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SQUIRRELS COLLECTED BY THE AMERICAN MUSEUM ASIATIC EXPEDITIONS¹

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The squirrel-like rodents hitherto brought back by the Asiatic Expeditions of The American Museum of Natural History amount to some 750 specimens from a wide range of territory, chiefly southwestern Yunnan, the southeast coast of China including the island of Hainan, and from the region of Peking and central Mongolia. This fine series of well-prepared skins has helped to make clearer the distribution and relationships of many species. Noteworthy are: the extension of range of certain spermophiles described from Kansu and Ala Shan and now found by Mr. Roy Chapman Andrews in central Mongolia; the tracing of the coniferous-forest types in their southward extension into Mongolia; the discovery of two flying squirrels in Hainan where none had previously been reported; and the evidences of intergradation between various subspecies of the widely distributed red-bellied squirrel (*Callosciurus erythræus*). The list of species collected is here given.

Sciuridæ

Citellus dauricus (Brandt)

Spermophilus dauricus BRANDT, 1843, Bull. Acad. Imp. des Sci., St. Pétersbourg, cl. phys.-math., II, p. 379.

A single specimen, taken twenty miles southwest of Urga, is undoubtedly referable to this species. It was first brought to the attention of naturalists by Pallas who obtained it near Tarei Nor. Radde in 1856 secured additional examples and, in his report published in 1862, gave a careful account with colored figures of the animal. Like his, the present specimen, though taken May 19, is still in winter pelage. Its lips, sides of neck, flanks, feet, and entire under side of body are white, and a dull white line runs from the muzzle to the base of the ear. The top of the nose is pinkish (vinaceous-buff), the rest of the upper side pale buff finely lined with black hairs evenly distributed. The tail is short, 59

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mm., buff above and below, its terminal half above and its terminal third below bordered with black and fringed with white. This is evidently closely related to *C. mongolicus*, differing only in its slightly more pallid coloring, and perhaps in slightly larger skull. The latter should therefore stand as a subspecies.

***Citellus dauricus mongolicus* (A. Milne-Edwards)**

Spermophilus mongolicus A. MILNE-EDWARDS, 1867, Ann. des Sci. Nat., Zool., (5) VII, p. 376.

The type-locality of this spermophile is "la Mongolie chinoise et dans le voisinage de Pékin." Specimens obtained by Mr. Andrews near Peking are therefore topotypes, and a careful comparison of these with a series from Taboul, 100 miles northwest of Kalgan (on the edge of the Mongolian plateau), fails to reveal any tangible difference. Evidently, therefore, the name *umbratus*, given by Mr. Oldfield Thomas to Taboul specimens, must be regarded as a synonym of *mongolicus*. He compared the latter with pale specimens from northwestern Shensi and Ordos desert but was misled by supposing the latter were typical of *mongolicus*. As compared with *dauricus*, this is less pallid and decidedly more pinkish above, with a yellowish belly in winter pelage. The summer coat is not assumed until fairly late, about the first of July. Specimens from Tsinanfu are grizzled pinkish buff and black above, washed with pale yellow on sides, limbs, and belly. The very short tail, 60 mm. or less, is distinctive.

***Citellus obscurus* (Buechner)**

Spermophilus obscurus BUECHNER, 1888, 'Przewalski Exp., Mamm.,' p. 17.

The type locality is Kansu, north of Tchagryn-gol, whence Buechner had two August skins and a third taken in May that still retained part of the paler winter pelage. A series taken by Mr. Andrews at Artsa Bogdo, Mongolia, in August, 1922, agrees closely with his description and figure and is provisionally referred to the same species. The general color above is an evenly grizzled mixture of dull buffy and black, producing a dark sandy appearance; sides and belly dull whitish, washed with buffy. It lacks the decidedly ruddy tinge of *mongolicus* and, even in a specimen still partly in winter dress, seems to lack the pinkish-buff patch on the nose of the latter. A distinguishing point noticed by Buechner is that the black subterminal border of the tail is more or less obscured on the ventral side by long rusty hairs. The dark brown bases of the hairs on back and belly are also more conspicuous, and the basal half of

the tail is less distichous, more cylindrical. In the dry plains country of Shansi this species is represented by a paler, more pinkish form, two specimens of which are in the Museum of Comparative Zoölogy. It may be described as follows.

***Citellus obscurus siccus*, new subspecies**

TYPE.—Adult female, skin and skull, No. 19924, Museum of Comparative Zoölogy, from ten miles west of Taiyuanfu, Shansi, China. August, 1921. F. R. Wulsin.

DESCRIPTION.—In summer pelage, paler, more vinaceous buff above than *C. obscurus*; slightly paler and with longer tail than *C. d. mongolicus*.

Forehead, sides of face, entire back and base of tail "vinaceous-cinnamon" evenly grizzled with fine black hairs. End of the muzzle clearer, "pinkish-cinnamon"; white eye-ring, indistinctly continued to the end of the nose and to the ear as a whitish line. Sides of neck, the fore limbs and feet, the flanks, front of hind leg, and the hind feet, pale buffy ("pinkish buff"). Below, white washed with buffy. On the chin and upper throat, fore arms and lower part of hind leg, the hair is practically white to the base, but elsewhere, on throat and belly the dark fuscous bases show through everywhere. The tail is distichous in its terminal half, which is pale rusty ("cinnamon") in the middle, bordered by black and fringed with buff. The lower side is entirely pale rusty, with the subterminal black border partly obscured by rusty hairs. The soles of the hind feet are hairy as far as the palmar tubercles.

The skull is not distinguishable from that of specimens from Artsa Bogdo, Mongolia, referred to *C. obscurus* except that the nasals equal the intermaxillaries in backward extension instead of falling short of them. Compared with that of *mongolicus* the skull is a trifling amount smaller.

MEASUREMENTS.—The type skin is about 210 mm. in length of head and body, the tail 76, hind foot 38. The skull measures: greatest length, 45.5 mm.; basal length, 41.7; palatal length, 24; diastema, 10; nasals, 16.5; zygomatic width, 29; width across molar rows, 13; upper cheek teeth, 10.5; mandible, 29; lower cheek teeth, 9.4.

This is apparently the representative of *C. obscurus* occurring in Shansi, and may at once be distinguished from *mongolicus* by its longer tail and paler, more pinkish, tint. I have seen no specimens of the shorter-tailed animal from Shansi, although Thomas has recorded *mongolicus* from that province, contrasting it, however, with darker Taboul specimens.

***Citellus pallidicauda* (Satunin)**

Spermophilus pallidicauda SATUNIN, 1903, Annuaire Mus. Zool. St. Pétersbourg, VII, p. 551.

A rather large species, at once distinguished by its large feet with naked palms and the tail, which is dull ochraceous at the base above, paling elsewhere to whitish or pale buffy, and so quite lacking the sub-

terminal black border of other Chinese species. This was apparently common on the Gobi Desert, whence series were secured at Ude and Us-suk as well as one each from Loh and Gun Burte. Although referred to *pallidicauda* on geographical grounds (type locality, Lake Chulmu Nor, Gobi-Altai), this is unquestionably very closely related to *C. alaschanicus* Buechner from southern Mongolia, if not identical with it.

***Citellus evermanni jacutensis* (Brandt)**

Spermophilus jacutensis BRANDT, 1843, Bull. Acad. Imp. des Sci., St. Pétersbourg, cl. phys.-math., II, p. 379.

A large, long-tailed species with the back thickly speckled with whitish. In winter pelage the sides and belly are white with a faint buffy wash, and the back is dull buffy, slightly darkened with scattered black hairs and marked with small white spots through the close juxtaposition of several of the white bands of the longer hairs. In summer coat, the back is very much darker, while the forehead, sides of the head and neck, the flanks, limbs, and belly are ochraceous. Compared with a series from the Altai Mountains representing typical *evermanni*, the back in the present series from Mongolia is slightly duller, less clear black-and-white speckled, while the ochraceous tint of sides and belly is more intense. Pallas long ago remarked these differences in Yakutsk specimens and Brandt in 1843 gave the provisional name *jacutensis*, which is probably worth recognition in a subspecific sense.

This is the common spermophile of the open, wooded country of northern Mongolia, where its southern limit is probably conterminous with that of the evergreen forest. A large series from Sain Noin Khan in the early part of June is just beginning to change from winter to summer dress. In one taken June 4, the new and contrastingly ochraceous hair of the muzzle, eye, and ear region has just appeared, while in others taken June 10 and 11, the new coat is coming in on the shoulders as well. A large series taken in mid-July forty-five miles northeast of Urga has fully assumed the summer pelage.

***Marmota bobak sibirica* (Radde)**

Arctomys bobac var. *sibirica* RADDE, 1862, 'Reise im Süden v. Ost-sibirien,' I, p. 159.

A pale-buffy marmot, with short dark-brown tail. A large series was secured from localities between eighty miles southeast of Urga and forty-five miles northeast of the same center; others were taken in the region about Tzetsenwan, Mongolia. There is some variation in color, tending to a darkening of the buffy hair-tips to brown. Several very small young were captured in mid-June.

Eutamias asiaticus (Gmelin)

Sciurus asiaticus GMELIN, 1788, Linné's 'Syst. Nat.,' 13th Ed., I, pt. 1, p. 150.

This small ground squirrel with its five sharply defined, black stripes on an olive or khaki-colored ground, and with a pure white belly, seems to show very little geographic variation in color. It was met with in sparsely wooded country near Urga (fifteen and forty-five miles north-east) and to the southwest at Sain Noin Khan, but seemingly it does not penetrate into the grass-lands or the more desert parts of the Gobi. Specimens from the above localities seem identical with others from Gichiga on the Sea of Okhotsk; nor am I able to distinguish them from *E. a. altaicus*, described as being less brightly colored than the typical form.

Eutamias senescens Miller

Eutamias senescens MILLER, 1898, Proc. Acad. Nat. Sci., Philadelphia, p. 330.

Jacobi is undoubtedly correct in regarding this as a species distinct from *E. asiaticus*, as originally described. It differs in its slightly larger hind foot, shaggier, coarser fur and in having the rump rusty instead of olivaceous; in addition, the two lateral pairs of black stripes are much mixed with ochraceous and merge with the reddish of the rump, whereas in *E. asiaticus* the five black stripes are all clear and distinct, the two inner lateral ones continuing to the root of the tail. The belly of *E. senescens* is faintly washed with yellowish, but the throat is contrastingly white, while in *E. asiaticus* the belly is clear white. The skull of the former is more slender, the rostrum longer. By these criteria, *orientalis* and *albogularis* are subspecies of *senescens*, rather than of *asiaticus* as suggested by Jacobi.

Four skins from Tungling and the Eastern Tombs in Chili Province were secured by Mr. Andrews.

Eutamias senescens intercessor Thomas

Eutamias asiaticus intercessor THOMAS, 1908, Abstr. Proc. Zool. Soc. London, December, p. 44.

Shansi specimens are a very little paler than the typical form, with less dark hairs on the forehead, and with the rusty and ochraceous of rump and flanks less intense. Skins from Kweihwating and from forty-five miles east of Paotow are referred to this subspecies.

Tamiops maccllelandi swinhosi (A. Milne-Edwards)

Sciurus maccllelandii var. *swinhoei* A. MILNE-EDWARDS, 1868-1874, 'Recherches Hist. Nat. Mamm.,' p. 308.

Of these striped tree-squirrels with white-tufted ears a series of four representing this subspecies was taken at Mucheng on the Salween drainage, 6500 to 7000 feet altitude. The light lateral stripes are clear ochraceous, the top of the head is strongly suffused with the same, the belly lightly so. February skins have the three black dorsal stripes well defined. This series probably marks nearly the southern limit of the subspecies, described originally from Moupin.

***Tamiops macclellandi forresti* Thomas**

Tamiops maritimus forresti THOMAS, 1920, Ann. Mag. Nat. Hist., (9) V, p. 305.

General color (winter) olive, the median black stripe alone distinct, the four other dark stripes faintly rusty, the white stripes washed with buffy; cheek stripes and belly white. On the isolated Lichiang range this local form has developed, and is well marked through its nearly uniform buffy-olive ground color. Four specimens were secured at an elevation of 10,000 feet near the summit of Pei Shui.

***Tamiops macclellandi vestitus* Miller**

Tamiops vestitus MILLER, 1915, Proc. Biol. Soc. Washington, XXVIII, p. 155.

This is a much more grayish race than any of the others. The summer and winter pelages differ slightly. In summer three black dorsal stripes are clearly shown, whereas in winter the two lateral of the three are brown, and the intermediate area is more buffy. The crown is sometimes distinctly russet. This was first described as a species but Jacobi is doubtless correct in regarding it as a subspecies of *macclellandi*. Mr. Andrews secured specimens from Tungling and from the vicinity of the Eastern Tombs, Chili Province.

***Tamiops macclellandi monticola* (Bonhote)**

Sciurus macclellandi monticolus BONHOTE, 1900, Ann. Mag. Nat. Hist., (7) V, p. 52.

A darker race of the Fukien highlands. Summer skins show five prominent dorsal stripes on a grayish-brown ground, the two outermost enclosing a white stripe with a decided ochraceous tinge. In winter the four lateral black stripes are rusty brown. A series from Yenping in the mountains of Fukien comes from very near the type locality. The bright buffy facial stripes are conspicuous but cannot be traced continuously across the shoulder to the light body-stripe as they can, for example, in *vestitus*.

Tamiops macclellandi maritimus (Bonhote)

Sciurus macclellandi maritimus BONHOTE, 1900, Ann. Mag. Nat. Hist., (7) V, p. 51.

A somewhat grayer race with narrower and paler whitish lateral stripe than in the preceding race. This is a slightly marked form of the low coastal area of Fukien. A small series was secured at Yuki by Rev. Harry R. Caldwell.

Tamiops macclellandi hainanus J. A. Allen

Tamiops macclellandi hainanus J. A. ALLEN, 1906, Bull. Amer. Mus. Nat. Hist., XXII, p. 476.

Very similar to *maritimus* but the light side-stripes are more buffy and the foot is smaller, more delicate. A fine series was secured by Mr. Clifford Pope at Nodoa, on the island of Hainan. He writes that it is common there, living in patches of jungle, prickly bamboos, in large bushes, or in isolated groups of trees. A favorite place is a mass of vines covering a dead tree. It is extremely quick and agile in its movements and easily alarmed. He never saw it descend to the ground.

Tamiops barbei (Blyth)

Sciurus barbei BLYTH, 1847, Journ. Asiatic Soc. Bengal, XVI, p. 875.

This is undoubtedly a species distinct from *macclellandi*, which it replaces in the lower country of Burma and the Malay peninsula. It is distinguished: (1) by the more conspicuous outer pale stripe, which is broadly continuous across the shoulder with the cheek stripe; (2) by the smaller hind foot, usually less than 30 mm.; (3) by the much narrower tail; and (4) by the ochraceous instead of pale yellow or whitish under surface. The skull is very slightly smaller, the cheek teeth noticeably so, with the outer anterior corner of p^4 less developed so that the anterior outline of the tooth is slightly convex instead of concave. A series of twelve specimens was taken near Mengting at the Burmese border of Yunnan, and two others on the Salween drainage at Mucheng (5000 feet). There it must be close to its northern limit in Yunnan, and meets the range of *T. macclellandi swinhoei*, specimens of which were secured at the slightly higher altitude of 7000 feet near the same place. Careful comparison with specimens of typical *barbei* from Tenasserim, kindly loaned by the U. S. National Museum, fails to reveal any important difference between the two series, although in the latter the hair of the lower surface is shorter and with slightly less conspicuous dark bases.

***Rupestes forresti* Thomas**

Rupestes forresti THOMAS, 1922, Ann. Mag. Nat. Hist., (9) X, p. 399.

A medium-sized squirrel, grizzled black and ochraceous above, merging into nearly clear ochraceous on sides of head, throat and flanks. There is a narrow whitish stripe on each side of the body, and the belly is pale ochraceous. Of this rare squirrel a single flat skin was obtained at Lichiang. The type was from the Mekong-Yangtze divide at 7000-9000 feet.

***Funambulus tristriatus* (Waterhouse)**

Sciurus tristriatus WATERHOUSE, 1837, Charlesworth's Mag. Nat. Hist., I, p. 499.

Three skins from the Faunthorpe-Vernay Expedition to India show stages in molt from the russet winter pelage to the black-backed summer coat.

***Sciurotamias davidanus* (A. Milne-Edwards)**

Sciurus davidanus A. MILNE-EDWARDS, 1867, Rev. et Mag. de Zool., (2) XIX, p. 196.

A grizzled black, gray and buff squirrel, with a white eye-ring and white streak at the posterior base of the ear. The long hair of the tail is white-tipped, the belly white, washed with buffy. The pelage is rather coarse, almost shaggy. A series from Tungling and the Eastern Tombs is typical and three skins from He-shuin, Shansi, seem to represent the same squirrel, here perhaps near its western limit.

***Sciurotamias davidanus owstoni* J. A. Allen**

Sciurotamias owstoni J. A. ALLEN, 1909, Bull. Amer. Mus. Nat. Hist., XXVI, p. 428.

This is a much more richly colored race, in which the buffy of the typical form is replaced by ochraceous, with a heavy wash of the same on the lower side. The eye-ring and the postauricular patches, however, remain whitish. The type locality is Tai Pei Shan, the mountain range of central Shensi. The Third Asiatic Expedition secured specimens along the base of these mountains, as well as forty-five miles southwest of Fengsiangfu in the same Province.

***Dremomys pyrrhomerus* (Thomas)**

Sciurus pyrrhomerus THOMAS, 1895, Ann. Mag. Nat. Hist., (6) XVI, p. 242.

A medium-sized squirrel, grizzled buffy and black above, white below, and at once distinguished by its ochraceous cheeks, and the bright

ferruginous thigh-patch and under side of the tail. Its range seems somewhat circumscribed in the middle Yangtze basin. The type was from Ichang and the Third Asiatic Expedition secured a series at Wanhhsien, in eastern Szechwan, collected by Mr. Walter Granger.

***Dremomys pernyi howelli* Thomas**

Dremomys pernyi howelli THOMAS, 1922, Ann. Mag. Nat. Hist., (9) X, p. 401.

Squirrels of this species are marked by a bright chestnut patch in the anal region and by having the backs of the ears ochraceous, contrasting with the dark olivaceous, black and buff mixture of the back. The present subspecies has a rich dark tone with a faintly marked black line in the middle area of the back. Two specimens from Taipingpu, Shweli River, Yunnan, are referred to it. The type locality is Machangkai, twenty-five miles southwest of Tengyueh, Yunnan.

***Dremomys pernyi flavior* G. M. Allen**

Dremomys pernyi flavior G. M. ALLEN, 1912, Proc. Biol. Soc. Washington, XXV, p. 178.

This is a smaller race, slightly paler in color. The type is from Mengtsz, southeastern Yunnan. Two skins from the Litien and Wie-shu Pass, 11,000 feet, and a third from Chungtu, Mekong River, 6000 feet, seem to be this race.

***Dremomys pernyi lichiensis* Thomas**

Dremomys pernyi lichiensis THOMAS, 1922, Ann. Mag. Nat. Hist., (9) X, p. 403.

This race of the Lichiang Range is barely distinguishable. Compared with a series from western Szechwan, representing *D. p. griselda*, it is a very little less gray, the skull possibly smaller. Specimens were obtained by Messrs. Andrews and Heller between 8200 and 10,000 feet near Lichiang.

***Dremomys pernyi calidior* Thomas**

Dremomys pernyi calidior THOMAS, 1916, Ann. Mag. Nat. Hist., (8) XVII, p. 394.

A darker, ruddier form from the mountains of Fukien, whence a single skin is in the collection.

***Callosciurus erythræus gordonii* (Anderson)**

Sciurus gordonii ANDERSON, 1871, Proc. Zool. Soc. London, p. 140.

As a species, *Callosciurus erythræus* has a wide range, extending from Burma eastward to the coast of central China. Over this great

territory it is represented by a number of local races. The general coloring is grizzled black and buffy above, with the ventral surface of body and limbs sharply contrasted chestnut. In the subspecies *gordoni*, a narrow, sharply defined grizzled line similar in color to the back passes medially from the throat down the chest. The long hairs of the tip of the tail are black, tipped with chestnut, forming contrasting areas. The type locality is Bahmó, eastern Burma. Specimens from southwestern Yunnan (Homushu Pass, Taipingpu, Huiyao, Watien) are quite like Anderson's plate and doubtless represent typical *gordoni*. A series from the Salween drainage, however, is exactly intermediate between these and the paler *michianus* of the Lichiang range. Above, they are quite as dark as *gordoni*; but, below, they show great variation. Thus, in two the grizzled median stripe is absent, while in the others it is mixed with ochraceous in varying degree; but on the whole the series is perhaps nearer *gordoni*.

***Callosciurus erythræus pranis* Kloss**

Sciurus erythræus pranis KLOSS, 1916, Journ. Bombay Nat. Hist. Soc., XXIV, p. 178.

The under side is pale ochraceous, the median grizzled line indistinct, the tail fringed with pale ochraceous or whitish. Specimens secured by the Asiatic Expeditions from the Burma border on the Namting River agree exactly with the description of this form, the type locality of which is Pran, southwestern Siam. Its range must meet that of *gordoni* somewhere in southwestern Yunnan. Two embryos were found in a specimen killed March 1, a number correlated with the reduced number of mammæ (four) in this group of squirrels.

***Callosciurus erythræus michianus* (Robinson and Wroughton)**

Sciurus castaneiventris michianus ROBINSON AND WROUGHTON, 1911, Journ. Fed. Malay States Mus., IV, p. 234.

This is a paler race of the Lichiang highlands. Compared with *gordoni*, with which it intergrades, it is much paler, especially along the sides, and the tail is yellow-tipped instead of rusty. The mid-ventral grizzled stripe is typically lacking, or it may be represented by a contrasted line of ochraceous extending from the throat for a varying distance posteriorly. Specimens from Yunnanfu, to the east of Lichiang though referred here, are intermediate between this and the smaller-footed *hæmobaphes*.

***Callosciurus erythræus castaneoventris* (Gray)**

Sciurus castaneoventris GRAY, 1842, Ann. Mag. Nat. Hist., (1) X, p. 263.

The type of this race is a skin in the British Museum collected by Reeves, but with no other locality than "China." Bonhote, in his review of these squirrels, says that specimens from Fukien are typical. I have therefore referred to it a series from Futsing and Yenping in that Province, obtained by the Asiatic Expeditions. In this race the belly lacks the median gray line, and the tips of the long fringing hairs of the tail are pale ochraceous. The throat is usually gray but in two specimens the chestnut of the belly is continued nearly to the lips. A female containing two embryos was killed at Futsing on August 2, 1916.

***Callosciurus erythræus ningpoensis* (Bonhote)**

Sciurus castaneoventris ningpoensis BONHOTE, 1901, Ann. Mag. Nat. Hist., (7) VII, p. 163.

This is a poorly marked and perhaps untenable subspecies. A series of eleven topotypes brought back by Mr. Andrews from Ningpo, Chekiang Province, is barely distinguishable from the Fukien series, but averages a little grayer along the sides and slightly paler below. One or two of the series are practically identical with *castaneoventris* from Fukien.

***Callosciurus erythræus styani* (Thomas)**

Sciurus styani THOMAS, 1894, Ann. Mag. Nat. Hist., (6) XIII, p. 363.

A buffy-bellied race of the lower Yangtze valley. Two skins from Tunglu, Chekiang Province, taken in March, are probably best regarded as intermediates between *ningpoensis* and *styani*, with the latter of which they seem to agree in general coloring. One has a gray mid-ventral line, as normally in the more southern representatives of the species, a character usually lacking, however, in the more northern races.

***Callosciurus erythræus insularis* (J. A. Allen)**

Sciurus erythræus insularis J. A. ALLEN, 1906, Bull. Amer. Mus. Nat. Hist., XXII, p. 473.

This Hainan race is at once distinguished by its white-fringed tail. In the large series obtained at Nodoa and Nam Fong on the island of Hainan, there is every gradation from a clear chestnut belly to the condition in which a sharply defined narrow line of grizzled gray divides this area medially. The usual coloring, however, is with gray throat and chestnut belly, the latter shade sometimes extending forward nearly to the lips.

Sciurus vulgaris chiliensis Sowerby

Sciurus vulgaris chiliensis SOWERBY, 1921, Ann. Mag. Nat. Hist., (9) VII, p. 253.

This is the representative in eastern China of the tufted-eared squirrel of Europe. The type locality is the Tungling area, seventy-five miles northeast of Peking. In a series of eleven skins from near there, there is much variation in the amount of rufous mixed with the predominating black of the sides and upper surface. The cheeks are usually blue-gray, the blackish tail with a tinge of brown in the central portion. In three specimens the lower side of the forearms and hind leg is clear rufous as well as a narrow flank stripe, while in two of these the rufous extends to the backs of the hind feet. There is no white eye-ring.

Sciurus vulgaris (near **mantchuricus** Thomas)

Sciurus vulgaris mantchuricus THOMAS, Ann. Mag. Nat. Hist., (8) IV, p. 501.

A series of ten skins from localities fifteen miles north and forty-five and sixty miles northeast of Urga, Mongolia, seems to approach *mantchuricus* in having the dorsal surface much more mixed with gray than in *chiliensis* which is of a more intense black. The skulls are, as in the latter, 54–55 mm. long, hence slightly smaller than in *mantchuricus*. As usual in these melanistic forms of the species, occasional individuals show more or less rufous, one for example, having chin, throat and belly white bordered by a rufous line, and with rufous feet and inner surfaces of legs. The range in Mongolia is doubtless conterminous with that of the coniferous forest.

Ratufa gigantea (MacClelland)

Sciurus giganteus MACCLELLAND, 1839, Proc. Zool. Soc. London, p. 150.

A giant squirrel, shining black above, light ochraceous below including inner side of legs. This large species reaches the borders of western Yunnan. One was secured in 1917 on the Namting River, 1700 feet altitude, on the Burma border, and two other skins were bought at Wai-tien, Yunnan.

Ratufa gigantea hainana J. A. Allen

Ratufa gigantea hainana J. A. ALLEN, 1906, Bull. Amer. Mus. Nat. Hist., XXII, p. 472.

Similar to *gigantea*, but the belly darker. This is apparently a rare species on Hainan. In addition to the type secured nearly twenty years ago, a female was obtained by Mr. Clifford Pope at Nam Fong. According to the native hunters, it lives only in heavy forest and is extremely agile, hence difficult to kill.

***Ratufa indica maxima* (Schreber)**

Sciurus maximus SCHREBER, 1784, 'Säugethiere,' Pl. CCXVII B.

***Ratufa indica centralis* Ryley**

Ratufa indica centralis RYLEY, 1913, Journ. Bombay Nat. Hist. Soc., XXII, p. 437.

Skins representing these two races were obtained by the Faunthorpe-Vernay Expedition in India, 1923.

PETAURISTIDÆ***Petaurista yunnanensis* (Anderson)**

Pteromys yunnanensis ANDERSON, 1875, Ann. Mag. Nat. Hist., (4) XVI, p. 282.

General color above maroon evenly ticked with white; membrane maroon; feet and adjacent borders of membrane, and terminal three-fourths of tail black; under surface of body white, extending out on the membrane. Two skins were purchased at Wei-shie, and two specimens collected at Taipingpu, 7000 feet, both localities in southwestern Yunnan.

***Petaurista alborufus castaneus* Thomas**

Petaurista alborufus castaneus THOMAS, 1923, Ann. Mag. Nat. Hist., (9) XII, p. 172.

A specimen from the Szechwan-Hupei border is practically a topotype (type locality, Ichang). This large flying squirrel is very handsome: back, except the dull buffy lower half, deep chestnut; the tail chestnut; feet black; lower sides of body and membrane rufous; head and throat, including a patch on upper surface of shoulder, white. As a species it ranges westward to the borders of Tibet and southward into the Yunnan highlands.

***Petaurista alborufus ochraspis* Thomas**

Petaurista alborufus ochraspis THOMAS, 1923, Ann. Mag. Nat. Hist., (9) XII, p. 172.

An imperfect skin was purchased at Lichiang, Yunnan, and evidently represents this race. The buffy area of the back is a little paler than in *P. a. castaneus* and is narrowly continuous with the buffy area of the base of the tail; otherwise the two are much alike.

***Petaurista petaurista rufipes*, new subspecies**

TYPE.—Adult male, skin only, No. 58224, American Museum of Natural History, from Yungan, Fukien Province, China. September 26, 1921. H. R. Caldwell.

DESCRIPTION.—Entire dorsal surface of the body, including the backs of the feet, the fingers and entire tail, rich "tawny" or ferruginous, glossy, the tips of some of the hairs of the nape and mid-dorsal area minutely tipped with black which causes a slight darkening. Vibrissæ, and a narrow eye-ring black; a minute dull brown spot

at the chin. Entire lower surface of the body pinkish rufous, nearly "ochraceous-salmon," deepening to "tawny" at the border of the membrane.

MEASUREMENTS.—The skin measures approximately: head and body, 375 mm.; tail, 330. The hind foot is 74 mm.

The typical form of this squirrel occurs in Java. Thomas, in reviewing the species in 1908 (under the specific name *nitidus*), recognized the animal of the Malay peninsula as a distinct subspecies for which Gray's name *melanotus* was revived. The discovery of the species in the wooded mountains of Fukien is apparently an extension northward of its previously known range. The two adults secured by Rev. H. R. Caldwell agree in lacking all trace of black on the feet, ears, and tip of tail, and in these respects are apparently different from the darker forms to the southward. A single young, about two-thirds grown, from Kweihwa, Fukien, is similar but, as usual, is less bright than the adults, with a darkening of black hairs at the sides of the toes and along the outer margin of the hind foot; below, the tail shows a narrow median line of black.

***Petaurista hainana*, new species**

TYPE.—Adult female, skin and skull, No. 58200, American Museum of Natural History, from Nam Fong, island of Hainan, China. February 19, 1923. Third Asiatic Expedition; Clifford Pope, collector.

DESCRIPTION.—Occiput, nape, and entire dorsal surface of body, including the arm to the elbow and leg to the knee, as well as the base of the tail and the interfemoral membrane, a grizzled rusty and black, the individual hairs black-tipped with a subterminal ring of ochraceous buff to tawny, and long blackish bases. Forehead, sides of head and a broad area behind each ear along the side of the neck, shining black. Ears black narrowly bordered with whitish. Lips white, but the chin black. Hair of the throat brownish black, white-tipped, this coloring extending in a triangular point on the side of each cheek between the eye and the ear, and in a broader area at the side of the neck to the upper side of the humerus. Forearm, lower leg, and most of the parachute blackish brown, tipped with ferruginous above; the feet, anterior and posterior edges of the membrane, forearm below, and the tail all around (except upper side of base) deep shining black. Ventral surface of body, humerus, and that part of the parachute between elbow and middle of tibia white, the hairs in the median region of the body with gray bases. A narrow border at the lateral edge of the parachute consists of black-tipped hairs with broad cinnamon-rufous bases showing through. These become wholly black on that portion of the membrane outside the forearm, but white-tipped for about 40 mm. at the extreme outer edge just back of the long rod that spreads it from the wrist. The interfemoral portion of the membrane and the lower surface of the tibia are covered with white-tipped hairs, whose bases are gray, becoming tawny in the central portion of each patagium.

MEASUREMENTS.—The collector's measurements of the type are: head and body, 445 mm.; tail, 595; hind foot, 84; ear, 45.

The skull measures: greatest length, 75 mm.; condylo-basal length, 68; palatal length, 37.5; diastema, 14.5; zygomatic width, 49; interorbital width, 17; mastoid width, 36; upper cheek teeth, 17; mandible, 44; lower cheek teeth, 18.

This is a large and richly colored flying squirrel, seemingly one of the *oral* group, with the tips of the dorsal hairs rusty. In a considerable series obtained on Hainan by Mr. Clifford Pope, there is but little variation, though one specimen is much more rufous than usual, with a tuft of this color behind the ear and with the upper surface of the parachute and the tibiæ completely rufous. The tail also is much mixed with this color. In only one specimen in the series of twenty is the lower side of the parachute buffy.

This genus has not previously been reported from Hainan. Mr. Pope writes that it was found only in the "big woods more than fifteen miles to the south of Nôdoa. There it must be abundant, for the Miao hunters shot as many as four in one day. The patches of jungle about Nôdoa are entirely devoid of them and they do not seem to be found even in the wooded mountains eight miles to the west. There is no market for them at Nam Fong and their continued existence seems to be due to that condition. They have a very strong odor and perhaps the flesh is too strong to be eaten."

***Petaurista clarkei* Thomas**

Petaurista clarkei THOMAS, 1922, Ann. Mag. Nat. Hist., (9) X, p. 396.

A large, grizzled gray-and-buff species with ochraceous feet and lower surfaces, as well as a spot of the same behind each ear. Two imperfect skins were bought at Lichiang and Talifu, Yunnan, extending the known range southward from northern Yunnan, Mekong valley.

***Petaurista philippensis* (Elliot)**

Pteromys philippensis ELLIOT, 1839, Madras Journ. Lit. and Sci., X, p. 217.

A skin was brought back from India by the Faunthorpe-Vernay Expedition.

***Petaurista melanopterus* (Milne-Edwards)**

Pteromys melanopterus MILNE-EDWARDS, 1867, Ann. des Sci. Nat., Zool., (5) VIII, p. 375.

A long-haired gray species, with black-edged hind feet and a border of ochraceous along both surfaces of the parachute. This flying squirrel was obtained in Chili Province at Tungling and the Eastern Tombs.

***Pteromys (Hylopetes) alboniger* (Hodgson)**

Sciuropterus alboniger HODGSON, 1836, Journ. Asiatic Soc. Bengal, V, p. 231.

A medium-sized, gray-and-buff flying squirrel, with dark feet, white hind toes, and whitish belly with the bases of the hairs everywhere pale gray. A single skin from Lichiang, Yunnan, is apparently this species; and Thomas has recorded it from the same range at 11,000 feet.

Pteromys (Petinomys) electilis, new species

TYPE.—Adult female, skin and skull, No. 58177, American Museum of Natural History, from Nam Fong, island of Hainan, China. April, 1923. Third Asiatic Expedition; Clifford Pope, collector.

DESCRIPTION.—A medium-sized species with pale russet back grading into fuscous on the upper part of the membrane. Tail tapering in width from the basal third to the dark tip.

Dorsal surface from the nose to the base of the tail uniform pale cinnamon, the basal four-fifths of the hairs fuscous. On the limbs and flanks the tips of the hairs are pale (grayish or whitish), becoming obsolete on the membrane which is blackish brown distally with a narrow white edging, most prominent along the posterior half and passing more to the ventral side in the anterior half. Backs of the feet covered with short hairs, whitish and fuscous, the latter predominating on the hind feet; terminal half or more of hind toes white. Side of the head from eye to ear dusky, below which the white of the lips is continued backward and upward, forming a white streak behind the ear on the side of the upper neck. A narrow dusky ring surrounds the eye. Below, the chin, throat and upper arm are pure white to the bases of the hairs; elsewhere the hairs have slaty bases, those of the membrane paler. Along the flanks a wash of cinnamon extends from axilla to knee. The tail is distichous, broadest at about its basal third, whence it tapers regularly to the tip. It is slightly darker than the back, pale cinnamon washed with dusky, the latter tint deepening distally to produce a distinctly dark tip. Ears naked.

Individuals vary in the relative amount of dusky and cinnamon. Some have the parachute membrane rusty instead of fuscous, and the tail may be less cinnamon. In some the pure white areas of throat and axilla may be continuous and even extend as a narrow line down the middle of the chest, or there may be a pure white area at the groin. Immature examples are grayer above than adults through the prevalence of white-tipped hair.

SKULL.—The skull shows the short rostrum and low uninflated bullæ typical of the subgenus. The cheek teeth are roughened on their crowns and show a small lateral cusp between the two main cusps of the molars.

MEASUREMENTS.—The dimensions of the type as noted by the collector are: head and body, 172 mm.; tail, 159; hind foot, 35; ear, 26. The skull measures: greatest length, 41.5; basal length, 35; palatal length, 21.7; diastema, 8.7; nasals, 11; zygomatic width, 25; mastoid width, 18.7; upper cheek teeth, 8; mandible, 24; lower cheek teeth, 7.6.

The discovery of this small flying squirrel on Hainan is an interesting extension of the range of the subgenus into southeastern China, but it seems specifically distinct from any of the other forms described from India and southeastern Asia, although agreeing well subgenerically with *Petinomys*. Mr. Pope, who secured nearly forty specimens, writes that many were obtained by the native Miao hunters while searching for the large *Petaurista* in the "big woods," but they appear not to inhabit the jungle areas north of the central mountains.