

Article XIV.—REVISION OF THE CHICKAREES, OR
NORTH AMERICAN RED SQUIRRELS (SUBGENUS
TAMIASCIURUS).

By J. A. ALLEN.

The Red Squirrels or Chickarees are the smallest of the true Squirrels in North America, and are distinguished not only by small size, but by the possession of a relatively short tail and a rather distinctive pattern of coloration. These features are combined with a reduced upper premolar, which is not only so minute as to be non-functional, but is often absent, either on one or both sides of the jaw, being wanting in about thirty per cent. of the specimens examined, throughout the group, regardless of the species. The only wonder is that so functionless an organ should persist so uniformly over such a large geographical area, while size and color are more or less variable. In view of these combined peculiarities, Trouessart, in 1880 (Bull. Soc. d'Études Scient. d'Angers, 1880, p. 81), very properly raised the group to the rank of a subgenus, under the name *Tamiasciurus*. It is confined to northern North America, and embraces several species and a considerable number of additional subspecies.

Without going into a detailed history of the group, it may be well to recall its status at two earlier periods, namely, 1857 and 1877. Baird, in 1857 (Mam. N. Amer., pp. 260-277), recognized three species, as follows: (1) *Sciurus hudsonius*; (2) *S. fremonti* (of which only two specimens were then known); (3) *S. richardsonii*, and (4) *S. douglasii*.

In 1877 the present writer (Mon. N. Am. Roden., pp. 672-700), reduced the three species to one, with two additional subspecies. During the following twenty years a considerable number of new forms were described, so that at the close of 1897 some twelve forms were current, to which five are now added. The following comparative list indicates the status of the group at these four dates.

BAIRD, 1857.

1. *Sciurus hudsonius*.
2. " *fremontii*.
3. " *richardsonii*.
4. " *douglasii*.

AUTHORS, 1897.

1. *Sciurus hudsonicus*.
2. " " *loquax*.
3. " " *dakotensis*.
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4. *S. hudsonicus richardsonii*.
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5. *S. hudsonicus vancouverensis*.
6. *S. douglasii*.
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7. *S. hudsonicus orarius*.
8. " " *californicus*.
9. " " *mearnsi*.
10. *S. fremonti*.
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11. *S. fremonti mogollonensis*.
12. " " *grahamensis*.

ALLEN, 1877.

1. *Sciurus hudsonius*.
2. " " var. *fremonti*.
3. " " var. *richardsoni*.
4. " " var. *douglasii*.

ALLEN, 1898.

1. *Sciurus hudsonicus (Erxl.)*.
2. " " *loquax Bangs*.
3. " " *dakotensis Allen*.
4. " " *baileyi Allen*.
5. " " *ventorum Allen*.
6. " " *richardsonii Bachm.*
7. " " *streatori Allen*.
8. " " *vancouverensis All.*
9. *S. douglasii Bachm.*
10. " " *cascadensis Allen*.
11. " " *mollipilosus Bachm.*
12. " " *californicus Allen*.
13. *S. mearnsi (Townsend)*.
14. *S. fremonti Bachm.*
15. " " *neomexicanus Allen*.
16. " " *mogollonensis Mearns*.
17. " " *grahamensis Allen*.

During the last ten years material relating to the Chickarees has rapidly accumulated. In 1877 I had before me all the specimens then extant in the larger museums of this country, aggregating about 390, of which about 90 were skulls without skins. The skins were mostly in bad condition, such as now would be regarded as practically worthless in comparison with the standard now demanded. Many were without definite localities, and a much larger number without date of collecting. Little was then known, or could readily be learned from the material then available, regarding the striking seasonal changes of coloration that characterize these animals. In recent years this has been made a matter of careful investigation,¹ and new light has thus been thrown upon the character of otherwise misleading specimens. With now about four times the number of specimens in hand, nearly all of satisfactory character, it is a pleasure to again retrace the work of two decades ago; and while my material is still grossly inadequate, it suffices to amend at many points former erroneous conclusions. For example, there are very few specimens as yet

¹ On Seasonal Variations in Color in *Sciurus hudsonius*. By J. A. Allen. Bull. Am. Mus. Nat. Hist., III, 1891, pp. 41-44.

available from New Mexico and Utah, practically none from Nevada, and important areas of large extent in Oregon, Washington and British Columbia are unrepresented, as are also some of the outlying buttes and mountain ranges east of the Rocky Mountains in Montana and Wyoming.

In this connection it gives me pleasure to acknowledge my indebtedness to those who have so generously assisted me with material. In addition to that contained in the American Museum, numbering about 350 specimens, I am indebted especially to Dr. C. Hart Merriam, Chief of the Biological Survey, U. S. Department of Agriculture, for generously placing at my disposal the vast series of Chickarees, collected under his direction during the last ten years, as well as the specimens from his own collection, the whole aggregating about 735 specimens. I am also indebted to Mr. F. W. True, Executive Curator of the U. S. National Museum, for the use of the specimens under his charge, containing many that were in my hands in 1877, and also the type and topotypes of *Sciurus h. mearnsi* Townsend. Also to Mr. Samuel N. Rhoads for a large series from British Columbia, of special interest as representing new localities; and also to Mr. Witmer Stone, of the Academy of Natural Sciences of Philadelphia, for securing to me the opportunity of examining the types of Bachman's *Sciurus fremonti* and *Sciurus douglasii*, which were almost indispensable for the satisfactory determination of these two species. The total number of specimens used as the basis of the present paper is 1385, or more than four times the amount available in 1877, and incomparably better in quality.

The subgenus *Tamiasciurus* is a compact group, its members presenting many features in common, while others are distinctively characteristic of particular sections of the group. The 17 forms here recognized cluster around three principal types, from which they have obviously been derived, namely, *Sciurus hudsonicus*, *Sciurus fremonti*, and *Sciurus douglasii*. These three types, so far as now appears, do not intergrade, although obviously derived from a common ancestor, at some not very remote period. The range in size, from the smallest to the largest, is not great, the total length varying only from about 290 mm. in the smaller phases of *Sciurus hudsonicus* to about 355 mm. in *Sciurus fre-*

monti mogollonensis, with a corresponding range in length of skull of from 43.5 mm. to about 49 mm. There is even a still closer agreement in the relative proportion of parts, as for example, the length of the tail to the total length, which rarely varies much from 40 per cent., the individual variation much more than overlapping the difference shown by distinct species. They all also have certain color markings in common.

All the forms undergo marked seasonal changes in color, but they are approximately parallel in all the forms, so that when once understood for one form, a key is available for the others. In winter the ears are rather prominently tufted, but they are tuftless at the height of the summer pelage. The soles of the feet are heavily furred in winter, especially at the northward, and comparatively naked in summer. In winter the pelage is much thicker, longer and softer than in summer, there being two annual molts. The winter pelage is retained till late in the season, especially at the northward and in mountainous districts, where the winter coat remains practically intact, though more or less worn and bleached, till late in June, and more or less of it often remains till into July. The acquisition of the full summer pelage is thus delayed till late in August or even later, and the new winter coat is not much developed till into November, and is usually not perfect till late in December. Thus early summer specimens—May till July 10—are usually in mixed pelage, and are thus exceedingly instructive. The black lateral line, present in all the forms in summer, is irregularly obsolete in winter, sometimes only a trace lingering, while sometimes (apparently in animals born the previous year) it is well pronounced, and in several of the western forms is never so much obscured in winter as it is at the same season in the eastern forms. The following synopsis will serve to show what characters are held more or less in common, and what are the distinctive features of the species and subspecies as here recognized.

COMMON CHARACTERS.—*Winter Pelage*.—A broad median reddish dorsal band, extending from the top of the head more or less on to the tail, contrasting with the gray of the sides and outer surface of limbs and feet; ventral surface white (except in some of the forms of *S. douglasii*), more or less vermiculated with black; ears tufted; soles heavily furred.

Sciurus hudsonicus (Erxl.).

NORTHERN CHICKAREE.

- Hudson Bay Squirrel*, PENNANT, Syst. Quadr. 1771, No. 206 α, 280, pl. xxvi, fig. 1. Hudson Bay.
Sciurus vulgaris FORSTER, Phil. Trans. LXII, 1772, 378. Not *S. vulgaris* LINN., 1758.
Sciurus vulgaris, ε, *hudsonicus* ERXLEBEN, Syst. Anim. 1777, 416 = *Hudson Bay Squirrel*, PENNANT, as above.
Sciurus hudsonicus PALLAS, Nov. Spec. Glires, 1778, 376; GMELIN, Syst. Nat. I, 1788, 147. Also of SCHREBER, ZIMMERMANN, etc.
Sciurus hudsonicus BAIRD, Mam. N. Am. 1857, 260, pl. xlvi, fig. 1.
Sciurus hudsonicus, var. *hudsonicus* ALLEN, Proc. Bost. Soc. Nat. Hist. XVI, 1874, 288; Mon. N. Am. Roden. 1877, 672; Bull. Am. Mus. Nat. Hist. III, 1891, 41.
Sciurus hudsonicus ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, 325.
Sciurus hudsonicus hudsonicus BANGS, Proc. Biol. Soc. Wash. X, 1896, 159.

Winter Pelage.—Above with a broad median band of rufous, varying from light yellowish rufous to deep rufous, extending from top of head nearly to end of tail; sides of body and outer surface of limbs to the toes olivaceous gray, the hairs plumbeous at base, then alternately ringed with a very pale tint of yellowish and black, and slightly tipped with black; ear tufts dusky, the hairs slightly tipped with rufous. Below grayish white, the hairs extensively plumbeous at base, then white and conspicuously ringed or tipped with black, giving a general grayish effect. Tail above with a broad central area of yellowish rufous, bordered with a band of black, widening at the tip into a broad subterminal bar, with a conspicuous outer fringe of pale yellowish rufous, lighter than the central area; below the central area is yellowish gray, with the black border and yellowish outer fringe nearly as above.

Post-breeding or Summer Pelage.—Whole upper surface, including flanks, pale yellowish rufous, strongest and brightest on outer surface of limbs and feet; a conspicuous black lateral line; ventral surface pure white; ears like the back and without ear tufts; tail colored nearly as in winter, but narrower and less full.

MEASUREMENTS.¹

	No. of Spec.	Total Length.	Tail Vertebrae.	Hind Foot.
Fort Simpson, N. W. T. ²	6	317 (305-333)	116 (92-134)	46 (43-47)
Nulato, Alaska	1	316	119	49
Hamilton Inlet, Labrador ³	4	309	120.5	47.75
Digby, Nova Scotia ⁴	10	296	118.2	45.2
Amherst, N. H. ⁴	9	284 (276-305)	118 (89-127)	46 (43-48)
South Twin Lake, Me. ⁵	5	290 (273-299)	107 (98-114)	45.5 43-46)

¹ The external measurements given in this paper, unless otherwise stated, were taken by the collector from the specimens in the flesh before skinning. The name of the collector is given in footnotes as voucher for the measurements. Very few of the specimens from Arctic America were measured by the collector, and the skins are in such condition as to preclude satisfactory measurement.

² Collected and measured by B. R. Ross.

³ From Outram Bangs, Proc. Biol. Soc. Wash., 1896, p. 160.

⁴ Measured from alcoholic specimens by J. A. Allen (from Mon. N. Am. Roden., p. 687).

⁵ Collected and measured by John Rowley.

	SKULLS. ¹			
	No. of Spec.	Total Length.	Postorbital Breadth.	Length of Nasals.
Ft. Simpson, N.W. T. ² .	10	47 (45.7-48.3)	16 (15.7-16.5)	14.2 (13.2-14.5)
Upton, Oxford Co., Me. ³	12	43.7 (42.4-44.9)	15.3 (14.5-17.3)	12.5 (12-13.5)
South Twin Lake, Me..	5	43.3 (43-44.3)	13.4 (13-14.5)	12.3 (11.5-13)
Trousers Lake, N. B... .	6	43 (41.5-44)	13.8 (13.5-14)	11.8 (11.3-12.4)

Geographic Range.—Cold Temperate Subregion,³ east of the Rocky Mountains, or the Hudsonian and Canadian Faunæ (east of the Rocky Mountains). In other words, from northern New England, northern New York, northern Ontario, and northern Minnesota northward, including Alaska north of the Alaskan Mountains. Probably also outlying areas in the Adirondack region and in parts of the Appalachian Highlands.⁴ Toward the southern border of this general area, it gradually merges into *S. hudsonicus loqua.x.*

*Material Examined.*⁵—Total, 130 specimens, from the following sources and localities:

Alaska:⁶ Fort Yukon, April and Oct., L. M. Turner, 14 spec.; Nulato, March 8, L. M. Turner, 1 spec.; do., summer, W. H. Dall, 2 spec.; Kowak River, July 20, C. H. Townsend, 1 spec.; Lake Iliamna, winter, C. L. McKay, 3 spec.; Fort Reliance, Sept. 12-Oct. 16, E. W. Nelson, 6 spec.; Upper Yukon, E. W. Nelson, 7 spec.; Koyukuk River, W. H. Dall, 1 spec.; Port Graham, Cook Inlet, April 9, C. H. Townsend, 1 spec.; Saldivoi, Cook Inlet, April, C. H. Townsend, 3 spec.

Labrador:⁶ Dr. J. B. Gilpin, 1 spec.

North West Territory:⁶ Hudson Bay, Dr. E. Coues, 1 spec.; Fort Good Hope, C. P. Gaudet, 1 spec.; Fort Anderson, August, R. P. MacFarlane, 1 spec.; Fort Rae, L. Clarke, Jr., 2 spec.; Fort Simpson, March 19, April 6 and 29, May 9, Bernard R. Ross, 4 spec.; do., Dec. 15, R. Kennicott, 1 spec.; Ungava, Nov. 11-Jan. 31, March and April, L. M. Turner, 20 spec.

Quebec: Port Daniel, Aug. 11, C. C. Young, 1 spec. (A. M. N. H.).

Manitoba: Red River, winter, D. Gunn, 2 spec. (U. S. N. M.); Roseau River, Nov. 27, Dr. E. A. Mearns, 2 spec. (A. M. N. H.); Rat Portage, Oct. 12, Ernest Seton Thompson, 1 spec. (A. M. N. H.); do., Oct. 22, 2 spec.

¹ In the skull measurements given in this paper, 'total length' is taken from the front border of the nasals to the most projecting part of the occipital plane; 'postorbital breadth' is the width across the frontals at the notch behind the postorbital processes; 'length of nasals' is their total length; 'width of nasals' (see next table) is the breadth at point of greatest expansion near the anterior border.

² From Allen, *Mon. N. Am. Roden.*, p. 688.

³ See *Bull. Am. Mus. Nat. Hist.*, IV, 1892, pp. 221-224, pl. vi (map).

⁴ According to Mr. Bangs (*Proc. Biol. Soc. Washington*, X, 1896, p. 159), specimens from "the tops of the higher Alleghenies to Roan Mountain, North Carolina," belong to this form. As noted later, I cannot accept this view. I have at this writing no specimens from the Adirondacks nor from the higher parts of the Catskills.

⁵ In crediting the material examined the following abbreviations are used: A. M. N. H. = American Museum of Natural History; U. S. N. M. = U. S. National Museum; Coll. Dept. Agr. = U. S. Department of Agriculture Collection; Coll. C. H. M. = private collection of Dr. C. Hart Merriam; Coll. S. N. R. = private collection of Mr. Samuel N. Rhoades.

⁶ All from U. S. National Museum.

(Coll. C. H. M.); Carberry, Jan. 3, Ernest Seton Thompson, 1 spec. (Coll. C. H. M.).

North Dakota: Turtle Mountain, July 28, Dr. E. Coues, 1 spec. (U. S. N. M.); do., July 10, Dr. L. B. Bishop, 2 spec. (A. M. N. H.). These are not typical, they being lighter and yellower, thus approaching *S. h. baileyi*.

Nova Scotia: Halifax, Dr. J. B. Gilpin, 1 spec. (U. S. N. M.).

Prince Edward Island: Georgetown, Oct. 26–Nov. 1, R. T. Young, 3 spec. (Coll. R. T. Y.).

New Brunswick:¹ Gulquack Lake, Victoria Co., Oct. 1–15, J. Rowley, 5 spec.; Trousers Lake, Victoria Co., Oct. 5–9 and 23, J. Rowley, 10 spec.; Forks of Tobique River, Victoria Co., Nov. 5–25, J. Rowley, 10 spec.

Maine:¹ South Twin Lake, Penobscot Co., Oct. 12–17, J. Rowley, 6 spec.; Waddley Brook, Washington Co., Oct. 8–19, Jenness Richardson, 9 spec.

Vermont:¹ Rutland, Nov., W. W. Granger, 2 spec.; North Clarendon, Sept. 11, W. W. Granger, 2 spec.

Sciurus hudsonicus loquax Bangs.

SOUTHERN CHICKAREE.

Sciurus hudsonicus loquax BANGS, Proc. Biol. Soc. Wash. X, 1896, p. 161 (Dec. 28, 1896). Liberty Hill, Conn.

Winter Pelage.—Similar to that of *S. hudsonicus* proper, but the median dorsal band is a brighter, deeper red, and the rest of the upper surface more yellowish and less olivaceous, with the black annulations narrower; below with the white much less strongly vermiculated with black; central area of tail above more strongly reddish. The submarginal black zone of the tail is narrower, and the red hairs of the central area are clear red, *i. e.*, not ringed with black.

Summer Pelage.—In general much redder and more brightly colored. General coloration above strong, reddish yellow; feet ochraceous or reddish ochraceous, this color extending up the fore arm and leg; below clear white.

MEASUREMENTS.

	No. of Spec.	Total Length.	Tail Vertebrae.	Hind Foot.
Hastings, N. Y. ² . . .	10	308 (292–321)	122.5 (102–140)	44.5 (40–48)
S. Nyack, N. Y. ³ . . .	16	305 (286–313)	116 (92–133)	47 (44.5–50.8)
Syracuse, N. Y. ⁴ . . .	6	308 (296–321)	124 (121–133)	
Ft. Snelling, Minn. ⁵	20	334 (297–356)	130.2 (118–146)	49.9 (47–52)
Camp Douglass, Wis. ⁵	7	324 (315–340)	137 (132–144)	49 (48–50)
Magnetic City, foot of Roan Mt., N. C. ⁶ . . .	7	340 (319–356)	139 (127–152)	40.4(35.6–45.7)

¹ All from American Museum of Natural History.

² Collected and measured by John Rowley.

³ Collected and measured by C. L. Brownell.

⁴ Collected and measured by M. M. Green.

⁵ Collected and measured by Dr. E. A. Mearns.

⁶ Collected and measured by Dr. A. G. Wetherby. Evidently the measurement of the hind foot was not taken in the usual manner, as the skins indicate a foot of average length.

SKULLS.

	No. of Spec.	Length.	Breadth at Post-orbital Notch.	Length of Nasals.	Width of Nasals.
S. Nyack, N. Y. . . .	6	44.5 (43-45.7)	14 (13-14.5)	13 (12.2-14)	6.5 (6.2-7)
Hastings, N. Y. . . .	10	44.4 (43-44.6)	14 (13.3-14.9)	12.2 (11-13)	6.3 (6-7)
Garrettsville, O. . . .	10	44.7 (44-46.5)	14.1 (13.3-15.2)	13 (12-14)	6.3 (6-6.7)
Ft. Snelling, Minn.	10	46.9 (45.5-48.5)	14.1 (13.3-14.8)	13.9 (13-14.8)	6.5 (6-7.2)
Roan Mt., N. C. . . .	7	45.7 (45-47)	14.6 (14.3-15.2)	13.7 (13-14.6)	6.6 (6.2-7.2)

Geographic Range.—Alleghanian and Carolinian Faunæ of the Humid Province.

Material Examined.—Total number of specimens, 236, from the following sources and localities:

Ontario: Hyde Park, Jan. 16 and Feb. 5, John A. Morden, 2 spec. (U. S. N. M.); Lorne Park, Sept., Jan., Feb., March, Ernest Seton Thompson, 5 spec. (U. S. N. M.); do., April 16, Sept. 24, Dec. 17, Ernest Seton Thompson, 4 spec. (A. M. N. H.); Linwood, July 7 and 22, S. E. Atkinson, 4 spec. (A. M. N. H.).

Wisconsin:¹ Camp Douglass, Juneau Co., July and August, Dr. E. A. Mearns, 27 spec.

Minnesota:¹ Fort Snelling, March 4-April 19 and June 29, Dr. E. A. Mearns, 25 spec.; Oronoco, Olmsted Co., July 13, Dr. E. A. Mearns, 2 spec. (A. M. N. H.); Houston, Houston Co., July 18, Dr. E. A. Mearns, 1 spec.; Excelsior, Scott Co., Sept. 28, A. Lano, 1 spec.

New York:¹ New York City, May 27, J. Richardson, 1 spec.; Hastings, Westchester Co., Jan. 5, 10, 12, Feb. 22, 23, March 18, April 8, 15, 30, May 13, June 9, 17, 23, 30, July —, Aug. 11, 12, 18, 23, 30, Sept. 12, 15, 24, Oct. 9, 17, 24, 29, Nov. 4, 8, 10-12, 27, 29, Dec. 4, 16, 23, J. Rowley, 61 spec.; Hartsdale, Westchester Co., May 16, J. Richardson, 1 spec.; Dunwoodie, Westchester Co., May 4, C. Allen, 1 spec.; South Nyack, Rockland Co., Jan. 2-4, 6, 16, 23-29, June 11, Oct. 16-19, Nov. 12, Dec. 14-17, C. L. Brownell, 25 spec.; Highland Falls, Putnam Co., May 5, Nov. 20, Jan. 26, Feb. 6, Dr. E. A. Mearns, 6 spec.; Cornwall, Orange Co., Oct. and Nov., C. Allen, 11 spec.; Blauveltville, Rockland Co., Jan. 1, C. L. Brownell, 1 spec.; Kiskatom, Greene Co., Aug. 25, L. S. Foster, 1 spec.; Lawyersville, Schoharie Co., April 19 and 30, L. D. Howell, 2 spec.; Stamford, Delaware Co., July, Clarence A. Smith, 4 spec.; Syracuse, Onondaga Co., Aug. 30, M. M. Green, 2 spec., Alder Creek, Onondaga Co., Sept. 7-13, M. M. Green, 8 spec.

New Jersey:¹ Newton, July 5, J. Richardson, 2 spec.

Pennsylvania:¹ Erie, George B. Sennett, 5 spec.

Ohio:¹ Ravenna, Feb. 3-5, March 10, C. P. Streator, 5 spec.

Indiana:¹ La Porte Co., Feb. 7 and April 29, F. M. Noe, 3 spec.

¹ All from American Museum Natural History.

North Carolina: Asheville, Dec., F. W. Fain, 1 spec. (A. M. N. H.); Magnetic City, foot of Roan Mt., Dec. 22-24, Jan. 4, July 15-29, A. G. Wetherby, 7 spec. (Coll. Dept. Agric.); Roan Mt., alt. 3000-6000 feet, April 29, 30, Aug. 2, Sept. 6, Oct. 31, Elmer Edson, 7 spec. (Coll. Dept. Agric.).

Red Squirrels from Massachusetts, New York, New Jersey, the States bordering the Great Lakes, southern Ontario, and thence westward to Wisconsin and southern Minnesota, and southward in the Appalachian Highlands, are quite different in coloration from the Red Squirrels of Arctic America (Labrador west to Alaska), in both winter and summer pelages, the northern form being much paler in general coloration than the southern. In winter pelage the northern form has the median dorsal band much paler red and narrower, and the hairs over the rest of the dorsal surface are more broadly annulated with black, while the white of the under parts is heavily vermiculated with black, in comparison with the comparatively slight and inconstant vermiculation seen in the southern form.¹ In summer pelage the southern form is markedly brighter and redder. The black zone bordering the red central area of the tail is much broader in the northern form, and the red hairs of its central area are slightly varied with black instead of being wholly red.

In size the difference is less well characterized, owing to great local variation in this respect. Apparently Arctic specimens are larger than the average of southern specimens, but unfortunately very few measurements of specimens from the far North are available. The smallest specimens examined are from New Hampshire, Maine, Nova Scotia, and New Brunswick, which are much smaller even than specimens from northern New Jersey and southern New York, while the largest are from southern Minnesota, and Roan Mountain, North Carolina, these rather exceeding in size the specimens from Arctic America, as shown by the tables of measurements given respectively under *hudsonicus* and *loquax*.¹

As regards coloration, there is a complete intergradation between *hudsonicus* and *loquax*, specimens from northern New England and New Brunswick being in this respect about as well referable to the one form as the other. In coloration the Roan Mountain

¹ The skull measurements, in this and other cases, give a surer standard of comparison for size than do the external measurements, which are taken by different persons, the skulls being all measured by myself after strictly the same method.

specimens closely resemble specimens from southern Ontario and western New York, and also northern New England, from which they differ chiefly in larger size. In general features they are 'intermediates' between the two forms, but much nearer *lequax* than typical *hudsonicus* of Arctic America.

***Sciurus hudsonicus dakotensis* Allen.**

BLACK HILLS CHICKAREE.

Sciurus hudsonicus dakotensis ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, 325, Nov. 7, 1894. Black Hills, S. Dak.

Winter Pelage.—Median dorsal band light yellowish rufous; rest of upper parts and outside of limbs and feet yellowish gray, the hairs pale fulvous narrowly ringed with black; ventral surface clear white (without vermiculations in the only specimen seen); tail above with the central area like the back, the black border narrow, fringed with fulvous; tail below with the central area pale gray basally, passing into very pale fulvous distally; bordered and fringed as above.

Summer Pelage.—Above pale yellowish olivaceous gray, the hairs finely annulated with black; feet, outside of shoulders and edge of thighs yellowish rufous; lateral line obsolete (wanting in 12 specimens out of the 18 examined, and clearly indicated in only 2, both young of the year); ventral surface pure white; tail above bright yellowish rufous, much lighter than in the northern (*S. hudsonicus*) and eastern (*S. h. lequax*) forms of the group, with the usual narrow black submarginal band and yellow fringe; tail below with the central area grizzled yellowish and black.

Measurements.—Average of 5 adults: Total length, 346 (338-356); tail vertebræ, 145 (143-149); hind foot, 51 (50.8-52-3).

Skulls.—Average of 7 specimens: Total length, 49¹ (47-50); breadth at postorbital notch, 14.2 (13.8-14.8); length of nasals, 14 (13-15); width of nasals, anteriorly, 7 (6-7.3).

Geographic Range.—The Black Hills of South Dakota and adjoining portions of Wyoming.

Material Examined.—Sixteen (18) specimens, as follows:

South Dakota: Black Hills, Glendale and Squaw Creek, July 21 and Sept. 3-5, W. W. Granger, 10 spec. (A. M. N. H.); Deadwood, Oct. 7 and 8, Dr. B. W. Evermann, 3 spec. (U. S. N. M.); Black Hills, Sept. 20 and Oct. —, Dr. F. V. Hayden, 4 spec. (U. S. N. M.).

Wyoming: Belle Fourche (western edge of Black Hills), Oct. 21, Vernon Bailey, 1 spec. (Coll. C. H. M.).

¹ Adults all = 50 mm.

This is practically an isolated form, distinguished by large size and pale coloration. It is larger even than the very large forms of *S. h. loquax* found in southern Minnesota, and at Roan Mountain, N. C., and in coloration is the palest of all the subspecies here recognized.

Sciurus hudsonicus baileyi, subsp. nov.

BAILEY'S CHICKAREE.

Winter Pelage.—Above, with a broad median reddish band; rest of dorsal surface pale yellowish gray; below white, finely vermiculated with black.

Summer Pelage.—Above yellowish olivaceous, the hairs pale yellow narrowly ringed with black; fore and hind feet ochraceous orange to reddish orange, this color extending to the shoulders and edge of thighs; a distinct blackish lateral line (present in at least 90 per cent. of the specimens); below white, usually with a distinct wash of yellow; tail above with the central area dark cherry red, varying to yellowish red, and extending about three-fourths the length of the tail, most of the hairs being, however, narrowly ringed with black, giving a grizzled effect; central area bordered by a zone of black, with an outer, rather broad fringe of pale yellow; lower surface of tail pale yellowish gray, slightly grizzled with black, bordered as above with a black band and a pale yellow fringe.

MEASUREMENTS.

	No. of Spec.	Total Length.	Tail Vertebrae.	Hind Foot.
Bighorn Mts., Wyo. ¹ . . .	7	344 (320-359)	141 (132-153)	52 (51-53)
Laramie Mts., Wyo. ² . . .	3	336 (333-339)	139 (124-148)	50.3 (49-52)
Pryor Mts., Mont. ¹	5	342 (320-350)	133 (123-151)	52 (50-53)
Big Snowy Mts., Mont. ³	6	323 (313-330)	130 (121-138)	50 (50-50)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Anterior width of Nasals.
Bighorn Mts., Wyo.	5	48.8 (47.5-49.5)	14.4 (14-14.5)	14.8 (14.2-16)	7.2 (7-7.7)
Pryor Mts., Mont.	4	47.8 (47-49)	14.4 (14.1-15)	13.9 (13-14.8)	7.2 (7-7.5)
Big Snowy Mts., Mont.	6	46.6 (46-48)	14 (13.8-14.3)	13.7 (13.3-14)	7.5 (6.6-8)

Type, No. 56,040, U. S. Nat. Mus. (Dept. Agric. Coll.), ♂ ad., Bighorn Mountains (alt. 8400 ft.), Wyoming, Sept. 19, 1893; Vernon Bailey, for whom this subspecies is named.

¹ Collected and measured by V. Bailey.

² Collected and measured by W. W. Granger.

³ Collected and measured by V. Bailey and B. H. Dutcher.

Geographic Range.—Outlying mountain ranges of central Wyoming and eastern Montana, and northward into Alberta in the eastern foot-hills of the Rocky Mountains. Its range includes the Bighorn, Pryor and Laramie Mountains in Wyoming, and the Big Snowy, Bear Paw and Little Rocky Mountains in Montana, and probably other outlying, pine-covered buttes and hills.

*Material Examined.*¹—Total number of specimens, 43, from the following localities and sources:

Wyoming: Bighorn Mts., alt. 8400 feet, Sept. 19 and 20, Vernon Bailey, 6 spec.; head of Smith's Fork (east base of Bighorn Mts.), Aug. 2, J. A. Loring, 2 spec.; Sherman (southern end of Laramie Mts.), Sept. 9-11, W. W. Granger, 3 spec. (A. M. N. H.); Laramie Mts., Aug. 11, W. S. Wood, 1 spec. (U. S. N. M.).

Montana: Bear Creek, Bear Paw Mts., June 19, A. H. Howell, 1 spec.; Pryor Mts., July 12-17, V. Bailey, 6 spec.; Big Snowy Mts., Aug. 22-25, V. Bailey and B. H. Dutcher, 7 spec.

Alberta: Banff, Aug. 27, J. A. Loring, 2 spec.; Jasper House, Aug. 26 and Oct. 5, J. A. Loring, 6 spec.; Edmonton, Aug. 27, J. A. Loring, 1 spec.; Cache Picot, Oct. 14, J. A. Loring, 3 spec.; Corral and Henry House, Oct. 24, J. A. Loring, 2 spec.; Muskeg Creek, Sept. 24-28, J. A. Loring, 3 spec.

Sciurus hudsonicus baileyi probably intergrades at the north with true *S. hudsonicus*, from which it differs, in summer pelage, in the much more olivaceous and darker tint of the dorsal surface, in the pale fulvous wash of the ventral surface, and in the red-and-black grizzled upper surface of the tail. It differs similarly, but in greater degree, from *S. h. dakotensis*, which is a much paler form. With *S. h. richardsonii*, it scarcely needs comparison, owing to the darker, deeper red of the upper parts of the latter, and its much greater amount of black in the tail. Its nearest ally is *S. h. ventorum*, which is geographically its near neighbor at the southwest, finding its eastern limit in the Wind River Mountains, while *S. h. baileyi* occupies the Laramie and Bighorn Mountains a little further to the eastward. The chief difference between these two forms consists in the less yellowish and decidedly darker olivaceous cast of the dorsal surface of *S. h. ventorum* in summer pelage, and the grayness of the lower surface of the tail. What the differences may be in winter pelage cannot now be determined, owing to lack of material.

¹ From the U. S. Department of Agriculture Collection, unless otherwise credited.

Sciurus hudsonicus ventorum, subsp. nov.

WIND RIVER MOUNTAINS CHICKAREE.

Winter Pelage.¹—Above with a narrow median band of dark rufous, narrower and less dark than in *S. h. richardsoni*, but much darker and less yellowish than in *S. h. baileyi*; rest of dorsal surface, and legs and feet gray, suffused with pale yellowish, the hairs being yellowish gray, ringed with black; a dusky lateral line obscurely indicated; below white without (in the specimens examined) black vermiculation; tail above centrally dark yellowish rufous, bounded by the usual zone of black and pale yellowish outer fringe, the black zone being of about the usual width in *S. hudsonicus*, *S. h. loquax* and *S. h. baileyi*; the tail is thus very different from that of *S. h. richardsonii*; lower surface of tail gray, grizzled sparingly with black.

Summer Pelage.—Above nearly uniform dark olivaceous, with the sides of the shoulders and outer edge of thighs heavily suffused with strong reddish fulvous; upper surface of feet ochraceous; the dusky lateral line as a rule narrow and rather indistinct as compared with most other members of the *S. hudsonicus* group; tail above without a well defined central area of reddish (owing to the hairs being narrowly but profusely ringed with black), bordered with a zone of black of the usual extent, and broadly fringed with fulvous; tail below with a broad central area of gray faintly suffused with grayish fulvous, with the dark outer border and fulvous fringe as above.

Type, No. 56,030, U. S. Nat. Mus. (Dept. of Agric. Coll.), ♀ ad., South Pass City, Wyoming, Sept. 6, 1893; Vernon Bailey.

Geographic Range.—Wind River Mountains region and northward along the eastern base of the Rocky Mountains to at least Mystic Lake, and probably to the Belt ranges east of Helena, and thence westward to the head of the Snake River in Idaho, and south along the Idaho and Wyoming boundary to the Wasatch Mountains in northeastern Utah. Its range thus includes not only the Wind River and Gros Ventre Ranges, but the Shoshone and Beartooth Mountains, the whole of the National Yellowstone Park region, and the outlying ranges east of the Main Divide to central Montana; to the westward and southward it includes the Snake River, Cariboo, Thompson, Blackfoot, Bear River, Bannock and Wasatch Ranges, with their outlying and included or connected spurs.

MEASUREMENTS.

	No. of Spec.	Total Length.	Tail Vertebrae.	Hind Foot.
South Pass City, Wyo. ² ...	10	331 (318-350)	134.7 (121-142)	51.6 (49-53)
Lake Fork, Wyo. ²	3	334 (328-344)	134 (131-138)	50.3 (50-51)
Beartooth Mts., Mont. ³ ..	7	325.4 (300-345)	132 (125-145)	52 (49-55)

¹ The winter pelage is not well shown by any specimens now available. This description is based on two poor skins taken in the Wind River Mountains by Dr. F. V. Hayden, May 31 and June 3, 1860.

² Collected and measured by Vernon Bailey.

³ Collected and measured by Vernon Bailey and B. H. Dutcher.

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Anterior Width of Nasals.
South Pass City, Wyo.	8	47.8 (47-49)	15 (14.5-15.5)	14 (13.2-15)	7.3 (7-8)
Beartooth Mts., Mont.	4	47.4 (46.3-48.3)	14 (13.3-14.8)	13.7 (13-14.2)	7 (6.4-7.3)

*Material Examined.*¹—Total number of specimens, 68, from the following localities and sources:

Wyoming: South Pass City, Sept. 5-7, V. Bailey, 21 spec.; La Barge Creek, Thompson's Plateau, Aug. 5, V. Bailey, 2 spec.; Bull Lake, east base of Wind River Range, Aug. 20-23, J. A. Loring, 5 spec.; Lake Fork, east slope of Wind River Range, alt. 9600-10,000 feet, Aug. 21-24, V. Bailey and J. A. Loring, 10 spec.; Wind River Mountains, May 31, June 3, Dr. F. V. Hayden, 2 spec. (U. S. N. M.); Yellowstone Lake, July, F. J. Huse, 4 spec. (U. S. N. M.).

Idaho: Henry's Lake, Sept. 8, Dr. C. H. Merriam, 1 spec. (U. S. N. M.); Fire Hole Basin, head of Snake River, Sept. 17, Dr. C. H. Merriam, 2 spec. (U. S. N. M.); Island Park, Snake River, alt. 6,000 feet, Aug., M. J. Elrod, 3 spec. (U. S. N. M.); head of Crow Creek (southeastern Idaho), July 30, V. Bailey, 2 spec.

Utah: Laketown (east base Wasatch Mts.), July 21 and 22, V. Bailey, 2 spec.; Salt Lake City (west slope Wasatch Mts.), Oct. 30, V. Bailey, 1 spec. (Coll. C. H. M.).

Montana: Beartooth Mts., July 26-Aug. 1, V. Bailey and B. H. Dutcher, 8 spec.; Mystic Lake, Sept. 27 and 28, Dr. C. W. Richmond, 5 spec. (Coll. C. H. M.).

The Mystic Lake Series is not typical, the upper surface having more of a reddish cast, thus approaching *S. h. richardsonii*, as it also does in having much more black on the tail; they are thus intergrades between *S. h. ventorum* and *S. h. richardsonii*.

Sciurus hudsonicus ventorum finds its nearest ally in *S. h. baileyi*, from which it differs in much darker and more olivaceous coloration above; the upper surface of the tail has the rufous of the central area more varied with black, and the under surface is grayer and less suffused with fulvous. The differences are not great, but are readily appreciable and fairly constant.

S. h. ventorum is thus one step nearer *S. h. richardsonii*, from which it differs strikingly in its less red and more olivaceous upper parts, and in the greatly reduced amount of black in the tail. It doubtless intergrades with *richardsonii* at the northward, Mystic Lake specimens being fairly good intermediates, though much nearer *ventorum* than *richardsonii*.

¹ From U. S. Department of Agriculture Collection, unless otherwise credited.

Sciurus hudsonicus richardsonii (*Bachman*).

RICHARDSON'S CHICKAREE.

Sciurus richardsonii BACHMAN, Proc. Zool. Soc. Lond. 1838, 100; BAIRD, Mam. N. Am. 1857, 318.
Sciurus hudsonius var. *richardsoni* ALLEN, Mon. N. Am. Roden. 1877, 673.

Winter Pelage.—Above with a broad median band of chestnut rufous, the hairs finely annulated with black; rest of upper surface, including limbs and feet, brownish gray, the hairs ringed with pale fulvous and black, the general effect being a rather dark gray with a wash of fulvous; tail above with a narrow central area of dark rufous, more or less grizzled with black, and extending generally only about half the length of the tail; rest of the tail intense black, with a slight fringe of yellowish on the sides for about two-thirds the length from the base, exceptionally extending all around the tail, including the tip; black lateral line generally prominent, sometimes more or less obscured; tail below yellowish gray centrally, the rest black, or wholly black at the surface with the base of the hairs gray or grayish fulvous; below white, finely vermiculated with black, the dark plumbeous under-fur showing more or less through the surface, giving a general effect (with the vermiculations) of grayish white; ears well tufted, the apical half blackish.

Summer Pelage.—Above nearly uniform rufous olivaceous, the hairs being ringed with fulvous or reddish fulvous and black; feet ochraceous to reddish orange, this color extending over the fore arm to the sides of the shoulder, and generally over the hind limbs to the edge of the thigh; black lateral line strongly developed; ventral surface generally clear white, the plumbeous under fur usually more or less tinging the surface; tail above with a narrow deep reddish central area, extending one-half to two-thirds the length of the tail, the hairs being basally yellowish chestnut rufous, more or less ringed and varied with black; rest of upper surface of tail black, with a yellowish or rufous fringe, generally confined to the sides, the tip being wholly black; lower surface of tail with the central area gray, grizzled with black, with more or less fulvous suffusion.

MEASUREMENTS.

	No. of Spec.	Total Length.	Tail Vertebrae.	Hind Foot.
Birch Creek, Id.	4	333.5 (330-338)	134 (120-147)	49.5 (47-51)
Salmon R. Mts., Id. . . .	6	340 (325-352)	134 (124-148)	51.5 (51-52)
Saw Tooth Lake, Id. . . .	4	336 (330-342)	134 (130-138)	52 (51-53)
Cœur d'Alene, Id.	10	333 (321-350)	135 (125-142)	51.7 (47-54)
Mullan, Id.	4	338 (318-345)	135 (129-139)	51 (49-53)
St. Mary's Lake, Mont. . .	6	331.5 (322-345)	135 (132-143)	50.5 (50-51)
Colville, Wash.	9	336 (323-353)	129 (124-136)	50.8 (49-52)
Wallowa Lake, Ore.	6	327 (316-345)	135 (128-141)	51.2 (49-53)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Anterior width of Nasals.
Cœur d'Alene, Id..	4	47.6 (46-48.5)	14.8 (14.4-15.6)	14.6 (14.2-15)	7 (6.7-7.2)
Mullan, Id.	3	47.7 (47.2-48.6)	14.2 (14-14.5)	14.5 (14-15.2)	7.3 (7-7.7)
Moscow, Id	3	47.5 (47-48.6)	14.9 (14.8-15)	14.5 (14.8-15)	7 (7-7.2)
St. Mary's La., Mt.	5	47.6 (46.3-49.3)	14.5 (14-15)	14.4 (13.8-15)	7 (6-7.3)
Wallowa Lake, Or.	5	48 (47.6-48.6)	14.5 (14.2-15)	14.2 (14-14.3)	7.2 (6.8-7.7)
Colville, Wash. . . .	5	47.6 (46.8-48.6)	15 (14.5-15.2)	14.2 (13.2-14.7)	7 (6.6-7.2)

Geographic Range.—Western border of northern Montana, central and northern Idaho, northeastern Oregon, northeastern Washington, and thence northward into southeastern British Columbia—in other words, the Bitterroot and Cœur d'Alene Mountains on the western border of Montana; the Lost River, Salmon River, Pahsimeroi and Saw Tooth Mountains in central Idaho, and westward in the Craig and Seven Devils Mountains to the Powder River and Blue Mountains of Oregon; thence through northern Idaho, and west in the mountains of northeastern Washington to Colville, and northward into the Kootenai District of eastern British Columbia. The extent of its range northward along the main Rocky Mountains cannot now be determined, owing to absence of material from the area in question. It appears to reach its maximum of differentiation in the Cœur d'Alene and Bitter Root Mountains, although specimens from central Idaho (the type region) are scarcely distinguishable.

Material Examined.—Total number of specimens, 164, from the following localities and sources:

Idaho:¹ Head of Big Lost River (type locality), Sept. 25, Dr. C. H. Merriam and V. Bailey, 1 spec.; head of Wood River, Sept. 25, Merriam and Bailey, 1 spec.; Saw Tooth Lake, Sept. 26-28, Merriam and Bailey, 5 spec.; Saw Tooth City, Oct. 2, A. H. Howell, 1 spec.; Birch Creek, Aug. 6-11, V. Bailey and B. H. Dutcher, 4 spec.; Crow Creek, July 30, V. Bailey, 1 spec.; Lost River Mts., July 29, V. Bailey, 2 spec.; Pahsimeroi Mts., Sept. 14-15, Merriam and Bailey, 5 spec.; Salmon River Mts., Aug. 19-Sept. 5, Merriam, Bailey, Dutcher and Streator, 15 spec.; Seven Devils Mts., Sept. 2, V. Bailey, 1 spec.; Craig Mts., Aug. 27, V. Bailey, 3 spec.; Moscow, Latch Co., April 8-13, Clay McNamee, 8 spec. (A. M. N. H.); do. Aug. 31, Clay McNamee, 4 spec.; do. April 10, 2 spec. (U. S. N. M.); Mullan, Shoshone Co., June 8-16, C. P. Streator, 7 spec.; Fort Sherman, Kootenai Co., March 4 and Dec. 4, Dr. J. C. Merrill, 2 spec.; Camp Kootenai, Aug. 30, Dr. J. C. Kennerly, 1 spec. (U. S. N. M.); St. Mary's, Oct. 1, Dr. George Suckley, 2 spec. (U. S. N. M.); Priest Lake, Kootenai Co., Sept. 30-Oct. 2, R. T. Young, 3 spec.; Bonners Ferry, Kootenai Co., July 15, J. A. Loring, 1 spec.; Fiddle Creek, Kootenai Co., Sept. 3, A. H. Howell, 1 spec.; Cœur d'Alene, Kootenai Co., May 25-30, C. P. Streator, 10 spec.; do. Aug. 12, A. H. Howell, 3 spec.

¹ All from U. S. Department of Agriculture Collection.

Oregon:¹ Wallowa Lake, Aug. 25–Sept. 14, V. Bailey and R. T. Young, 6 spec. ; Elgin, Blue Mts., May 28, E. A. Preble, 2 spec. ; Meacham, Blue Mts., June 2, E. A. Preble, 1 spec.

Washington:¹ Blue Creek, Blue Mts., Aug. 30–Sept. 3, C. P. Streator, 7 spec. ; Marshall, Spokane Co., Oct. 8, 9, C. P. Streator, 6 spec. ; Loon Lake, Stevens Co., Sept. 26, V. Bailey, 1 spec. ; Colville, Stevens Co., April 28–30, C. P. Streator, 15 spec.

Montana:² Thompson's Pass, Missoula Co., July 29–Aug. 6, A. H. Howell, 5 spec. ; Silver, Missoula Co., June 24–26, C. P. Streator, 3 spec. ; Flathead Lake, June 13, A. H. Howell, 1 spec. ; Coram, Flathead Co., June 25, A. H. Howell, 1 spec. ; Paola, Flathead Co., June 20, V. Bailey, 1 spec. ; Tobacco Plains, Flathead Co., July 4–6, Bailey and Howell, 3 spec. ; Bear Creek, Flathead Co., June 19, A. H. Howell, 1 spec. ; Summit, Teton Co., June 14, 15, V. Bailey, 5 spec. ; St. Marys Lake, Teton Co., June 1–6, V. Bailey, 4 spec. ; do. May 24 and June 4, A. H. Howell, 2 spec. ; Bitter Root Valley, winter, J. Pearsall, 8 spec. (U. S. N. M.).

British Columbia: Nelson, Kootenai Dist., July 20, J. A. Loring, 3 spec. (Dept. Agr. Coll.); do. Aug. 16–19, S. N. Rhoads, 5 spec. (Coll. S. N. R.); Deer Park, Prof. J. Macoun, 1 spec. (A. M. N. H.).

The Nelson specimens are not typical, they strongly approaching *S. h. streatori*, particularly in size, and for this reason the measurements of the Nelson specimens are entered with the measurements of *streatori* (see p. 268).

***Sciurus hudsonicus streatori*, subsp. nov.**

STREATOR'S CHICKAREE.

Winter Pelage.—Similar to that of *S. h. richardsonii*, but with much less black in the tail. Above with the broad dark chestnut rufous median band vermiculated with black; below gray or grayish white, the hairs extensively plumbeous at base, then white strongly vermiculated with black, giving a gray effect; dusky lateral line generally wanting or obsolete. Tail above with the central area rufous chestnut, grizzled with black, and occupying nearly the whole surface, being broad and extending nearly four-fifths the length of the tail; a narrow submarginal zone of black, and a subapical broad bar of black; outer fringe pale yellowish, well developed; tail below with a very broad central area of grizzled gray and black, faintly suffused with pale fulvous.

Summer Pelage.—Above similar to that of *S. h. richardsonii*, but general color more olivaceous and less rufous; tail with the black portions greatly reduced and the outer yellowish fringe more developed, essentially as in winter. Lateral line very broad and black.

¹ All from U. S. Department of Agriculture Collection.

² From U. S. Department of Agriculture Collection, unless otherwise credited.

There is much individual variation in the color of the dorsal surface, some specimens being dark olivaceous, as dark as in *S. douglasii*, while others are as ruddy as average examples of *S. h. richardsonii*.

MEASUREMENTS.

	No. of Spec.	Total Length.	Tail Vertebrae.	Hind Foot.
Nelson, B. C. ¹	5	312 (280-315)	114 (110-116)	50 (49-51)
Lac la Hache, B. C. ¹ ...	4	316 (300-325)	114.5 (100-123)	49 (47-50)
Field, B. C. ¹	3	316 (290-330)	124 (115-130)	50 (49-51)
Vernon, B. C. ¹	8	322 (315-330)	122 (120-128)	51.3 (50-52)
Bounaparte, B. C. ¹	3	316 (308-320)	119 (110-120)	50 (49-51)
Ashcroft, B. C. ²	10	332 (296-355)	129 (105-144)	51.4 (50-54)
Kamloops, B. C. ²	7	315 (282-341)	133 (128-144)	51.4 (51-52)
Shuswap, B. C. ²	9	318 (280-340)	127 (107-141)	52 (49-54)

SKULLS.

	No of Spec.	Length.	Postorbital Breadth.	Length of Nasals	Anterior Width of Nasals.
Ashcroft, B. C.	6	48 (47-49.2)	14.6 (13.8-15.7)	14.6 (13.4-15)	7 (6.5-8)
Kamloops, B. C.	3 ³	47.2 (47-47.7)	14.1 (13.8-14.6)	13.5 (13-14)	7 (6.8-7.2)
Shuswap, B. C.	4	48 (47-48)	14.2 (14-14.5)	13.9 (13.5-14.3)	7 (6.7-7.2)

Type, No. 2054, Am. Mus. Nat. Hist., ♂ ad., Ducks, British Columbia, Aug. 3, 1889; C. P. Streator, for whom this subspecies is named.

Geographic Range.—Central part of northern Washington, from the Columbia River northward over central British Columbia. It occupies the Okanagan District of Washington, from the head of Lake Chelan northward. At Lake Chelan and Fort Spokane it meets *S. douglasii* without intergrading; at Marcus and Conconully it intergrades with *S. h. richardsonii*, which occupies the area immediately to the eastward, as it does also in the Kootenai District, in south-eastern British Columbia.

Material Examined.—Total number of specimens, 93, from the following localities and sources:

Washington:⁴ Fort Spokane, Spokane Co., Sept. 27, 28, C. P. Streator, 5 spec.; Cheney, July 22, J. A. Loring, 1 spec.; Conconully, Okanagan Co., Sept. 8-10, J. A. Loring, 3 spec.; head of Lake Chelan, Okanagan Co., Aug. 19, 20, C. P. Streator, 2 spec.; Marcus, Stevens Co., Sept. 21, Bailey and Young, 4 spec., and one typical *richardsonii*.

British Columbia:⁵ Ducks (type locality), Aug. 1-16, C. P. Streator 5 spec. (A. M. N. II.); Kamloops, Aug. 20-28, C. P. Streator, 7 spec. (A. M. N. H.); do., June 18, Prof. J. Macoun, 1 spec. (A. M. N. H.); do., July 14, S. N. Rhoads, 2 spec. (Coll. S. N. R.); Ashcroft, June 26 and

¹ Collected and measured by S. N. Rhoads

² Collected and measured by C. P. Streator.

³ All rather young.

⁴ All from U. S. Department of Agriculture Collection.

⁵ From U. S. Department of Agriculture Collection, when not otherwise credited.

July 9-12, C. P. Streator, 5 spec. (A. M. N. H.); do., Aug. 11-13, C. P. Streator, 10 spec.; do., June 4, 9, S. N. Rhoads, 2 spec. (Coll. S. N. R.); Shuswap, Sept. 3-6, C. P. Streator, 9 spec.; Sicamous, Oct. 1, 2, C. P. Streator, 4 spec.; Vernon, July 20-Aug. 6, S. N. Rhoads, 14 spec. (Coll. S. N. R.); Revelstoke, April 13, Prof. J. Macoun, 1 spec. (A. M. N. H.); Field, Aug. 27, S. N. Rhoads, 5 spec. (Coll. S. N. R.); Glacier, Aug. 11, 12, J. A. Loring, 2 spec.; Bounaparte, June 14-16, S. N. Rhoads, 3 spec. (Coll. S. N. R.); Clinton, June 20-July 6, S. N. Rhoads, 4 spec. (Coll. S. N. R.); Lac la Hache, July, S. N. Rhoads, 4 spec. (Coll. S. N. R.).

S. hudsonicus streatori is closely related to *S. h. richardsonii*, with which it intergrades along the western and northern border of the range of the latter, namely, in the Kootenai District of British Columbia and in eastern Spokane County, Washington. Specimens from Fort Spokane, Cheney, Conconully, and Marcus, Washington, are about as well referable to one form as the other. Of five specimens from Marcus, one is typical *richardsonii*, while the others are *streatori*. At the westward, in the coast region of British Columbia, it intergrades with *S. h. vancouverensis*. The northern limit of its range is not at present determinable.

It differs from true *S. h. richardsonii* in the greatly reduced amount of black in the tail, and the more olivaceous tone of its upper surface in summer pelage. *It also has a much shorter tail.* It differs from *S. h. vancouverensis* as pointed out under that form. Specimens from Field and Glacier, in the Rocky Mountains, on the line of the Canadian Pacific Railway, shade strongly toward *richardsonii*.

Sciurus hudsonicus vancouverensis Allen.

VANCOUVER CHICKAREE.

Sciurus hudsonicus vancouverensis ALLEN, Bull. Am. Mus. Nat. Hist. III, 1890-91, 165 (Nov. 14, 1890). Duncan Station, Vancouver Island, B. C.

Winter Pelage.—Above like *S. h. richardsonii*, except that the black area of the tail is one-half to two-thirds smaller; below gray with a brownish tinge, sometimes brownish heavily vermiculated with dusky; generally the hairs are ashy-white, finely and profusely vermiculated with dusky, with only a slight tinge of brownish; tail nearly as in *S. h. streatori*.

Summer Pelage.—Above dark olivaceous, sometimes with a tinge of reddish—nearly as in *S. h. streatori* and *S. douglasii*; below white, generally with a tinge of fulvous, varying to a strong wash of pale yellow.

MEASUREMENTS.¹

	No. of Spec.	Total Length.	Tail Vertebræ.	Hind Foot.
Wellington, Vanc. Isl.	1	303	124	50
Goldstream, Vanc. Isl.	11	308 (295-325)	120 (104-130)	50.1 (49-52)
Comox, Vanc. Isl.	4	309 (303-315)	120 (114-128)	50.4 (50-52)
Wrangel, Alaska.	7	297 (290-310)	115 (103-121)	49.4 (48-52)
Loring, Alaska.	4	296 (290-305)	118 (110-124)	49.5 (49-50)
Juneau, Alaska.	6	307 (300-315)	126 (120-132)	49.7 (48-51)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Anterior Width Nasals.
Duncan, Vanc. Isl.	5	45.6 (44.5-46)	14.6 (14.3-15)	12.8 (12-13.6)	6.5 (6-6.8)
Comox, Vanc. Isl.	3	45.7 (45-46.3)	15.2 (14.9-15.8)	12.6 (12.3-13)	7 (6.8-7.3)
Goldstream, Vc. Isl.	9	46.3 (45.6-47.3)	15.6 (14.6-15.6)	13 (12.4-13.4)	7.3 (6.8-7.6)
Wrangel, Alaska.	9	44.7 (43.3-46.3)	15.2 (14.2-15.8)	12.6 (12-13.4)	6.6 (6.2-7.3)
Loring, Alaska.	4	44.8 (44.6-45.1)	14.9 (14.8-15)	13.3 (13-13.6)	6.5 (6.2-7.2)
Juneau, Alaska.	4	44.2 (43.2-45)	14.6 (14.1-15)	12.6 (12.3-12.8)	6.5 (6.2-7)

Geographic Range.—Vancouver Island, and the coast region of northern British Columbia, north at least to Sitka.

*Material Examined.*²—Total number of specimens, 90, from the following localities and sources:

Vancouver Island: Duncan Station, Oct. 1-9, C. P. Streator, 7 spec. (A. M. N. H.); Goldstream, May 9-23, C. P. Streator, 15 spec.; do., June 5-23, S. N. Rhoads, 16 spec. (Coll. S. N. Rhoads); Comox, May 31-June 8, C. P. Streator, 4 spec.; do., June 23, F. W. True and Dr. D. W. Prentiss, 2 spec. (U. S. N. M.); Wellington, May 23, C. P. Streator, 1 spec.; Departure Bay, May and Aug., C. H. Townsend, 7 spec. (U. S. N. M.); Victoria, June and July, S. N. Rhoads, 3 spec. (Coll. S. N. R.).

British Columbia: Inverness, mouth of Skeena River, Aug. 23, E. A. Preble, 1 spec.

Alaska: Wrangel, Aug. 31-Sept. 10, C. P. Streator, 13 spec.; do., Summer, 1 spec. (Coll. C. H. M.); Yakutat, July 13, C. P. Streator, 1 spec.; Loring, Sept. 19, 20, C. P. Streator, 8 spec.; Juneau, Aug 16-25, C. P. Streator, 11 spec.

The Alaska specimens appear to be rather smaller than those from Vancouver Island, but the difference is probably more apparent than real, as with a few exceptions the Alaska specimens are young of the year, taken mostly in August, while the Van-

¹ All collected and measured by C. P. Streator. Several of the Alaska specimens are evidently young of the year, which doubtless accounts for the slightly smaller size of the Alaska series.

² From U. S. Department of Agriculture Collection, when not otherwise credited.

couver specimens, of which measurements are here given, are all adult,—May and June specimens.

The peculiar faint yellowish wash below, which is very different in tone and appearance from that of members of the *douglasii* group, is quite a pronounced feature in *vancouverensis*, though shared, but in less degree, by both *streatori* and *baileyi*. In winter pelage, in *vancouverensis*, this pale rusty or fulvous tint suffuses the heavily vermiculated under surface, which is only a little less prominent, but of a different shade, than in the winter pelage of *S. douglasii*.

Sciurus hudsonicus vancouverensis was based originally on six specimens in summer pelage from Duncan Station, Vancouver Island. In the original description (*l. c.*) it was compared with what is here recognized as *S. h. streatori*, no specimens of true *S. h. richardsonii* being then at hand. The measurements given were only approximate, being taken from skins badly prepared. The present material renders it possible to give correct measurements, and to make full comparison with its allies.

S. h. vancouverensis is closely related to *S. h. streatori*, with which it intergrades near the coast region of British Columbia. It is a coast form resembling in coloration *S. h. richardsonii* of the interior mountains, except that in winter pelage the ventral surface is more heavily vermiculated and more or less suffused with brownish. In this last feature it differs markedly from *S. h. streatori*, as well as in being less olivaceous and more suffused with rufous in summer pelage. It is also smaller than *S. h. streatori*, and consequently very much smaller than *S. h. richardsonii*.

REVIEW OF THE *Sciurus hudsonicus* GROUP.

The *Sciurus hudsonicus* group is made up of a number of closely related, intergrading forms, the most strongly differentiated of which, in their extreme phases, are true *S. hudsonicus* of the Arctic districts, the somewhat isolated *S. h. dakotensis* of the Black Hills region of South Dakota, and *S. h. richardsonii* of the mountains of central Idaho and the Cœur d'Alene and Bitter Root regions of northern Idaho and adjoining parts of Montana and Washington. Taking the range of *S. h. richardsonii* as a point of departure, we have two pale forms adjoining *S. h. richardsonii* on

the east and south—to the east and southeast the *S. h. baileyi*, a pale form of the more arid region between the plains and the eastern base of the Rocky Mountains, in central and southeastern Wyoming and eastern Montana; to the southward, *S. h. ventorum*, a less pale form of the Wind River region, and thence southward to the Wasatch range. West of the Rocky Mountains, to the northward, and cut off from the range of *S. h. ventorum* by the intervention of typical *S. h. richardsonii* and *S. douglasii californicus*, we meet with *S. h. streatori*, a pale form of the somewhat arid interior of British Columbia, and to the west of this, in the Columbian and Sitkan coast region (including Vancouver Island) the darker and more heavily vermiculated and suffused *S. h. vancouverensis*. None of these forms are strongly marked except *S. h. richardsonii*, which, however, unquestionably intergrades with *baileyi*, *ventorum* and *streatori*; but the slight differences in all these forms are fairly constant (allowing for exceptional individual variation) over large areas, characterized respectively by well marked differences in physical conditions.

Besides the differences in the general coloration of the upper parts, the greatly lessened amount and darker tint of the red in the tail is a striking feature of the western forms as compared with the eastern. The red in the tail is at the maximum and lightest in tint in *S. h. dakotensis*; there is much less in *S. h. baileyi*, a further reduction and darkening of the tint in *S. h. ventorum*, *S. h. streatori*, and *S. h. vancouverensis*, the greatest reduction, however, and the darkest tint occurring in *S. h. richardsonii*.

In the East, south of Canada and northern New England and northern New York, only *S. h. loquax* occurs; it intergrades at the northward with *S. hudsonicus*, with a rather broad connecting area where neither form is typically represented. Within the area of *loquax*, as here assigned, there is no very well defined variation in coloration characteristic of particular areas, whatever may exist being masked by the wide range of individual variation at all seasons. Variations in size with locality, however, are quite marked, with, at the same time, such gradual intergradation over the intervening areas, and with no very tangible color differences, that it has not been deemed advisable to recognize in nomenclature local variations in size, although very marked when

the extremes are compared, as, for example, northern Maine and New Brunswick with southern Minnesota and Wisconsin.

As melanistic examples of the *Sciurus hudsonicus* group are extremely rare, it may be of interest to note that the present material includes one example, in winter pelage, wholly intense black. It was collected by Dr. W. H. Dall, at Nulato, Alaska, and is No. 8930 of the U. S. National Museum collection (original No. 502).

Sciurus douglasii Bachman.

DOUGLAS'S CHICKAREE.

Sciurus douglasii GRAY, Proc. Zoöl. Soc. Lond. 1836, 88 (*nomen nudem*); BACHMAN, Proc. Zoöl. Soc. Lond. 1838, 99 ("Columbia River," summer pelage); BAIRD, Mam. N. Am. 1857, 275 (in part).

Sciurus hudsonius douglasii ALLEN, Proc. Bost. Soc. N. H. XVII, 1874, 288; Mon. N. Am. Roden. 1877, 673 (in part).

Sciurus belcheri GRAY, Ann. & Mag. Nat. Hist. X, 1842, 263; Zoöl. Voy. Sulphur, I, 1845, 33, pl. xii, fig. 2. Mouth of Columbia River.

Sciurus suckleyi BAIRD, Proc. Acad. Nat. Sci. Phila. 1855, 333; Mam. N. Am. 1857, 276, footnote. Puget Sound, winter pelage.

Winter Pelage.—Above with a broad median band of dark ferruginous, the hairs ringed near the tip with black and chestnut; rest of upper parts, limbs and feet, dark brownish gray, the hairs being ringed with a much lighter shade of ferruginous than on the back, the general effect tending to gray; dusky lateral line generally present, varying from obsolete to well defined; under parts strong buffy gray varying to ochraceous, profusely vermiculated with black, the general effect in average specimens being buffy gray. Tail above centrally for two-thirds its length of nearly the same color as the median dorsal band, but more coarsely varied with black, and with the tips of the hairs yellow or yellowish; the black submarginal zone narrow and obscured; a broad subterminal band of black; outer fringe of tail yellow or yellowish, narrowest across the end of the tail; below the tail is grizzled rusty and black, with the submarginal black zone and the broad subterminal black band more distinct than above, as is also the yellow marginal fringe. Ears conspicuously tufted with blackish.

Summer Pelage.—Above dark olivaceous brown with a tinge of reddish, the hairs being minutely punctated with deep ferruginous; lateral line broad and intensely black; feet deep orange rufous, extending with diminishing intensity to the shoulder; ventral surface orange, varying from orange yellow to deep reddish orange; tail much as in winter pelage but narrower and less full.

In general effect the color, both above and below, in both pelages, is subject to much individual variation, but especially in summer, dependent upon the

depth of the rufous suffusion above, and of the intensity of the orange tint below. In coördination with this the tail fringe varies from deep yellowish rufous to yellowish white.

MEASUREMENTS.

	No. of Spec.	Total Length.	Tail Vertebræ.	Hind Foot.
Marshfield, Ore. ¹ ...	6	316 (305-336)	123 (113-132)	49.5 (49-50)
Yaquina Bay, Ore. ² .	4	314 (295-343)	127 (117-144)	48.5 (47-50)
Newport, Ore. ²	5	316 (310-323)	129 (121-134)	50 (49-51)
Neah Bay, Wash. ³ ..	14	315 (305-325)	128 (122-135)	50 (49-51)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Breadth of Nasals.
Marshfield, Ore..	3	47 (46-48.2)	14.7 (14.5-15)	14 (12.8-14)	6 (5.5-6.2)
Yaquina Bay, Ore.	5	46.7 (45-47.5)	14.7 (14.2-15.2)	13.3 (12-14)	6.5 (6-7)
Neah Bay, Wash..	5	46 (44.5-47)	14.4 (14-16)	12.7 (12.5-13)	6.9 (6-7.2)

Geographic Range.—The immediate vicinity of the Pacific coast in Oregon and Washington, from about Cape Blanco to Juan de Fuca Strait. In its extreme development it is limited to within about 50 to 100 miles of the coast. To the southward it merges into *S. d. mollipilosus*, and to the eastward grades into *S. d. cascadenis*. Specimens from Myrtle Point, Coos Co., Oregon, are apparently intergrades with *mollipilosus*; specimens from Glendale and Cleveland, Douglas Co., and from Eugene, Lane Co., Oregon, have the tail fringed with white, but the under parts are much more ochraceous than in true *cascadenis*. North of Eugene, *S. douglasii* appears to reach the Willamette Valley, as shown by specimens from Corvallis, Salem and Portland; while Kalama specimens from further north, on the Columbia River, are more or less intermediate between the true coast and the Cascades forms. Further north in Washington, specimens from Tenino (Thurston Co.) and Roy (western Pierce Co.) have the white-fringed tails of the interior form, while Fort Steilacoom, Tacoma, and Port Townsend specimens are referable to the coast form. There are no specimens from east of the great net-work of sounds connected with Admiralty Inlet, so that whether the coast form occurs to the eastward of these waterways present material does not determine, but it seems probable, as specimens from Mt. Vernon, Hamilton and Sauk, in the Skagit Valley, are either the coast form or intermediates closely approaching it. Further north, however, on the east coast of the Strait of Georgia, *S. douglasii* is replaced by *S. d. cascadenis*, the white-tailed form found further south only in the interior.

¹ Collected and measured by J. E. McLellan.

² Collected and measured by B. J. Bretherton.

³ Collected and measured by E. A. Preble and R. T. Young.

*Material Examined.*¹—Total number of specimens, 120, from the following localities and sources :

Oregon: Type, "Columbia River," J. K. Townsend (Coll. Acad. Nat. Sci. Phila.); Marshfield, Coos Co., Aug. 25-30, J. E. McLellan, 7 spec.; Scottsburgh, Douglas Co., Sept. 19, J. E. McLellan, 1 spec.; Gardiner, Douglas Co., Sept. 4, J. E. McLellan, 1 spec.; Florence, Lane Co., Sept. 24, J. E. McLellan, 1 spec.; Seaton, Lane Co., Oct. 10, J. E. McLellan, 2 spec.; Yaquina Bay, Lincoln Co., March 8 and July 27, B. J. Bretherton, 4 spec.; do., Dec. 7, C. P. Streator, 1 spec.; Newport (on Yaquina Bay) Aug. 3, 5, 31, and Sept. 4, B. J. Bretherton, 6 spec.; Grand Ronde, Polk Co., Nov. 27, J. E. McLellan, 1 spec.; McCoy, Yamhill Co., Oct. 19, B. J. Bretherton, 1 spec.; Tillamook, Tillamook Co., June 30, Dr. A. K. Fisher, 1 spec.; do., Nov. 8, J. E. McLellan, 1 spec.; Astoria, Clatsop Co., July 30, Dr. T. S. Palmer, 1 spec.; Forest Grove, Washington Co., July 7-9, C. McNamee, 2 spec.; Beaverton, Washington Co., June 1, 1 spec. (Coll. C. H. M.); do., Feb. 8-March 26, A. W. Anthony, 3 spec. (U. S. N. M.); Portland, June 24, Dr. A. K. Fisher, 1 spec.; Eagle Creek, Clackamas Co., Nov. 18, B. J. Bretherton, 1 spec.; Salem, Nov. 1-16, C. P. Streator, 4 spec.; Colquit City, F. S. Matteson, 1 spec. (U. S. N. M.).

Washington: Kalama, Cowlitz Co., Oct. 14, 15, C. P. Streator, 7 spec. (not typical); Pacific Co., April 29, July 17-21, A. H. Helme, 4 spec. (A. M. N. H.); Cape Disappointment, Pacific Co., Oct. 14, 15, C. P. Streator, 5 spec. (A. M. N. H.); Aberdeen, Chehalis Co., Aug. 13, Dr. T. S. Palmer, 1 spec.; Quinniault Lake, Chehalis Co., July 17, R. T. Young, 1 spec.; Chehalis Co., March 1 and Nov. 14, Dr. L. C. Tony, 2 spec. (Coll. C. H. M.); Steilacoom, Pierce Co., Aug. 27-30, Dr. T. S. Palmer, 3 spec.; do., Oct. 7, C. P. Streator, 1 spec.; Fort Steilacoom, Jan. and March, Dr. Geo. Suckley, 3 spec. (*Sciurus suckleyi* Baird—U. S. N. M.); American Lake, Pierce Co., March 25, S. N. Rhoads, 2 spec. (Coll. S. N. R.); Tacoma, Pierce Co., Aug. 20, Dr. A. K. Fisher, 1 spec.; Nesqually, Pierce Co., April 4-17, S. N. Rhoads, 5 spec. (Coll. S. N. R.—the Pierce County specimens are not typical); North Fork of Skokomish River (Olympic Mts.), Aug. 26-31, B. J. Bretherton, 5 spec.; Lake Cushman, Mason Co., June 27 and July 7, C. P. Streator, 2 spec.; Port Townsend, Aug. 28, 29, Dr. C. Hart Merriam, 2 spec. (Coll. C. H. M.); Neah Bay, Clallam Co., May 25-June 8, R. T. Young, 10 spec.; do., May 15-June 8, E. A. Preble, 4 spec.; do., Aug. 31, Sept. 1, Dr. C. Hart Merriam, 3 spec. (Coll. C. H. M.); Suez, Clallam Co., May 18, R. T. Young, 2 spec.; Lapush, Clallam Co., June 16-18, R. T. Young, 3 spec.; Mt. Vernon, Skagit Co., Sept. 7, Dr. T. S. Palmer, 1 spec.; do., Dec. 28, C. P. Streator, 1 spec.; do., June 29, E. A. Preble, 1 spec.; Sauk, Skagit Co., Sept. 11, C. P. Streator, 1 spec.; Hamilton, Skagit Co., Sept. 11-14, C. P. Streator, 8 spec.; Simiahmoo, Whatcom Co., Sept., Dr. J. H. Kennerly, 1 spec. (U. S. N. H.).

¹ From U. S. Department of Agriculture Collection, when not otherwise credited.

Sciurus douglasi mollipilosus *Aud. & Bach.*

REDWOOD CHICKAREE.

Sciurus mollipilosus AUD. & BACH. Proc. Acad. Nat. Sci. Phila. 1842, 316 ;
Quad. N. Am. I, 1849, 157, pl. xix. Coast of Northern California.
Sciurus hudsonicus orarius BANGS, Proc. Biol. Soc. Wash. XI, 1897, 281,
Dec. 30, 1897. Philo., Mendocino Co., Cal.

Winter Pelage.—Above similar to *S. douglasii*, but the median dorsal band is less dark, and the sides are more decidedly grayish in general effect ; below pale buffy gray, heavily vermiculated with black. Tail nearly as in *S. cascadenis*, being fringed with white instead of yellow.

The coloration below is generally gray with a slight tinge of buff, but varies to strong buff.

Summer Pelage.—Very similar, both above and below, to *S. douglasii*, except that the tail is fringed with white ; the general tone of the upper parts, however, is more olivaceous and less ferruginous, and the lower parts are less deeply tinted.

MEASUREMENTS.

	No. of Spec.	Length.	Tail Vertebrae.	Hind Foot.
Crescent City, Cal. ¹	4	321 (316-330)	126 (123-135)	50.8 (50-52)
Sherwood, Cal. ²	5	314 (299-336)	135 (127-147)	46.5 (45-50)
Willets, Cal. ²	3	317 (314-347)	135 (121-146)	50 (45-55)
Philo, Cal. ³	14	316 (302-327)	136 (127-148)	50.8 (50.8-50.8)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Width of Nasals.
Crescent City, Cal.	3	46.6 (45.6-47.3)	15.4 (15.3-15.6)	13.6 (13-14.6)	7.1 (7-7.2)
Willets, Cal.	2	45.5 (43.6-46.5)	14.7 (14.5-14.8)	13 (12.8-13.1)	6.5 (6-7)
Sherwood, Cal.	5	44.3 (42.4-45.8)	14.7 (14.2-15)	12.7 (12.2-13)	6.8 (6.2-7.6)

Geographic Range.—Pacific coast region of northern California, west of the Coast Range, from Sonoma County (Petaluma) north into Curry County (Port Oxford), Oregon. Grades into *S. d. californicus* in the Siskiyou region.

*Material Examined.*⁴—Total number of specimens, 16, from the following localities and sources :

California : Cazadero, Mendocino Co., July 4, J. E. McLellan, 1 spec. ; Willets, Mend. Co., alt. 1700-2000 ft., F. Stephens, May 5 and 22, 3 spec. ; Sherwood, Mend. Co., alt. 2400-2700 feet, May 9-12, F. Stephens, 6 spec. ; Eureka, Humboldt Co., May 23, Dr. T. S. Palmer, 1 spec. ; Crescent City, Del Norte Co., June 25, Dr. T. S. Palmer, 3 spec. ; Gasduct, Del Norte Co., Oct. 25, J. A. Loring, 1 spec.

Oregon : Port Oxford, Curry Co., Aug. 16, J. E. McLellan, 1 spec.

¹ Collected and measured by Dr. T. S. Palmer.

² Collected and measured by F. Stephens.

³ Collected and measured by C. A. Allen (from Bangs, Proc. Biol. Soc. Wash., Vol. XI, 1897, p. 282).

⁴ All from U. S. Department of Agriculture Collection.

Sciurus douglasii cascadenis, subsp. nov.

CASCADES CHICKAREE.

Winter Pelage.—Almost indistinguishable, both above and below, from *S. d. mollipilosus*, being similarly characterized by the white fringed tail and rather paler tints, in comparison with *S. douglasii*.

Summer Pelage.—More olivaceous above and less deeply orange below than either *S. douglasii* or *S. d. mollipilosus*, varying from yellowish buff to buffy ochraceous, thus strongly approaching *S. d. californicus*, with which it intergrades to the east and south.

MEASUREMENTS.

	No. of Spec.	Length.	Tail Vertebræ.	Hind Foot.
Mt. Hood, Ore. ¹	2	325 (320-330)	135 (130-138)	50.5 (50-51)
Bald Mt., Ore. ³	1	322	132	51
Mt. Ranier, Wash. ²	1	303	125	50
Lake Chelan, Wash. ⁴	11	333 (315-348)	133 (113-146)	52.8 (51-54)
Hamilton, Wash. ⁴	8	287 (270-325)	115.6 (102-125)	48.6 (47-51)
Port Moody, B. C. ⁴	17	309 (290-318)	123 (116-131)	49 (46-51)
Agassiz, B. C. ⁴	9	307 (292-321)	125 (113-132)	50.9 (48-52)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	NASALS.	
				Length.	Ant. Breadth.
Hamilton, Wash.	2	46.4 (45.8-47)	14.9 (14.8-15)	13.2 (12.4-14)	6.7 (6.5-7)
Lake Chelan, Wash.	5	48.5 (47.6-49)	14.5 (14-15)	13.8 (13.3-14.3)	7 (6.7-7.1)
Port Moody, B. C.	5	45.1 (43.6-46)	14.9 (14.5-15.4)	12.9 (12.4-13.4)	6.3 (6-6.6)
Agassiz, B. C.	4	45.9 (45-46.6)	14.6 (14.3-15.2)	13.1 (12-14.2)	6.3 (6-6.7)
N. Westminster, B. C.	8	46.2 (46-46.5)	14.9 (14-15.3)	13.7 (13-14.6)	6.5 (6.2-7)

Geographic Range.—The Cascades region of Oregon and Washington, north into British Columbia, including also the coast region at the mouth of the Fraser River, and north at least to Rivers Inlet (about 51° 30'), some fifty miles north of Vancouver Island. In Oregon this form prevails south in the Cascades to the vicinity of Fort Klamath; and, west of the Cascades, to Glendale, Cleveland, Eugene and Sweet Home, and in Washington, to Tenino, Roy and Snoqualmie Falls.

Type, No. 80,229, U. S. Nat. Mus. (Dept. Agr. Coll.), ♂ ad., Mt. Hood, Oregon, Sept. 9, 1896; V. Bailey.

¹ Collected and measured by V. Bailey.

² Collected and measured by Dr. A. K. Fisher.

³ Collected and measured by B. J. Bretherton.

⁴ Collected and measured by C. P. Streater.

*Material Examined.*¹—Total number of specimens, 107, from the following localities and sources :

Oregon : Glendale, Douglas Co., Dec. 18 (C. P. Streator), and June 18 (Dr. A. K. Fisher), 2 spec. ; Elk Head, Douglas Co., April 20, A. Todd, 1 spec. (U. S. N. M.) ; Eugene, Lane Co., Nov. 21, C. P. Streator, 1 spec. ; Sweet Home, Linn Co., Nov. 28, and Jan. 27, W. C. Swann, 3 spec. (U. S. N. M.) ; Bald Mt., head of Clackamas River, Nov. 10, B. J. Bretherton, 1 spec. ; Eagle Creek, Clackamas Co., Nov. 18, B. J. Bretherton, 1 spec. ; Permillia Lake, west base of Mt. Jefferson, Oct. 2-5, J. A. Loring, 4 spec. ; Mt. Hood, Sept. 9 and 10, V. Bailey, 2 spec.

Washington : Goldendale, Klickitat Co., July 8, W. K. Fisher, 1 spec. ; Cleveland, Klickitat Co., July 28, W. K. Fisher, 2 spec. ; do., July 12, Bailey and Loring, 2 spec. ; Trout Lake, Klickitat Co., June 28, J. A. Loring, 2 spec. ; Tenino, Thurston Co., June 30, R. T. Young, 2 spec. ; Ashford, Pierce Co., Aug. 9, W. K. Fisher, 2 spec. ; Roy, Pierce Co., Aug. 18, V. Bailey, 1 spec. ; Mt. Ranier, Aug. 6, Dr. A. K. Fisher, 1 spec. ; Easton, Kittitas Co., July 3-20, C. P. Streator, 4 spec. ; Kecheelus Lake, Kittitas Co., Aug. 15, Dr. A. K. Fisher, 1 spec. ; Wenatchee, Kittitas Co., Sept. 19, J. A. Loring, 3 spec. ; Natchez River, Yakima Co., July 28, W. K. Fisher, 1 spec. ; Snoqualmie Falls, Kings Co., June 1, C. H. Townsend, 3 spec. (U. S. N. M.) ; head of Lake Chelan, Okanagan Co., Aug. 13-21, C. P. Streator, 10 spec. (not typical, they approaching *californicus*, particularly in large size, and somewhat in color).

British Columbia : Head of Rivers Inlet, Aug. 27-Sept. 3, E. A. Preble, 3 spec. ; Burrard Inlet, May 4, Prof. J. Macoun, 1 spec. (A. M. N. H.) ; Gibson's Landing, Howe Sound, July 23, E. A. Preble, 1 spec. ; Lund, July 16, 17, E. A. Preble, 2 spec. ; Langley, July 9, E. A. Preble, 1 spec. ; Hastings, Nov. 21, C. P. Streator, 1 spec. ; Port Moody, July 26-31, and Oct. 25-Nov. 1, C. P. Streator, 18 spec. ; Mt. Lehman, June 2 and 9, C. P. Streator, 3 spec. (A. M. N. H.) ; New Westminster, April 23-May 20, C. P. Streator, 14 spec. (A. M. N. H.) ; do., Nov. 2, H. W. Elliott, 1 spec. (U. S. N. M.) ; Agassiz, Nov. 28-Dec. 6, C. P. Streator, 9 spec. ; Sumas, March 2 and June 10, S. N. Rhoads, 2 spec. (Coll. S. N. R.).

***Sciurus douglasii californicus* (Allen).**

CALIFORNIA CHICKAREE.

Sciurus hudsonius californicus ALLEN, Bull. Am. Mus. Nat. Hist. III, 1890-91, 165 (Nov. 14, 1890). Blue Cañon, Placer Co., Cal.

Winter Pelage.—Above similar to *S. d. cascadenis*, but the median band of a much paler shade of chestnut, and the general color much lighter and grayer

¹ From U. S. Department of Agriculture Collection, when not otherwise credited.

in general effect. Tail broad and full, with generally less chestnut at the base of the hairs and the outer white fringe much broader and intense, clear white. Ventral surface grayish white, without fulvous tinge and with little or no vermiculation, and this mainly at the sides of the ventral area.

Summer Pelage.—Above similar to *S. d. cascadenis*—almost indistinguishable, in fact, but rather lighter and grayer in general effect. Ventral surface pale fulvous, varying from cream white to pale fulvous; feet ochraceous, with a conspicuous deep ochraceous band along the front edge of the thigh; fore arm ochraceous, the inner surface only a little paler than the outer. Tail narrow and slender, usually very little chestnut at base of hairs, and the fringe pure white, as in winter, but narrower.

The contrast between the coloration of the ventral surface in true *S. douglasii* and typical *S. d. californicus*, in both the summer and winter pelages, is thus very striking, but in the Cascades region of Oregon and Washington, the two completely intergrade through *S. d. cascadenis*.

MEASUREMENTS.

	No. of Spec.	Length.	Tail Vertebrae.	Hind Foot.
Mt. Whitney, Cal. ¹	9	322 (290-344)	131 (116-142)	51.3 (47-55)
Buck's Ranch, Cal. ²	6	319.5 (307-325)	128.3 (126-133)	52 (51-54)
Lassen Creek, Cal. ²	7	341 (331-348)	148 (137-156)	53 (52-55)
Siskiyou, Ore. ³	6	332 (325-338)	131 (126-135)	52.3 (52-54)
Fort Klamath, Ore. ⁴	8	331 (308-340)	137 (126-144)	52.6 (52-55)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Width of Nasals.
Mt. Whitney, Cal.	4	47.4 (47-48.5)	14.3 (13.8-15)	13.4 (12-14.5)	6.9 (6.5-7)
Buck's Ranch, Cal.	4	46.1 (44.6-47)	14.3 (14-15)	12.9 (12-13.4)	6.7 (6.3-7.2)
Donner, Cal.	6	47.9 (47-49)	14.5 (14.3-15)	13.6 (13-14.8)	7 (6.7-7.3)
Siskiyou, Ore.	5	47.4 (46.2-47.8)	14.8 (14.2-15)	13.3 (13-13.5)	6.8 (6.3-7.3)
Fort Klamath, Ore.	4	47.4 (46.5-48.5)	14.9 (14.8-15)	14.1 (14-14.3)	6.9 (6.5-7)

Geographic Range.—The Sierra Nevada region of central and northern California, north in Oregon, east of the Cascades, to the Maury Mountains and Strawberry Butte, over which region it prevails with little change and may be considered typical, and nearly typical *californicus* prevails westward in Oregon to the eastern base of the Cascades, where it passes into *cascadenis*.

Material Examined.⁵—Total number of specimens, 174, from the following localities and sources:

Nevada: Near Bijou, June 4, C. A. Keeler, 3 spec.

¹ Collected and measured by B. H. Dutcher.

² Collected and measured by F. Stephens.

³ Collected and measured by C. P. Streater.

⁴ Collected and measured by Vernon Bailey and E. A. Preble.

⁵ From the U. S. Department of Agriculture Collection, when not otherwise credited.

California: Kern River, Kern Co., Sept. 4, E. W. Nelson, 1 spec.; Kern Lakes, Kern Co., Aug., V. Bailey, 1 spec.; E. Fork of Keweah River, Tulare Co., July 30, V. Bailey, 1 spec.; Mt. Whitney, Tulare Co., June 23-Aug. 31, B. H. Dutcher, 8 spec.; do., Aug. 20 and 31, Dr. Fisher and V. Bailey, 2 spec.; do., Sept 6 and 10, H. W. Henshaw, 5 spec. (U. S. N. M.); Minera! King, Fresno Co., Sept. 9, Dr. A. K. Fisher, 1 spec.; San Joaquin River, Fresno Co., July 25 and 28, E. W. Nelson, 2 spec.; do., alt. 8000 feet, July 28 and 29, F. Stephens, 2 spec.; S. Fork of King River, Fresno Co., Aug. 15, Dr. A. K. Fisher, 1 spec.; Mammoth, Fresno Co., alt. 8400 feet, July 22, F. Stephens, 2 spec.; Bishop Creek, Fresno Co., alt. 8000 feet, Aug. 4, F. Stephens, 1 spec.; Sierra Nevada, Fresno Co., July 22-24, E. W. Nelson, 4 spec.; Sequoia National Park, Merced Co., Aug 4-7, Dr. A. K. Fisher, 4 spec.; S. Fork Merced River, Merced Co., Aug. 3, E. W. Nelson, 1 spec.; Soquel Mill, Merced Co., alt. 5500 feet, Dec. 1 and 2, J. E. McLellan, 2 spec.; Markleville, Alpine Co., alt. 5800 feet, Aug. 30 and Sept. 1, F. Stephens, 2 spec.; Michigan Bluff, Placer Co., Oct. 27, V. Bailey, 1 spec.; Blue Cañon, Placer Co., Oct. 7-13, C. A. Allen, 9 spec. (A. M. N. H.); do, Oct. 16-20 and June 3, 6, C. A. Allen, 4 spec.; Summit, Placer Co., alt. 4500 feet, July 1, F. Stephens, 1 spec.; do., Aug. 19-22, J. E. McLellan, 2 spec.; Atwell's Mill, alt. 6300 feet, Nov. 19, J. E. McLellan, 1 spec.; Pyramid Peak, Eldorado Co., July 18, W. W. Price, 1 spec. (A. M. N. H.); Silver Lake Amidor Co., June 27 and 28, J. Diefenbach, 2 spec. (A. M. N. H.); Donner, Nevada Co., June 1-4, J. A. Loring, 3 spec.; do., June 11-18, C. A. Allen, 6 spec. (Coll. C. H. M.); do., June 7, C. A. Allen, 2 spec. (A. M. N. H.); Nevada City, Nevada Co., Aug. 7-10, C. P. Streator, 6 spec.; Buck's Ranch, Plumas Co., alt. 5100 feet, June 22-24, F. Stephens, 6 spec.; Greenville, Plumas Co., alt. 4500 feet, F. Stephens, 2 spec.; Oroville, Butte Co., alt. 3400 feet, June 17, F. Stephens, 1 spec.; Lassen Creek, Modoc Co., alt. 5200-6000 feet, July 25-Aug. 2, F. Stephens, 10 spec.; Camp Bidwell, Modoc Co., July 25, H. W. Henshaw, 1 spec. (U. S. N. M.); Grizzly Creek, Lassen Co., June 21, F. Stephens, 1 spec.; Mt. Lassen, Lassen Co., Sept. 16, C. H. Townsend, 3 spec. (U. S. N. M.); Honey Lake, Lassen Co., June 20, H. W. Henshaw, 1 spec. (U. S. N. M.); Big Valley Mts., Lassen Co., Sept. 15-20, C. P. Streator, 5 spec.; Mt. Shasta, Shasta Co., July, C. H. Townsend, 3 spec. (U. S. N. M.); Fort Crook, Trinity Co., Oct. 24, D. F. Parkinson, 1 spec. (U. S. N. M.); do., John Feilner, 1 spec. (U. S. N. M.); Carberry, Trinity Co., May 18, C. P. Streator, 1 spec.; Shelly Creek, Siskiyou Co. (Siskiyou Mts.), Oct. 16-25, J. A. Loring, 3 spec.

Oregon: Siskiyou, Jackson Co., Sept. 27-Oct. 7, C. P. Streator, 8 spec.; Diamond Lake, Jackson Co., Aug. 13, E. A. Preble, 1 spec.; Prospect, Jackson Co., Aug. 30, E. A. Preble, 1 spec.; Fort Klamath, Klamath Co., Feb. 18-28, and Jan. 17, S. Parker, 9 spec.; do., Jan., Feb. and Aug., Capt. C. Bendire, 6 spec. (Coll. C. H. M.); do., Aug. 12, Dr. C. H. Merriam, and V. Bailey, 2 spec.; do., Sept. 8-11, E. A. Preble, 6 spec.; do., Feb. 18, S.

Parker, 1 spec. (Coll. C. H. M.); do., Nov. 9 and 19, and Dec. 18, Dr. J. C. Merrill, 4 spec. (U. S. N. M.); do., Aug. 31, H. W. Henshaw, 1 spec. (U. S. N. M.); Swan Lake Valley, June 12, 13, V. Bailey, 2 spec.; Naylox, Klamath Co., Sept. 19, E. A. Preble, 1 spec.; W. Sink Creek, east base of Mt. Thielsen, Klamath Co., Aug. 25, 26, Merriam and Bailey, 2 spec.; Warner Mts., Lake Co., Aug. 2, 3, Merriam and Bailey, 4 spec.; do., Aug. 9, H. W. Henshaw, 1 spec. (U. S. N. M.); Maury Mts., Lake Co., June 30, and July 31, V. Bailey, 2 spec.; ten miles north of Harney, Harney Co., July 10, E. A. Preble, 1 spec.; Camp Harney, Harney Co., Jan. 9, Capt. C. Bendire, 1 spec. (U. S. N. M.); Buck Creek, Crook Co., July 4, V. Bailey, 1 spec.; Bend, Crook Co., Aug. 2, E. A. Preble, 1 spec.; Pengra, Crook Co., Aug. 7, E. A. Preble, 1 spec.; Strawberry Butte, Grant Co., July 13, V. Bailey, 2 spec.; ten miles west of Wapineta, Wasco Co., Sept. 5, V. Bailey, 1 spec.

REVIEW OF THE *Sciurus douglasii* GROUP.

The present material is greatly inadequate for a satisfactory study of the *S. douglasii* group as developed in California, Oregon, Washington and British Columbia. There are apparently three forms along the coast, one of which (the northern) also occurs in the interior, while a fourth is wholly confined to the interior. These are, beginning at the southwest: (1) *S. douglasii mollipilosus*, of the redwood belt, west of the Coast Range, which extends from Sonoma County, California, into Curry County, Oregon, intergrading with *S. d. californicus* in the Siskiyou region, and with *douglasii* proper at the northward; (2) *S. douglasii* of the immediate coast region of Oregon and Washington, being confined mainly to within 50 to 100 miles of the coast, but extending also up the Skagit Valley, and intergrading on the east with *S. d. cascadenis*; (3) *S. d. cascadenis*, of the coast region of southwestern British Columbia, and thence southward throughout the Cascades, not only in the mountains proper, but to varying distances from the base, both to the east and the west, intergrading to the westward with *S. douglasii*, and to the southeastward with *S. d. californicus*; (4) *S. d. californicus*, of the Sierra Nevada region of California and southern Oregon, ranging in the interior at least to the Maury Mountains and Strawberry Butte, where it still retains nearly its typical features. A series of specimens from Lake Chelan, Washington, is almost referable to this form (being paler

and larger), showing that it probably ranges, perhaps somewhat modified, much to the northward of the limits shown by the present restricted material.

The extreme phases of the group are *S. douglasii* of the coast and *S. d. californicus* of the interior, which are exceedingly unlike; the coast forms are all considerably smaller than *californicus*, and much more strongly colored, particularly below, yet the coast and interior forms appear to completely intergrade through *cascadensis*. *Californicus* is especially characterized by the pale (creamy white to buff) coloration of the ventral surface in the summer pelage, and, in the winter pelage, by the absence in large degree of dusky vermiculations, and any tinge of yellow below. The series of 32 specimens from the vicinity of Fort Klamath, representing all seasons of the year, is especially interesting, since at about this point *californicus* passes into *cascadensis*. Of 14 specimens in winter pelage, about one-half are typical *californicus*, being white below and only slightly vermiculated—about like winter specimens from the southern Sierra Nevada; the others show somewhat more vermiculation, but are all without the fulvous wash of coast specimens, except one, which is heavily vermiculated and as strongly suffused with fulvous below as average specimens from Neah Bay. Of the 18 summer specimens, all but three are typical *californicus*, differing very little from a similar series from the mountains of central California, the remaining three closely resembling average coast specimens. On the other hand, a series of 11 specimens from Siskiyou decidedly approaches the coast form. Specimens from the Warner and Maury Mountains and Strawberry Butte are fairly typical *californicus*.

In the interior forms the tail is fringed with pure white—broadly so in *californicus*, more narrowly in *cascadensis*—and with yellow or yellowish in the central coast form (*douglasii*). There is, however, much variation in this respect, both individual and geographical, the fringe of the tail being occasionally decidedly yellowish white rather than yellow at localities on the coast, and again yellowish white instead of white at some localities in and east of the Cascades; while over quite a belt about midway between the west base of the Cascades and the coast, the tail fringe averages yellowish white rather than either yellow or white,

this belt being occupied by intergrades between *douglasii* and *cascadensis*. In large series from points on the coast, usually about one specimen in ten has the tail fringed with white.

S. d. cascadensis is really little more than a vast assemblage of intergrades between the interior (*californicus*) and coast (*douglasii*) forms, as a whole much nearer *douglasii* than *californicus*. The examination of much further material will be necessary to determine whether or not it is a sufficiently stable and distinct enough form to warrant permanent recognition.

It may here be noted that there is a marked tendency to albinism on the ventral surface in the whole *S. douglasii* group, less pronounced, however, in *californicus*, owing to its lighter under surface, than in the other forms. This is manifested in the presence of a white spot in the axillary region, varying in different specimens from a few white hairs to a large area of white. It is more frequent at some localities than at others; thus, in British Columbia, at Port Moody, in a series of 17 specimens, only two are thus marked, and none in 15 from New Westminster, while out of 22 from Agassiz, Sumas, Mt. Lehman, etc., one in three have more or less white in the axillary region. In Washington (various localities) only about one in twelve is thus marked. In 98 specimens from various localities in Oregon, 22 are marked with white, and three out of fifteen from the coast of northern California. Specimens with much white in the axillæ are apt to show traces of white elsewhere on the lower parts, as on the lower part of the throat and middle of the breast.

The earliest name presumably applied to any member of the group is *Sciurus douglasii* Gray (P. Z. S., 1836, p. 88), a *nomen nudum* given to a specimen collected "by the late Mr. Douglas in North America." Two years after a Squirrel was described by Dr. Bachman (P. Z. S., 1838, p. 99) under the same name, and without indication of locality, but later Bachman states (Aud. & Bach., Quad. N. A., I, p. 371) that "his specimens" were obtained "by Mr. Townsend," "on the Columbia River." The locality is thus unfortunately indefinite. It is evident from the original description that the specimens could not have had a white-fringed tail, as it says, "on the extremity of the tail the hairs are black from the roots, tipped with light brown"; yet the hairs from

the sides of the tail are said to be "tipped with soiled white," or probably yellowish white. The specimen would thus seem to be an intermediate between the coast form and that of the interior, here called *cascadensis*. Under these circumstances it seemed very desirable to examine the type specimen, which proves to be still extant in the collection of the Academy of Natural Sciences of Philadelphia. Through the kind offices of Mr. Witmer Stone, the specimen¹ is now before me, and proves to be, as the description indicates, a specimen in which the tail is fringed with yellowish white, and thus probably from the lower part of the Columbia,—doubtless from Vancouver or below. It agrees well with specimens from about this point,—much more nearly than with specimens from the Cascades region further eastward. Although it is not strictly typical of the coast form, it so decidedly approaches it that it seems best to restrict the name *douglasii* to the coast phase of the group, as represented at the mouth of the Columbia River.

In 1841 Audubon and Bachman described another Squirrel of this group under the name *Sciurus mollipilosus* (Proc. Acad. Nat. Sci. Phila., 1841, p. 102), from the "northern parts of California," or, as said more definitely later (Quad. N. Am., 1, p. 158): "Our specimens were obtained in the northern part of California, near the Pacific Ocean." This definitely fixes the name on the Redwood Chickaree of the coast region of northern California, recently re-described by Mr. Bangs (Proc. Biol. Soc. Wash., XI, 1897, p. 281) as *Sciurus hudsonicus orarius*, from specimens collected at Philo, Mendocino County, California.

In 1842 Gray described a *Sciurus belcheri* (Ann. and Mag. Nat. Hist., X, 1842, p. 263), based on a specimen collected by Capt. Belcher, on the voyage of the 'Sulphur,' at the "mouth of the Columbia River" (Voy. Sulphur, Zoöl., I, p. 33). As Capt. Belcher's party went as far up the Columbia River as Fort Vancouver, and as the tail of *S. belcheri* is described as "black and red varied, with long white tips to the hairs," it may well have been an intergrade from Fort Vancouver, and must thus be considered as a synonym of *S. douglasii* Bachm.

¹ It bears the following on the label: "286. Type of *Sciurus douglasii* Bach. Columbia River, J. K. Townsend." The specimen was formerly mounted, and is still in a good state of preservation. It is in full summer pelage, and must have been taken in August or September.

In 1855 Baird (Proc. Acad. Nat. Sci. Phila., 1855, p. 333) gave the name *Sciurus suckleyi* to winter specimens obtained at Puget Sound, which he afterward (Mam. N. Am., 1857, p. 276, footnote) referred to *S. douglasii*; and the types and topotypes, as well as the description, show the reference to have been properly made.¹ It thus unfortunately happens that none of the names given to members of the *S. douglasii* group are available for the form here named *cascadensis*.

Baird, in 1857, seemed to harbor a suspicion that *S. douglasii* would be found to intergrade with *S. richardsonii*, a surmise that I thought my material in 1877 clearly proved. The present material seems to establish the contrary, since it shows that at several points it meets forms of the *hudsonicus* group (*S. h. streatori* and *S. h. vancouverensis*) without indication of intergradation. A series of 12 specimens collected at the head of Lake Chelan, Okanagan Co., Washington, by Mr. C. P. Streater, Aug. 13-21, contains 10 examples of *S. d. cascadensis* (or *californicus*?) and 2 of *S. hudsonicus streatori*. The former all have the ventral surface varying from pale buff to deep orange buff; the *streatori* specimens are clear grayish white below, with a subapical broad black bar on the upper surface of the tail, which is lacking in all the other specimens. Thus the two series are respectively typical of the two forms in question. Yet the *streatori* specimens were taken on the same day, by the same collector, as some of the others, and doubtless at the same place, showing that a phase of *douglasii* and *streatori* here meet without intergrading. Thence northward on the eastern shore of the Strait of Georgia to Howe Sound (opposite Comox, Vancouver Isl.), and eastward along the Fraser River as far as Agassiz, *S. d. cascadensis* appears to exclusively prevail, while at Ashcroft, a short distance east of Agassiz, only *S. h. streatori* is found. Thus *S. d. cascadensis* meets (except for a narrow strait) *S. h. vancouverensis* on the west and north, and *S. h. streatori* on the east, without intergradation, so far as present evidence goes.

Three specimens from the head of Rivers Inlet, far up on the

¹ Prof. Baird also identified both his *S. suckleyi* and *S. mollipilosus* Aud. and Bach. with *S. douglasii*. He says: "I have already referred to the probable identity of my *S. suckleyi* with this species [*S. douglasii*], and I have no doubt that the *Sciurus mollipilosus* of Audubon and Bachman is the cinereous [=winter] pelage ascribed to the above species [*S. douglasii*]."—*Mam. N. Am.*, 1857, p. 277.

coast of British Columbia, unexpectedly prove to be *S. d. cascadenensis*, instead of *S. h. vancouverensis*; but the intermediate coast region southward to about the mouth of Fraser River is wholly unrepresented in the present collection.

Sciurus mearnsi (*Townsend*).

MEARNS'S CHICKAREE.

Sciurus hudsonius mearnsi TOWNSEND, Proc. Biolog. Soc. Washington, XI, 146, June 9, 1897. (Not the synonymy.) San Pedro Martir Mts., L. Cal.

Sciurus hudsonicus californicus ALLEN, Bull. Am. Mus. Nat. Hist. V, 1893, 199; not *ibid.* III, 1890, 165, 167.

Winter Pelage.—Similar to *S. d. californicus*, but paler and grayer above, with the dorsal band a paler, more yellowish shade of chestnut.

Summer Pelage.—Probably similar to that of *S. d. californicus* but lighter above and with the lower parts only faintly washed with cream white, and the feet, both fore and hind, very much paler ochraceous.

Measurements.—Total length, 325; tail vertebræ, 125; hind foot (from skin), 51.

Skull.—Total length, 48.5; postorbital breadth, 14.9; length of nasals, 14; width of nasals in front, 7.

Material Examined.—Total number of specimens, 4, as follows:

Lower California: San Pedro Martir Mts., April 29 and May —, C. H. Townsend, 3 spec. (U. S. N. M.); do., alt. 8200 feet, May 18, A. W. Anthony, 1 spec. (A. M. N. H.).

The four specimens available for examination were all taken in the San Pedro Martir Mountains, Lower California, April 29 to May 18, and are hence in worn winter coat. The feet have begun to show the coloration of the summer pelage, and in one specimen this is well developed also over the anterior two-thirds of the ventral surface. The hind feet are white with a faint tinge of fulvous; the fore feet are in change to strong buff. The fulvous tint on the lower parts, and particularly on the inner surface of the fore limbs, shows that the affinities of this form are with *S. douglasii californicus* rather than with *S. fremonti mogollonen-*

sis. In other respects it is quite as near the latter as the former, the general coloration of *mogollonensis* and *californicus* being often closely similar.

Sciurus mearnsi is separated from the ranges of both *californicus* and *mogollonensis* by a wide interval of country, where at the present time no representative of either group exists, or apparently can exist. It seems therefore proper to treat this form as a fully segregated species, there being no possibility of its intergradation with either of its northern affines, which it still so closely resembles, being evidently a recent derivative of the *californicus* stock.

***Sciurus fremonti* Aud. & Bach.**

FREMONT'S CHICKAREE.

Sciurus fremonti AUD. & BACH. (ex TOWNSEND MS.) Quad. N. Am. III, 1853, 237, pl. cviii, fig. 1 (Park region, Colorado?); BAIRD, Mam. N. Am. 1857, 272.

Sciurus hudsonius var. *fremonti* ALLEN, Proc. Bost. Soc. Nat. Hist. XVII, 1874, 288; N. Am. Roden. 1877, 673.

Sciurus hudsonicus fremonti ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, 325.

Winter Pelage.—Above gray, with a broad, not sharply-defined median band of pale yellowish rufous; the hairs of the median band are plumbeous at the base, broadly tipped with yellowish rufous and narrowly ringed with black; on the sides the hairs are broadly tipped with very pale fulvous and ringed with black, with a general gray effect; fore and hind limbs, including upper surface of feet, like sides of body; an obscure, nearly obsolete dusky lateral line; below grayish white, rather profusely annulated with dusky. Tail above with the central hairs yellowish rusty, rather brighter than the middle of the back, varied with black, forming an indistinct central area; lateral hairs fulvous basally, subapically broadly banded with black and tipped broadly with white; terminal fifth or sixth black, slightly fringed with white; below gray or pale fulvous gray centrally, with a broad zone of black and a conspicuous fringe of white; ears slightly tufted with dusky.

Summer Pelage.—Above nearly uniform yellowish gray, varying in different specimens to pale rufescent gray; upper surface of feet ochraceous, the fore feet, including fore arm, brighter and stronger ochraceous than the hind; a strong, deep black lateral line; ventral surface white or grayish white; tail colored nearly as in winter, but narrower, and edged more narrowly with white.

MEASUREMENTS.

	No. of Spec.	Length.	Tail Vertebrae.	Hind Foot.
South Park, Col. ¹	3	316 (310-320)	120 (117-123)	49 (48.3-49.5)
Long's Peak, Col. ²	3	320 (320-320)	133 (130-137)	49 (48-49)
Fort Garland, Col. ³	3	333 (326-342)	132 (130-133)	50.8 (50.8-50.8)
Cochetope Pass, Col. ⁴	7	320 (303-335)	128 (114-139)	48.4 (46-51)
Uintah Mts., Utah ⁵	5	326 (305-345)	127 (102-145)	49.5 (48-50)
Fort Bridger, Wyo. ⁵	3	327 (323-334)	134 (128-140)	50 (47-52)
Wood's P. O., Wyo. ⁵	5	327 (310-342)	133 (121-140)	50 (49-51)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Width of Nasals.
Mill City, Col.	3	47.5 (46.5-49)	14.9 (14.8-15)	14.3 (14-14.4)	7.3 (7-7.8)
Cochetope Pass, Col.	5	45.8 (42.2-48)	14.6 (13.6-15)	14.1 (13-15)	7.2 (7-7.5)
Uintah Mts., Utah.	1	47.8	14.7	15	7.5

Geographic Range.—The mountainous portions of Colorado, reaching the extreme southern border of Wyoming at Woods P. O., and Uintah Mountains of Utah; also reaching the southern boundary of Wyoming at Fort Bridger.

Material Examined.—Total number of specimens, 64, from the following localities and sources:

Colorado: Type (exact locality not known), J. C. Fremont, summer (probably June, 1844), 1 spec. (Coll. Acad. Nat. Sci. Phila.); Arkins, Larimer Co., Feb. 5, 8, R. S. Weldon, 2 spec. (A. M. N. H.); Estes Park, Larimer Co., June 9, W. G. Smith, 2 spec. (U. S. N. M.); headwaters of Laramie River, Larimer Co., Aug. 20-30, Dr. E. Coues, 5 spec. (U. S. N. M.); Middle Park, Grand Co., July 26, J. Stevenson, 1 spec. (U. S. N. M.); Berthoud's Pass, Middle Park, J. Stevenson, 1 spec. (U. S. N. M.); Ward, Boulder Co., June 9, J. A. Loring, 1 spec.; do., Oct. 25, Nov. 15, 20, Dennis Gale, 3 spec. (Coll. C. H. M.); Mill City, June 20, July 9, C. H. Eagle, 3 spec. (A. M. N. H.); Long's Peak, Boulder Co., Aug. 6-8, E. A. Preble, 5 spec. (Dept. Agr. Coll.); Georgetown, Clear Creek Co., July and Oct., G. E. Marsh, 2 spec. (U. S. N. M.); Granite, Park Co., Oct. 16, J. H. Batty, 1 spec. (U. S. N. M.); no locality, J. H. Batty, 3 spec. (U. S. N. M.); Twin Lakes, Lake Co., summer, Dr. J. T. Rothrock, 2 spec. (U. S. N. M.); Central Colorado (without definite locality or date), Dr. F. V. Hayden (=J. H. Batty?), 2 spec. (U. S. N. M.); Sangra de Christo Pass, Aug. 9, C. E. Aiken, 1 spec. (U. S. N. M.); Monshower Meadows, near Cochetope Pass, Sauguache Co., Aug. 6-21, J. A. Loring, 11 spec. (Dept. Agr. Coll.); Fort Garland, Costilla Co., June 3 and 4, H. W. Henshaw, 2 spec. (U. S. N. M.); Silverton, San Juan Co., Oct. 17, J. A. Loring, 1 spec. (Dept. Agr. Coll.).

¹ Collected and measured by J. A. Allen (from Mon. N. Am. Roden., p. 691).

² Collected and measured by E. A. Preble.

³ From Allen, Mon. N. Am. Roden., p. 691.

⁴ Collected and measured by J. A. Loring.

⁵ Collected and measured by Vernon Bailey.

Utah: Uintah Mts., June 4, V. Bailey, 1 spec. ; do., Sept. 21, V. Bailey, 3 spec. (Coll. C. H. M.); do., Dr. F. V. Hayden (=H. D. Schmidt), 1 spec. (U. S. N. M.).

Wyoming: Fort Bridger, Uintah Mts., Sept. 19, V. Bailey, 3 spec. (Coll. C. H. M.); Bridger's Pass, Uintah Mts., July 31, W. S. Wood, 1 spec. (U. S. N. M.); Wood's P. O., Medicine Bow Mts., Aug. 9 and 13, V. Bailey, 5 spec. (Coll. C. H. M.).

New Mexico: Chama, Taos Co., Dec. 22, J. A. Loring, 1 spec. (Dept. Agr. Coll.).

The type locality of *Sciurus fremonti* is not definitely known. Audubon and Bachman state in their original description of the species (*l. c.*): "We possess no information in regard to this animal farther than that it was obtained on the Rocky Mountains." They further say: "The only specimen we have seen was obtained by Colonel Frémont; it was procured on the Rocky Mountains, on his route by the South Pass to California." Baird (*l. c.*), evidently loosely paraphrasing Audubon and Bachman, says the specimen described by Audubon and Bachman "was collected in 1849 [*lege* 1844?] by Colonel Frémont somewhere in the vicinity of the South Pass, and is now in the Museum of the Philadelphia Academy of Natural Sciences." He identified with it a specimen from Sawatch Pass, Rocky Mountains, these two examples, being, he says, "all that as yet have come to the notice of naturalists."

Through the kind intervention of Mr. Witmer Stone, of the Philadelphia Academy of Natural Sciences, I have in hand the type specimen obtained by Frémont. It proves to be the form of Chickaree found throughout the Rocky Mountains of Colorado, to which the name *fremonti*, since 1857, has been currently applied. It shows also that it could not have come from "the vicinity of the South Pass," at the southern end of the Wind River chain in Wyoming, the form there being the very different *Sciurus hudsonicus ventorum*.

An examination of the type shows it to be in winter pelage, the soles being heavily furred, the ears well tufted, and the general pelage that of winter or late spring. Even the feet, where change to summer coat first begins to appear, show very little departure from winter conditions. The specimen might have been taken in May, or even as late as the middle of June. The label on the
[September, 1898.]

specimen ("285, Type") is evidently of very recent date, and erroneously attributes the specimen to "J. K. Townsend," and gives the locality as "South Pass, Rocky Mts." I wrote to Mr. Stone regarding this point, and he kindly replied as follows (under date of May 20, 1898): "The specimen, along with others, seems to have been presented by Townsend to our Academy; he apparently received it from Fremont. You will notice that Audubon [and Bachman] gives the species as *S. fremonti* TOWNSEND. The occurrence of Townsend's name on the label, instead of Fremont's, is due to the fact that museum records of old days seem to have placed more stress on the donor than the collector. The label now on the specimen I transcribed from the base of an old stand, about 1890, on which the animal was mounted. There is no other specimen of *S. fremonti* in our collection."

From the above it is evident that beyond reasonable doubt this specimen is the actual type of Audubon and Bachman's "*Sciurus fremonti* Townsend." It therefore becomes important to determine as nearly as possible the type locality. Reference to Fremont's reports to the U. S. War Department shows that his two visits to the region of the South Pass were respectively in August, 1842, and August, 1843, and that the season alone thus rules out of consideration this locality as the source of the type of *Sciurus fremonti*. On his return journey, in 1844, he skirted the southern Wasatch Mountains as far north as Utah Lake, and then turned eastward to the north Fork of the Platte, in Colorado, which he reached June 11, passing up the North Platte to the headwaters of the Arkansas, and down this river to the Plains at the present site of Pueblo, Colorado, which point he reached June 29. The specimen which became the type of *Sciurus fremonti* could not have been taken in the Wasatch range, as the present material shows that the form of Chickaree occurring near Utah Lake is *Sciurus hudsonicus ventorum*. On the other hand, it might have been taken in the Park region of Colorado, where this, and only this form of Chickaree is known to occur, and the season—June 11-26—fully agrees with the condition of the specimen, as already stated. Probably, therefore, the Park region of central Colorado may be safely considered as the type locality of *Sciurus fremonti*.

Sciurus fremonti neomexicanus, subsp. nov.

TAOS CHICKAREE.

Winter Pelage.—Similar to *S. fremonti*, but the median dorsal band much brighter yellowish rufous, nearly as in *S. f. mogollonensis*, but size much smaller than the latter.

Summer Pelage.—The summer pelage is not represented in the present material, but is probably very nearly like that of *S. f. mogollonensis*.

Measurements.—Average of 7 specimens from Rayado Cañon, April 1, 1895: Total length, 321 (308–330); tail vertebrae, 133 (127–145); hind foot, 48.5 (45–52).

Skull.—Average of 4 specimens (part of the above), total length, 45.9 (43.5–47.3); postorbital breadth, 14.9 (14.6–15.2); length of nasals, 14.3 (13.7–15); width of nasals at anterior border, 7 (6.4–7.5).

Type, No. 71,690, U. S. Nat. Mus. (Dept. Agr. Coll.), ♂ ad., Rayado Cañon, Colfax Co., New Mexico, April 1, 1895; C. Barber.

Geographic Range.—Taos Range, New Mexico.

Material Examined.—Total number of specimens, 11, from the following localities and sources:

New Mexico: Rayado Cañon, Colfax Co., April 1, C. Barber, 7 spec. (Dept. Agr. Coll.); Martinez, Colfax Co., Dec. 13, C. Barber, 2 spec. (Dept. Agr. Coll.); Hall's Peak, Mora Co., Oct. 14, C. Barber, 2 spec. (U. S. N. M.).

In coloration *S. f. neomexicanus* very closely resembles *S. f. mogollonensis*, in this respect being much nearer this form than to *S. fremonti*. It is, however, essentially of the same size as *S. fremonti*, and is thus much smaller than *S. h. mogollonensis*, with relatively much shorter nasals.

Sciurus fremonti mogollonensis (*Mearns*).

ARIZONA CHICKAREE.

Sciurus hudsonius mogollonensis MEARNS, Bull. Am. Mus. Nat. Hist. II, 1887–90, 277 (Feb. 21, 1890). Mogollon Mts., Arizona.

Sciurus fremonti mogollonensis MERRIAM, N. Am. Fauna, No. 3, 48 (Sept. 11, 1890).

Sciurus hudsonicus mogollonensis ALLEN, Bull. Am. Mus. Nat. Hist. VII, 1895, 243.

Winter Pelage.—Similar to *S. fremonti*, except that the median dorsal band is of a brighter, stronger tint of yellowish rufous. Tail and lower parts similar.

Summer Pelage.—Similar in all respects to *S. fremonti*, except that the rufous suffusion of the upper parts is much brighter and stronger.

MEASUREMENTS.

	No. of Spec.	Length.	Tail Vertebrae.	Hind Foot.
Mogollon Mts., Ariz. ¹	16	356 (327-385)	142 (127-158)	52.8 (51-56)
San Francisco Mts., Ariz. ²	14	332 (320-365)	138 (130-156)	53 (50-55)
White Mts., Ariz. ³	8	322 (310-336)	131 (126-138)	51 (49-53)

SKULLS.

	No. of Spec.	Length.	Postorbital Breadth.	Length of Nasals.	Width of Nasals.
Mogollon Mts., Ariz.	10	49.4 (48.5-51-5)	15.2 (14.2-15.4)	15.6 (14.5-16.2)	7.8 (7.3-8)
White Mts., Ariz.	4	46.9 (46-48.2)	14.9 (14.8-15)	14.8 (14.2-15.2)	7.2 (7-7.5)

Geographic Range.—The higher mountains and plateaus of central Arizona, from the Douglas fir belt to timber line.

Material Examined.—Total number of specimens, 44, from the following localities and sources:

Arizona: Mogollon Mts., May 23-27, Dr. E. A. Mearns, 13 spec. (A. M. N. H.); San Francisco Mts., June 6-19, Dr. E. A. Mearns, 4 spec. (A. M. N. H.); Baker's Butte, July 21 and Aug. 22, Dr. E. A. Mearns, 2 spec. (A. M. N. H.); San Francisco Mts., July 31-Oct. 5, Merriam and Bailey, 16 spec. (Dept. Agr. Coll.); Little Spring, San Francisco Mts., Sept. 20, Dr. L. Stejneger, 1 spec. (U. S. N. M.); Springerville, Aug. 29, E. W. Nelson, 1 spec. (Dept. Agr. Coll.); White Mts., Aug. 9-12, B. C. Condit, 7 spec. (A. M. N. H.).

***Sciurus fremonti grahamensis* (Allen).**

MOUNT GRAHAM CHICKAREE.

Sciurus hudsonicus grahamensis ALLEN, Bull. Am. Mus. Nat. Hist. VI, 1894, 350 (Dec. 7, 1894); *ibid.* VII, 1895, 244. Mt. Graham, Arizona.

Summer Pelage.—Differing from that of *S. f. mogollonensis* in being yellower and less rufescent above, with the central area of the tail ochraceous above and nearly white below.

The winter pelage is not represented.

Measurements.—Three adult specimens give the following: Total length, 332 (325-340); tail vertebrae, 134 (130-140); hind foot, 55 (53-57); ear from crown, 28 (27-28).

¹ Collected and measured by Dr. E. A. Mearns (from Bull. Am. Mus. Nat. Hist., II, p. 278).

² Collected and measured by Dr. C. Hart Merriam and V. Bailey (from N. Am. Fauna, No. 3, p. 40).

³ Collected and measured by B. C. Condit (from Bull. Am. Mus. Nat. Hist., VII, p. 244).

Skull.—Average of two specimens: Total length, 48 (47.5–48.5); postorbital breadth, 15.4 (15.2–15.6); length of nasals, 15.1 (14.6–15.6); width of nasals at anterior border, 7.5 (7.2–7.8).

Whether the great length of the hind foot in this form is a constant feature must be determined by examination of further material.

Geographic Range.—The fir zone on the summit of Mt. Graham, Arizona.

Material Examined.—The 3 specimens thus far examined are as follows:

Arizona: Graham Mts., July 18 and 19, Price and Condit, 3 spec. (A. M. N. H.).

S. fremonti grahamensis is very closely related to *S. f. mogollonensis*, from which, however, it seems to be readily separable, as stated above, so far at least as present material is concerned. The two forms are, moreover, geographically well isolated.

REVIEW OF THE *Sciurus fremonti* GROUP.

The *Sciurus fremonti* group is sharply differentiated from the *S. hudsonicus* group, although separated at several points by only a slight geographical interval. *S. fremonti* proper is found apparently throughout the mountains of Colorado, ranging northward to the northern extremity of the Medicine Bow Range, which extends a few miles over the Wyoming border. In the Laramie Mountains, the next range to the northeastward, and only a few miles distant, is found the entirely distinct, and very different *S. h. baileyi*. The Chickaree found at Wood's P. O., in the Medicine Bow Mountains, is true *S. fremonti*, while the Chickaree from the southern end of the Laramie Mountains, less than thirty miles to the eastward, is a pale phase of *S. h. baileyi*.

Typical *S. fremonti* is represented in the present material by specimens from several points in the Uintah Mountains, including the vicinity of Fort Bridger, Wyoming, while from the Bear River and Wasatch Mountains, only thirty to fifty miles to the westward of points where *S. fremonti* occurs, *S. h. ventorum* is the only Chickaree represented in the material now in hand. In neither case is there apparent any evidence of intergradation.

In southern Colorado true *S. fremonti* grades toward what is here called *S. f. neomexicanus*, a phase which in coloration is hardly separable from *S. mogollonensis*. At present our knowl-

edge of the distribution of the Chickarees in southern Colorado and New Mexico is very limited. A single winter specimen from Chama, New Mexico, almost on the Colorado boundary, seems referable to true *fremonti*, but all the specimens from the eastern slope of the Taos Mountains, in Colfax and Mora Counties, New Mexico, are very different from specimens from central and northern Colorado.

S. f. mogollonensis differs from *S. fremonti* in its much brighter and more yellowish dorsal region in both pelages, and also in its larger size, especially as shown by the skull measurements, and in the relatively greater length of the nasals. *S. f. neomexicanus* agrees in size and in the relative length of the nasals with *S. fremonti*, but with *S. f. mogollonensis* in coloration.

The species most nearly related to *S. fremonti* is *S. douglasii*, as represented in *S. d. californicus*, where the resemblance is often so close, in the case of winter specimens, that their separation, without reference to the localities, would be exceedingly difficult; yet the same individuals in summer pelage, would differ so markedly in the coloration of the ventral surface as to leave not the slightest doubt as to their true relationships. In *S. fremonti*, *S. f. mogollonensis* and *S. d. californicus*, the tail is conspicuously fringed with white, in contrast with the yellow-fringed tail of true *S. douglasii*, and of all the members of the *S. hudsonicus* group.

COMPARATIVE MEASUREMENTS.

SPECIES.	LOCALITY.	EXTERNAL.				CRANIAL.			
		No. of Spec.	Length.	Tail Vertebrae.	Hind foot.	No. of Spec.	Length.	Postor. Br'dth.	Length of Nasals.
<i>Sciurus hudsonicus</i>	Ft. Simpson, N. W. T.....	6	317	116	46	10	47	16	14
"	Hamilton Inlet, Labrador.....	4	309	120.5	47.7	1	45		
"	Amherst, N. H.....	9	284	118	46				
"	S. Twin Lake, Me.....	5	290	107	45.5	5	48.3	13.4	12.2
"	Upton, Oxford Co., Me.....	12	48.7						12.5
"	Digby, Nova Scotia.....	10	296.5	118	45.2				
"	Trousers Lake, N. B.....								
<i>S. h. loquax</i>	Hastings, N. Y.....	10	308	122.5	44.5	10	44.4	14	12.2
"	South Nyack, N. Y.....	16	305	116	47	6	44.5	14	13
"	Syracuse, N. Y.....	6	308	124					
"	Garrettsville, O.....					10	44.7	14.1	13
"	Ft. Snelling, Minn.....	20	334	130	49.9	10	46.7	14.1	13.9
"	Camp Douglass, Wis.....	7	324	137	49				
"	Magnetic City, N. C.....	7	340	139	40.4	7	45.7	14.6	13.7
<i>S. h. dakotensis</i>	Black Hills, S. D.....	5	346	145	51	7	49	14.2	14
<i>S. h. baileyi</i>	Bighorn Mts., Wyo.....	7	344	141	52	5	48.8	14.4	14.8
"	Laramie Mts, Wyo.....	3	336	139	50.8				
"	Prior Mts., Wyo.....	5	342	133	52	4	47.8	15	14
"	Big Snowy Mts., Wyo.....	6	323	130	50	6	46.6	14	13.7
<i>S. h. ventorum</i>	South Pass City, Wyo.....	10	331	134.7	51.6	8	47.8	15	14
"	Lake Fork, Wyo.....	3	334	134	50.8				
"	Beartooth Mts., Mont.....	7	325	132	52	4	47.4	14	13.7
"	Birch Creek, Id.....	4	335	134	49.5				
<i>S. h. richardsonii</i>	Salmon River Mts., Id.....	6	340	134	51.5				
"	Saw Tooth Lake, Id.....	4	336	134	52				
"	Coeur d'Alene, Id.....	10	333	135	51.7	4	47.6	14.8	14.6
"	Moscow, Id.....	3				3	47.5	14.9	14.5

COMPARATIVE MEASUREMENTS.—Continued.

SPECIES.	LOCALITY.	EXTERNAL.			CRANIAL.				
		No. of Spec.	Length.	Tail Vertebrec.	Hind foot.	No. of Spec.	Length.	Postor. Br'dth.	Length Nasals.
<i>S. h. richardsonii</i>	Mullan, Id	4	338	135	51	3	47.7	14.2	14.5
"	St. Mary's Lake, Mont.	6	332	135	50.5	5	47.6	14.5	14.4
"	Colville, Wash.	9	336	129	50.8	5	47.6	15	14.2
"	Wallowa Lake, Ore.	6	327	135	51.2	5	48	14.5	14.2
<i>S. h. streator</i>	Nelson, B. C.	5	312	114	50				
"	Lac la Hache, B. C.	4	316	114.5	49				
"	Field, B. C.	3	316	124	50				
"	Vernon, B. C.	8	322	122	51.3				
"	Bounaparte, B. C.	3	316	119	50				
"	Ashcroft, B. C.	10	332	129	51.4	6	48	14.6	14.6
"	Kamloops, B. C.	7	315	133	51.4	3	47.2	14.1	13.5
"	Shuswap, B. C.	11	308	120	50.1	4	48	14.2	13.9
<i>S. h. vanconverensis</i>	Goldstream, Vanc. Isl., B. C.	11	308	120	50.1	9	46.3	15.6	13
"	Duncan, Vanc. Isl., B. C.					5	45.6	14.6	12.8
"	Comox, Vanc. Isl., B. C.	4	309	120	50.4	3	45.7	15.2	12.2
"	Wrangel, Alaska.	7	297	115	49.4	9	44.7	15.2	12.6
"	Loring, Alaska.	4	296	118	49.5	4	44.8	14.9	13.8
"	Juneau, Alaska.	6	307	126	49.7	4	44.2	14.6	12.6
"	Marshfield, Ore.	6	316	123	49.5	3	47	14.7	14
<i>Sciurus douglasii</i>	Yaquina Bay, Ore.	4	314	127	48.5	5	46.7	14.7	13.3
"	Newport, Ore.	5	316	129	50				
"	Neah Bay, Wash.	14	315	128	50.8	6	46	14.4	12.7
<i>S. d. mollipilosus</i>	Crescent City, Cal.	4	321	126	50.8	3	46.6	15.4	13.6
"	Sherwood, Cal.	5	314	135	46.5	5	44.3	14.7	12.7
"	Willits, Cal.	3	317	135	50	2	45.5	14.7	13
"	Philo, Cal.	14	316	136	50.8				
<i>S. d. cascadenis</i>	Mt. Hood, Ore.	2	323	136	50.5				

COMPARATIVE MEASUREMENTS.—Continued.

SPECIES.	LOCALITY.	EXTERNAL.				CRANIAL.			
		No. of Spec.	Length	Tail Ver-te-bræ.	Hind foot,	No. of Spec.	Length.	Postor. Brdth.	Length of Nasals.
<i>S. d. cascadenis</i> .	Hamilton, Wash.	8	287	115.6	48.6	2	46.4	14.9	18.2
"	Lake Chelan, Wash.	11	333	153	52.8	5	48.5	14.5	18.8
"	Port Moody, B. C.	17	309	123	49	5	45.1	14.9	12.9
"	Agassiz, B. C.	9	307	125	50.9	4	45.9	14.6	18.1
"	New Westminster, B. C.	.....	.....	.....	.....	8	46.2	14.9	18.7
<i>S. d. californicus</i> .	Mt. Whitney, Cal.	9	322	131	51.3	4	47.4	14.3	18.4
"	Buck's Ranch, Cal.	6	319.5	128.3	52	4	46.1	14.3	12.9
"	Donner, Cal.	.....	.....	.....	.....	6	47.9	14.5	18.6
"	Lassen Creek, Cal.	7	341	148	53	.....	.....	.....	.....
"	Siskiyou, Cal.	6	333	131	52.3	5	47.4	14.8	13.3
"	Ft. Klamath, Ore.	8	331	137	52.6	4	47.4	14.9	14.1
<i>Sciurus mearnsi</i> .	San Pedro Martir Mts., L. C.	1	325	125	51	1	48	14.9	14
<i>Sciurus fremonti</i> .	South Park, Col.	3	316	120	49	.....	.....	.....	.....
"	Long's Peak, Col.	3	320	133	49	.....	.....	.....	.....
"	Fort Garland, Col.	3	333	132	50.8	.....	.....	.....	.....
"	Mill City, Col.	.....	.....	.....	.....	3	47.5	14.9	14.3
"	Cochetope Pass, Col.	7	320	128	48.4	5	45.8	14.6	14.1
"	Uintah Mts., Utah.	5	326	127.9	49.5	1	47.8	14.7	15
"	Fort Bridger, Wyo.	3	327	134	50	.....	.....	.....	.....
"	Wood's P. O., Wyo.	5	327	133	50	.....	.....	.....	.....
<i>S. f. neomexicanus</i> .	Rayado Cañon, N. Mex.	7	321	133	48.5	4	45.9	14.9	14.3
<i>S. f. mogollonensis</i> .	Mogollon Mts., Ariz.	16	356	142	52.8	10	49.4	15.2	15.6
"	San Francisco Mts., Ariz.	14	332	138	53	.....	.....	.....	.....
"	White Mts., Ariz.	8	322	131	51	4	46.9	14.9	14.8
<i>S. f. grahamensis</i> .	Mt. Graham, Ariz.	3	332	134	55	2	48	15.4	15.1

SUMMARY OF MATERIAL EXAMINED.

Sciurus hudsonicus	130
“ “ loquax	236
“ “ dakotensis	18
“ “ baileyi	43
“ “ ventorum	68
“ “ richardsonii	164
“ “ streatori	93
“ “ vancouverensis	90
Sciurus douglasii	120
“ “ mollipilosus	16
“ “ cascadenis	107
“ “ californicus	174
Sciurus mearnsi	4
Sciurus fremonti	64
“ “ neomexicanus	11
“ “ mogollonensis	44
“ “ grahamensis	3