth of California*, 1868, p. 442.

“*Vespertilio nitidus* Allen” (part), Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 5 (“Lat. 49° W. T., to Cape St. Lucas and Texas.”)

“*Vespertilio obscurus* Allen” (part), Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 5 (“Oregon? to Cape St. Lucas”).

Specimen examined.—One: No. 7187, U. S. Nat. Mus. (in alcohol); an old label in the bottle, from which the writing has almost disappeared, reads “583 *Vespertilio* S D” According to the Museum catalog, in which the specimen was entered January 19, 1864, the bat was collected by “Mr. J. Cooper,” in California.

The specimen is in fair condition, except that the hair has sloughed off the skin of the posterior half of the body. The skull has not been removed.

***Myotis californicus quercinus* H. W. Grinnell.**

“*V[espertilio] nitidus*” (part), Cooper, Zoology, in Cronise, *The Natural Wealth of California*, 1868, p. 442.

Specimen examined.—One: No. 5601, Univ. Calif. Mus. Vert. Zool.; obverse of label “*Vespertilio nitidus* Allen, San

<sup>12</sup> It is probable that Dr. Cooper accompanied Captain McClellan on this side trip. Baird (1857, p. 465) lists a specimen of “*Hesperomys gambelii*” collected by Dr. J. G. Cooper on “Naches Pass, Cascade mountains, W. T.” on “July 1, 1854.” The date is evidently erroneous, for during July, 1854, Cooper was in western Washington (see p. 74); but the record appears to indicate that Cooper did collect on Naches Pass.



Diego Cal. Apr. 24th, 62. J. G. C.”; reverse, ten measurements.

Specimen mounted dorsal side down on a strip of brown paper, the wings extended and sewed to the paper with white thread; skull inside skin; specimen in excellent condition.

Not typical of *Myotis californicus quercinus* H. W. Grinnell, the terminal portions of the hairs below being buffy brown, as in *M. c. californicus*, rather than light buff, as in typical *quercinus*. Geographically, however, it should be referable to *quercinus*, unless it represents a wandering example of the more northerly race.

### ***Eptesicus fuscus fuscus* (Beauvois)**

“*Scotophilus fuscus* Palisot (Allen),” Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 5 (Said to occur in the “whole United States to Vera Cruz, Mexico”).

“*Scotophilus fuscus*,” Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 442.

Specimen examined.—One: No. 5600, Univ. Calif. Mus. Vert. Zool., original data “1502 *Scotophilus fuscus* { Palisot  
Allen  
Brown Bat, Mount Stanford,<sup>13</sup> Cal. 7500 ft. alt. July 29, 70  
J. G. Cooper”.

This specimen is mounted, dorsal side down, on a strip of brown paper, the wings being extended and sewed into the paper with black thread. The skull is inside the skin. Specimen in fairly good condition. Possibly faded a trifle, but very similar to pale-colored specimens of the form in collections.

### ***Nycteris borealis teliotis* (H. Allen)**

“*Lasiurus noveboracensis*” (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 442.

“*Lasiurus Noveboracensis* Erxleben (Tomes)” (part), Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 5 (Said to occur in “whole United States and south to Chili.”)

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<sup>13</sup> Mount Stanford: Nevada County, California (see Whitney's Map of California and Nevada, State Geological Survey of California, 2nd ed., 1874), four or five miles a little north of east of Donner Lake, probably the present Castle Peak (see Truckee Sheet, U. S. Geological Survey, Topographic Map of the United States, 1906).



Specimen examined.—One: No. 84555, U. S. Nat. Mus.; original Cooper label missing; oldest label attached reads "*Atalapha teliotis* Cal. Acad. N. S." With regard to the source of this specimen, Dr. Allen, the describer of this species, says (1891, pp. 5, 6) "The specimen was forwarded to me by Mr. J. G. Cooper, of the California Academy of Natural Science . . . ." "Habitat unknown, but it is probably Southern California."

The skin is in alcohol; in poor state of preservation; for discussion of its condition see Lyon and Osgood (1909, p. 277.)

***Corynorhinus rafinesquii intermedius* H. W. Grinnell**

"*Synotus Townsendii* Cooper, (Wagner)," Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 6 (Said to occur in "Nebraska and Washigton Territory to Utah [and Cal.]").

"*Synotus Townsendii*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 442 (Said to be "found in the desert east of the Sierra," which is erroneous); Cooper, Proc. Cal. Acad. Sci., 4, 1871a, p. 124 (Refers to bats of this species found in a cave in El Dorado County).

Specimens examined.—Three: Nos. 5603, 5604, 5605, Univ. Calif. Mus. Vert. Zool. No. 5603: obverse of label "*Synotus Townsendii* Cooper ♀ Pioneer Cave <sup>14</sup> Placer Co. Cal. May 12th '70 J. G. Cooper"; reverse, nine measurements. No. 5604: obverse of label "*Synotus Townsendii* Cooper sp. ♀ Pioneer Cave, Placer Co. Cal, May 12 '70"; reverse, nine measurements. No. 5605: obverse of label "*Synotus Townsendii* Cooper Placer Co. Cal. May 12, 1870 ♀ J. G. Cooper Coll."; reverse, nine measurements.

Specimens prepared as study skins, dorsal side down, wings extended; skulls inside skins; abdominal incisions not sewed up in Nos. 5603 or 5605. No. 5604 mounted on a doubled piece of white paper, apparently two discarded pages from an old catalog of Cooper's, the wings being sewed to the paper with black thread. Specimens in fair condition except for No. 5605: The head of the latter has been broken off and is missing, and one wing is somewhat torn.

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<sup>14</sup> Pioneer Cave could not be located on any map examined.



The three specimens agree closely with a series of Mrs. Grinnell's *Corynorhinus rafinesquii intermedius* in the collection of the Museum of Vertebrate Zoology.

It is highly probable that the locality where these bats were actually secured is not far from the type locality of *C. r. intermedius* (Auburn, California).

### ***Antrozous pallidus pallidus* (LeConte)**

"*Antrozous pallidus*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 442; Amer. Nat., 3, 1869, pp. 472, 478 (Fort Mojave).

"*Antrozous pallidus* Lec.," Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

"*Antrozous pallidus* Leconte, (Allen)" (part), Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 6 ("Columbia River to Cape St. Lucas and Texas").

Specimen examined.—One: No. 5602, Univ. Calif. Mus. Vert. Zool.; obverse of label "223 ♀ Ft. Mojave Coldo V May 1 '61 J. G. C."; reverse, ten measurements.

Specimen is stuffed, to lie on back, wings extended; in good condition.

Though somewhat faded, the specimen is still typical of this form.

### ***Vulpes macrotis arsipus* Elliot**

"*Vulpes velox* (Aud. and Bach.)," Cooper, Proc. Cal. Acad. Nat. Sci., 2, 1863, p. 121 (One specimen recorded from Fort Mojave, apparently from the California side of the Colorado River, as the species is listed under the heading "Known species new to the State of California").

"*Vulpes velox*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 439 ("The Swift Fox is a small kind found on the desert plains of the interior"); Amer. Nat., 3, 1869, p. 476 (Reference made to specimen taken at Fort Mojave on March 30, 1861).

"*Vulpes velox* Say," Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

Specimen examined.—One: No. 5646, Univ. Calif. Mus. Vert. Zool., obverse of label "156 *Vulpes velox* ♂ Ft Mojave



Col'do R. Mch. 30 '61 J. G. C."; reverse, eleven measurements, and a notation "I. brush grey". A separate label has the printed name pasted on "*Vulpes velox*, Aud. and Bach. Kit Fox; Swift Fox."<sup>15</sup>

Skin in poor condition, neither stuffed nor tanned. Bones of tail, feet, and partly of legs, attached; skull removed, neck stuffed with brown paper, left fore leg almost broken off; tail partly broken off, adherent by bones only.

The specimen closely resembles examples of *Vulpes macrotis arsipus* from the Colorado River in the collection of the Museum of Vertebrate Zoology.

### ***Mephitis occidentalis holzneri* Mearns**

"*Mephitis occidentalis*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 436. (Common in California); Amer. Nat., 3, 1869, p. 186 ("Southern coast-slope" of California).

Specimen examined.—One, skull only: No. 7048, Mus. Comp. Zool. Harvard Univ.; original label missing; museum label reads "Museum Comp. Zool., Skull No. 7048 ♀ *Mephitis occidentalis* Baird, Cal. Saticoy, Apl. 1873." On cranium, apparently in Cooper's handwriting, appears the following: "*Mephitis* ♀ Saticoy, Cal. Apr. 1873 J. G. C."

Cranium in good condition, but with injury between left outer incisor and canine, and with small portion of right paroccipital process missing.

### ***Mephitis occidentalis* (subspecies indet.)**

Specimen examined.—One, skin only: No. 5644, Mus. Comp. Zool. Harvard Univ.; original label missing; items from labels attached indicate that skin is from "California" and was collected by "Dr. J. G. Cooper."

Skin has been made over into a modern museum specimen. In the absence of a cranium it is not identifiable as between

<sup>15</sup> In the case of certain Cooper specimens from the older collection of the University of California, now incorporated with the collection of the Museum of Vertebrate Zoology, printed strips bearing the scientific or vernacular names or both have been pasted on Cooper's original label. It is not improbable that this was the work of J. J. Rivers, who at one time did curatorial duty on the collections in the Department of Zoology at the University of California.



*Mephitis occidentalis occidentalis* and *M. o. holzneri*. It seems not unlikely, however, that this skunk came from Saticoy, as did the one listed on page——, and that it is referable to *holzneri*.

### ***Lynx fasciatus fasciatus* Rafinesque**

"*L[ynx] fasciatus*," Cooper, Pac. R. R. Expl. and Surv., 12, book 2, 1860, p. 32 (Peculiar to forests of western Washington.)

"*Lynx fasciatus* Raf.," Cooper, Pac. R. R. Expl. and Surv., 12, book 2, 1860, pp. 74-75 (Abundant in the forests of Washington Territory; habits).

Specimen examined.—One: No. 464 [probably 461], U. S. Nat. Mus.; original label missing; obverse of label attached "464 *Lynx faciatus* [so] Shoalwater Bay, W. T. Dr. J. G. Cooper." A museum label attached to the specimen bears the date "Sept. 1854."

Specimen evidently made over into modern study skin after receipt at Museum.

This example and another collected by Dr. Suckley are at the dark extreme of the *Lynx fasciatus* series as represented in the collections in the National Museum.

### ***Lynx rufus californicus* Mearns**

"*Lynx rufus*" (part), Cooper, Pac. R. R. Expl. and Surv., 12, book 2, 1860, p. 75 (Abundant in California); Cronise, The Natural Wealth of California, 1868, p. 438 (Abundant throughout California); Amer. Nat., 3, 1869, p. 186.

"*Lynx rufus*, var. *maculatus*" (part), Cooper, Amer. Nat., 8, p. 15 (Cuyamaca Mountains).

Specimen examined.—One: No. 1167, U. S. Nat. Mus., original label missing; obverse of old label attached "1167 *Lynx rufus*? Santa Clara, Cal. Dr. J. G. Cooper"; reverse, four measurements. The typewritten museum label attached bears the date "November 1855."

Specimen evidently worked over and made up after receipt at Museum. Skin in rather poor condition; large hole on the left side.



The specimen is a trifle darker than the type of *Lynx ruffus californicus*, apparently varying somewhat in the direction of *L. r. oculus*.

***Peromyscus californicus californicus* (Gambel)**

"*H[esperomys] Californicus*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 (General note inserted to cover all *Peromyscus* listed).

"*Hesperomys californicus* Gamb.," Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 69. (Peculiar to California; not known to occur north of the latitude of San Francisco Bay).

"*Hesperomys Californicus*," Cooper, Amer. Nat., 4, 1871, p. 757. (Monterey).

Specimens examined.—Eight; Nos. 5835, 5836, Univ. Calif. Mus. Vert. Zool.; Nos. 8547-8552, U. S. Nat. Mus. No. 5835: original label missing; labelled *Hesperomys Californicus* ♂ Santa Cruz, Calif., April. No. 5836: original label missing, labelled *Hesperomys Californicus*, from Los Gatos, Calif., April. The specimens in the National Museum all lack original labels; Nos. 8547-8549 are labelled *Hesperomys californicus*, Santa Cruz, Dr. J. G. Cooper, 1861; Nos. 8550-8552 come from the same locality, but are dated 1866.

Specimens prepared in accordance with Cooper's custom; part of skull inside each skin; fore-feet folded back on breast, hind feet either irregularly aligned posteriorly or arranged anteriorly beneath body; tails never skinned out. Some of the skins have very little stuffing within them; one, No. 8552, is represented by a head only.

The condition and coloration of the pelage, the size and especially the thickness of the tail, were principally relied on in the identification of these specimens. The cranium of No. 8552 has been removed, and its characters confirm the identification previously made.

***Peromyscus eremicus fraterculus* (Miller)**

"*H[esperomys] Sonoriensis*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444.

Specimen examined.—One: No. 145276, U. S. Nat. Mus.; obverse of label "268d *Hesperomys sonoriensis* ♀ San Diego



Cal May 26th '62, J G C"; reverse "from old nest of Cactus Wren 4 ft above ground 2 young on teats, in alcoh."

Prepared as usual, part of skull inside skin; fore feet disposed irregularly on breast, hind feet bent forward beneath body; abdominal slit not sewed up; tail straight out behind, not skinned; body stuffed with cotton; in good condition.

The relatively long tail, which lacks the distinct dorsal and ventral coloration characteristic of *Peromyscus maniculatus gambelii*, demonstrates the identity of this specimen.

### ***Peromyscus maniculatus clementis* (Mearns)**

"*H[esperomys] Gambelii*" (probably part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444.

"*Hesperomys* —————?", Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 77 (Collected on Santa Barbara Island, and evidently observed on San Clemente; record of occurrence on Santa Catalina Island is questioned).

Specimen examined.—One: No. 7184, U. S. Nat. Mus.; obverse of label "*Hesperomys gambellii* S. Barbara I. Cal. May 27th 63 J. G. C."

Prepared as usual; a portion of the skull is inside the skin; fore feet folded on breast, hind feet crossed behind body; tail not skinned. Specimen in good condition, except tail loose.

Although no characters distinguishing this specimen from topotypes of *Peromyscus maniculatus gambelii* are clearly in evidence, it should doubtless be referred to *P. m. clementis* on geographic grounds alone.

### ***Peromyscus maniculatus sonoriensis* (LeConte)**

"*H[esperomys] Sonoriensis* (Leconte)," Cooper, Proc. Cal. Acad. Nat. Sci., 2, 1863, p. 122 (Mojave River).

"*H[esperomys] Sonoriensis*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 (General note covers all the *Peromyscus*).

"*Hesperomys Sonoriensis*," Cooper, Amer. Nat., 3, 1869, p. 183 (Southern part of California).



"*Hesperomys Gambellii*" (part), Cooper, Amer. Nat., 3, 1869, pp. 473, 476 (Fort Mojave).

"*Hesperomys sonoriensis* Lec." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 67, 68 (Range does not so far as known extend north of "Southern Coast Slope").

"*Hesperomys Boylii*? Baird," Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

"*Hesperomys Gambellii*? Baird," Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

Specimens examined.—Five: Nos. 5624, 5625, Univ. Calif. Mus. Vert. Zool.; Nos. 7183, 7186, 145275, U. S. Nat. Mus. No. 5624: original label missing; skeleton only; Fort Mojave, Feb. 24, 1861, J. G. Cooper. No. 5625: obverse of label "*268 Hesperomys sonoriensis*? [the "*sonoriensis*?" pencilled in] ♀ Mojave R. Camp Cady <sup>18</sup> June 6, '61, J. G. C."; reverse, ten measurements. No. 7183: original label missing; from two other labels attached we learn that the specimen came from "California"; it is credited to the "Geol. Surv. Cal.," and is said to have been collected by Dr. J. G. Cooper; it has been variously identified as "*Hesperomys*" merely, "*Hesperomys leucopus*," "*Hesperomys leucopus*?" "*gambeli*," and "*Peromyscus m. sonoriensis*." No. 7186: obverse of label "*90 Hesperomys gambellii* ♂ Ft. Mojave Coldo. R. Feb. 14 '61, J. G. C."; reverse, eleven measurements. No. 145275: obverse of label "*19 Hesperomys gambellii* Ft. Mojave, Col'do R. Dec. 24th '60, J. G. C."; reverse, ten measurements.

As usual with Dr. Cooper's material these skins were prepared with the skulls inside, the forelegs folded on breast, the hind legs crossed and tied just posterior to body or disposed beneath body; tail not skinned (end nearly broken off in No. 7183), extended posteriorly; in several of the specimens the abdominal slit is not sewed up.

Nos. 7183 and 7186 are bright examples of *Peromyscus maniculatus sonoriensis* both apparently in full winter pelage. It is not improbable that No. 7183 came from Fort Mojave, as did No. 7186. The other specimens are typical *sonoriensis*, presenting no conspicuous peculiarities.

<sup>18</sup> Camp Cady: San Bernardino County, Cal., on lower course of Mojave River, about lat. 35°, long. 116° 30', a little south of west of the south end of the sink of the Mojave River (see Whitney's Map of California and Nevada, State Geological Survey of California, 2nd ed., 1874). Camp Cady is shown on all the maps of this period which I have examined.



***Peromyscus maniculatus gambelii* (Baird)**

"*H[esperomys] Gambelii*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 (A general note is inserted to cover all the *Peromyscus*).

"*Hesperomys Gambellii*," Cooper, Amer. Nat., 3, 1869, p. 473 ("The common woodmouse of California.")

"*Hesperomys sonoriensis* LeC." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 67, 68 (Range does not, so far as known, extend north of "Southern Coast Slope").

Specimens examined.—Four: Nos. 5626, 5627, Univ. Calif. Mus. Vert. Zool.; Nos. 5652, 5653, Mus. Comp. Zool. Harvard Univ. No. 5626: obverse of label "*Hesperomys Gambellii* Wilmington Cal. Oct '65, J. G. C.". No. 5627: obverse of label "*Hesperomys californicus*.—Great-Eared mouse [printed strips pasted on] ♀ Sta Cruz Cal. Apr 8th, '66, J. G. C." Cooper had written "*Hesperomys Californicus*" on the label, the printed strips having been pasted over his written name. No. 5652, obverse of label "*Hesperomys sonoriensis*—juv. Saticoy Cal. May 1873 J. G. C."; No. 5653, obverse of label (erroneously attached here) "*Perognathus parvus* Saticoy Cal. Mch. '73 J. G. C."

Specimens (Nos. 5626-5627) prepared in the usual manner, skulls inside skins, fore legs folded on breast, etc.; abdominal slit in No. 5626 not closely sewed up; hind feet in this specimen disposed at right angles to body in the region of the base of the tail, tails not skinned. In No. 5627 the hind feet are broken so that care must be exercised to avoid separating them from the body completely. Nos. 5652-5653 have been made over into modern museum skins; the skulls have been removed; that of No. 5652 is uncleaned, and its posterior portion has been cut away as was customary with Cooper in preparing his specimens. I have not seen the skull of No. 5653.

The October example of *Peromyscus maniculatus gambelii* from Wilmington, California, is buffy in coloration, with some admixture of black; the April specimen from Santa Cruz is intensely warm buff to ochraceous-buff, likewise with some black intermixed. No. 5652 from Saticoy is a typical juvenal.



***Peromyscus maniculatus oreas* (Bangs)**

"*Hesperomys austerus*" (probably part), Cooper, Pac. R. R. Expl. and Surv., 12, book 2, p. 23 (In western Washington confined to prairies or their borders).

[?] "*Hesperomys austerus* Baird" (probably part), Cooper, Pac. R. R. Expl. and Surv., 12, book 2, pp. 83-84 (One taken August 11 [1853] on top of the Cascade Mountains).

"*Hesperomys boylii* Baird" (part), Cooper, Pac. R. R. Expl. and Surv., 12, book 2, p. 84 (One specimen collected at Shoalwater Bay, Washington Territory).

"*Hesperomys austerus*?" (probably part), Cooper, Amer. Nat., 3, 1869, p. 476 (Incidental reference to this species as occurring in Washington Territory).

Specimen examined.—One: No. 578/1701, U. S. Nat. Mus., original label missing; according to other labels attached the specimen is a female collected at Shoalwater Bay, Washington Territory, by Dr. Cooper.

Skin made over into modern museum specimen, but vertebræ left in tail. In rather poor condition, right ear and fore leg broken off, several patches of hair gone from back, tail loose; skull could not be located in the National Museum collection on February 6, 1918.

***Peromyscus truei gilberti* (Allen)**

"*H[esperomys] Californicus*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 (A general note covers all the *Peromyscus*).

"*H[esperomys] Boylii* (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 (A general note covers all the *Peromyscus*).

Specimens examined.—Three: Nos. 5833, 5834, Univ. Calif. Mus. Vert. Zool.; No. 145278, U. S. Nat. Mus. No. 5833: original label missing; label attached reads "*Hesperomys californicus* (young), Santa Cruz, April." No. 5834 also lacks the original label; it is labelled "*Hesperomys californica* Monterey, Calif." No. 145278: obverse of label "494 *Hesperomys boylii* Baird ♂ Monterey Cal. Sept. 4 '61 J. G. C."; reverse, eleven measurements.



Specimens in fair condition; skulls have been removed from Nos. 5833, 5834 for examination; fore legs folded on breast, hind feet extended posteriorly; tail not skinned out, disposed posteriorly. In No. 145278 the tip of tail is broken off.

The long ears, pelage quality, general size, and cranial characters of these specimens all indicate their identity with *Peromyscus truei gilberti*.

### *Neotoma albigula venusta* True

"*N[eotoma] Mexicana*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444.

"*Neotoma mexicana* Baird" (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

"*Neotoma Mexicana*" (part), Cooper, Amer. Nat., 3, 1869, p. 477 (Said to be common and very large in the Colorado Valley).

Specimens examined.—Three: Nos. 5608, 5609, 5610, Univ. Calif. Mus. Vert. Zool. No. 5608; obverse of label "91 *Neotoma mexicana*, Baird, Mexican Bush Rat, [printed strips pasted on] ♂ Ft. Mojave Feb. 15 '61 J. G. C."; reverse of label, eleven measurements. No. 5609: obverse of label "92 *Neotoma mexicana* ♂ Ft. Mojave, Col'do R. Feb. 16 '61. J. G. C." No. 5610: obverse of label "104 *Neotoma mexicana* ♂ Ft. Mojave, Col'do R. Feb. 20 '61 J. G. C."; reverse, ten measurements.

Skulls inside; fore feet either extended anteriorly and tied together, or else folded posteriorly on breast, hind feet extended posteriorly, tied together; abdominal slit not always sewed up; tails left unskinned, extended posteriorly.

These specimens were identified by Major E. A. Goldman of the U. S. Biological Survey.

### *Neotoma intermedia intermedia* Rhoads

"*N[eotoma] Mexicana*" (probably part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444.

"*Neotoma mexicana* Baird" (probably part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 68 (not extending north of the "Southern Coast Slope" of California).



"*Neotoma Mexicana*" (probably part), Cooper, Amer. Nat., 3, 1869, p. 184 (Cajon Pass).

Specimen examined.—One: No. 145270, U. S. Nat. Mus.; obverse of label "*Neotoma* (Bairdii J. G. C. [plus an undecipherable notation]) San Diego Cal. May 1st 62 J. G. C."; reverse, ten measurements.

Specimen stuffed with cotton; skull inside; fore feet folded back on breast; hind feet crossed behind body; bones left in tail, which points straight out posteriorly.

The condition of this specimen is not all that could be desired for purposes of identification; but it is evidently closer to *Neotoma intermedia intermedia* than to *Neotoma fuscipes macrotis*, which is the only other wood rat occurring in the region.

#### ***Neotoma intermedia desertorum* Merriam**

"*N[eotoma] Mexicana*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444.

"*Neotoma mexicana* Baird" (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

"*?Neotoma Mexicana*" (part), Cooper, Amer. Nat., 3, 1869, p. 184 (Cajon Pass).

"*Neotoma Mexicana*" (part), Cooper, Amer. Nat., 3, 1869, p. 476 (Colorado Valley).

Specimens examined.—Two: Nos. 5607, 5611, Univ. Calif. Mus. Vert. Zool. No. 5607: obverse of label "217 *Neotoma mexicana* ♂ Ft. Mojave Coldo V Apr 29 '61, J G C"; reverse "About half grown". No. 5611: obverse of label "210 *Neotoma mexicana* ♂ Ft. Mojave Col'do V Apr 27 '61 J. G. C."; reverse "two thirds grown" and eleven measurements.

These skins were identified by Major E. A. Goldman of the U. S. Biological Survey. No. 5607 exemplifies a dark phase of coloration not normal in specimens from the Colorado Valley, though in a series of specimens collected in the vicinity of the Desert of the Little Colorado River in Arizona by Goldman in 1917 the darker phase predominates. The other specimen (No. 5611) exemplifies the normal coloration.



***Neotoma fuscipes annectens* Elliott**

"*Neotoma fuscipes*" (part), Cooper, Zoology, in Cronise, the Natural Wealth of California, 1868, p. 444; Amer. Nat., 2, 1868, p. 534 (California).

"*Neotoma fuscipes* Cp.", Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 69. (Believed to be peculiar to California; not known to occur north of San Francisco Bay).

Specimens examined.—Three: Nos. 1185/2040, 2041, U. S. Nat. Mus.; No. 5264, Mus. Comp. Zool. Harvard Univ. No. 1185/2040: obverse of label "Santa Clara Cal. Nov. '55. Head  $2\frac{1}{4}$  nose to tail 9 tail  $8\frac{1}{2}$  Heel  $1-\frac{7}{8}$ ? Cubit  $2\frac{1}{2}$  males J. G. Cooper". No. 2041: skull only; label reads "Smithsonian 2041/1159 Institution Neotoma Santa Clara Cal Dr. Cooper". The original label for No. 5264 is lacking; obverse side of the oldest label attached reads "1159/2041 Neotoma 'fuscipes' Santa Clara, Cal. Nov. 55, J. G. Cooper."

No. 1185 in poor condition, original stuffing removed, except for wads of cotton in the regions of chest and head. Skull removed; hole torn in head near left ear; fore feet disposed irregularly in throat region; hind feet and tail pointing straight out behind; bones left in tail, as usual. Parietal portion of cranium (No. 2040) broken; nasal bones and upper incisor teeth broken off, left lower incisor missing. No. 5624 is not stuffed; skin of abdomen slit up nearly five inches; tail not skinned, broken off from skin and tied to right hind foot; portion of skin about head torn off. The cranium numbered 2041 in the National Museum collection evidently belongs with the skin numbered 1159 now in the collection of the Museum of Comparative Zoology (No. 5624, Mus. Comp. Zool.). The skull (No. 2041) is in fragments.

***Neotoma fuscipes macrotis* Thomas**

"*N[eotoma] fuscipes*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444.

"*Neotoma fuscipes* Cp." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 69. (Believed to be peculiar to California; listed also as one of the animals not known north of San Francisco Bay).



"*Neotoma fuscipes*" Cooper, Amer. Nat., 2, 1868, p. 534, (Casual mention of the species as occurring in California).

"*Neotoma fuscipes*" (part), Cooper, Amer. Nat., 4, 1871, p. 757, (Monterey).

Specimen examined.—One: No. 5606, Univ. Calif. Mus. Vert. Zool.; obverse of label "326 *Neotoma fuscipes*, Cooper, Brown-Footed Rat [printed strips pasted on] Monterey, Cal. Aug 14th 61 J. G. C." There is a pencilled "♀" sign on this face of the label which was evidently put on at a later date than that on which the rest of the label was written; reverse side of the label, eleven measurements.

Prepared as usual, skull inside skin, fore feet folded onto breast, hind feet extended posteriorly; tail folded anteriorly along side of animal.

#### *Neotoma cinerea occidentalis* Baird

"*Neotoma occidentalis*," Cooper, Pac. R. R. Expl. and Surv., 12, book 2, p. 32 (occurs in forests west of Cascade Mountains).

"*Neotoma occidentalis*, Cooper," Cooper, Pac. R. R. Expl. and Surv., 12, book 2, pp. 85–86 (Inhabits the wooded regions west of the Cascade Mountains; discussion of habits).

"*N[eotoma] occidentalis*" Cooper, Amer. Nat. 2, 1868, p. 535 (West of Cascade Range).

Specimens examined.—Two: Nos. 462/1662, 572, U. S. Nat. Mus.; No. 462/1662: original label missing; from other labels attached we learn that the specimen is from Shoalwater Bay, W. T., and that it was collected by J. G. Cooper in June, 1854. No. 572: obverse of a label, apparently in Cooper's handwriting "No. 16 W. T. '54 J. G. C."; reverse, seven measurements and sex, "male."; another label attached reads "N. Pacific R. R. Survey Gov. I. I. Stevens 572 *Neotoma occidentalis* ♂ Shoalwater Bay, W. T. Dr. J. G. Cooper." This specimen is the type of *occidentalis*. For additional details regarding it see Lyon and Osgood (1909, pp. 102-103).

Both these examples of *Neotoma cinerea occidentalis* have been made over into modern study skins. The skull of No. 462/1662 is in good condition, except that the posterior portion of the cranium has been cut off and the angular processes of the mandibles are broken.



**Microtus townsendii** (Bachman)

"*Arvicola Townsendii*, Bachman" (part), Cooper, Pac. R. R. Expl. and Surv. 12, book 2, 1860, p. 86 (Abundant on the meadows of Shoalwater Bay).

"*Arvicola Townsendii*, Bachm." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 70 (Latitude of San Francisco said to be southern limit of distribution.)

Specimen examined.—One: No. 5300, Mus. Comp. Zool. Harvard Univ.; original label lacking; obverse of oldest label attached "N. Pacific R. R. Survey. Gov. I. I. Stevens 464 *Arvicola townsendii* skull 1595 Shoalwater Bay, W. T. Dr. J. G. Cooper."

Skull removed; skin stuffed with cotton, in good condition; fore feet spread, pointing out to sides; hind feet pointing irregularly to rear; tail not skinned out, disposed posteriorly.

**Microtus californicus californicus** (Peale)

"*A[rvicola] Californica*" (probably part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445.

"*A[rvicola] montana*" (probably part), Cooper Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445.

"*A[rvicola] edax*" (probably part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445.

"*Arvicola edax* Lec." (probably part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 69 (Believed to be peculiar to California; not known to occur north of San Francisco Bay).

"*Arvicola edax*" (probably part), Cooper, Amer. Nat., 4, 1871, p. 757 (Monterey; called the "Monterey Field-mouse").

Specimens examined.—Two: Nos. 145279, 145280, U. S. Nat. Mus.; No. 145279, obverse of label "424 *Arvicola* [*'edax'* pencilled in] Monterey Cal. Aug. 23 '61"; reverse, eleven measurements. No. 145280, obverse of label "*Arvicola montana* ♂ Oakland Cal. Apr. 3 '63, 950 J. G. C."; reverse, eleven measurements.

Specimens prepared as usual; skulls inside skins, fore feet folded back on breast; hind feet disposed irregularly behind body except in No. 145280, in which hind feet are crossed close up to posterior end of body; tail not skinned out.



In coloration these specimens are close to examples of *Microtus californicus californicus* in the Biological Survey Collection from Alameda, Marin and Monterey Counties; the brownish dorsal coloration with the whitish of the under parts very faintly washed with buffy can be easily matched in our series. While it is true that No. 145279 resembles certain pale-colored examples of *edax* from the Sacramento Valley, on the average *edax* is considerably darker. No. 145280, an immature specimen, is paler than are specimens of *edax* of corresponding age.

### **Lagurus pauperrimus** (Cooper)

"*Arvicola pauperrima*" Cooper, Amer. Nat., 2, 1868, pp. 535-536. (Original description, with notes on habits).

Specimen examined.—One: No. 10268/35071 U. S. Nat. Mus.; obverse of label "*Arvicola* ♂ 126 Great Plains, W. T. Oct. 9 60 J. G. C."; reverse, eight measurements.

This specimen, though in very poor condition (see Lyon and Osgood, 1909, p. 90) is nevertheless of importance from the fact that it is the type of *Lagurus pauperrimus*; and the species is of interest because it is one of the earliest known members of the group of short-tailed gray meadow mice of the uplands, now referred to the genus *Lagurus*.

### **Mus musculus musculus** Linnæus

"*Mus musculus*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444.

Specimen examined.—One: No. 5651, Mus. Comp. Zool. Harvard Univ.; original label missing. Said to have been collected in "California" by "J. G. Cooper."

Specimen has been made over into modern study skin, skull removed but not cleaned; the posterior portion evidently cut away in the original process of preparation.

### **Rattus rattus** (subspecies indet.)

"*M[us] rattus*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 (General note on the introduced rats).



Specimen examined.—One: No. 5647, Univ. Calif. Mus. Vert. Zool.; obverse of label "755 *Mus rattus*, L-Black Rat [printed slip pasted on] San Diego Cal ♀ Feb 7th '62 J. G. C."; reverse, eleven measurements.

The specimen is prepared as usual, skull inside, hind feet sticking out behind, fore feet folded back on breast; tail not skinned out, turned so as to lie along back.

This animal is a pure albino; the size of its ears, length of its tail, and character of its teeth shows it to belong to the *rattus* series rather than to *norvegicus*.

***Thomomys bottæ bottæ* (Eydoux & Gervais)**

"*Thomomys bulbivorus*" (part), Cooper, Zoology in Cronise, The Natural Wealth of California, 1868, pp. 445-446 (Middle counties near the coast).

"*T[homomys] umbrinus*" (part), Cooper, same, p. 446 ("found in the southeast quarter [of the state]"); Amer. Nat., 3, 1869, p. 183 (Southern part of California).

"*Thomomys bulbivorus* Rich." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 69 (Peculiar to California; not known to occur north of the Middle and North Coast Ranges).

"*Thomomys umbrinus* Rich." (part), Cooper, same, p. 68 (Does not extend north of the southern coast slope).

Specimens examined.—Seven: Nos. 5613-5617, Univ. Calif. Mus. Vert. Zool.; Nos. 11933, 145271, U. S. Nat. Mus. No. 5613: obverse of label "*Thomomys bulbivorus* San Mateo Cal. Mch 10 '63 J. G. C."; reverse, eight measurements. No. 5614: obverse of label "*Thomomys bulbivorus*—California Gopher—[printed strips pasted on] San Mateo Cal. Mch. 7, '63 J. G. C."; reverse, eleven measurements. No. 5615: obverse of label "*Thomomys talpoides bulbiv* Santa Cruz Mts. Cal. 20th May 1864 J. G. C."; reverse, nine measurements and the word "young?"; the "*talpoides bulbiv*" portion of the scientific name was evidently pencilled in subsequent to the writing of the rest of the label. No. 5616: obverse of label "*Thomomys umbrinus* [printed strip pasted on] Drum Bks. Cal. Oct. '65 Sonora Gopher [printed slip containing name pasted on] J. G. C." No. 5617: obverse of label "*Thomomys umbrinus* Drum Bks. Cal. Nov. '65, J. G. C." No. 11933: original label missing; Saticoy,



Ventura County, no date. No. 145271: obverse of label "679a San Diego Cal Dec 6th '61 J. G. C."

Skins all prepared as was customary by Cooper, skulls inside, fore feet either extended anteriorly or bent back on breast, hind feet folded forward beneath the body posteriorly or extended irregularly backward; tail not skinned, in two specimens (Nos. 11933, 145271, U. S. Nat. Mus.) broken off completely and missing.

Nos. 5615 and 5617 (Univ. Calif. Mus. Vert. Zool.) are young animals. While the pelage appearance of Nos. 5613, 5614 (Univ. Calif. Mus. Vert. Zool.) from San Mateo, California, indicates a condition of molt, close examination of the skin does not disclose the darkened appearance usually so characteristic of the molting process. No. 5616 (Univ. Calif. Mus. Vert. Zool.) is an adult specimen with an unusually intense reddish brown coloration, somewhat resembling *Thomomys bottæ leucodon* in summer pelage. The coloration of No. 11933 (U. S. Nat. Mus.) from Saticoy, California, comes well within the range of variation of *T. b. bottæ*; while a bright-colored example from San Diego (No. 145271, U. S. Nat. Mus.) is very similar to specimens of *bottæ* in the Biological Survey collection from Twin Oaks, California (compare Nos. 100161, 100164). The specimens in the collections of the National Museum were identified by Vernon Bailey of the U. S. Biological Survey.

### *Thomomys bottæ pallescens* Rhoads

"*Thomomys umbrinus*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 446 ("found in the southeast quarter [of the state]"); Amer. Nat., 3, 1869, p. 183 (Southern part of California).

"*Thomomys umbrinus* Rich." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 68 (does not extend north of the southern coast slope).

Specimen examined.—One: No. 145273, U. S. Nat. Mus.; obverse of label "273 *Thomomys* ['umbrinus?'] written on in pencil] ♂ Cajon Pass, W. Slope. Cal. June 8 '61, J. G. C."

Skull inside skin; fore feet crossed on breast; hind feet and tail disposed posteriorly; tail not skinned.



This specimen is an immature molting from the soft pelage of the adolescent into a bright summer pelage. Its coloration is well within the range of variation of *Thomomys bottæ pallescens*. Identified by Vernon Bailey of the U. S. Biological Survey.

***Thomomys monticola monticola* Allen**

"*T[homomys] borealis*" (probably part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 446 (Said to be found northward and on the mountains).

Specimen examined.—One: No. 145272, U. S. Nat. Mus.; obverse of label "1125 *Thomomys* Summit Johnson's Pass<sup>17</sup> Sept. 25 '63 J. G. C."; reverse, nine measurements.

Specimen prepared as usual, skull inside skin; fore feet bent back, hind feet folded forward beneath body; tail not skinned out, disposed straight out behind.

The coloration of this specimen is identical with that of a series of topotypes in the collection of the U. S. Biological Survey.

***Thomomys perpallidus mohavensis* Grinnell**

"*Thomomys umbrinus*" (part), Cooper, Proc. Cal. Acad. Nat. Sci., 2, 1861, p. 121 (Said to occur in the "Mojave river bottoms and Cajon Pass"); Amer. Nat., 3, 1869, p. 183 (Southern California).

"*T[homomys] umbrinus*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 446 ("found in the southeast quarter [of the state]").

Specimen examined.—One: No. 5845, Univ. Calif. Mus. Vert. Zool.; original label missing; label from old University collection reads "No. 254, *Thomomys umbrinus*? ♂ Bottom land Mojave R. June."

Skull left within the skin; fore legs crossed on breast, hind feet crossed at base of tail; tail not skinned; abdomen not sewed up; in fairly good condition.

This animal is evidently an immature; it is molting conspicuously from a pale to a much browner pelage.

<sup>17</sup> Johnson's Pass: El Dorado County, California (see Whitney's Map of California and Nevada, State Geological Survey of California, 2nd ed., 1874), about eight miles south of the south end of Lake Tahoe, at the head of the South Fork of the American River between Lake Valley and Phillips (see Pyramid Peak Sheet, U. S. Geological Survey, Topographic Map of the United States, 1905).



***Perognathus panamintinus brevinasus* Osgood.**

"*Perognathus parvus*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445 (Note on habits); Amer. Nat., 3, 1869, p. 183 (Southern part of California).

"*Perognathus parvus Peale*" (Part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 63 (Believed to be peculiar to California).

Specimens examined.—Four: Nos. 5633-5635, Univ. Calif. Mus. Vert. Zool.; No. 145280, U. S. Nat. Mus. No. 5633: obverse of label "*Perognathus parvus* Wilmington Cal. Oct. '65 J. G. C." No. 5634: obverse of label "136 — *Perognathus parvus* [printed slip bearing number and name pasted on] Wilmington, Cal. Oct '65 J. G. C." No. 5635: obverse of label "*Perognathus parvus* Wilmington Cal., Oct. '65 J. G. C."

Specimens prepared as usual by Dr. Cooper; skulls within skins (except No. 5633); fore feet folded posteriorly on breast, hind feet extended posteriorly or bent forward beneath body, tails not skinned; in No. 145280 the abdominal slit is not sewed up. Condition of specimens fair, except that the tail in No. 5634 has been broken off about one-half inch from the body.

***Perognathus penicillatus penicillatus* Woodhouse**

"*P[erognathus] penicillatus*" Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445 (Notes on habits).

"*Perognathus penicillatus* Woodh." Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 67, 74 (Not found west of the desert region; occurs Colorado Valley).

"*Perognathus penicillatus*," Cooper, Amer. Nat., 3, 1869, p. 476 (Colorado Valley; said to be quite common in the thatched roofs.)

Specimens examined.—Four: Nos. 5636, 5637, 5825, 5826, Univ. Calif. Mus. Vert. Zool. No. 5636: obverse of label "267 *Perognathus penicillatus* ♀ Ft. Mojave, Col'do V Apr 25 '61 J. G. C."; reverse, eleven measurements. No. 5637: obverse of label "*Perognathus penicillatus* Woodhouse [printed slip pasted on] Ft Mojave, Col'do R. Mch 19 '61 J. G. C. Tuft-



tailed Mouse [printed slip bearing this name is pasted on over Cooper's initials]"; reverse, eleven measurements. No. 5825: original label missing; from label attached we learn that the specimen is from Fort Mojave; that it was taken in February; and that it is a male. No. 5826: original label missing; data identical with that of No. 5825, except that the specimen was taken in March instead of February.

Skulls inside the skins; fore feet folded posteriorly on breast; hind feet variously placed, one pair forward on the belly, the others posteriorly just back of the body; the tails unskinned, extended irregularly posteriorly; abdominal slits rather carelessly sewed up.

In color characters the specimens agree closely with the large series of *Perognathus penicillatus* taken on both sides of the Colorado River by the members of the Colorado River Expedition of the Museum of Vertebrate Zoology in 1910.

#### *Perodipus agilis simulans* Merriam

"*Dipodomys agilis*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445 (Notes on habits); Amer. Nat., 3, 1869, p. 183 (Southern part of California).

Specimens examined.—Two: No. 5847, Univ. Calif. Mus. Vert. Zool.; No. 7181, U. S. Nat. Mus. No. 5847: original label missing; label attached reads "*Dipodomys agilis* ♂ San Diego Calif. Dec." No. 7181: original label missing; old museum label attached reads "Smithsonian Institution Washington, D. C., Geol. Surv. Cal. 7181 *Dipodomys* [crossed out] *Perodipus agilis*? [pencilled in later] California Dr. J. G. Cooper."

No. 5847 in rather poor condition; skull inside skin; fore feet folded back on breast; abdominal slits not sewed up; bones left in tail, which is turned forward beneath body, broken and somewhat loose at base. Specimen No. 7181 is also in poor condition, apparently at one time preserved in alcohol; skull inside skin [until removed for examination], forelegs disposed irregularly forward; hind feet pointing backward; body unevenly stuffed with cotton; abdominal slit not sewed up; tail broken off and lost.



There is little doubt but that No. 5847, collected at San Diego, is referable to *Perodipus agilis simulans*; the case is different with No. 7181, the condition of which makes the precise determination of its status difficult or impossible. In the writer's opinion, so far as its appreciable characters are concerned, the specimen may be referred with equal propriety to *agilis* or *simulans*.

### *Perodipus panamintinus* Merriam

"*D[ipodomys] Philippii*" (part)?, Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445 (The reference is somewhat uncertain, but the probabilities point to this allocation.)

Specimen examined.—One: No. 5630, Univ. Calif. Mus. Vert. Zool.; obverse of label "249 *Dipodomys* ♂ Chico spr.<sup>18</sup> Providence Mt. Cal. 1. 35° alt. 5000 ft. May 28'61 J. G. C."; reverse, nine measurements.

Specimen prepared as usual; skull inside; fore feet folded backward along sides, hind feet extended posteriorly. Tail not skinned, extended posteriorly.

In coloration and cranial characters this specimen is nearest *Perodipus panamintinus*, though in color it is a trifle closer to examples from Maturango Spring, Argus Mountains, than to the typical form. It is not improbable that the specimen represents a local variant of *P. panamintinus*, but the answer to this and other questions concerning the status of the kangaroo rats must await a monographic revision of the group.

### *Dipodomys merriami merriami* Mearns

"*D[ipodomys] Philippii*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 445 (General comments only).

"*Dipodomys Philippii* Gray" (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

<sup>18</sup> I have failed to locate "Chico Spring" on any of the maps examined. Cooper's route from Fort Mojave to Los Angeles doubtless traversed the Pah Ute Hills and Providence Mountains almost due west of Fort Mojave (see Whitney's Map of California and Nevada, State Geological Survey of California, 2nd ed., 1874). It is highly probable that "Chico Spring" is an obscure locality in the Pah Ute Hills of this map rather than in the true Providence Range; for Cooper did not leave Fort Mojave until May 28, 1861, and could hardly have reached the Providence Mountains by the evening of the first day out.



"*Dipodomys Phillippii*" (part), Cooper, Amer. Nat., 3, 1869, p. 477 (Colorado Valley, said to be common and an invader of dwellings).

Specimens examined.—Three: Nos. 5631, 5632, Univ. Calif. Mus. Vert. Zool.; No. 7182, U. S. Nat. Mus. No. 5631: obverse of label "129—*Dipodomys phillipii*, Gray, [printed slip pasted on] ♂ Ft Mojave Col'do R. Mch. 3'61, J. G. C. Jumping Rat. [printed slip pasted on]"; reverse, eleven measurements. No. 5632: obverse of label "115 *Dipodomys philippii* ♀ Ft. Mojave, Col'do R. Mch 3'61, J. G. C."; reverse, eleven measurements. No. 7182: obverse of label "106 *Dipodomys philippii* ♂ Ft Mojave Col'do R.—Feb. 23 '61, J. G. C."; reverse, eleven measurements.

Specimens prepared as was customary by Dr. Cooper; fore legs extended forward and tied beneath throat; hind feet extended posteriorly and tied or crossed beneath tail; tail not skinned, extended posteriorly, somewhat loose; abdominal incision not sewed up. Specimens in fair condition.

In general characters these examples agree closely with specimens of *Dipodomys merriami merriami* from the Colorado Valley.

### *Zapus trinotatus trinotatus* Rhoads

"*Jaculus hudsonius*" Cooper, Pac. R. R. Expl. and Surv., 12, book 2, 1860, p. 83 (Single specimen collected in Washington Territory).

Specimen examined.—One: No. 587/1710, U. S. Nat. Mus.; original label missing; the catalog entry shows that the skin was taken out of alcohol; a label attached reads as follows "N. Pacific R. R. Survey Gov. I. I. Stevens 587/1710 *Meriones hudsonius* ♂ [sex mark pencilled in] Shoalwater Bay, W. T. [locality crossed out] W. T. [written in later, apparently in same handwriting as name and Museum number] Dr. J. G. Cooper."

Specimen made over, after having been preserved as an alcoholic. Skull in fragments.

Its dark coloration shows the specimen to be referable to *Zapus trinotatus trinotatus* rather than to *Zapus princeps oregonus*, which is the only other jumping mouse known to occur in the State.



**Citellus beecheyi beecheyi** (Richardson)

"*Spermophilus Beecheyi*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 443 (A serious pest in all parts of the valleys).

"*Spermophilus Beecheyi* Rich." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 77 (Believed to be peculiar to California).

Specimen examined.—One: No. 2384, U. S. Nat. Mus.; original label missing; a very old and greasy label reads "2384 *Spermophilus beecheyi* Santa Clara, Cal. Dr. J. G. Cooper."

Skin with skull inside; fore feet aligned along sides of neck; hind feet folded forward beneath body and tied together; tail skinned, extending irregularly backward.

**Citellus beecheyi fisheri** (Merriam)

"*Spermophilus Beecheyi*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 443 ("So numerous and destructive in all parts of the valleys that are not annually inundated, as to be one of the most serious pests of the farmer and gardener"); Amer. Nat. 3, 1869, pp. 182-189, (Said to abound in the southern part of California); Amer. Nat., 8, 1874, p. 15 (Said to be scarce in the Cuyamaca Mountains, though common near river beds along the coast).

"*Spermophilus Beecheyi* Rich." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 77 (Believed to be peculiar to California).

Specimen examined.—One: No. 5645, Univ. Calif. Mus. Vert. Zool.; obverse of label "748a California Ground Squirrel [name pasted on] ♂ San Diego Cal Jan 27th '62 J. G. C."; reverse, eleven measurements and a slip, bearing the name "*Spermophilus beecheyi*, Rich."

Specimen prepared as a study skin, stuffed with tow, fixed to lie on back; skull inside skin; fore legs folded onto breast, hind legs crossed at posterior end of body; tail folded along side of body, abdominal incision very roughly sewed together; specimen in good condition.



**Citellus beecheyi nesioticus (Elliot)**

"*Spermophilus Beecheyi*" (probably part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 443.

"*Spermophilus Beecheyi* Rich." (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 63 (Believed to be peculiar to California); Proc. Cal. Acad. Sci., 4, 1870, p. 77 (Collected Catalina Island; evidently observed on Santa Barbara Island also).

Specimen examined.—One: No. 145285, U. S. Nat. Mus.; obverse of label "*Spermophilus Catalina I. Cal* ♂ June 16-'63 J. G. C."; reverse, ten measurements.

Specimen prepared as usual, skull inside; a little dry grass has been stuffed into skin; ventral incision not sewed up; fore feet folded posteriorly beneath body; hind feet and tail anteriorly.

The specimen is darker colored than typical *Citellus beecheyi fisheri*, the form of the adjoining mainland.

**Citellus beldingi (Merriam)**

"*Spermophilus elegans* Kennicott" (part), Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 6 ("Hab. near Salt Lake, Utah, to Johnson's Pass, Sierra Nevada, where I found it in 1863. Pitt River?").

"*S[permophilus] elegans*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 443 ("inhabits east of the Sierras.")

Specimen examined.—One: No. 5824, Univ. Calif. Mus. Vert. Zool.; original label missing; label in old University of California collection reads "1124 *Spermophilus elegans* Kenn. ♂ Summit Johnson's Pass Sept."

Skull inside skin; fore feet folded posteriorly beneath body; hind feet forward; tail not skinned.

**Eutamias canicaudus Merriam**

"*Tamias quadrivittatus*" (part), Cooper, Amer. Nat., 2, 1868, pp. 530-531 (Found east of mountains in Washington Territory).



Specimen examined.—One: No. 145286, U. S. Nat. Mus.; obverse of label "Smithsonian Institution, Washington, D. C. *Tamias* 4 vittatus 145286 125 S of Spokane R. W. T. Oct. 7, 60, J. G. C."

Specimen stuffed with cotton, slit in abdomen not sewed up; part of skull inside of skin; right fore foot folded back on right side of body; left fore foot on left side; hind legs and tail disposed forward beneath body.

#### *Eutamias townsendii townsendii* (Bachman)

"*Tamias Townsendii*" (part), Cooper, Pac. R. R. Expl. and Surv., 12, Book 2, 1860, pp. 80-81 (Habits and distribution in Washington Territory).

"*T[amias] Townsendii*," Cooper, Amer. Nat., 2, 1868, p. 531 (Found west of Cascade Mountains in Washington Territory).

Specimens examined.—Two: No. 1381, U. S. Nat. Mus.; No. 4756, Mus. Comp. Zool. Harvard Univ. No. 1381: original label missing; obverse of label attached reads "1381 ♂ *Tamias townsendi* [*asiaticus* written in and later crossed off], Shoalwater Bay, W. T. Dr. Cooper"; reverse, "Aug. 30, 1855." No. 4756: original label "No. 18 W. T. '54 near coast J. G. C."; another label reads "N. Pacific R. R. Survey 2469 Gov. I. I. Stevens, *Tamias townsendii*, Shoalwater Bay, W. T. Dr. J. G. Cooper, 18".

Specimen No. 1381 prepared as usual, skull inside skin; fore and hind feet folded back and forward, respectively, beneath the body; tail curled anteriorly beneath the body; No. 4756 has been made over into a modern museum skin; the skull has suffered several slight injuries, basal and occipital portion, part of the nasal region, and the angular and coronoid processes of the left mandible having been broken away.

#### *Eutamias townsendii cooperi* (Baird)

"*Tamias townsendii*" (part), Cooper, Pac. R. R. Expl. and Surv., 12, book 2, 1860, pp. 80-81 (Account of habits and distribution in Washington Territory, *Tamias cooperi* synonymized under *Tamias townsendii*).



"*T[amias] Townsendii*," Cooper, Amer. Nat., 2, 1868, p. 531 (nearly intermediate between forms found east and west of Cascade Mountains).

Specimens examined.—Two: Nos. 4754, Mus. Comp. Zool. Harvard Univ.; 212/1183 U. S. Nat. Mus. No. 212/1183: original label missing; specimen collected at Klickitat Pass, 4500 ft., Skamania County, Wash. (see Amer. Nat., 2, p. 531), July, 1853, by Dr. J. G. Cooper. No. 4754: original label missing also; one label attached to the specimen reads "N. Pacific R. R. Survey, Gov. J. J. [so] Stevens, 211 *Tamias cooperi*? [the *cooperi* has been crossed out and *townsendii* written in] W. T. Cascade Mts. Lat 46 1182 Dr. J. G. Cooper."

These specimens are cotypes of *Eutamias townsendii cooperi*, which appears to be worthy of recognition. They have been remade into modern study skins.<sup>19</sup>

Specimens of *Eutamias townsendii* from the Cascade Mountains of Washington and Oregon are paler in comparable pelage than those from Astoria, Tillamook, Aberdeen, Quinalt Lake and other localities on the coast. They appear to show a mass difference in cranial characters, also, the mountain form, *E. t. cooperi*, tending to have larger incisors and heavier zygomata than typical *townsendii*.

#### ***Eutamias speciosus frater* (Allen)**

"*T[amias] quadrivittatus*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 ("found in the higher Sierras, and eastward to the Rocky Mountains").

Specimen examined.—One: No. 5640, Univ. Calif. Mus. Vert. Zool.; obverse of label "1101 *Tamias quadrivittatus*, Rich.—Missouri Striped Squirrel—[printed strips pasted on] ♂ Lake Tahoe Valley Cal. Sept. 1863 J. G. C."; on the reverse side of the label is the single word "immature."

Prepared with skull inside skin; legs and tail folded beneath body; specimen in good condition.

<sup>19</sup> For note on the condition of No. 212/1183, see Lyon and Osgood (1909, p. 175). The other cotype (No. 211/1183) referred to but not found by these authors is No. 4754 in the collection of the Museum of Comparative Zoology of Harvard University.



**Eutamias merriami pricei** (Allen)

"*Tamias Townsendii*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 ("Inhabits both ranges of mountains, as far south as Santa Cruz.")

Specimen examined.—One: No. 5639, Univ. Calif. Mus. Vert. Zool.; obverse of label "Townsend's Striped Squirrel [printed strip pasted on] ♂ 932 Arroyo Quito,<sup>20</sup> Sta Clara Co Mch. 17th 63 J G Cooper"; on the back of the label is a printed slip bearing the words "*Tamias townsendii* Bach." and ten measurements.

Specimen prepared with skull inside; fore feet folded onto breast, hind feet placed forward posteriorly beneath abdomen; tail folded forward on back. Specimen in good condition.

**Eutamias senex** (Allen)

"*Tamias Townsendii*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 ("inhabits both ranges of mountains, as far south as Santa Cruz").

Specimen examined.—One: No. 5823, Univ. Calif. Mus. Vert. Zool.; original label missing; label in old University of California Collection reads "*Tamias Townsendii* ♂ Summit Johnson's Pass Sept."

Prepared with skull inside; fore feet folded back, hind feet forward beneath body; in good condition.

**Callospermophilus chrysodeirus chrysodeirus** (Merriam)

"*Spermophilus lateralis* Say, (Rich.)" (part), Cooper, Proc. Cal. Acad. Sci., 4, 1868, p. 6 ("Near summits of the Sierra Nevada, lat. 38° common").

"*S[permophilus] lateralis*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 443 ("inhabiting the high Sierras").

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<sup>20</sup> Arroyo Quito, Santa Clara County. I have been unable to find this locality on any map examined. Possibly it refers to the present San Francisquito Creek, which near Palo Alto constitutes the boundary line between San Mateo and Santa Clara Counties, California. The Santa Cruz sheet (1906), U. S. Geological Survey Topographic Map of the United States, shows a large tract of land labelled Rinconada del Arroyo de San Francisquito in the vicinity of Stanford University, Palo Alto and Mayfield.



Specimens examined.—Two: Nos. 5618, 5619, Univ. Calif. Mus. Vert. Zool. No. 5618: obverse of label "Say's Striped Squirrel, [printed strip pasted on over Cooper's handwritten name *Spermophilus lateralis*] ♀ 1104 Tahoe valley, Cal. Sept. 14 '63 J. G. C."; on reverse side of label appear eleven measurements and another printed slip bearing the name "*Spermophilus lateralis*, Rich." No. 5619: obverse of label "*Spermophilus lateralis* ♂ Tahoe Valley Cal Sept. 15 '63 J. G. C."; reverse, ten measurements.

Specimens prepared with skulls inside, fore feet folded back on breast, hind feet forward beneath body, tail not skinned, disposed straight out behind, skins in good condition.

#### ***Amмосpermophilus leucurus leucurus* (Merriam)**

"*S[permophilus] Harrisii*" Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 443 (" . . . found only in the desert plains of the southeast part of the State").

"*Spermophilus Harrisii* Aud.," Cooper, Proc. Cal. Acad. Sci., 4, 1870, pp. 63, 67 (Peculiar to California, and said not to occur west of the "Desert Region").

"*Spermophilus Harrisii*," Cooper, Amer. Nat., 3, 1869, p. 188 (Mentioned as occurring on the desert between Cajon Pass and Fort Mojave).

Specimens examined.—Two: Nos. 5638, Univ. Calif. Mus. Vert. Zool.; No. 145284, U. S. Nat. Mus. No. 5638: obverse of label "248 *Spermophilus harrisii*, Aud. and Bach. [printed slip pasted on] ♀ Mts. W. side Col'do V. 1. 35° Cal. May 27 '61—Harris's Spermophile [printed strip bearing vernacular name pasted on]"; reverse, eleven measurements. No. 145284: obverse of label "247 *Spermophilus harrisii* ♂ Mts W. side Col'do Val. 35° Cal. May 27—'61 J. G. C."; reverse, eleven measurements.

Specimens prepared with skulls inside, fore feet bent back along side or beneath body, hind feet extended posteriorly; tail with bones inside, extended backward; abdominal slits not sewed up.

No. 5638 is apparently a young animal, as it is undersized. Both specimens are clearly referable to *Amмосpermophilus leucurus leucurus*.



**Sciurus douglasii albolimbatus Allen**

"*Sciurus Douglassii*" (part), Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 444 ("It is found north of San Francisco bay and in the Sierras. . . .").

Specimens examined.—Three: Nos. 5641, 5642, 5643, Univ. Calif. Mus. Vert. Zool. No. 5641: obverse of label "*Sciurus douglassii* ♀ Strawberry Flat,<sup>21</sup> Cal.—Sept. 18–63, J. G. C."; reverse, eleven measurements. No. 5642: obverse of label "Oregon Red Squirrel [pasted on] ♂ Summit Johnson's Pass Sept 24—'63 J. G. C."; reverse, eleven measurements, a number "1128a," and the name "*Sciurus douglassii*, Bach." pasted on. No. 5643: obverse of label "Summit, Placer Co Cal. July 26 '70"; reverse "*Sciurus Douglassii*, Bach. J. G. C."

The specimens are prepared with skulls inside, fore feet folded on breast, hind feet either folded beneath abdomen or crossed behind body; tails disposed variously posteriorly; abdominal slits sewed up in two specimens, left gaping open in the other; specimens in very good condition.

**Sciurus griseus nigripes Bryant**

"*Sciurus leporinus*," Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 443 (" . . . common in the mountains from Santa Cruz north"); Amer. Nat., 3, 1869, p. 186 ("Southern coast slope" of California).

Specimens examined.—Two: No. 5644, Univ. Calif. Mus. Vert. Zool.; No. 5647, Mus. Comp. Zool. Harvard Univ. No. 5644: obverse of label "*Sciurus leporinus*, Aud. & Bach. [name pasted on] ♂ Sta Cruz Mts Cal May 27 '64 J. G. C."; reverse, eleven measurements. No. 5647: original label missing; "Near San Francisco, Dr. J. G. Cooper."

No. 5644 prepared as usual by Dr. Cooper; skull inside skin, fore feet folded on breast, hind feet extended backward. Specimen in excellent condition. The skin of No. 5647 has been made over into a modern museum specimen.

<sup>21</sup> Strawberry Flat: Tuolumne County, California, South Fork of the Stanislaus River, on main wagon road across Sonora Pass, about 25 miles distant (straight line) from Sonora in a general northeasterly direction (see Whitney's Map of California and Nevada, State Geological Survey of California, 2nd ed., 1874).



**Ochotona schisticeps schisticeps (Merriam)**

"*Lagomys princeps*," Cooper, Proc. Cal. Acad. Nat. Sci., 3, 1863, p. 69 (Record in minutes of meeting of Academy for October 19, 1863, of exhibition by Dr. Cooper of specimens from the summits of the Sierra Nevada); the same, 4, 1868, p. 6 ("I obtained specimens near the snow line, above Johnson's Pass, Sierra Nevada . . .").

"*Lagomys princeps?*" Cooper, Zoology, in Cronise, The Natural Wealth of California, 1868, p. 446 ("It inhabits the Alpine summits of the Sierra Nevada, among enormous granite boulders and banks of perpetual snow . . .").

"*Lagomys princeps*," Cooper, Amer. Nat., 8, 1874, p. 15 (Footnote reference to Gabb's record of *Ochotona* in Lower California. Cope, in Proc. Acad. Nat. Sci. Phil., 1868, p. 2, erroneously records Gabb as having noted a specimen at 10,000 feet in the Sierra Nevada at 32° latitude).

Specimens examined.—Three: Nos. 5612, 5628, Univ. Calif. Mus. Vert. Zool.; No. 145282, U. S. Nat. Mus. No. 5612: obverse of label "*Lagomys princeps*, Rich.—[printed strip pasted on] ♂ Summit Sierras Lat. 39°, Sept 26–63 J. G. C."; reverse, eight measurements and a printed strip bearing the name "Little Chief Hare". No. 5628: obverse of label "1120 *Lagomys princeps* ♀ juv. Summit Sierras, Lat., 39° Sept. 22–'63, J. G. C."; on the reverse side of the label appear the words "immature 4/5 grown". No. 145282: obverse of label "*Lagomys princeps* ♀ Summit Sierras Lat. 39°, Sept. 26 '63, J. G. C."; reverse, eight measurements.

Specimens prepared with skulls inside; fore and hind feet folded posteriorly and anteriorly, respectively, beneath body; the hind feet in No. 145282 are somewhat torn and loosened.

The locality where these examples were secured is probably not far from the type locality of the species (Donner, Placer Co., Calif.). The two specimens in the Museum of Vertebrate Zoology (Nos. 5612, 5628) are in very different pelage condition in spite of the fact that they were collected within four days of each other. The female, No. 5628, taken September 22, is in worn summer pelage, and in spite of its being marked "juv.", may have been a breeding animal. In such an event, a delayed molt would not be unexpected. The male



specimen (No. 5612), taken September 26, has acquired most of the full fresh pelage of winter.

***Sylvilagus audubonii sanctidiegi* (Miller)**

"*L[epus] Audubonii*," Cooper, Zoology in Cronise, The Natural Wealth of California, 1868, p. 446. (" . . . the two latter [*Lepus Audubonii* and *Lepus Trowbridgii*] occur together throughout most of the western slope of the State").

"*Lepus Audubonii*" (part), Cooper, Amer. Nat., 3, 1869, p. 183 (Southern part of California.)

"*L[epus] Audubonii*" (part) Cooper, Amer. Nat., 8, 1874, p. 15 (Seen once about 2000 feet up in the Cuyamaca Mountains).

Specimen examined.—One: No. 5623, Univ. Calif. Mus. Vert. Zool.; obverse of label "33c *Lepus audubonii*, Baird, Audubon's Hare [printed strips pasted on] ♂ San Diego Cal. Nov. 6th, '61 J. G. C."; reverse, eleven measurements.

Prepared with skull inside; fore feet folded back beneath body; hind feet forward; specimen in good condition.

***Sylvilagus audubonii arizonæ* (Allen)**

"*L[epus] Audubonii*" (part), Cooper, Zoology in Cronise, The Natural Wealth of California, 1868, p. 446 (Refers to occurrence of this form in the western part of the state only).

"Audubon's Hare (fur finer than near the coast, approaching *Lepus artemisiæ*)", Cooper, Amer. Nat., 3, 1869, p. 476 (Colorado Valley).

"*Lepus Audubonii*? Baird", Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 74 (Colorado Valley).

Specimen examined.—One: No. 145283, U. S. Nat. Mus.; obverse of label "95 *Lepus audubonii* Ft. Mojave, Col'do R. Feb. 19 '61 J. G. C."; reverse, eleven measurements.

Skin in fairly good condition; stuffed flat, the skull inside the skin; legs folded, the fore feet backward, the hind feet forward beneath the body.

In general coloration agrees closely with *Sylvilagus audubonii arizonæ* in the collection of the National Museum, being distinctly paler than either *S. a. audubonii* or *S. a. sanctidiegi*.



**Lepus californicus bennettii** Gray

"*L[epus] Californicus*" (part), Cooper, Zoology, in Cro-nise, The Natural Wealth of California, 1868, p. 446 ("most numerous west of the Sierra Nevada").

"*Lepus californicus* Gray" (part), Cooper, Proc. Cal. Acad. Sci., 4, 1870, p. 63 (Believed to be peculiar to California).

"*Lepus Californicus*" (part), Cooper, Amer. Nat., 3, 1869, p. 183 (Southern part of California); Amer. Nat., 3, 1869, p. 470 (Only large species westward of Fort Mojave).

"*Lepus Californicus*," Cooper, Amer. Nat., 8, 1874, p. 15 (Seen in the foothills of the Cuyamaca Mts.).

Specimens examined.—Two: Nos. 5621, 5622, Univ. Calif. Mus. Vert. Zool. No. 5621: obverse of label "719 *Lepus californicus* ♂ San Diego Cal. Dec 20th '61 J. G. C."; reverse, ten measurements, and a notation "Iris brown". No. 5622: obverse of label "810 *Lepus californicus*, Gray.—California Hare.—[printed slips pasted on] San Diego Cal Apr 25th '62 J. G. C."

Specimens prepared with skulls inside skins, fore feet folded backward, hind feet forward beneath body.

No. 5622 is in very dark pelage, being darker, in fact, than any specimens in the series of *Lepus californicus bennettii* in the collection at the Museum of Vertebrate Zoology.



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