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Description of a rare Squirrel, new to the Territory of Arizona.

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ARTICLE XII.—*Description of a rare Squirrel, new to the Territory of Arizona.*—By EDGAR A. MEARNS, Assistant Surgeon, U. S. A.

Spermophilus (Ictidomys) tereticaudus BAIRD.

ROUND-TAILED SPERMOPHILE.

THIS interesting mammal was first taken at Fort Yuma, California, about thirty years ago, by Major G. H. Thomas, who forwarded four specimens to Professor Baird, which furnished the material for his original description of the species in "Mammals of North America," page 315, published in 1857. The head, feet and skull were subsequently figured by the same author in the "Report of the United States and Mexican Boundary Survey." These four specimens, I believe, have remained the only ones known up to the present time.* Upon the same specimens, Mr. J. A. Allen based his accounts of the species in his memoir on the American Sciuridæ occuring north of Mexico (Proc. Bost. Soc. Nat. Hist. XVI, Feb., 1874, p. 291), and in his Monograph of the American Sciuridæ, published in the eleventh volume of Hayden's "Geological Survey of the Territories," 1877. In the latter work, page 863, he states that "it is known as yet only from the specimens described by Professor Baird in his original account of the species, published twenty years ago.... They consist of one skin and a skull, and three examples in alcohol, all in rather bad condition."

Upon a recent occasion, when I rode in the saddle from Fort Verde, Arizona, to Deming, New Mexico, and back, a distance of over nine hundred miles, I became familiar with this and many other little-known species, and now present as complete an account of the animal and its habits as possible.

DIAGNOSIS.—In addition to the characters pertaining to Allen's subgenus *Ictidomys*,† to which this species belongs, it is to be distinguished by the following specific characters: Size small, about equal to *Tamias harrisi* inhabiting the same region; total

*[They remain the only ones thus far publicly recorded, but Mr. F. Stephens obtained several specimens at San Gorgonio Pass, California, early in April, 1885, some of which he kindly sent me for examination.—J. A. ALLEN.]

†"Ears generally small, sometimes rudimentary; tail long, cylindrical, or narrow and flattened, or quite broad, with the hairs one-half to three-fourths the length of the body; skull very long and narrow; first upper premolar usually rather small, and the dentition not heavy. Species, *S. tereticaudus*, *S. mexicanus*, *S. tridecemlineatus*, *S. franklini*."

length, 255 mm.; head and body, 162 mm.; tail, vertebræ, 78 mm., to end of hairs, 99 mm.; manus, 24 mm.; pes, 35 mm.; chest girth, 107 mm.; belly girth, 166 mm. Tail, with hairs, about four-fifths as long as the body without the head; terete, with hairs appressed, and scarcely expanded at tip. Ears reduced to a narrow rim. Feet broad and powerful. Palms naked in front, pilose behind. Soles of feet clothed with long hairs beneath. Muzzle pilose. Hair short, coarse and scanty. Above, pale yellowish-brown with a vinaceous cast; ventral surface, a circle around each eye, feet and inner aspect of legs, pure white; terminal portion of tail indistinctly annulated with black, whitish on circumference and at extreme end; otherwise of the same color as the back above, and a pale shade of the same below.

Description.—Professor Baird, in the original description of this Spermophile, makes an apt comparison between it and the "Prairie-dog," which is borne out not only by the color-pattern but by the rotund abdomen, shape and proportions of the animal, excepting the long tail of the former, and is especially applicable to the light yellowish phase of *Cynomys* inhabiting Arizona. The general color of the entire dorsum is uniformly pale yellowish-brown, with a slight pinky or vinaceous cast, finely grizzled with gray, and having a slight admixture of black hairs. The individual hairs are yellowish-brown, either pointed or annulated with gray, many of them black at the extreme base, some ringed with the same, and a few black throughout. Under parts of body, excepting the region around the arms, and including the inner surface of legs, pure white. There is no distinct line of separation between the colors of the upper and lower surfaces, the colors blending laterally. The feet are white, the color of the back extending downward on the outer side of the legs, and passing into white by an insensible gradation. The extreme tip of the nose and sides of the face are whitish, the latter faintly washed with yellowish-brown, and mixed with black hairs in an area below the eye, sharply defining the white orbital circle. The whiskers, lashes on lower lid, and a tuft of long hairs of similar quality above the front of the eye, black. Occasionally a few of the whiskers are white, or some are black at base and white terminally; this is probably an indication of old age. The rump and region around

the anus are yellowish-brown ; the latter white in some specimens. Above, the tail is colored like the back, below a pale brownish-yellow, some of the hairs tipped with yellowish-white; its terminal portion—about two-thirds—is indistinctly annulated with black, whitish terminally and on circumference. The subterminal bar of black, mentioned in the descriptions of Baird and Allen, is not a very tangible or constant feature. The nail on the rudimentary pollux is distinct, and much more developed than in *Tamias harrisi*. The fore claws are considerably larger than the hind, the proportion being as 6.2 : 5 ; their color, brownish-black, fading to horn-color at tip. When perfectly fresh, the color of the inner surface of the skin is a brilliant purplish-blue. The winter pelage may prove to be more dense, longer and softer, as it is in *Tamias harrisi*. The testicles are abdominal, as in *Cynomys columbianus*. This is not usually the case with *Spermophilus grammurus*, nor the species of *Tamias* found in Arizona, so far as I have observed. There is but little sexual difference in the amount of development of the mammæ, of which there are always five pairs.

The type of the above description, amending the original one by Professor Baird and that of Mr. Allen, based upon the same specimens, is No. 169, ♂ ad., taken by me between New River and Phœnix, Arizona, on March 28, 1885.

The principal disagreement between the present description and those hitherto published consists in the statement that the tail is concolor with the body, both sides, and that the color below is yellowish- or brownish-white, whereas the under surface of the body is *pure white*, and the under side of the tail brownish. The discrepancy may be due to the original specimens being earth-soiled or stained* by the preservative fluid in which they were immersed.†

Cranial and Dental Characters.—On comparison of skulls of this species with those of the other Arizona Sciuridæ, the only material now at my command, comprising two typical *Sciuri*

*[Doubtless due to discoloration from long immersion in spirits, since specimens sent me (see p. 197, foot note) from San Gorgonio Pass, California, have the lower surface pure white, and the lower surface of the tail brown, as in Arizona specimens.]

† The under surface is quite thinly coated with hair, permitting the skin to be seen in places ; in some specimens the axillæ are entirely naked. The bare skin is yellow in dry specimens ; but every hair is pure white.

(*Sciurus hudsonius fremonti* and *S. aberti*), *Tamias asiaticus et vars.*, *T. harrisi*, *Spermophilus grammurus* and *Cynomys columbianus*, all are found to have the same dental formula, viz.: I. $\frac{1-1}{1-1}$; Pm. $\frac{2-2}{1-1}$; M. $\frac{3-3}{3-3} = \frac{12}{10}$. The chief variation in dentition consists in the form and relative size of the molar series, especially in the upper first two premolars, together with the direction of insertion and relative position of the molar series of teeth on the two sides. In these respects the species named form a continuous series in the order mentioned (*Spermophilus tereticaudus* falling in with *S. grammurus*); beginning with the *Sciuri* in which the first premolar is minute and functionless, or even occasionally deciduous in *S. hudsonius fremonti*, becoming slightly more pronounced in *Tamias asiaticus dorsalis* and in *T. harrisi* (which "favors" the *Spermophili*), until, in *Spermophilus grammurus* and *C. tereticaudus*, it becomes a serviceable grinding-tooth, and in *Cynomys*, where it reaches its maximum development, measures quite as much anteroposteriorly as either of the three neighboring teeth, the last molar being enormously developed. In like manner the molar series undergo a change, more or less gradual, from the *Sciuri* in which the molar series are exactly parallel and but slightly oblique in their insertion to *Cynomys*, in which the teeth are inserted very obliquely, and converge posteriorly until the first premolars are separated by twice the distance between the last molars.

In *Spermophilus tereticaudus* the first premolar is a small but efficient tooth, about twice as large as that of *Tamias harrisi*, and, relatively, rather more developed than in the sciurine *Spermophilus grammurus*. Its dentition, as a whole, is considerably heavier than in *Tamias harrisi*, with which *Spermophilus tereticaudus* is properly to be compared on account of the spermophiline affinities of *T. harrisi*, and, relatively, than in *S. grammurus*. The teeth are more obliquely inserted than in either.

Deferring any elaborate comparison of the skulls until the occasion of treating of the Arizona Squirrels as a whole, the salient cranial characters may be said to consist in the narrow and elongated skull, convex above, with the malar arch but moderately expanded, and the interorbital region much contracted, as in *Cynomys*. The postorbital process is strong, triangular, and directed downward and backward; anteorbital foramina large,

oval, and protected by a strong bony process below; plane of the malar turned completely outward, instead of obliquely as in *Tamias*.

I am debarred from comparing the skulls of *S. mexicanus* and *T. lateralis*, which connect this species with the genus *Tamias;* but *S. tereticaudus* differs from *T. harrisi* in having the dorsal outline more convex, the interorbital space contracted, the anterior outline more obtuse, the malars more expanded, the brain cavity much less inflated, the skull more depressed behind, the postorbital process broader and less depressed, and the surface roughened with ridges for muscular attachment. As noted above, the dentition is much heavier. Its relationship can be better understood by reference to the accompanying table, expressing the ratio between the dimensions of certain parts of the skull and its total length in all of the species above mentioned.

HABITAT.—Although previously known only from Fort Yuma, California, the Round-tailed Spermophile inhabits quite a wide area of our southwestern territory.

When marching toward Texas, from Fort Verde, in Central Arizona, I first met with this Squirrel when eighty miles southwest of Fort Verde, near Hall's Station, on New River, just within the northern limit of Maricopa County, on March 28, 1885; and we saw them every day of our march thereafter until we reached Frisk's ranche, twenty-two miles northwest of Bowie Station, in Pima County, Arizona, on the 8th of April. It was next noted in a greasewood tract, about six or seven miles in extent, west of Lordsburg, New Mexico, none having been actually seen on the intervening sixty miles of our march, although its presence was suspected. Fifty miles were again traversed without any positive proof of its presence, and I began to think that we had crossed the boundary of its habitat, when it again appeared several miles west of Deming, New Mexico, and was afterwards found to be abundant in the immediate vicinity of that town.

Returning over the same route (except from Railroad Pass to Mountain Spring, Arizona, a distance of seventy miles), I observed this species from Deming to Separ, New Mexico, from Lordsburg, New Mexico, to San Simon, Arizona, and at Bowie Station, where we remained in camp on April 30; thence, for a distance of two

hundred and sixty miles, to within a few miles of Hall's ranche, on New River, where we returned on the 15th of May, 1885, the Round-tailed Spermophile was observed every day of the march, and was generally abundant. From its colonial mode of residence, there are often considerable areas over which none are found, but, in general terms, the species may be said to inhabit the entire line of our march, from New River, Arizona, to Deming, New Mexico, a distance of three hundred and seventy-seven miles. From descriptions given me of a "gray" or "yellow gopher" by persons who have traveled in Mexico, I believe that this species will be found to extend all the way across Western Sonora, to the coast.

The southern part of California, including the peninsula, the southern third of Arizona, excluding the higher altitudes, the western half of Southern New Mexico, and the Mexican State of Sonora, will probably be found to include the whole or greater part of the habitat of *Spermophilus tereticaudus* and its varieties, if any.

HABITS.—We first found the Round-tailed Spermophile on the 28th of March, 1885, in a wide zone of greasewood and cacti, when crossing a level desert between New River and Phœnix, Arizona, bounded by barren mountains rising abruptly from the plain, and covered with volcanic rocks.

The first one seen was crawling stealthily through some weeds, its body depressed, head elevated, and presenting such a musteline appearance, that I believed it to be a veritable Weasel until I stooped to pick up the specimen after killing it. Several others were shot during the day. At Desert Well, about the middle of the day's march, we found Harris's Chipmunk associating with the newly-found Spermophile, whose range it overlaps upon the edge of the desert; but the locality was at the base of a mountain piled with malapai rocks, in which the Chipmunks found a congenial home, quite different from the adjacent plain in which the Spermophile is so abundant.

In the torrid, sandy, desert region south of the Gila River, the Round-tailed Spermophile is the most abundant and characteristic mammal. This singular species lives in holes under the greasewoods, which they undermine, excavating chambers, and tunneling beneath the roots. They form large, low mounds around the bases

of the greasewoods, providing many holes for ingress and egress. This site for their dwellings seems to be selected for the reason that the meshes formed by the fine roots of the greasewood serve to support the dome of their habitation; the soil being everywhere light and loose, would otherwise be continually caving in upon their numerous chambers and galleries.

This species must be infinitely abundant in the region which it inhabits, for they live in immense colonies. In many areas, every greasewood bush had their burrows beneath it. In habits, they are shy. At a distance, they were very often seen sitting up erect like "Prairie-dogs" (*Cynomys*), at the entrance to their burrows. As soon as they saw us, they usually dived into one of several holes generally found beneath the bush, which, in this region, was always a greasewood, as that is the only abundant shrub growing upon most of the desert. In Southeastern Arizona, however, especially along the San Pedro River, their mounds were frequently seen in open, grassy places, and were usually large and high, much resembling large ant-hills, which, indeed, they may originally have been; but at Deming, New Mexico, they lived almost exclusively in mounds beneath the mesquite bushes, and fed upon the fruitage of that plant.

When surprised away from home they try to skulk unobserved to their holes, crouching low and elevating their heads, which they poise horizontally, always furtively eyeing any human intruder. Its resemblance to a Weasel at such times is very striking. If conscious that it has been discovered, it runs behind the nearest bush, alternately making advances toward its burrow and seeking concealment behind a tuft of grass or weeds. Those shot had been eating the seeds of a hispid weed, bearing yellow flowers. Their huge stomachs were so distended with food that they had the appearance of being about to bear young. They utter a low, plaintive whistle when disappearing into their burrows. One kept popping its head in and out of a hole, uttering this sad note at each disappearance. It is hard to shoot them owing to their shyness, and the difficulty of seeing them upon the dazzling sand of their tropical home before they reach their holes, into which they scurry on the slightest alarm, but often pause and sit up at the entrance before slipping in, giving an opportunity for a quick shot

from the saddle. Near the Pima Villages, on the Gila River, they were abundant, and were a favorite mark for the arrows of the Indian urchins. One old Indian seemed to take great pleasure in seeing me shoot at them from my horse. He would ride ahead and point them out, and was able to see them at a surprisingly great distance.

The Round-tailed Spermophile is exceedingly abundant in and about Fort Lowell, where its association with man has made them far less shy than those living in the desert away from human habitations.

When returning into Arizona, across the New Mexico line, we found these Spermophiles abundant, although none were seen when passing over this portion of the route before, and their lisping whistle was constantly heard. The species, in fact, was abundant at intervals throughout our line of march from New River to Deming; but its existence would be patent to a casual traveler, more from the presence of their burrows, and their soft whistle, whose source he would be apt to look for in vain, than from frequent sight of the animals themselves.

Although eminently fossorial, this animal is endowed with latent scansorial proclivities, which are brought out by the sight of food in elevated situations. In other words, they will climb for mesquite beans. I caught one in the very top of a mesquite, by creeping unobserved to the bottom of the tree; seeing its means of escape cut off, the poor creature became so paralyzed with terror, that I had no difficulty in climbing up and taking it in my hand. I carried it safely home to Fort Verde. It drank eagerly, although inhabiting a region where water is seldom found. It ate corn and mesquite beans with avidity, and was a lively and agreeable pet.

Their young are brought forth in the subterranean burrows, which I regret not having had time to examine with sufficient care to describe exactly. Young, but a few weeks old, were seen upon the surface with their parents on May 15, and must have been born late in April.

DIMENSIONS* OF SEVEN SPECIMENS OF *Spermophilus tereticaudus*.

Collector's number.	Sex and age.	Date. 1885.	Locality.	Total length.	Head and body.	From tip of nose to					Tail to end of		Manus.	Pes.	Fore leg.	Hind leg.	Height of ear above skull.	Height of ear above meatus.	Distance between eyes.	Chest girth.	Belly girth.	Longest fore claw.	Longest hind claw.
						Eye.	Ear.	Meatus.	Tip of ear.	Occiput.	Vertebræ.	Hairs.											
168	♀ ad	Mar. 28	Near Hall's ranche, on New River, Arizona	265	173	17	34	36	41	45	74	92	24	35	48	68	4	8	22	110	165	6.7	5
169†	♂ ad.	" 28	Between New River and Phœnix, Arizona	272	165	16	34	36	40	44	85	107	24	36	50	68	3	7	22	110	170	6	4.5
170	♀ ad.	" 28	Between New River and Phœnix, Arizona	250	160	17	32	33	38	43	72	90	23	33	46	63	4	7	23	105	175	6.5	5.2
171	♂ ad.	" 28	Between New River and Desert Station, Arizona,	257	166	18	32	34	39	43	73	91	23	34	47	63	3	7	24	112	175	6.9	5.1
172	♂ ad.	" 28	Between New River and Desert Station, Arizona,	270	155	17	32	34	38	42	85	115	25	35	48	66	4	7.5	23	110	175	7	5
174	♀ ad.	" 30	Near Maricopa, Arizona	257	160	15	30	31	37	41	77	97	24	34	49	64	3	7	22	105	170	5	4.1
195	♂ ad.	May 23	Desert Station, Arizona	217	159	17	32	34	41	43	‡	§	26	37	51	70	3	8	22	95	180	5.3	5.5
Average				255	162	17	32	34	39	43	78	99	24	35	48	66	3.5	7.4	22.6	107	166	6.2	5
Maximum				272	173	18	34	36	41	45	85	115	26	37	51	70	4	8	24	112	175	7	5.5
Minimum				217	155	15	30	31	37	41	72	90	23	33	46	63	3	7	22	95	180	5	4.1
Average in inches and hundredths				10.04	6.38	.67	1.22	1.34	1.54	1.69	3.07	3.90	.94	1.38	1.89	2.60	.14	.29	.89	4.21	6.54	.24	.20

* Taken from fresh specimens, in millimeters.
† Type specimen.
‡ 46 mm. } The end has been broken off.
§ 58 mm. }

MEASUREMENTS* OF EIGHT SKULLS OF *Spermophilus terticaudus.*

Collector's number.	Sex and age.	Locality.	Total length.	Greatest breadth.	Distance between orbits.	Nasal bones, length.	Nasal bones, width behind.	Nasal bones, width before.	Upper incisors, from front to molars.	Upper incisors, from front to hinder margin of palate.	Upper incisors, height.	Upper incisors, width between external edges.	Upper molars, length taken together.	Lower jaw, length.	Lower jaw, greatest height.
168	♀ ad.	Near Hall's ranche on New River, Arizona.	37	23.5	8.5	12	3	4 6	10 2	19 2	5.4	4 1	8	22.5	13
169	♂ ad.	Between New River and Phœnix, Arizona	39	24.5	8 5	12	3	5	10 2	20 5	5.2	4.2	8	23.9	13 5
170	♀ ad.	" " " "	36.5	23.3	8	11.5	2 8	5	10	20	6	4.1	8	23.5	12.1
171	♂ ad.	Between New River and Desert Station, Arizona.	37.5	24	8.4	12	3 3	4.6	11	20	6.3	4.3	7.9	23.3	12.5
174	♀ ad.	" " " " "	36.5	23	9.5	11.9	3.5	5	11	20	6	4.2	8	23	13
195	♂ ad.	Desert Station, 14 miles north of Phœnix, Arizona.	39	24	9	13	2.9	4.1	11	20.7	5.6	4	8	23.4	13
227	♀ ad.	Fort Lowell, Arizona	36	22	8.6	11	3	4 4	10.7	19	6	4	7.6	22.3	12
228	♂ ad.	Desert Well, 20 miles north of Phœnix, Arizona.	39	24 2	9	13.6	2.2	5	11.9	20.2	7	4.5	8.1	24	12.3
Average			37 6	23 6	8.7	12.1	3	4 7	10 8	20	5.9	4 2	8	23.2	12.7
Maximum			39	24.5	9.5	13.6	3 5	5	11.9	20.7	7	4 5	8.1	24	13.5
Minimum			36	22	8	11	2.2	4.1	10	19	5 2	4	7.6	22.3	12
Average in inches and hundredths			1 48	.93	.34	.48	.12	19	.42	.79	.23	.17	.31	.91	.50

* The measurements are in millimetres. If desirable, for comparison, reduce to inches and hundredths by dividing by 25 4.

Table showing the ratio between the dimensions of certain parts of the skull and its total length, in eight species and varieties of Arizona Squirrels.

NAME.	Total length, in millimeters.	Greatest width.	Distance between orbits.	Nasal bones, length.	Upper incisors from front to molars	Upper incisors from front to hinder margin of palate.	Upper molars, length taken together.	Lower jaw, length.
Sciurus arizonensis,	64.3	.581	.33	.336	.295	.50	.186	.59
Sciurus aberti,	59.5	.57	.33	.35	.29	.49	.18	.58
Sciurus hudsonius fremonti,	48	.59	.34	.31	.30	.51	.17	.59
Tamias asiaticus quadrivittatus,	31	.54	.25	.32	.30	.47	.16	.54
Tamias asiaticus dorsalis,	37	.55	.24	.31	.30	.47	.16	.57
Tamias harrisi,	39.6	.58	.26	.29	.31	.53	.18	.59
Spermophilus grammurus,	61	.66	.26	.35	.33	.56	.20	.64
Spermophilus tereticaudus,	37.6	.63	.23	.32	.29	.53	.21	.62
Cynomys columbianus,	65	.677	.215	.385	.27	.55	.27	.69