

MISCELLANEOUS PUBLICATIONS
MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, NO. 117

The Mammals of El Salvador

BY

WILLIAM HENRY BURT

AND

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ANN ARBOR

MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN

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MISCELLANEOUS PUBLICATIONS
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	Cloth bound	\$4.60

(Continued on back cover)

MISC. PUBL. NO. 117

Erratum, page 27, last line. Should read megaloptylia Peters.

not semicula Rein.

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THE MAMMALS OF EL SALVADOR

CAPTAIN Sir Edward Belcher, R.N., sent to the Zoological Society of London a specimen (or specimens) of squirrel to which Ogilby (1839) gave the name *Sciurus variegatoides*. Although "sent from the west coast of South America," the squirrel presumably was taken in El Salvador, near La Unión, in 1838. This is the earliest record that I have of any wild mammal being taken in El Salvador. The next record available to me is one of bats taken near Volcán "Palco" (= Izalco), about 30 mi W by N of San Salvador, and donated to the Academy of Natural Sciences of Philadelphia by Captain John M. Dow in 1860 (Proc. Acad. Nat. Sci. Phila., p. ii, under "Donations to Museum.") Six years later (1866) H. Allen described *Vespertilio concinnus* (= *Myotis nigricans*) from "Salvador." He had two specimens in alcohol, presumably the ones donated by Captain Dow.

In 1925, Donald R. Dickey who, with A. J. van Rossem, had initiated a survey of the avifauna of El Salvador, decided to include the mammalian fauna as well. For this part of the project he employed R. A. Stirton. This was the first real attempt to determine the nature of the mammalian fauna of the Republic. The first entry in Stirton's field catalogue was on July 29, 1925. He remained in the field through April, 1926. After a holiday in the States he returned the latter part of November of that year, with G. D. Stirton, to continue through June, 1927.

When the field work in El Salvador was finished, Stirton went to the University of California and eventually changed his main interests to the field of paleontology. He still maintained an interest in Salvadoran mammals, and in November, 1941, again visited El Salvador as head of an expedition from the University of California. Milton Hildebrand was mammalogist on this expedition which included also a herpetologist (John Davis), an ornithologist (Joe T. Marshall), a botanist (John M. Tucker), and a geologist (W. K. Gealey). The total time in the field was from November 28, 1941, to May 14, 1942. Hildebrand collected many of the mammals on this expedition.

Stirton's collections resulted in a series of publications by Dickey (in 1928) in which 11 species and subspecies were described as new, and in descriptions of four additional subspecies by Nelson and Goldman (1931), Nelson (1932), Goldman (1937), and Hooper (1949). Also, an article on the ecology of *Rheomys* by Stirton (1944) and one on variation in two species of *Peromyscus* by Ondrias (1960).

The next systematic collecting in El Salvador was by Dr. Heinz Felten

who was in the country from October, 1952, to April, 1954. This resulted in a series of papers (Felten, 1955-58) in which he recorded 73 species, and described two new subspecies. Felten recorded eight species not taken by Stirton, and Stirton took 23 species not encountered by Felten. The total recorded in the present report is 97 species (Table 1).

TABLE 1
NUMBER OF SPECIMENS AND NUMBER OF SPECIES IN EACH ORDER OF MAMMALS COLLECTED BY
R. A. STIRTON AND HANS FELTEN IN EL SALVADOR

Order	Stirton		Felten		Total No. Species Known
	Specimens	Species	Specimens	Species	
Marsupialia	86	4	47	3	4
Insectivora	15	1	1	1	1
Primates	11	1	8	1	1
Chiroptera	841	33	1892	32	40
Edentata	20	2	8	1	2
Carnivora	227	16	21	8	16
Rodentia	1685	30	319	24	30
Lagomorpha	26	1	11	1	1
Artiodactyla	11	1	3	2	2
Totals	2922	89	2310	73	97

In 1948, Rafael Gonzales Sol published a list of "Mamiferos" for El Salvador. There are 55 names in this list, many of which are duplications, and many no longer in use. It is quite obvious that the list is not based on specimens.

Dickey and van Rossem (1938) give a good historical account of ornithological work in El Salvador as well as a fairly complete account, as far as then known, of climatic and physiographic features of the area. Mertens (1952) has done similarly for the reptiles and amphibians. Stirton and Gealey (1949) made a reconnaissance study of the geology and vertebrate paleontology of El Salvador, and Williams and Meyer-Abich (1955) have discussed the mode of origin of the large collapse basins and described volcanism in the southern part of the Republic. Additional references to the geology of the area are given in the latter paper. For details that need not be repeated here, the reader is referred to the above sources.

Dickey fully intended to write the report on the mammalian fauna of El Salvador, but his untimely death in 1932 precluded this. Being with the

Dickey organization at the time, it was my privilege to pick up where Dickey had left off. I have had access to the notes that Dickey made on the collections and to the original field notes made by Stirton.

Although this report is the result of a joint effort, I assume all responsibility for the systematic treatment of the species and for any errors that might have been overlooked. Items on habits, habitat, ecology, etc. are from Stirton's field notes. The personal pronoun, wherever used, refers to me and me only.

The material in the Dickey collection was all procured by or under the direction of Stirton and financed by Donald R. Dickey. Later collections for the University of California, as well as the published accounts, particularly by Felten (1955-58), are included here for the sake of completeness. The bulk of the Dickey Mammal Collection is now housed at the Museum of Vertebrate Zoology, University of California, Berkeley. A lesser amount is at the Museum of Zoology, University of Michigan.—*William H. Burt.*

ACKNOWLEDGMENTS

To various officials and ranch owners in El Salvador, we are most grateful for their many courtesies and other friendly cooperation. Many of our colleagues have aided in one way or other. To them, especially to Seth B. Benson who supplied information on the collections of the last expedition, our gratitude. We are particularly indebted to Mrs. Donald R. Dickey who generously gave permission to report on the collections from El Salvador.

FAUNAL RELATIONSHIPS

El Salvador, although small in area, is relatively diverse ecologically. Elevations range from sea level on the Pacific side to 9000 ft. along the Honduran border. The zonation is from Arid Lower Tropical to Humid Upper Tropical. In spite of this, the mammalian fauna is somewhat impoverished. No species are confined to El Salvador; six subspecies of rodents are doubtfully so restricted.

Relationships with the North American and South American faunas are divided with the preponderance toward that of South America. The marsupials, primates, and edentates (total of 7 species) are all of South American affinities. Also in this category are 28 species of bats, four rodents, four carnivores, and one artiodactyl (a grand total of 44 species). With northern affinities are: one insectivore, three bats, fourteen rodents, one rabbit, seven carnivores, and one artiodactyl (total, 27 species). The remaining 24 species (excluding two Old World kinds) are confined to Mexico and Central America. This group consists of nine bats, ten rodents and five

carnivores. El Salvador has a typical Central American mammalian fauna with little that is peculiar to the Republic.

GAZETTEER OF STIRTON LOCALITIES

(Fig. 1)

ACAJUTLA, Dept. Sonsonate: 13° 37' N, 89° 50' W; on coast. Some *Balantiopteryx* were taken here among the rocks along the shore, April 18, 1927.

APANECA, Dept. Ahuachapán: 13° 52' N, 89° 49' W; *Cryptotis* were taken here.

BARRA DE SANTIAGO, Dept. Ahuachapán: 13° 47' N, 90° 03' W; on coast; collected March 29–April 15, 1927.

Channels were lined with mangroves; back from the coast were brushy tangles and swampy forests with many palms. In the open brushy areas were *Liomys*, *Oryzomys*, *Sigmodon*, *Sylvilagus*, and *Urocyon*; in the forests were *Nasua*, *Procyon*, *Potos*, *Philander*, *Didelphis*, *Sciurus*, *Dasyprocta*, *Nyctomys*, and *Ototylomys*. Raccoons abounded in the mangroves.

BARRIOS MINE (see Divisadero): collected bats, March 27, 1926; also took *Urocyon*, *Procyon*, and *Ototylomys* here.

CAROLINA MINE (see Divisadero).

CERRO DEL AGUILA, Dept. Santa Ana: 13° 55' N, 89° 42' W; on NW flank of Volcán de Santa Ana; cloud forest, oaks and other hardwoods; 4500–6000 ft. *Sciurus deppei* and *S. variegatoides* were taken here.

CERRO DE LOS NARANJOS, Dept. Santa Ana: 13° 53' N, 89° 42' W; on NW flank of Volcán de Santa Ana; 4500–6000 ft.; similar to Cerro del Aguila. *Mustela*, *Nasua*, *Potos*, *Urocyon*, *Sciurus*, *Orthogeomys*, and *Sylvilagus* were taken here.

CHILATA, Dept. Sonsonate: 13° 39' N, 89° 34' W; elevation about 2000 ft.; collected April 21–30, 1927; May 2–14, 1942.

Coffee plantings, second growth forest, and a few small openings with grass constitute the principal habitats near this hacienda. Except for *Sigmodon*, *Baiomys*, and *Liomys*, the mammals taken were typical of, or tolerated, forests. Bats were taken from hollow logs or trees and along rock cliffs. Other mammals taken in the forests were *Sciurus*, *Nyctomys*, *Tylomys*, *Reithrodontomys mexicanus* (some caught in trees), *Oryzomys*, *Peromyscus mexicanus* (also caught in trees), *Didelphis*, *Philander*, *Marmosa*, *Jentinkia*, and *Nasua*. *Ototylomys* was taken along rock cliffs and *Orthogeomys* was taken nearby.

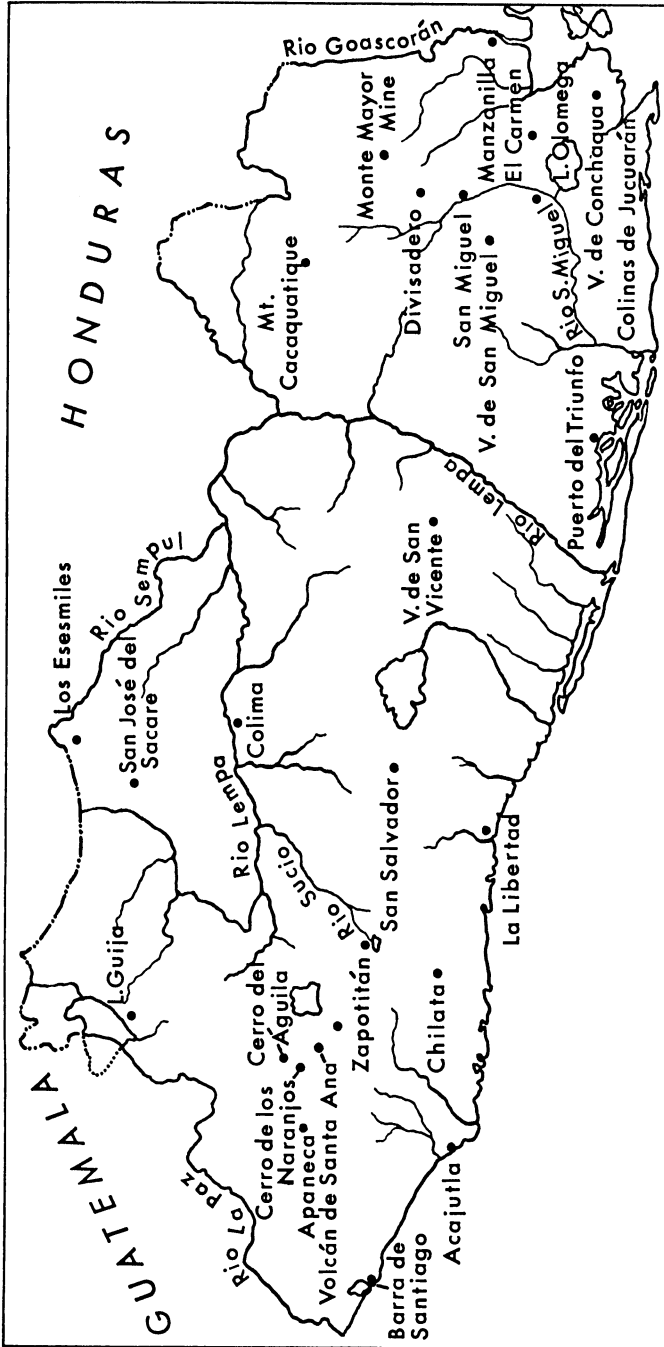


FIG. 1. Map of El Salvador showing principal collecting localities.

COLIMA, Dept. Cuscatlán: 13° 59' N, 89° 06' W; elevation 1000 ft.; collected January 20–26, 1927.

A large hacienda on the Río Lempa. The flat valley floor is about two miles wide; it was checkered with sugar cane, grassy pastures, banana groves, and weed-grown fields. There was no large timber nearby. *Saccopteryx* was found in a hollow tree, other bats beneath banana palm leaves or around buildings. The fields and a stone fence yielded *Sigmodon*, *Oryzomys*, and *Baiomys*. Other kinds taken in the area were *Peromyscus*, *Coendou*, *Sylvilagus*, *Urocyon*, *Mephitis*, *Spilogale*, *Procyon*, and *Didelphis*.

COLINAS DE JUCUARÁN, Dept. San Miguel: 13° 15' N, 88° 05' W; a line of hills between Lake Olomega and the ocean; 2200 ft.; dense, arid, deciduous forest to 2000 ft.; a few patches of stunted trees, occasional pines, but mostly coarse grass above 2000 ft. Bats, pacas, kinkajous, margay cats, and deer were taken here.

COMACARAN, Dept. San Miguel: 13° 34' N, 88° 06' W; a town about 6 mi S Divisadero; Potosí Mine is located here.

DIVISADERO, Dept. Morazan: 13° 37' N, 88° 04' W; elevation about 800 ft.; collected September 23–October 23, November 2–5, 12–15, 1925; December 6–12, 21–23, 1926; November 28–December 22, 1941.

Original forest gone; low rounded hills covered with grass and thickets of *Acacia* and *Mimosa* with a few trees along numerous small streams; partially farmed; mine tunnels in this area were Monte Cristo Mine (1½ mi W), Encuentros Mine (3 mi W), Carolina Mine, Barrios Mine (4 mi W), Pico de la Señora Mine (3 mi W), San Pedro Mine (2½ mi W), Graveyard Mine (1½ mi NW), and San José Mine (½ mi down river from Graveyard Mine).

Several bats as well as *Rattus* and *Ototylomys* were taken from the mine tunnels. Along the slopes where there were boulders, grass, and brush lived *Liomys*, *Sigmodon*, *Reithrodontomys*, *Peromyscus*, *Oryzomys*, *Ototylomys*, *Dasybus*, *Sylvilagus*, *Mephitis*, *Conepatus*, *Urocyon*, *Philander*, and *Didelphis*.

EL CARMEN, Dept. San Vicente: 13° 25' N, 87° 55' W; a small village on coastal plain, near Lake Olomega and Río San Miguel; *Tamandua* and *Ototylomys* taken here.

EL TABLÓN (see Lake Guija).

ENCUENTROS MINE (see Divisadero).

GIGANTE MINE, Dept. Morazan: about 6 mi NE Divisadero; habitat similar; several mine tunnels. Collected bats March 29–30, 1926.

GRAVEYARD MINE (see Divisadero).

LA LIBERTAD, Dept. Libertad: 13° 31' N, 89° 19' W; small coastal town; brush-covered lava hills nearby.

LA UNIÓN, Dept. La Unión: 13° 20' N, 87° 50' W; seaport on western arm of Gulf of Fonseca and at base of Volcán de Conchagua; second growth woods and scrub on hills.

LAKE GUIJA, Dept. Santa Ana: 14° 15' N, 89° 35' W; elevation 1450 ft.; Arid Lower Tropical; collected May 24–29, 1927.

Headquarters at El Tablón on the southeast shore of the lake. Near the lake were some grass and thorn scrub meadows, but surrounding country was mostly recent lava flows, in which there were caverns, with a cover of brush and trees. Bats sought refuge in the caverns. In the brush and tree-covered areas were *Liomys*, *Baiomys*, *Ototylomys*, *Nyctomys*, *Dasyprocta*, *Sciurus*, *Procyon*, *Urocyon*, and *Canis*.

LAKE OMEGA (south side), Dept. San Miguel: 13° 20' N, 88° 00' W; elevation, 200 ft. at lake, 2000 ft. on ridges; collected July 28–September 15, 1925; January 22–February 25, 1942.

Near the lake were corn patches, tall grass, and forest with trees 60–70 ft. high. The steep slopes were strewn with lava boulders and covered by rather thick growths of thorn brush. Tall grass grew on the nearby ridges. Opossums (*Didelphis*) and raccoons (*Procyon*) were particularly common near the lake. In the grassy and brushy areas, *Sigmodon*, *Oryzomys*, and *Liomys* were the common species while in the forest were bats, monkeys, tree squirrels, kinkajous, four-eyed and murine opossums, jaguarundi cats, porcupines, and the arboreal *Nyctomys* and *Ototylomys*. Deer, peccaries, coatis, armadillos, anteaters, agoutis, cottontails, and skunks were seen in various habitats. The only specimen of *Eira* was taken here.

LOS ESESMILES, Dept. Chalatenango: 14° 17' N, 89° 07' W; elevation at headquarters about 6400 ft.; summit of mountain, 9000 ft.; collected February 3–March 8, 1927; March 6–April 5, 1942.

This short range of mountains merges to the north with the Honduran highlands. The southern exposure is arid with pines and oaks up to 8700 ft. The north slope and summit are humid, dripping wet throughout the year. Here are large oaks covered with epiphytes and with an understory of tree ferns, shrubs, small ferns, and moss. It is a cloud forest. Several small streams carry seepage down to the Río Lempa. Near camp, on the east side of the mountain, were patches of corn and wheat. Also, some areas were grassy and others covered with berry vines and ferns. Dense clumps of berry vines were common along the banks of small streams.

Confined to the cloud forest were *Peromyscus oaxacensis*, *Reithrodontomys mexicanus octepequensis*, *Scotinomys*, *Oryzomys alfaroi*, *Rheomys*,

and *Heteromys*. Other species taken in the cloud forest, but not confined to it, were *Peromyscus mexicanus*, *Sciurus*, and *Potos*. Species taken only in the grassy or brushy areas were *Reithrodontomys sumichrasti*, *Oryzomys palustris*, *Sigmodon*, and *Orthogeomys*. Of general occurrence in the area were *Didelphis*, *Procyon*, *Jentinkia*, *Nasua*, *Spilogale*, *Mephitis*, *Conepatus*, *Mustela*, *Urocyon*, and *Sylvilagus*. This is the only place that *Eptesicus* was taken.

MISERICORDIA MINE, Dept. Morazan: a 50-foot tunnel 2½ mi N (upstream) Monte Mayor Mine; collected bats (*Carollia*) April 12, 1926.

MONTE CRISTO MINE (see Divisadero).

MONTE MAYOR MINE, Dept. Morazan: 13° 42' N, 88° 00' W; elevation 1000 ft.; collected October 6, 1925, April 13, December 13–16, 1926.

An abandoned mine 4 hrs. by mule NE Divisadero in a broad-floored canyon through which runs a stream with well-wooded banks; original forests gone except for a few patches on mountain slopes; partially farmed. Bats taken from the mine were *Desmodus*, *Carollia*, and *Glossophaga*.

Stayed here through courtesy of Mr. G. A. Swanquist.

MT. CACAGUATIQUE, Depts. Morazan and San Miguel: 13° 48' N, 88° 14' W; elevation at camp on southwest slope 3500 ft.; summit of mountain, 4000 ft.; collected November 21–December 23, 1925; December 24, 1941–January 18, 1942.

The canyons and high ridges were forested with oaks and scattered pines from about 3500 ft. up. Epiphytes, mosses, and ferns were found near the top of the mountain. Lower down, most of the original forests had been cleared and much of it converted to coffee with smaller plantations of bananas and some patches of corn. Grassy areas, mostly near the small streams, were not extensive. Some of the rocky slopes supported thick growths of brushy plants. In the grassy areas were such rodents as *Oryzomys*, *Sigmodon*, *Baiomys*, *Liomys*, and *Reithrodontomys*. *Oryzomys* was found also along the streams with *Rheomys*. On the rocky canyon slopes, near the bottom, were *Heteromys*, *Ototylomys*, *Peromyscus*, and *Cryptotis*; *Potos*, *Sciurus*, and *Coendou* were fairly confined to the oak forest. Others that ranged widely were *Didelphis*, *Felis*, *Urocyon*, *Conepatus*, *Dasypus*, *Dasyprocta*, *Agouti*, and *Sylvilagus*. Pocket gophers were taken on the north slope. Others observed but not taken were deer and raccoons.

PICO DE LA SEÑORA MINE (See Divisadero).

PINE PEAKS, 3 miles W of Volcán de Conchagua, Dept. La Unión: 13° 17' N, 87° 51' W; elevation up to 3600 ft.; collected February 26–March 7, 1926.

The upper 200 to 300 ft. of Pine Peaks, and near headquarters, was pine

forests and open grassland. There were no oaks. Below this, down to an elevation of about 2000 ft., much of the underbrush had been cleared and the land planted to coffee. Mammal collecting was in the pines, grassland, and coffee forest. There were also patches of thick brush and the slopes were strewn with lava boulders. *Peromyscus mexicanus* occupied chiefly the coffee areas with *Ototylomys* and *Sciurus*; *Peromyscus stirtoni* preferred grasslands along with *Sigmodon*.

POTOSÍ MINE (see Comacaran); collected bats April 7, 1926.

PUERTO DEL TRIUNFO, Dept. Usulután: 13° 16' N, 88° 32' W; collected December 28, 1925–January 25, 1926.

This was an old deserted seaport on the north side of Triunfo Bay. Mangrove thickets border the open channels. East of the village was an extensive jungle forest with an understory of huiscoyol palm. Threading through this jungle were numerous small streams and swampy areas. Bands of monkeys (*Ateles*) were common here, also agoutis, pacas, and opossums. Near the village were areas of second growth, thick masses of vines, brush, and trees 20 to 30 feet high. Also there were cleared areas, some with grass grown head high and others planted to corn. *Sigmodon* and *Oryzomys* were common here and in an old banana grove where there were also many signs of raccoons, skunks, opossums, and pocket gophers. Tracks of raccoons and coatis were numerous along the tide flats. Bats were common in the old buildings. Vampire bats were taken from hollow trees. Other mammals taken in this area were: *Felis*, *Potos*, *Urocyon*, *Liomys*, *Nyctomys*, *Sciurus*, *Ototylomys*, *Coendou*, *Dasypus*, *Sylvilagus*, and *Odocoileus*.

RÍO GOASCORÁN, Dept. La Unión: 13° 31' N, 87° 44' W; elevation, 100 ft.; collected October 25–31, 1925, December 21–30, 1926.

West bank of the Río Goascorán; second growth woods along streams and river banks; river plain, grass and mimosa; foothills with rocky cliffs and scrubby woods. Here were taken *Liomys* and *Ototylomys* along the rocky slopes, *Sigmodon* and *Oryzomys* in the savanna, *Peromyscus* in the woods, and bats (*Balantiopteryx*, *Carollia*, and *Glossophaga*) along the rock cliffs. Skunks (*Mephitis*), coyotes, raccoons, foxes, and cottontails were also encountered. The headquarters ranch was known as Manzanilla.

RÍO SAN MIGUEL, Dept. San Miguel: 13° 25' N, 87° 44' W; about 3 mi NW of Lake Olomega; collected February 2–21, 1926.

This was the dry season. Headquarters was at a large cattle ranch owned by Enrique Prunera. Much of the lowland along the river was in pasture. There were also melon patches, old bean, corn, and cane fields, and a jungle-like forest nearby. Willows lined the river bank. A shallow lagoon was used extensively by raccoons, and deer fed along its edges. The fields

and grassy areas were inhabited by *Liomys*, *Oryzomys*, and *Sigmodon* as well as by some of the larger mammals. *Nyctomys*, *Ototylomys*, *Sciurus*, *Potos*, and *Coendou* were fairly confined to the forest. Opossums, most carnivores, armadillos, and agoutis ranged over several habitats. Most of the bats, especially *Trachops* and *Saccopteryx*, were found in hollow logs and trees.

RÍO SUCIO (see Zapotitán).

SAN ANTONIO, Dept. San Miguel: a hacienda off northwest shore of Lake Olomega; 2 cats (*Felis pardalis*) taken here by José M. Moreles, April 25, 1926; not a regular collecting locality.

SAN JOSÉ DEL SACARE, Dept. Chalatenango: 14° 12' N, 89° 10' W; elevation 3600 ft.; Arid Upper Tropical; collected March 11–17, 1927.

On the ridges and in the ravines were pines and deciduous oaks. Much of the area was heavily grazed, but there were a few small areas of grass along the streams. Also, there were some brushy areas, banana and coffee plantings, and rock cliffs. The rock cliffs afforded shelter for *Ototylomys* and *Peromyscus mexicanus*; *P. boylei* was taken among the oaks, *Oryzomys* and *Sigmodon* in grass or brush along streams. The oaks and pines were inhabited by *Sciurus deppei*, *S. variegatoides*, and *Didelphis*. The mammalian fauna was poor here owing possibly to the overgrazed condition.

SAN JOSÉ MINE (see Divisadero).

SAN MIGUEL, Dept. San Miguel: 13° 31' N, 88° 08' W; elevation 300 ft.; original forest gone.

SAN PEDRO MINE (see Divisadero).

SAN RAMON VALLEY, Dept. San Miguel: a *Dasyprocta* taken here.

SAN SALVADOR, Dept. San Salvador: 13° 45' N, 89° 09' W; the Capital City; a skin of *Mustela* from nearby (La Ceiba).

SERRO MÓGOTE (see Río Goascorán): 3–4 mi SW Manzanilla; some dense forest, brushland, and small areas of grassland; 2 coyotes taken here.

TABANCO, Dept. La Unión: 2½ hr. muleback ride down river from Monte Mayor Mine; collected December 17–19, 1926.

A mine tunnel near the village was visited for the express purpose of collecting bats; nine kinds were taken.

VOLCÁN DE CONCHAGUA (see Pine Peaks).

VOLCÁN DE SAN MIGUEL, Dept. San Miguel: 13° 28' N, 88° 11' W; elevation 2500–5000 ft.; collected January 4–14, 1927.

Headquarters was at about 3000 ft. Below this was thick jungle and coffee plantation forest. Higher, the forest gave way to brush then grass and shrubs among the lava boulders. Above 5000 ft., on the south side,

vegetation ceased; the volcano was still slightly active. There were no permanent streams. A few small areas had been cleared for corn fields. Here were found *Liomys*, *Sigmodon*, *Oryzomys*, and *Baiomys*. Higher up among the grass and rocks were *Reithrodontomys*. Rock ledges also sheltered *Peromyscus* and *Lonchophylla*. In the jungle and coffee area were *Ototylomys*, *Nyctomys*, *Sciurus*, *Potos*, *Coendou*, and *Tamandua*. Other, more cosmopolitan kinds were *Didelphis*, *Urocyon*, *Procyon*, *Nasua*, and *Conepatus*.

VOLCÁN DE SAN VICENTE, Dept. San Vicente: 13° 37' N, 88° 45' W; forests gone; cultivated nearly to summit (7000 ft.).

VOLCÁN DE SANTA ANA, Dept. Santa Ana: 13° 52' N, 89° 37' W; elevation at headquarters, 4500 ft.; main cone, 7200 ft. Humid Upper Tropical on north and west sides above 4000 ft.; south side and summit, Arid Upper Tropical; collected May 6-16, 1927; April 10-29, 1942.

Plateau dotted with steep, rounded, wooded hills; some coffee and corn fields. The area worked was from 4500 to 6800 ft. *Neotoma* were taken in trees in the volcanic area at 6800 ft. In a coffee nursery were *Reithrodontomys* and *Baiomys*. The former was taken also in the humid forest along with *Peromyscus*, *Nyctomys*, *Sciurus deppei*, *Potos*, and *Jentinkia*. *Orthogeomys* was found in a corn field.

ZAPOTITÁN, Dept. Libertad: 13° 46' N, 89° 28' W; elevation 1500 ft.; Arid Lower Tropical; collected June 5-22, 1927.

All efforts were directed at collecting water opossums, six, and one *Lutra*, were taken along the Río Sucio. Also taken, in the forest, was one *Potos*.

FELTEN LOCALITIES OTHER THAN THOSE OF STIRTON

Dept. Ahuachapán:

Finca Raquelina, near Apaneca (13° 52' N, 89° 48' W).

Laguna de las Ninfas (13° 53' N, 89° 48' W).

Laguna Verde (13° 54' N, 89° 48' W).

Dept. Chalatenango:

Citalá (14° 23' N, 89° 13' W).

Dept. Santa Ana:

Cerro Blanco (Finca Las Canarias).

Cerro Verde (in part; 13° 50' N, 89° 38' W).

Finca El Marne (8 km SW Santa Ana).

Hacienda Los Planes (14° 24' N, 89° 22' W).

Hacienda Montecristo ($14^{\circ} 25' N, 89^{\circ} 22' W$).
 Isla de la Cabra (in Lago de Coatepeque; $13^{\circ} 51' N, 89^{\circ} 34' W$).
 Laguna de Metapán ($14^{\circ} 19' N, 89^{\circ} 28' W$).

Dept. Sonsonate:

Cerro Verde (in part; $13^{\circ} 50' N, 89^{\circ} 38' W$).
 Hacienda Puerto Arturo ($13^{\circ} 44' N, 89^{\circ} 29' W$).
 Hacienda San Antonio ($13^{\circ} 42' N, 89^{\circ} 45' W$).
 Mizata.
 Sonsonate ($13^{\circ} 43' N, 89^{\circ} 44' W$).
 Volcán Izalco ($13^{\circ} 49' N, 89^{\circ} 38' W$).
 Volcán de los Naranjos ($13^{\circ} 52' N, 89^{\circ} 41' W$).

Dept. Libertad:

Agrícola Militar (= San Andrés).
 Colon ($13^{\circ} 42' N, 89^{\circ} 20' W$).
 Cueva Hedionda (5 km E La Libertad).
 Hacienda Hedionda.
 Hacienda Miramar ($13^{\circ} 35' N, 89^{\circ} 17' W$).
 Hacienda San Diego ($13^{\circ} 27' N, 89^{\circ} 13' W$).
 Hacienda Talcualuya ($13^{\circ} 53' N, 89^{\circ} 22' W$).
 Laguna Chanmico ($13^{\circ} 47' N, 89^{\circ} 22' W$).
 Los Chorros ($13^{\circ} 42' N, 89^{\circ} 19' W$).
 Puerta La Laguna ($13^{\circ} 41' N, 89^{\circ} 15' W$).
 San Andrés.
 Santa Ana ($13^{\circ} 59' N, 89^{\circ} 34' W$).
 Santa Tecla ($13^{\circ} 40' N, 89^{\circ} 17' W$).
 Talnique ($13^{\circ} 40' N, 89^{\circ} 24' W$).
 Toluca.

Dept. San Salvador:

Milingo ($13^{\circ} 54' N, 89^{\circ} 03' W$).
 Rosario de Mora ($13^{\circ} 35' N, 89^{\circ} 13' W$).
 San Marcos ($13^{\circ} 40' N, 89^{\circ} 11' W$).

Dept. La Paz:

Amate de Campo (= Laguna Limpia) ($13^{\circ} 24' N, 89^{\circ} 07' W$).
 Hacienda Miraflores ($13^{\circ} 29' N, 89^{\circ} 00' W$).
 La Herradura.
 Laguna Limpia (see Amate de Campo).
 Los Hojas ($13^{\circ} 22' N, 89^{\circ} 02' W$).
 Olocuilta ($13^{\circ} 44' N, 89^{\circ} 07' W$).
 Zacatecoluca.

Dept. Cuscatlán

San Rafael Cedros (13° 44' N, 88° 53' W).

Suchitoto (13° 57' N, 89° 03' W).

Dept. San Vicente:

Finca El Carmen (13° 37' N, 88° 15' W).

Quinta Samayoa.

Tecoluca (13° 32' N, 88° 47' W).

Dept. Usulután

Alagría (13° 30' N, 88° 30' W; road from Alagría to Berlin).

Berlin (13° 32' N, 88° 31' W).

Hacienda Nancuchiname (13° 25' N, 88° 41' W).

Hacienda San Pedro (13° 16' N, 88° 24' W).

Jucuarán (13° 12' N, 88° 19' W).

Nueva Grenada (13° 36' N, 88° 27' W).

Pueblo El Triunfo (La Cueva, 13° 34' N, 88° 26' W).

Dept. San Miguel:

Laguna de Aramuaca (20 km S San Miguel).

Dept. Morazan:

Corinto (13° 49' N, 87° 58' W).

Hacienda Santa Rosa (6 mi W Mineral Montecristo).

Mineral Montecristo (13° 56' N, 88° 05' W).

SPECIES AND SUBSPECIES OF MAMMALS DESCRIBED FROM
EL SALVADOR*Chironectes argyrodytes* Dickey, 1928, La Libertad.*Vespertilio concinnus* H. Allen, 1866 (= *Myotis nigrescens*), Volcán Izalco.*Procyon lotor dickeyi* Nelson and Goldman, 1931, Barra de Santiago.*Canis latrans dickeyi* Nelson, 1932, Río Goascorán.*Sciurus variegatoides* Ogilby, 1839, La Unión.*Sciurus variegatoides bangsi* Dickey, 1928, Barra de Santiago.*Orthogeomys pygacanthus* Dickey, 1928, Mt. Cacaguatique.*Orthogeomys grandis engelhardi* Felten, 1957, Volcán de San Vicente.*Heteromys desmarestianus psakastus* Dickey, 1928, Los Esesmiles.*Reithrodontomys mexicanus orinus* Hooper, 1949, Chilata.*Peromyscus boylii cordillerae* Dickey, 1928, Mt. Cacaguatique.*Peromyscus boylii sacarensis* Dickey, 1928, San José del Sacare.*Peromyscus mexicanus philombrius* Dickey, 1928, Los Esesmiles.*Peromyscus mexicanus salvadorensis* Dickey, 1928, Mt. Cacaguatique.*Peromyscus stirtoni* Dickey, 1928, Río Goascorán.*Nyctomys sumichrasti florencei* Goldman, 1937, Barra de Santiago.*Rheomys thomasi* Dickey, 1928, Mt. Cacaguatique.*Rheomys thomasi stirtoni* Dickey, 1928, Los Esesmiles.*Oryzomys rostratus salvadorensis* Felten, 1958, Hacienda San Antonio.

ACCOUNTS OF SPECIES

In the following accounts of the species of mammals now known from El Salvador, all linear measurements are in millimeters. It seems unnecessary to give this indication in the text for each measurement. Except for *Sciurus variegatoides*, where they are given separate headings, the sub-specific designations, when appropriate, are given at or near the end of each account.

ORDER MARSUPIALIA (POUCHED MAMMALS)

FAMILY DIDELPHIIDAE (OPOSSUMS)

Five toes on each foot; first toe on hind foot without claw and opposable; tail long, naked, scaly; teeth number 50.

Genus *Didelphis* (Large Opossums)

Size large (see below); long guard hairs project beyond underfur; pouch on belly of female.

Didelphis marsupialis Linnaeus

SIZE.—(13 ♂, 11 ♀) Head and body, ♂, 390–477, ♀, 370–464; tail, 380–465, 354–446. Skull: condylobasal length, 100.4–120, 89.3–117.7; zygomatic breadth, 51.5–70.1, 45.4–57.5; length of nasals, 48.4–56.7, 44.1–53.4. Weight, two males, 6¾ and 7½ lbs.

DESCRIPTION.—Feet and ears black; tail whitish for terminal two thirds in adults of both color phases; basal portion of body hair soiled whitish; guard hairs whitish for entire length (gray phase) or broadly tipped with black (black phase); under fur tipped with dark brown or black; cheeks white or slightly soiled yellowish (gray phase) or always yellowish, sometimes with grayish overcast (black phase). Ears of "pouch young" flesh-color. Fourteen young are all nearly black; most of them have a few white hairs sparsely scattered over the back. Adults and young adults are divided into 28 in the gray phase and 18 in the black phase. One is intermediate with fore part of body in black phase and rump in gray phase.

DISTRIBUTION IN EL SALVADOR.—Specimens from: Barra de Santiago, Chilata, Los Esesmiles, San José del Sacare, Colima, Mt. Cacaguatique, Divisadero, Volcán de San Miguel, Río San Miguel, Lake Olomega, and Puerto del Triunfo. Recorded by Felten (1958c) from Laguna de Guija, Isla de la Cabra in Lago de Coatepeque, Cerro Verde, Hac. San Antonio, Hac. Talcualuya, km 15 and 43 on road from San Salvador to Santa Ana, Colon, Santa Tecla, Los Chorros, Hac. Miramar, Talnique, San Salvador, San Rafael Cedros, La Herradura, and Hac. Nancuchiname.

REMARKS.—Cranial characters are variable in *Didelphis*. J. A. Allen (1901) stressed the value of the length and shape of the nasals as taxonomic characteristics. In the Salvadoran specimens, the shapes of the nasals, posteriorly, range from bluntly truncate to

acutely pointed. The majority of those with truncate nasals are from lower and those with pointed nasals from higher altitudes. This may be no more than a coincidence inasmuch as the number of specimens is not sufficient to rule out chance selection.

Felten (1958c) considered the Salvadoran opossums as belonging to the subspecies *californica* Bennett. We think they should be designated as *tabascensis* J. A. Allen. Felten found from 6 to 9 young in the pouches of females.

Genus *Marmosa* (Murine Opossums)

Small, rat-like in general appearance; fur short (about 6 mm), reddish on dorsal and buffy on ventral surface; no guard hairs; black orbital area from base of ear to whiskers; no pouch in female; tail nearly naked, slightly paler beneath.

Marmosa mexicana Merriam

SIZE.—(1 ♂, 1 ♀) Head and body, ♂, 129, ♀, 121; tail, 170, 161. Skull: condylobasal length, 33.2, 30.1; zygomatic breadth, 19.3, 18.1; length of nasals, 14.8, 13.8.

DESCRIPTION.—Hairs of back, sides, and outer surfaces of legs lead color at bases and tipped with cinnamon; forehead and nose paler; cheeks, throat, belly, and inner surfaces of legs buffy with no darkening of hairs at bases; body hair continues on base of tail for about ten millimeters; color of sides grades gradually into that of belly; in life, nose pink, ears grayish brown, feet grayish to brownish flesh, tail dusky brown, and iris dark brown or blackish. The skull has definite supraorbital ridges and in the oldest male slightly developed processes; palate well ossified in this male, but fenestrated in the others.

DISTRIBUTION IN EL SALVADOR.—Specimens from Chilata, Lake Olomega, and Puerto del Triunfo. Felten (1958c:215) reported an adult female from km 43 on road from San Salvador to Santa Ana.

REMARKS.—Three of the specimens are mature, but not old. The female, taken May 6, 1942, was nursing ten young about 8 mm long. The other specimen, taken January 9, 1926, is cutting P³. The Salvadoran specimens are slightly paler than two from Chiapas, and distinctly paler than specimens from Costa Rica. They are assigned to the subspecies *mexicana* Merriam.

Genus *Philander* (Four-eyed Opossums)

Size medium (see below), weight up to 620 grams; fur short (about 9 mm), dull grayish, sprinkled profusely with silver-tipped hairs on dorsum; buffy white on venter; no guard hairs; cheeks and a spot above each eye, buffy white; body hair continues on base of tail for two to three inches, remainder of tail nearly naked, scaly, with up to terminal one half yellowish white; web between terminal phalanx of first and proximal phalanx of second hind toes; female has abdominal pouch lined with fine reddish hairs.

Philander opossum Linnaeus

SIZE.—(12 ♂, 10 ♀) Head and body, ♂, 270–325, ♀, 248–425; tail, 280–334, 247–325. Skull: condylobasal length, 65.4–81.4, 62.8–76.7; zygomatic breadth, 33.8–48.7, 31.8–39.8; length of nasals, 31.5–40.0, 29.8–37.3.

DESCRIPTION.—Essentially, the characters are as given under the genus. We consider the subspecies in Salvador to be *Philander opossum pallidus* J. A. Allen. Felten (1958c) called his Salvadoran material *fuscogriseus* J. A. Allen. Actually, they should be treated as intergrades between the two subspecies. Compared with specimens from Río Siquia, Nicaragua, and from Costa Rica and Panamá, the Salvadoran specimens are distinctly paler throughout. The spots over the eyes are larger and the yellowish white terminal part of the tail is more extensive (from one fourth to one half of tail length). In life, the feet are dusky yellow and the nose is pink flesh. The Salvadoran material compares favorably with that from British Honduras.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barra de Santiago, Chilata, Puerto del Triunfo, Lake Olomega, Río San Miguel, and Divisadero. Felten (1958c: 215) reported the species from: Laguna de Guija, Isle de la Cabra in Lago de Coatepeque, Hac. San Antonio, Hac. Talcualuya, Laguna Chanmico, bei San Andres, bei Toluca, km 80 between San Salvador and San Miguel, Hac. Nancuchiname, and Puerto del Triunfo.

REMARKS.—Felten (1958c:217) reported five pouch young in each of three females and four young in another.

Genus *Chironectes* (Water Opossums)

Size medium (total length about 700 mm); fur short (about 10 mm) and dense; hind feet fully webbed.

Chironectes argyrodytes Dickey

SIZE.—(5 ♂, 1 ♀) Head and body, ♂, 317–335, ♀, 285; tail, 348–388, 370. Skull: condylobasal length, 70.0–74.9, 67.6; zygomatic breadth, 41.7–45.2, 38.7; length of nasals, 33.5–37.0, 32.7.

DESCRIPTION.—Fur brown, regularly mottled with gray above; sides gray; underparts white except at base of tail; tail longer than head and body, scaly, dark brown with extreme tip yellowish white. Skull with prominent, pointed postorbital processes. There are four mammae.

DISTRIBUTION IN EL SALVADOR.—Known only from the type locality, Zapotitán, Río Sucio, altitude 1500 feet (Dickey, 1928c).

REMARKS.—The water opossums probably all belong to one species, but we do not have the material to demonstrate this. In case it is demonstrated that they constitute a single species, *minimus* Zimmermann will be the name which is applicable. We strongly suspect that at least *panamensis* Goldman and *argyrodytes* Dickey are only subspecifically distinct. This was the treatment given them by Hall and Kelson (1959), although they state (p. 9) that they "made no study designed to show if the kinds are anything more than subspecies of one species." They used the species name *panamensis*.

ORDER INSECTIVORA (SHREWS AND MOLES)

FAMILY SORICIDAE (SHREWS)

Genus *Cryptotis* (Least Shrew)

Dark brown, nearly black in some specimens; five toes on each foot; nose pointed; eyes small; smallest of the terrestrial mammals. Dental formula: I 3/1, C 1/1, P 2/1, M 3/3 \times 2 = 30.

Cryptotis nigrescens J. A. Allen

SIZE.—(3 ♂, 10 ♀) Length, 92–103; tail, 28–33; hind foot, 12–14. Skull: greatest length, 19.2–20.3; cranial breadth, 9.1–9.8; interorbital constriction, 4.5–5.1; maxillary breadth, 5.8–6.8.

DESCRIPTION.—In addition to above for genus: unicuspid crowded, fourth not visible from lateral view (slightly in two), pigmented.

DISTRIBUTION IN EL SALVADOR.—Specimens from Mt. Cacaguatique and from 2 mi NW Apameca. Recorded from Hac. Montecristo by Felten (1958c).

REMARKS.—These shrews are larger than, but otherwise similar to, *orophila*. The Salvadoran specimens were compared with *nigrescens* from Costa Rica (in Amer. Mus. Nat. Hist.) and no differences could be detected.

ORDER PRIMATES

FAMILY CEBIDAE (NEW WORLD MONKEYS)

Genus *Ateles* (Spider Monkeys)*Ateles geoffroyi* Kuhl

The only monkey native to El Salvador. Extremely long arms and long prehensile tail. Dental formula: I 2/2, C 1/1, P 3/3, M 3/3 \times 2 = 36.

SIZE.—(2 ♂, 2 ♀) Length, 1110–1177; tail, 738–768. Skull: greatest length, 105.1–110.9; zygomatic breadth, 60.2–66.5; tooth row, 28.0–29.2.

DESCRIPTION.—Top of head, arms, legs, and tip of tail nearly black; from shoulders to rump golden slightly washed with dark brown; cheeks, throat, belly, and undersides of limbs whitish (washed with pale yellow on breast). Four fingers on hand, five toes (first opposable) on foot.

DISTRIBUTION IN EL SALVADOR.—Specimens from Lake Olomega (given as "Lomego" by Kellogg and Goldman, 1944) and Puerto del Triunfo. Reported by Felten (1958c) from Hac. Nancuchiname and Puerto del Triunfo. The subspecies is *vellerosus* Gray.

ORDER CHIROPTERA (BATS)

Front limbs developed into wings; capable of true flight.

FAMILY EMBALLONURIDAE (SAC-WINGED BATS)

Second metacarpal fully developed, but with no phalanges; third finger has two phalanges, the proximal phalanx, when at rest, is flexed on dorsal surface of metacarpal; tail short, perforates interfemoral membrane on upper surface anterior to edge; postorbital processes well developed; premaxillaries never fused with one another; size small (see measurements below).

Genus *Rhynchiscus* (Longnose Bat)

Four or five grayish tufts of fur on dorsal surface of forearm; no glandular sac in wing. Dental formula: I 1/3, C 1/1, PM 2/2, M 3/3 \times 2 = 32.

Rhynchiscus naso Wied

SIZE.—(7 ♂, 6 ♀) Forearm, 35.2–37.1; tail, 13–16. Skull: greatest length, 11.0–12.5; zygomatic breadth, 6.4–7.5; postorbital constriction, 2.6–3.1.

DESCRIPTION.—Tragus short and blunt (2 mm); hair of head and back black at base, minutely tipped with white and pale brown; palest on head and shoulders; indistinct whitish spots or stripes on rump; interfemoral membrane scantily haired at base, naked for terminal two thirds; underparts yellowish white.

DISTRIBUTION IN EL SALVADOR.—Specimens from El Tablón and San Salvador (Sanborn; 1937:327).

REMARKS.—Each of two females, taken May 28, contained one 10-mm embryo, and one, taken May 29, contained a 7-mm embryo. A young half-grown male was taken May 28 and a nearly mature male and female on the following day. An adult female still retains one milk incisor and a young adult male has three milk incisors, in addition to the permanent dentition. All the specimens examined have well-developed anterior and posterior cusps on the small upper premolar.

Genus *Saccopteryx* (Two-lined Bats)

Two white or brownish white longitudinal lines over rump and back; prominent glandular sac in males on upper surface of wing membrane near elbow. Dental formula as in *Rhynchiscus*.

Saccopteryx bilineata Temminck

SIZE.—(24 ♂, 24 ♀) Forearm, 40.2–45.0; tail, 15–22. Skull: greatest length, 15.7–16.7; zygomatic breadth, 9.6–10.3; postorbital constriction, 2.2–3.0; maxillary tooth row, 5.8–6.6.

DESCRIPTION.—Entire upper surface (except for pale stripes) and membranes dark brown or black; fur of underparts tipped with slightly paler brown; small upper premolar a simple spicule. Length of upper tooth row, from front of canine to back of last molar, usually 5.8 mm or more.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barra de Santiago, Chilata, Colima, Río San Miguel, Lake Olomega, Divisadero (Monte Cristo Mine), and Monte Mayor Mine. Felten (1955*b*) reports this species from Hac. San Antonio, between Acajutla and Mizata, km 35 on road from San Salvador to Santa Ana, Escuela Agrícola Militar, Cueva Hedionda, and Hac. Nancuchiname.

REMARKS.—Compared with specimens from Panamá and Costa Rica, those from El Salvador are slightly smaller with narrower rostral and orbital regions, sagittal crest either absent or poorly developed, and with shorter tooth rows (usually less than 6.5 mm). In 38 specimens from El Salvador, and measurements given for 30 additional specimens from México, Guatemala, and British Honduras (Sanborn, 1937:333), 63 are 6.4 mm or less in this measurement, four are 6.5 or less and one specimen measures 6.6.

These bats often hang in hollow trees.

Saccopteryx leptura Schreber

SIZE.—(1 ♂, 1 ♀) Forearm, ♂, 39, ♀, —; tail, 16, 15; third metacarpal, 38.1, 38.5. Skull: greatest length, 13.4, 13.5; zygomatic breadth, 8.5, 8.8; postorbital constriction, 2.5, 2.5; maxillary tooth row, 5.2, 5.1.

DESCRIPTION.—Fur on body, except for two indistinct, whitish stripes on back and rump, mummy brown; membranes blackish. Distinguished from *bilineata* by smaller size (tooth row 5.5 mm or less; forearm less than 41 mm) and by brownish instead of blackish coloration.

DISTRIBUTION IN EL SALVADOR.—Specimens from Río San Miguel and Lake Olomega. This extends the known range of the species northward from the Canal Zone.

REMARKS.—The two known specimens from El Salvador are somewhat paler and smaller than a specimen from Barro Colorado. However, the measurements fall within the range given for the species by Sanborn (1937:332).

Genus *Peropteryx* (Doglike Bats)

Wing sac opens outward and reaches anterior margin of antebrachial membrane; ears separate; dental formula as in *Rhynchiscus*.

Peropteryx macrotis Wagner

SIZE.—(1 ♂) Forearm, 43.7; thumb, 6.5; third metacarpal, 39.8; fourth metacarpal, 33.6; fifth metacarpal, 32.8.

DESCRIPTION.—Uniformly dark brown, slightly paler below than above.

DISTRIBUTION IN EL SALVADOR.—One male was taken at El Tablón. Felten (1955*b*) reported one specimen, also from Laguna de Guija.

REMARKS.—The subspecies represented is *macrotis* Wagner.

Genus *Balantiopteryx* (Sac-winged Bats)

Wing sac at center of antebrachial membrane, about four mm in greatest diameter, opens upward and inward. Rostrum of skull greatly inflated. Teeth as in *Rhynchiscus*.

Balantiopteryx plicata Peters

SIZE.—(16 ♂, 19 ♀) Forearm 37.5–44.4; third metacarpal, 34.5–40.4; fourth metacarpal, 28.2–34.2. Skull: condyle to front of canine, 11.9–13.2; zygomatic breadth, 8.7–9.5; mastoid breadth, 7.7–9.0; front of canine to back of M³, 5.2–5.8; across upper molars, 5.9–6.8.

DESCRIPTION.—Head and body smoky brown; hairs of underparts faintly tipped with buffy on belly and flanks; wings brown, bordered with white, particularly between foot and fifth finger; distinct pouches on upper side of wing membranes.

DISTRIBUTION IN EL SALVADOR.—Specimens from Acajutla, Divisadero (Monte Cristo Mine), Lake Olomega, Río Goascorán, Comacaran, Pico de la Señora Mine, and Monte Mayor Mine. Additional localities reported by Felten (1955b): Laguna de Guija, Hac. Miraflores, Nueva Granada, and Hac. Santa Rosa.

REMARKS.—These bats may be found hanging on the underside of projecting boulders and in short mine tunnels. When approached, they lay their ears back, like a dog, and back away. The subspecies represented is *plicata* Peters.

FAMILY PHYLLOSTOMIDAE (LEAFNOSE BATS)

Three completely bony phalanges on third finger; premaxillaries complete, fused with each other and with maxillaries. Nose leaf usually present, sometimes rudimentary or absent.

Genus *Pteronotus* (Whiskered Bats)

1838. *Pteronotus* Gray, Mag. Zool. and Bot., II, 500. Trinidad.

1839. *Chilonycteris* Gray, Ann. Nat. Hist., IV, 4, Sept., 1839. Cuba.

No nose leaf; lower lip with plate like outgrowth. Dental formula: I 2/2, C 1/1, P 2/3, M $\frac{3}{3} \times 2 = 34$.

In the original description of the genus *Pteronotus*, Gray stated: "Ears lateral; tragus elongate lobed; chin with a reflexed cartilaginous edge to the lower lip, and an erect membranaceous ridge across its lower part; wings only affixed by a narrow line to the middle of the back, which is covered with fur beneath them; hind feet long; the ankle rather produced and exposed; the lower angle of the wing lies folded over it." One year later, Gray described the genus *Chilonycteris* and gave as essential characters "Nose obliquely truncated, appendaged; lower lip rounded, two transverse reflexed membranaceous ridges; ears lateral, separate, with the lower outer edge expanded and continued to the hinder edge of the expansions on the lower lip. Tragus distinct." Every character listed in his general description as well as in his "Essential Characters" is applicable to *Pteronotus*. The only character distinguishing the two genera is the position of the attachment of wing membranes along the back (in the center line in *Pteronotus*). Subsequent authors, likewise, have failed to discover addi-

tional characters to distinguish the two genera. When one considers the similarities in the skulls (no structural differences have been found), in the facial characteristics (some species of *Pteronotus* are closer to certain species of *Chilonycteris* than the species of *Chilonycteris* are to each other in this respect), and in the relationships of wing and interfemoral membranes to the tibia (in both genera they vary from being bound to the tibia for nearly half its length to coming off at the ankle), it is impossible to ignore the close relationships implied. The position of attachment of the wing membranes to the back is variable in the *Chilonycteris* group. In *rubiginosus* the membranes are attached fairly low on the sides, whereas in *mackleyi* and *torrei* they are attached more than half way up the sides. It would be a relatively small step from this condition to the one found in *Pteronotus* where they come together in mid-line. This character alone, it appears to me, is of no more than specific value. *Chilonycteris* is, therefore, relegated to synonymy under *Pteronotus*, which has priority. It is doubtful if it should even be given subgeneric consideration.

Pteronotus rubiginosus Wagner

1843. *Chilonycteris rubiginosa* Wagner, Weymann's Arch. Natur., IX, 1:367. Caiçara, Brazil.

SIZE.—(18 ♂, 6 ♀) Forearm, 56.0–59.9. Skull: greatest length, 21.6–23.0; maxillary tooth row, including canine, 9.0–9.4; zygomatic breadth, 12.0–12.8; width of brain case, 10.2–10.8; least interorbital constriction, 4.0–4.4; length of palate, to front of incisors, 10.1–10.7; width of palate, including teeth, 7.2–8.0; length of mandible, 16.0–17.0.

DESCRIPTION.—Wing membranes attached low on sides; back furred; color ranges from warm sepia to bright ochraceous on dorsum; hairs tipped with pale buff in sepia specimens, pale ochraceous in ochraceous specimens. Wing membrane and calcar bound to tibia for no more than one fourth its length; in some specimens they leave the tibia immediately above the foot. Lower second premolar usually displaced toward lingual side of tooth row. Free part of tail, above interfemoral membrane, seven to eight mm long. Largest of the genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Monte Mayor Mine, Encuentros Mine, Comacaran, Gigante Mine, Graveyard Mine, Potosí Mine, and Tabanco. Felten (1956a) reported this species from Finca El Marne, Hac. San Diego, Suchitoto, San Rafael Cedros, Quinta Samayoa, and Mineral los Encuentros. These localities are all in the southeastern part of the country.

REMARKS.—Specimens in our series are slightly smaller than those from Panamá and distinctly larger than Chihuahuan specimens. The color of the specimens from El Salvador is more dilute than that of those from Panamá, but richer than that of specimens from Chihuahua. They are closer, however, to Panamanian specimens. The wing membranes and calcar are bound to the tibia for no more than one fourth the length of the latter; in many, these are free immediately above the foot. In this respect they agree with Panamanian specimens. Those from Chihuahua have the membrane and calcar bound to the tibia for about half its length.

It has been stated that there are two color phases in this species. If one selects the extremes, this is true. In our series of 28 skins, one can find nearly every degree of intermediacy between the two. If one arbitrarily divides them he finds that 17 are toward the orchraceous extreme and 11 toward the sepia extreme. But it is practically impossible to draw the line between the two groups at the same place every time.

One female (No. 11384), collected March 29, contained one 25-mm embryo. Apparently one young at a time is the rule in this species. Eight females from Panamá (UMMZ), collected March 9, each contained one large embryo.

One specimen (No. 12066) has an extra upper premolar on the right side. In using the name *rubiginosus* instead of *parnellii*, I follow de la Torre (1955:696) rather than Koopman (1955:111). The subspecies in El Salvador is *fuscus* J. A. Allen.

Pteronotus psilotis Dobson

1878. *Chilonycteris psilotis* Dobson, Catalogue Chiropt. Brit. Mus. p. 451, pl. xxiii, fig. 2.
Type locality unknown.

SIZE.—(7 ♂, 6 ♀) Forearm, 42–44.5. Skull: greatest length, 15.3–16.0; zygomatic breadth, 8.3–8.9; width of brain case, 7.5–8.2; least interorbital constriction, 3.5–3.8; width of palate across M³, including teeth, 5.4–5.6; length of mandible, 10.1–10.8. Males average slightly, but not significantly, larger than females.

DESCRIPTION.—Brilliant orange-rufous above; slightly paler on underparts. Interfemoral and wing membranes attach to tarsus; toes longer than metatarsus; back furred to base of tail where wing membranes approach one another; strip of fur between membranes about 11 mm wide. Front edge of ear with four or five small tooth-like projections about half way from base to tip; ridge above external nares studded with a series of wart-like bumps; small leaf-like flap of skin low on forehead.

DISTRIBUTION IN EL SALVADOR.—Specimens from Graveyard Mine and Encuentros Mine. Felten (1956a), under the name *personata* Wagner, reports it from Finca El Marne, Suchitoto, and San Rafael. I follow de la Torre (1955) in using the name *psilotis*.

Pteronotus suapurensis Allen

SIZE.—(10 ♂, 7 ♀) Forearm, 48.8–53.0. Skull: greatest length, 17.3–18.1; zygomatic breadth, 10.2–10.7; interorbital constriction, 4.0–4.6; mastoidal breadth, 9.6–10.3; maxillary tooth row, including canine, 7.3–7.7; length of palate, to front of incisors, 8.5–9.1; width across molars, 6.8–7.2; width across canines, 5.8–6.2; length of mandible, 12.6–13.3.

DESCRIPTION.—Wing membranes meet in middorsal line and extend forward to shoulders. The only fur showing on the back is in front of the wing membranes, which cover the fur of the hinder back region. Size large (see above). Color ranges from a bright ochraceous to Van Dyke brown; definite color phases are not evident.

DISTRIBUTION IN EL SALVADOR.—Specimens from Tabanco and Graveyard Mine. Reported from Finca El Marne, Suchitoto, and San Rafael Cedros by Felten (1956a).

REMARKS.—There is considerable variation in size in the Salvadoran series (and the same is true for a series from Penonomé, Panamá). The only other species with which *suapurensis* might be confused is *davyi*, but size alone will separate the two.

Four females, taken March 30 at Graveyard Mine, contained one embryo each. The embryos measured from 18 to 21 mm in length.

Pteronotus davyi Gray

SIZE.—(16 ♂ and ♀) Forearm, 43.2–45.8. Skull: greatest length, 15.1–16.2; zygomatic breadth, 8.5–9.2; least interorbital constriction, 3.2–3.9; mastoidal breadth, 8.2–9.0; maxillary tooth row, including canine, 6.1–6.6; length of palate, to front of incisors, 7.3–7.9; width across molars, 5.7–6.1; width across canines, 4.6–5.1.

DESCRIPTION.—Wing membranes as in *suapurensis*. Color ranges from dull ochraceous to Van Dyke brown, less brilliant than in the Salvadoran series of *suapurensis*. Size small (see above).

DISTRIBUTION IN EL SALVADOR.—Specimens from Tabanco and Encuentros Mine. Reported by Felten (1956a) from Finca El Marne and San Rafael Cedros.

REMARKS.—The bats from El Salvador are intermediate in size between those that occur to the northwest and those from the southeast. This is to be expected. Color seems to vary from one locality to another, or even in a series from one locality. This species is easily distinguished from *suapurensis* by smaller size (see measurements). Felten (1956a) records one embryo each from two females taken in March and one in May. The subspecies represented is probably *fulvus* Thomas.

Genus *Mormoops* (Leafchin Bats)

Dermal flaps on chin prominent, divided in middle, folded; lower lip beaded; two wart-like projections on top of rostrum; prominent ridge down middle of nose pad between nasal openings. Skull with brain case shortened and elevated so that frontals rise at nearly right angles to rostrum. Dental formula as in *Pteronotus*.

Mormoops megalophylla Peters

SIZE.—(30 ♂, 37 ♀) Forearm (56 specimens), 51.1–56.0. Skull: greatest length, 14.4–15.7; zygomatic breadth, 9.3–10.1; least interorbital constriction, 5.0–5.6; width of brain case, 8.5–9.5; height of brain case, 7.4–8.3; length of palate to front of incisors, 8.3–9.5; width across molars, 6.7–7.3; mandible (length of single ramus), 13.2–13.9.

DESCRIPTION.—In addition to the above, color ranges from a rather bright ochraceous to chocolate brown. The hairs on the back of the neck and on the shoulders are distinctly paler, except at the tips, than those of the remainder of the upper parts. On several specimens the hair in this region has apparently been worn off, exposing the pale bases of the remaining hairs. This gives the appearance of a pale spot in the shoulder region.

DISTRIBUTION IN EL SALVADOR.—Specimens from Encuentros Mine and Tabanco. Reported from Mineral los Encuentros by Felten (1956a).

REMARKS.—If one were to see only the extremes in color he would no doubt consider them as two distinct color phases. The preponderance of our specimens are toward the chocolate brown, but there are represented all stages from that to bright rufous.

One female, taken March 12, contained one 9-mm embryo. Most of the bats had empty stomachs when collected. Three, taken September 25, contained wing scales of lepidoptera. We assign material to the subspecies *senicula* Rehn.

Genus *Micronycteris* (Large-eared Bats)

Ears joined by a low, inconspicuous, transverse band; prominent nose leaf; dental formula as in *Pteronotus*; tail extends less than half way to edge of interfemoral membrane, free at extreme tip.

Micronycteris megalotis Gray

SIZE.—(8 ♂, 5 ♀) Forearm, 34.3–37.0. Skull: greatest length, 19.3–20.1; mastoidal breadth, 8.7–9.3; zygomatic breadth, 9.3–9.7; least interorbital constriction, 4.0–4.3; length of palate to front of incisors, 9.0–9.5; maxillary tooth row to front of canine, 7.2–7.6; width across molars, 6.0–6.6; mandibular tooth row, 7.7–8.2.

DESCRIPTION.—Specimens from El Salvador are light wood-brown above and below. Hairs of back white at bases; on neck and shoulders they are tipped with brown.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barrios Mine and Lake Olomega. Reported by Felten (1956*b*) from Talnique and Nueva Granada.

REMARKS.—The striations on the inner sides of the rather large ears are variable in number and in their degree of prominence. I question their value, therefore, as taxonomic characters in *Micronycteris*.

One female, taken March 27, contained one 17-mm embryo. One skull (MVZ no. 98197) was taken from an owl stomach. The subspecies is probably *mexicana* Miller.

Genus *Lonchorhina* (Long-eared Bats)

Nose leaf large and prominent (about 22 mm); ears large, separate; tail extends to edge of membrane. Dental formula as in *Pteronotus*.

Lonchorhina aurita Tomes

SIZE.—(from Felten, 1956*b*) Two adult males: length, 118, 108; tail, 59, 52; ear, 34, 31; forearm, 50, 48; tragus, 19, 18. Skull (one specimen): greatest length, 20.3; mastoidal breadth, 11.0; maxillary tooth row, 6.7; width of brain case, 8.9; interorbital breadth, 4.9.

DESCRIPTION.—As for the genus (see above).

DISTRIBUTION IN EL SALVADOR.—Felten (1956*b*) reported the species from km 15 between San Salvador and Santa Ana, Cueva Hedionda, and Suchitoto. He assigned it to the subspecies *aurita* Tomes.

Genus *Macrophyllum* (Long-legged Bats)

Small; broad nose leaf; ears separate; tail to outer edge of membrane. Dental formula as in *Pteronotus*.

Macrophyllum macrophyllum Wied

SIZE.—From Felten (1956*b*) Five adult males: length, 86–91; tail, 42–45; forearm, 34–35; tragus, 8.0–8.5. Skull, 3 adult males: greatest length, 16.3–16.8; mastoidal breadth,

8.8–9.2; maxillary tooth row, 5.2–5.6; width of brain case, 7.9–8.3; interorbital breadth, 3.2–3.3.

DESCRIPTION.—As for genus (see above).

DISTRIBUTION IN EL SALVADOR.—Felten (1956*b*) records the species from Cueva Hedionda.

Genus *Phyllostomus* (Leafnose Bats)

Nose leaf present; lower incisors 2–2; lower premolars 2–2; ears separate; tail short, free end (one third to one half total length, 4–7 mm) projects above interfemoral membrane; size, relatively large (see measurements below). Dental formula: I 2/2; C 1/1; P 2/2; M $3/3 \times 2 = 32$.

Phyllostomus discolor Wagner

SIZE.—(15 ♂, 12 ♀) Forearm, 57.3–65.2. Skull: greatest length, 29.3–32.1; zygomatic breadth, 14.5–16.4; mastoidal breadth, 13.8–15.3; least interorbital constriction, 6.0–6.7; palate, including incisors, 13.0–15.6; width across molars, 9.3–10.7; maxillary tooth row, including canine, 9.3–10.4; mandible, 19.3–21.2.

DESCRIPTION.—Upperparts mummy brown, paler on head and shoulders; lower lip margined with warts and with V-shaped groove in middle; tragus constricted at base; no facial stripes.

DISTRIBUTION IN EL SALVADOR.—Specimens from Divisadero, Tabanco, Monte Mayor Mine, and Misericordia Mine. Reported by Felten (1956*b*) from km 35 on road from San Salvador to Santa Ana, Escuela Agrícola Militar, Hac. San Diego, San Rafael Cedros, and Suchitoto.

REMARKS.—From December 8 to 17, 1926, twelve young bats, ranging from a few days old to nearly mature, were collected, and one female contained one 20-mm embryo. This indicates a rather long breeding season. When the young approach maturity they are dark brown, nearly black, at least in the Salvadoran series. They are distinctly darker than any of the adults. The subspecies is *verrucosus* Elliot.

Genus *Trachops* (Fringe-lipped Bats)

Lips studded with numerous, cylindrical, wart-like projections; middle lower premolar (P_3) minute, smaller than lower incisors, and crowded between roots of other premolars. Dental formulae: I 2/2; C 1/1; PM 2/3; M $3/3 \times 2 = 34$.

Trachops cirrhosus Spix

SIZE.—(5 ♂, 17 ♀) Forearm, 55.9–60.4. Skull: greatest length, 27.8–29.2; zygomatic breadth, 13.3–14.2; least interorbital constriction, 4.8–5.3; maxillary tooth row, including canine, 9.7–10.3; across molars, 9.3–10.0; length of palate, to anterior palatine foramen, 8.5–9.2, width of brain case, 11.1–11.9; length of mandible, 18.3–19.2.

DESCRIPTION.—Rather uniform dark brown, white-tipped hairs on underparts; hair

long and soft; nose leaf prominent, sharply pointed; tail short, at base of interfemoral membrane.

DISTRIBUTION IN EL SALVADOR.—Specimens were taken in February, 1926 and 1942, from Lake Olomega and Río San Miguel. Reported by Felten (1956*b*) from Cueva Hedionda.

REMARKS.—I have been unable to come to definite conclusions regarding the proper systematic status of the Salvadoran *Trachops* because of insufficient comparative material. From the published accounts, it would appear that *Trachops coffini* Goldman differs but slightly from *cirrhosus*, if it is in fact distinct. Felten (1956*b*) considered *coffini* a subspecies of *cirrhosus*, and I follow him.

These bats apparently are carnivorous. Several specimens contained hair and flesh in their stomachs when killed.

Three females, taken February 5, each contained one embryo.

Genus *Chrotopterus* (False Vampire Bats)

Largest bat known from El Salvador (see measurements). Nose leaf prominent; hair long and woolly; tips of wings whitish; skull with only two incisors in mandible, small and crowded between canines, and with middle premolar (P³) minute and crowded between P² and P⁴ as in *Trachops*. Superficially similar to *Trachops*, except larger. Dental formula: I 2/1; C 1/1, PM 2/3, M 3/3 \times 2 = 32.

Chrotopterus auritus Peters

SIZE.—One specimen: forearm, 81.1; thumb, 16.9; second metacarpal, 54.8; third metacarpal, 64.3; fourth metacarpal, 69.1; fifth metacarpal, 75.1. Skull: greatest length, 35.6; condylobasal length, 31.2; least interorbital constriction, 6.1; palate, including canine, 12.7, mandible, 23.8.

DESCRIPTION.—See above for genus.

DISTRIBUTION IN EL SALVADOR.—KNOWN only from Barra de Santiago.

REMARKS.—AS far as known, this is the first record of the genus in Central America, although it occurs both to the northwest and southeast. The subspecies is *auritus* Peters.

Genus *Glossophaga* (Longtongue Bats)

Prominent nose-leaf; tail short, projects slightly near base of interfemoral membrane; upper premolars 2-2; zygomatic arch complete; lower incisors rounded; tongue long with filiform papillae on sides near tip; muzzle long; ears relatively short and broad; size small. Dental formula: I 2/2; C 1/1; P 2/3; M 3/3 \times 2 = 34.

Glossophaga soricina Pallas

SIZE.—(43 ♂, 32 ♀) Forearm, 32.5-37.6. Skull: greatest length, 20.8-22.5; condylobasal length, to front of incisors, 19.4-21.1; breadth of brain case; 8.2-8.9; maxillary tooth row, including canine, 6.8-7.6; mandibular tooth row, 7.2-8.0.

DESCRIPTION.—Color varies from pale grayish brown through rich reddish brown to nearly black. Underparts slightly paler than upper parts.

DISTRIBUTION IN EL SALVADOR.—Specimens from Monte Cristo, Pico de la Señora, Encuentros, Potosí and Monte Mayor mines, Chilata, Tabanco, Barra de Santiago, Volcán de Santa Ana, Lake Olomega, Río Goascorán, Puerto del Triunfo, and Colinas de Jucuarán. Reported by Felten (1956*b*) from Finca Raquelina, Finca El Marne, km 14–19, 35, and 42–48 on road from San Salvador to Santa Ana, Hac. San Antonio, Mizata, Hac. Chilata, Hac. Puerto Arturo, Hac. Talcualuya, Talnique, Hac. Miramar, San Salvador, Milingo, San Marcos, Citalá, Suchitoto, Olocuilta, Volcán de San Vicente, Quinta Samayoa, Tecoluca, km 80 between San Salvador and San Miguel, between Berlin and Alegría, Pueblo El Triunfo, Nueva Granada, Hac. Nancuchiname, Hac. San Pedro, Puerto del Triunfo, Mineral Montecristo, Mineral los Encuentros, Hac. Santa Rosa, and La Unión.

REMARKS.—In a series of 99 adults there are three color mutants, all males. In one (no. 12111) the fur of the entire body is white, except for brownish on the extreme tips of the hairs. The ears and membranes are normal. One (no. 10682) has a white band across the back at the region of the shoulders; this band is the shape of a narrow diamond with the broadest part in the middorsal section. In this specimen also, the tips of the wings are without pigment. The proximal border of the unpigmented area, with the two wings symmetrical in this respect, starts about half way down the second metacarpal, crosses the midsection of the third metacarpal, angles off in a jagged line to the distal end of the fourth metacarpal, follows down the first phalanx of the fourth digit to the midpoint where it crosses and continues, at a slight angle, away from the phalanx, to about the level of the distal end of the phalanx. The line then extends proximad to about the level of the distal ends of metacarpals four and five where it turns sharply and, about three mm from the fifth finger, parallels that finger to the margin of the membrane. The third specimen (no. 11428) has a prominent white spot on the left side of the rump and a less prominent one on the right side.

Abnormalities are also present in the number and arrangement of teeth in five skulls. One (no. 10682, same specimen as described above for color abnormalities) has a double-rooted middle lower incisor, with two rounded cusps, on the right side. The tooth is set in an antero-posterior position so that it will fit into the space provided for a normal incisor. One (no. 10485) has an extra small upper premolar, next to the canine, on the right side. Number 11337 has a fourth lower molar on the left side. Number 10924 has an extra lower incisor on the right side, and number 11324 has but one lower incisor on the left side.

One young individual, still clinging to its mother, was taken November 14. A pregnant female gave birth to one young after she was captured on September 26. The subspecies is *leachi* Gray.

Genus *Anoura* (Tailless Bats)

Forearm, 40 mm or over; length of skull, 24.5–27 mm; no tail; calcar rudimentary; base of interfemoral membrane narrow, triangular in shape, and well haired. Dental formula: I 2/0; C 1/1; PM 3/3; M $\frac{3}{3} \times 2 = 32$.

Anoura geoffroyi Gray

SIZE.—One specimen: forearm, 43.7. Skull: greatest length, 25.2; least interorbital constriction, 4.8; mastoidal breadth, 10.0; palatal length, 13.2 width across molars, 6.1; maxillary tooth row, 9.3; length of mandible, 17.5; mandibular tooth row, including canine, 9.7.

DESCRIPTION.—See above for the genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Mt. Cacaguatique and Volcán de Santa Ana (Sanborn, 1933:27). Felten (1956*b*) reported the species from Volcán de San Vicente. The subspecies is *lasiopyga* Peters.

Genus *Choeroniscus* (Longtail Bats)

First phalanx of fifth digit more than one fourth length of fifth metacarpal; hair of back pale at bases and darker at tips, not tricolor; size small, see measurements; cusps of lower premolars subequal. Dental formula: I 2/0; C 1/1; PM 2/3; M $3/3 \times 2 = 30$.

Choeroniscus godmani Thomas

SIZE.—(1 ♂, 1 ♀) Forearm, ♂, 31.7, ♀, 33.8. Skull: condylobasal length, incisors missing, ♂,—, ♀, 20.2; mastoidal breadth,—, 8.1; least interorbital constriction, 3.0, 3.2; maxillary tooth row, including canine, 6.6,—; width across molars, 3.7,—; palatal length, 11.5, 12.3; width across canines, 3.0,—; length of mandible,—, 15.1; mandibular tooth row, including canine, 6.9, 7.5.

DESCRIPTION.—Color dark brown, other details as given under the genus.

DISTRIBUTION IN EL SALVADOR.—Known only from Volcán de San Miguel.

REMARKS.—The genus *Choeroniscus* Thomas is apparently close to *Hylonycteris* Thomas. It seems within the realm of possibility that the two genera might be the same, at least the characters given seem rather trivial, but critical material is not available. The currently available name is used here.

Genus *Carollia* (Shorttail Bats)

Tail short, inclosed in interfemoral membrane except for extreme tip which forms a small knob; nose leaf prominent; series of wart-like beads on front of lower lip; palate prolonged backward beyond molars, forms a kind of tubular projection; basisphenoidal pits broad and shallow; zygomata incomplete. Dental formula: I 2/2; C 1/1; PM 2/2; M $3/3 \times 2 = 32$.

Carollia perspicillata Linnaeus

SIZE.—(22 ♂, 14 ♀) Forearm, 39.0–43.5. Skull: greatest length, 22.6–24.5; width of brain case, 9.3–10.1; least interorbital constriction, 5.2–5.8; maxillary tooth row, including canine, 7.5–8.2; width across molars, 7.5–8.5; mandibular tooth row, including canine, 8.0–9.1; mandible, 14.8–16.5.

DESCRIPTION.—Color varies from grayish brown through light golden (yellowish) brown to a rich golden brown. The extremes appear to represent distinct color phases, but there are all grades of intermediacy in the amount of golden admixture. All are slightly paler beneath than above. Those without any trace of yellow, in our series, outnumber those with a trace of yellow about three to one.

DISTRIBUTION IN EL SALVADOR.—Specimens from Monte Cristo, Monte Mayor, Potosí, Misericordia, Pico de la Señora, San Pedro, Barrios, and Gigante mines, and Tabanco. Felten (1956b) reported this species from Hac. Chilata, Cueva Hedionda, Pueblo El Triunfo, Hac. San Pedro, and Mineral Montecristo.

REMARKS.—A relatively young male was taken on September 23, a slightly more mature female on September 28, and a subadult specimen was collected on December 10. A female, containing a 35-mm embryo, was taken on March 29. The subspecies is *azteca* Saussure.

Carollia castanea H. Allen

SIZE.—(4 ♂) Forearm, 37.2–39.2 Skull: greatest length, 21.2–22.1; width of brain case, 9.0–9.7; least interorbital constriction, 5.1–5.4; maxillary tooth row, including canine, 6.6–7.1; width across molars, 7.1–7.7; mandibular tooth row, including canine, 7.3–7.6; mandible, 13.6–14.6.

DESCRIPTION.—Differs from *perspicillata* in smaller size. All four specimens are grayish brown.

DISTRIBUTION IN EL SALVADOR.—Specimens from Río San Miguel, Río Goascorán, and Chilata. In addition, Felten (1956b) reported the species from the following localities: km 14–19 and 44 on road from San Salvador to Santa Ana, Hac. San Antonio, Mizata, Hac. Puerto Arturo, Hac. Talcualuya, Cueva Hedionda, Hac. San Diego, San Marcos, Pueblo El Triunfo, Nueva Granada, and Hac. San Pedro.

REMARKS.—One specimen was taken in a hollow log, one in a crevice between rocks, and two were beneath rocks. The subspecific name *subrufa* Hahn is assigned the Salvadoran material.

Genus *Sturnira* (Yellow-shouldered Bats)

No tail; prominent nose leaf; tragus short and blunt. Dental formula same as *Carollia*.

Sturnira lilium Geoffroy St. Hilaire

SIZE.—(1 ♀) Head and body, 59; foot, 11; ear, 16; tragus, 6; forearm, 38. Skull: greatest length, 20.2; breadth of brain case, 9.9; zygomatic breadth, 12.7; upper molar tooth row, 7.5 (measurements from Felten, 1956c).

DESCRIPTION.—Dark brown above with tawny on shoulders; underparts paler.

DISTRIBUTION IN EL SALVADOR.—Reported from San Salvador under the subspecies *parvidens* Goldman by Felten (1956c).

Genus *Uroderma* (Tent-making Bats)

A distinct white stripe above each eye, running from side of nose leaf nearly to back of ear, and another below eye, running from corner of mouth to base of ear; faint, but distinct, median dorsal white line from back of neck to base of interfemoral membrane. Dental formula as in *Carollia*.

Uroderma bilobatum Peters

SIZE.—(16 ♂, 13 ♀) Forearm, 39.0–42.1. Skull: greatest length, 21.8–23.4; zygomatic breadth, 12.5–13.6; breadth of brain case, 9.0–10.0; least interorbital constriction, 5.0–5.6; maxillary tooth row, including canine, 7.6–8.3; width across molars, 8.9–9.5; palatal length, to front of incisors, 10.7–12.1; mandibular tooth row, including canine, 8.0–9.0; mandible, 14.2–15.6.

DISTRIBUTION IN EL SALVADOR.—Specimens from 3 mi W Monte Cristo Mine, Colima, Barre de Santiago, Chilata, and El Tablón. Felten (1956c) reports the species from Hac. Santa Rosa.

REMARKS.—Three females, taken January 21 and 24, contained one embryo each. One female, taken May 29, contained one 18-mm embryo. These bats were mostly taken from beneath leaves of the banana; one was taken beneath the eaves of a house and a few from beneath the leaves of a coconut palm. The genera *Uroderma*, *Artibeus*, and *Enchistenes* are doubtfully separable. The differences are rather subtle and probably should warrant no more than subgeneric rank, if that. It is left to some future reviser to settle this complex problem as it is beyond the scope of this paper. The subspecies is probably *bilobatum* Peters.

Genus *Artibeus* (Fruit-eating Bats)

Distinct nose leaf; usually with facial stripes, sometimes obscure, sometimes distinct; last molar, if present, small; tail absent; interfemoral membrane narrow; distinct calcar, short; lower lip beaded in front; no median dorsal stripe. Dental formula: I 2/2; C 1/1; PM 2/2; M 2/2, 2/3 or $3/3 \times 2 = 28, 30, \text{ or } 32$.

Artibeus lituratus Olfers

SIZE.—Five adults, both sexes: forearm, 59.4–68.2. Skull: length to front of canines, 28.5–29.8; mastoidal breadth, 18.5–18.7; least interorbital constriction, 6.1–6.5; zygomatic breadth, 18.5–18.7; width of palate across M², 12.6–13.6; maxillary tooth row, including canine, 10.0–10.5; palatal length, including incisors, 13.1–13.8; mandibular tooth row, 11.0–11.5; length of mandible, 19.8–20.3.

DESCRIPTION.—Largest of the Salvadoran *Artibeus*; interorbital constriction 32.6–35.1 per cent of the zygomatic breadth.

DISTRIBUTION IN EL SALVADOR.—Specimens from Mt. Cacagatique and Volcán de San Miguel. Reported from San Salvador and Corinto by Felten (1956c). The subspecies is *palmarum* Allen and Chapman.

Artibeus hirsutus Anderson

SIZE.—(3 ♂, 2 ♀) Forearm, 48.0–52.3. Skull: greatest length, to front of canines, 24.6–25.7; zygomatic breadth, 15.4–15.8; mastoidal breadth, 13.4–14.0; interorbital constriction, 5.3–5.6; palatal length, to front of incisors, 11.9–12.5; maxillary tooth row, M² through C¹, 8.5–9.0.

DESCRIPTION.—Last upper molar present, but small, in four specimens, absent in one. Interorbital constriction 33.5–35.7 per cent of zygomatic breadth. This ratio plus the size range will distinguish this species from all other Salvadoran *Artibeus*.

DISTRIBUTION IN EL SALVADOR.—Specimens from Divisadero. This is apparently the first record for this species in Central America.

Artibeus jamaicensis Leach

SIZE.—(18 ♂, 26 ♀) Forearm, 53.7–61.0. Skull: greatest length, to front of canines, 26.8–28.5; zygomatic breadth, 16.6–18.1; mastoidal breadth, 14.0–15.7; least interorbital constriction, 6.6–7.6; palatal length, to front of incisors, 13.0–14.4; maxillary tooth row, including canine, 9.3–10.2.

DESCRIPTION.—Interorbital constriction 38.7–43.4 per cent of zygomatic breadth.

DISTRIBUTION IN EL SALVADOR.—Specimens from Monte Mayor Mine, Tabanco, and Barra de Santiago. Felten (1956c) reported the species from Lago de Coatepeque, Hac. Chilata, Talnique, Hac. San Diego, Milingo, and Hac. Nancuchiname.

REMARKS.—Sixteen females, taken on December 15 and 16, 1926, each contained one embryo. The embryos ranged from 20 to 45 mm in length. The subspecies is *jamaicensis* Leach.

Artibeus cinereus Gervais

SIZE.—(4 ♂, 14 ♀) Forearm, 37.5–40.6. Skull: greatest length, to front of canines, 19.5–20.7; zygomatic breadth, 11.3–12.4; mastoidal breadth, 10.3–11.1; least interorbital constriction, 4.7–5.3; palatal length, to front of incisors, 8.8–9.6; maxillary tooth row, to front of canine, 6.2–6.8.

DESCRIPTION.—Interorbital constriction 39.3–43.7 per cent of zygomatic breadth.

DISTRIBUTION IN EL SALVADOR.—Specimens from Volcán de San Miguel and Chilata. Also reported from San Salvador by Felten (1956c) as the subspecies *toltecus* Saussure.

REMARKS.—Seven females, taken January 5–11, each contained one embryo. Lengths of embryos ranged from 7 to 14 mm.

Genus *Centurio* (Wrinkleface Bats)

There are about 25 unpigmented transverse bars on membrane between fourth and fifth fingers (no other Salvadoran bat has this arrangement); forearm heavily furred. Dental formula: I 2/2; C 1/1; PM 2/2; M 2/2
 $\times 2 = 28$.

Centurio senex Gray

SIZE.—(1 ♂) Forearm, 41.9. Skull: greatest length, 19.2; zygomatic breadth, 14.8; least interorbital constriction, 5.0; mastoidal breadth, 12.0; palatal length, to front of incisors, 4.1; mandibular tooth row, including canine, 5.6; greatest width of mandible, across angular processes, 14.4.

DESCRIPTION.—Same as for genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Colima and Lake Olomega (skull from owl stomach, MVZ no. 98236). Reported from San Salvador by Felten (1956c).

FAMILY DESMODONTIDAE (VAMPIRE BATS)

Central upper incisors enlarged, sharp, and adapted for cutting. Canines sharp, prominent, and flattened laterally. Cheek teeth reduced in size and number to practically non-functional elements. Deep pits immediately back of lower incisors, into which tips of upper incisors fit when teeth are occluded. No tail.

Genus *Desmodus* (Vampire Bats)

Thumb long, metacarpal extends beyond wing membrane, with a wart-like pad on ventral surface. Dental formula: I 1/2; C 1/1; PM 1/2; M 1/1 $\times 2 = 20$.

Desmodus rotundus Geoffroy

SIZE.—(14 ♂, 23 ♀) Forearm, ♂, 53.3–56.6, ♀, 57.0–61.8. Skull: greatest length, 23.7–24.9; 24.1–25.1; zygomatic breadth, 11.3–12.4, 11.4–12.6; mastoidal breadth, 12.0–12.9, 12.0–12.8; least interorbital constriction, 5.3–6.1, 5.2–5.9; maxillary tooth row, including canine, 3.2–3.8, 3.1–3.7; width across canines, 5.8–6.5, 5.8–6.6; palatal length, 9.2–10.0, 9.2–10.2; mandibles, 13.6–14.4, 13.8–15.1.

DESCRIPTION.—Calcar enclosed in uropatagium, which is sparsely furred with hairs about two mm long. Lower incisors bilobed, inner incisors separated by a gap about twice the width of an incisor.

DISTRIBUTION IN EL SALVADOR.—Specimens from Monte Cristo, Píco de la Señora, and Monte Mayor Mines, Puerto del Triunfo and Chilata. Felten (1956c) reported these bats from Laguna de Metapán, Finca El Marne, Hac. Chilata, Hac. San Diego, Cueva Hedionda, Escuela Agrícola Militar, Hac. Talcualuya, Milingo, Quinta Samayoa, Pueblo El Triunfo, and road to La Herradura.

REMARKS.—There are apparently two color phases represented in the Salvadoran series. Six specimens, all adults, both sexes, and all from Puerto del Triunfo, are in the red phase although two specimens are somewhat darker than the others. All other specimens are definitely in the dark brown phase. Larger series might show intermediates from the palest red to the dark brown.

Young bats were taken from December 7 to March 11. The specimen taken on December 7 was attached to the mother and probably was only a few days old. Two

of the young taken March 11 are only slightly larger than the December specimen. Felten (1956c) found pregnant females (one embryo each) in March, May, July, August, and October. The breeding season is probably throughout the year. The subspecies is *murinus* Wagner.

Genus *Diphylla* (Hairy-legged Vampire)

Thumb short, no wart-like pad on ventral surface. Dental formula: I 2/2; C 1/1; PM 1/2; M 2/2 \times 2 = 26.

Diphylla ecaudata Spix

SIZE.—(6 ♂, 9 ♀) Forearm, ♂, 53.5–55.1, ♀, 55.5–61.0. Skull: greatest length, 23.3–24.1, 23.3–24.3; maxillary tooth row, including canine, 3.4–3.6, 3.6–3.9; width across canines, 5.2–5.6 (both sexes); zygomatic breadth, 12.5–13.1, 12.7–13.7; mastoidal breadth, 11.8–12.1, 11.7–12.5; least interorbital constriction, 6.9–7.4, 7.1–7.6; palatal length, to front of incisors, 7.2–7.6, 7.0–7.6; length of mandibles, 12.7–13.1, 12.8–13.5.

DESCRIPTION.—First metacarpal short, does not extend beyond wing membrane; calcar short, about four mm, free from narrow uropatagium which is heavily furred with hairs about five mm long. Outer lower incisor fan-shaped and with seven lobes.

DISTRIBUTION IN EL SALVADOR.—Specimens from Monte Cristo and Potosí mines, and Tabanco. Reported from Finca El Marne, Talnique, Quinta Samayoa, Hac. Santa Rosa, and Mineral los Encuentros by Felten (1956c).

REMARKS.—When he described *D. centralis*, Thomas had one specimen from Boquete, Panamá. The primary distinction between *centralis* and *ecaudata*, as given in the original description of the former, was supposedly in the relative sizes of the lower cheek teeth. These distinctions do not hold for the Salvadoran specimens. Donald R. Dickey, in 1927, sent two specimens from the Salvadoran series to Thomas for comparison with the type of *centralis*. Thomas' reply (in *litt.*, May 29, 1927) was as follows: "Now as to your specimens—I am sorry to say that the validity of *Diphylla centralis* has long appeared doubtful to me and I do not think it distinct from *ecaudata*. The sizes of the decadent lower cheek teeth vary a good deal, in the type of *centralis* their proportions are merely a little out of the common run. We have never received any further specimens confirming *centralis*, and I now believe it is only *ecaudata*." Felten (1956c) considered *centralis* a subspecies of *ecaudata*, and so designated the Salvadoran material.

The breeding season probably lasts over a period of several weeks. On April 7, young bats in three stages of growth were taken from Potosí Mine. The youngest was about one-fourth grown, the next about one-half grown, and the third was nearly adult in size. The youngest, taken with its mother, has its milk teeth with the permanent teeth just starting to emerge. The next older one also retains the milk teeth, but the permanent teeth are somewhat farther along.

FAMILY NATALIDAE

Second metacarpal fully developed, but with no phalanges; two phalanges on third finger; legs long.

Genus *Natalus* (Funnel-eared Bats)

Tail extends to posterior edge of interfemoral membrane; membranes naked; tragus short with conspicuous basal lobe on outer side and a smaller inner lobe near tip, the entire tragus somewhat twisted and folded. Skull, in profile, with brain case rising rather abruptly from plane of rostrum; upper incisors in fairly straight line, but with wide gap in middle. Dental formula: I 2/3; C 1/1; PM 3/3; M 3/3 \times 2 = 38.

Natalus mexicanus Miller

SIZE.—(10 ♂, 9 ♀) Forearm, 35.7–37.8. Skull: greatest length, 15.8–16.9; zygomatic breadth, 7.9–8.5; least interorbital constriction, 3.1–3.3; width of brain case, 7.7–8.2; maxillary tooth row, including canine, 6.5–7.0; width across upper molars, 5.3–5.7; mandibular ramus, 11.7–12.6; mandibular tooth row, 6.8–7.5.

DESCRIPTION.—Same as for genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Divisadero, Tabanco, and Potosí Mine. Felten (1957a) reported these bats from Laguna de Guija, Finca El Marne, Cueva Hedionda, Hac. San Diego, Hac. Santa Rosa, and Mineral los Encuentros.

REMARKS.—The size range of the Salvadoran specimens would place them equally in *stramineus* or *mexicanus*. From the descriptions of these "species" there seem to be no other salient differences. The type locality of *stramineus* is unknown; that of *mexicanus* is Santa Anita, Baja California, México.

Color, in the Salvadoran series, varies from a pale gray with brownish tips on upper parts (three specimens from Divisadero) through yellowish brown (eight specimens from Potosí Mine) to bright reddish brown (three from Tabanco). The two extremes, from Divisadero and Tabanco, are entirely different in coloration, but the Potosí Mine specimens are intermediate. The entire series forms a nice gradient from those with no yellow or red pigment to those that are bright red throughout.

One female, taken April 7, contained one 21-mm embryo. Felten (1957a) records embryos for January and May. The subspecies is probably *saturatus* Dalquest and Hall.

FAMILY VESPERTILIONIDAE

Second metacarpal fully developed; second finger with one small phalanx; third finger with three phalanges, the distal one cartilaginous except at extreme base; ears usually separate; tragus well developed, simple; muzzle simple without leaf-like outgrowths; tail fully developed and extends to edge of wide interfemoral membrane.

Genus *Myotis* (Myotis Bats)

Dental formula: I 2/3; C 1/1; P 3/3; M 3/3 \times 2 = 38.

Myotis nigricans Wied

SIZE.—One adult male (from Felten, 1957a): length, 76; tail, 35; foot, 8; ear, 15; tragus, 7; forearm, 34. Skull: greatest length, 13.2; condylobasal length, 12.7; mastoidal breadth, 6.8; zygomatic breadth, 8.1; interorbital width, 3.6; maxillary tooth row, 5.0.

DESCRIPTION.—Small, dark brown bat, slightly paler beneath than above; membranes and ears black; tragus long and pointed.

DISTRIBUTION IN EL SALVADOR.—Known from Volcán Izalco (H. Allen, 1866) and Lago de Coatepeque, Dept. Santa Ana (Felten, 1957a). The subspecies is *nigricans* Wied.

Genus *Eptesicus* (Big Brown Bat)

Ears and membranes black; fur burnished brown, paler below than above; tragus distinct, rounded at tip; muzzle simple. Dental formula: I 2/3; C 1/1; P 1/2; M 3/3 \times 2 = 32.

Eptesicus fuscus Peale and Beauvois

SIZE.—(1 ♂) Third metacarpal, 43.7; fourth metacarpal, 43.2. Skull: least interorbital constriction, 4.5; zygomatic breadth, 13.7; length of palate, to anterior notch, 8.2; maxillary tooth row, including canine, 7.7; mandibular tooth row, including canine, 8.6.

DESCRIPTION.—Same as for genus.

DISTRIBUTION IN EL SALVADOR.—Known only from Los Esesmiles (7200 feet), one adult male. The subspecies is probably *miradorensis* H. Allen.

Genus *Lasiurus*

Interfemoral membrane, above, furred to edges. Dental formula: I 1/3; C 1/1; P 2/2; M 3/3 \times 2 = 32.

Lasiurus borealis Müller (Red Bat)

SIZE.—One specimen: forearm, 38.1. Skull: greatest length, 12.2; zygomatic breadth, 8.5; least interorbital constriction, 4.2; breadth of brain case, 7.0; maxillary tooth row, 4.0; width across upper molars, 5.3.

DESCRIPTION.—Hairs on upper body plumbeous at bases, pale yellowish in the middle, and tipped with brick red; undeparts plumbeous, tipped with yellowish.

DISTRIBUTION IN EL SALVADOR.—Known only from Los Esesmiles; probably of the subspecies *ornatus* Hall.

Genus *Rhogeessa*

Smallest of Salvadoran vespertilionids; fur pale yellowish at base, tipped with dark brown on upper parts. Dental formula: I 1/3; C 1/1; P 1/2; M 3/3 \times 2 = 30.

Rhogeëssa parvula H. Allen

SIZE.—(2 ♂, 6 ♀) Averages: forearm, ♂, 27.1, ♀, 29.5. Skull: greatest length, 11.9, 12.9; zygomatic breadth, 8.1, 8.5; least interorbital constriction, 3.0, 3.4; breadth across upper molars, 5.3, 5.8; maxillary tooth row, 4.4, 5.0.

DESCRIPTION.—Ear broad; tragus pointed.

DISTRIBUTION IN EL SALVADOR.—Specimens from Puerto del Triunfo, Colima, San José del Sacare, and Río San Miguel. Reported by Felten (1957a) from Laguna de Guija, Puerta La Laguna, and San Salvador. The subspecies is *tumida* H. Allen.

FAMILY MOLOSSIDAE (FREETAIL BATS)

Free tail extends beyond posterior margin of interfemoral membrane.

Genus *Tadarida* (Freetail Bats)

Deep vertical grooves and ridges on upper lip; two upper premolars; premaxillae separated between upper incisors.

Tadarida yucatanica Miller

Dental formula: I 1/2; C 1/1; P 2/2; M 3/3 \times 2 = 30.

SIZE.—One adult male (from Felten, 1957a): length, 99; tail, 39; foot, 9; ear, 21; tragus, 3; forearm, 44. Skull: breadth of brain case, 9.0; zygomatic breadth, 10.5; interorbital width, 3.9; maxillary tooth row, 6.6.

DESCRIPTION.—Upper parts reddish brown; underparts paler, sometimes washed with buffy.

DISTRIBUTION IN EL SALVADOR.—Known only from San Salvador (Felten, 1957a).

Genus *Eumops* (Mastiff Bats)

Upper incisors project forward, the bases completely fill the gap between the canines. Dental formula as in *Tadarida*.

Eumops abrasus Temminck

SIZE.—(1 ♂, 1 ♀) Forearm, ♂, 57.4, ♀, 56.0. Skull: greatest length, 25.1, 24.4; zygomatic breadth, 14.2, 14.0; mastoidal breadth, 11.8, 11.5; least interorbital constriction, 4.3, 4.4; palatal length, 10.6, 19.9; width across upper molars, 9.8, 10.1; maxillary tooth row, including canine, 9.2, 8.9; length of mandible, 18.8, 17.8; mandibular tooth row, including canine, 10.2, 10.6.

DESCRIPTION.—In addition to the generic characters given above, the tragus is small and pointed, quite inconspicuous. This is the largest member of the family found in El Salvador.

DISTRIBUTION IN EL SALVADOR.—Specimens from Chilata.

REMARKS.—Three adults, two males and one female, and one young male were taken from beneath a corrugated iron roof on April 30. The young specimen is nearly naked.

Genus *Molossus* (Small Mastiff Bats)

Tragus short and pointed; two lower incisors and one upper premolar; upper incisor broader than high. Dental formula: I 1/1; C 1/1; P 1/2; M $3/3 \times 2 = 26$.

Molossus rufus Geoffroy

SIZE.—(11 ♂, 3 ♀) Forearm, ♂, 44.2–52.0, ♀, 48.3–49.8. Skull: greatest length (not including teeth), 21.5–23.1, 20.6–21.2; condylobasal length, 20.4–22.4, 19.6–20.0; mastoidal breadth, 13.4–14.7, 12.9–13.4; zygomatic breadth, 13.8–15.0, 13.5–14.0; least interorbital constriction, 4.1–4.9, 4.3–4.4; maxillary tooth row, including canine, 7.8–8.4, 7.8–8.0; mandibular tooth row, 8.7–9.5, 8.3–8.7.

DESCRIPTION.—The velvet-like hair varies from a rich reddish brown to an intense blackish brown. There seems not to be two distinct color phases. We have specimens that bridge the gap between the two extremes. There are distinct patches of fur on the wing membranes as follows: a patch about 15 mm by 6 mm on the dorsal, basal part of the radius; a long narrow strip between the distal part of the radius and the fifth metacarpal (dorsal), nearest the radius; a patch near the wrist and between the fifth and fourth metacarpals (dorsal); a strip five or six millimeters wide on the ventral side of the wing extends from the body to the wrist with a naked area between the furred strip and the radius. This area continues down the fifth metacarpal for a distance of ten mm or more. There is also a considerable area on the underside of the wing extending from the humerus to the body near the femur. This is largest of the species of *Molossus* known from El Salvador.

DISTRIBUTION IN EL SALVADOR.—Specimens from Lake Olomega and Río San Miguel. Felten (1957a) reported the species from San Salvador, Olocuilta, and Hac. Nancuchiname.

REMARKS.—Felten (1957a) recorded one embryo from a female taken on November 10. The subspecies is *nigricans* Miller.

Molossus major Kerr

SIZE.—One adult male (Felten, 1957a): length 100; tail, 41; foot, 8; ear, 13; forearm, 38. Skull: greatest length, 17.2; condylobasal length, 15.6; mastoidal breadth, 10.4; zygomatic breadth, 10.7; interorbital width, 3.5; maxillary tooth row, 6.2.

DESCRIPTION.—Similar to *rufus*, but smaller; larger than *coibensis*.

DISTRIBUTION IN EL SALVADOR.—KNOWN only from San Salvador (Felten, 1957a). Felten assigned it to the subspecies *aztecus* Saussure.

Molossus coibensis J. A. Allen

SIZE.—One adult female (Felten 1957a): forearm, 34. Skull: greatest length, 16.0; condylobasal length, 14.6; mastoidal breadth, 9.7; zygomatic breadth, 10.0; interorbital width, 3.2; maxillary tooth row, 5.9.

DESCRIPTION.—Smallest of the genus in El Salvador.

DISTRIBUTION IN EL SALVADOR.—KNOWN only from San Salvador (Felten, 1957a).

REMARKS.—Felten (1957a) listed the above as *M. tropidorhynchus coibensis*, and Hall and Kelson (1959) list it as *M. major coibensis*. The treatment of Hall and Kelson would indicate two subspecies of *M. major* in El Salvador. However, they state (p. 216) that *coibensis* may not belong to the species *major*.

ORDER EDENTATA (XENARTHRA)

FAMILY MYRMECOPHAGIDAE (ANTEATERS)

Snout long; no teeth; middle toe and claw on front foot greatly enlarged.

Genus *Tamandua* (Tamandua)

Tail scantily haired, nearly bare beneath and for terminal half above.

Tamandua tetradactyla Linnaeus

SIZE.—(1 ♂, 4 ♀) Length, 1010–1200; tail, 498–700; hind foot, 80–105. Skull: greatest length, 116.0–132.3.

DESCRIPTION.—Size of small dog; long, pointed nose and long tail; four toes on front foot, side toes small, third toe and claw greatly enlarged; five toes on hind foot, all about equal in size; creamy white with black or dark brown band around mid-body, between front and back legs, except for whitish middorsal stripe nearly to rump; black or dark brown over each shoulder; no teeth; rostrum long and tube-like.

DISTRIBUTION IN EL SALVADOR.—Specimens from El Carmen, San Antonio, Lake Olomega, Volcán de San Miguel, and Río San Miguel.

REMARKS.—The tamandua subsists chiefly on termites and other soft insects. The subspecies represented is probably *mexicana* Saussure.

FAMILY DASYPODIDAE (ARMADILLOS)

Body covered with armor on top and sides; teeth peg-like.

Genus *Dasypus*

Dasypus novemcinctus Linnaeus (Nine-banded Armadillo)

SIZE.—(4 ♂, 3 ♀) Length, 645–815; tail, 260–386; hind foot, 70–103. Skull: greatest length, 85–95.0; zygomatic breadth, 36.8–45.0.

DESCRIPTION.—Body, except belly, enclosed in armor; nine jointed bands encircle mid-body, thus enabling animal to roll into a ball; tail surrounded by jointed bands of plates; ears relatively large and set close together; four toes on front foot, five on hind foot; teeth, a series of small pegs, seven to nine on each side above and below. Only mammal in El Salvador that is covered with armor.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barra de Santiago, Puerto del Triunfo, Lake Olomega, Río San Miguel, Mt. Cacaguatique, and Divisadero (3 mi W Monte

Cristo Mine). Felten (1958c) recorded them from Hac. Talcualuya, San Salvador, and Laguna Limpia near Amate de Campo.

REMARKS.—Felten (1958c) considered the subspecies represented to be *fenestratus* Peters. This seems to be the appropriate designation.

ORDER CARNIVORA (FLESH EATERS)

FAMILY PROCYONIDAE (RACCOONS, COATIS, KINKAJOUS)

Genus *Procyon* (Raccoon)

Dental formula: I 3/3; C 1/1; P 4/4; M 2/2 \times 2 = 40.

Procyon lotor Linnaeus

SIZE.—(9 ♂, 11 ♀) Length, ♂, 800–915, ♀, 730–1030; tail, 240–340, 280–335; hind foot, 110–145, 105–115; ear from notch, 45–53, 40–50. Skull: condylobasal length, 102.9–130.8, 107.4–118.2; zygomatic breadth, 76.0–82.2, 69.9–84.0; mastoidal breadth, 57.4–71.9, 56.7–66.6; least interorbital constriction, 22.2–26.5, 22.3–27.7; palatilar length, 59.5–75.7, 63.2–69.4; alveolar length of upper tooth-row, including canine, 41.1–48.4, 42.4–46.5; width across M², 39.5–41.8, 37.8–42.7.

DESCRIPTION.—Size of small dog; grayish upper parts slightly washed with yellowish; tail with six or seven blackish and six or seven yellowish white rings, plus a black tip; top of nose and cheeks black, giving the effect of a black mask over eyes.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barra de Santiago (type locality of *Procyon lotor dickeyi* Nelson and Goldman), Puerto del Triunfo, Laguna de Guija, Los Escsmiles, Colima, San Salvador, San Pedro Mine, Volcán de San Miguel, San Miguel, Río San Miguel, Lake Olomega, and La Unión; observed at Mt. Cacagatique and Pine Peaks. Felten (1958c) reported them from Hac. Talcualuya, Los Chorros, and Zacatecoluca.

REMARKS.—The populations of raccoons that live along the sea shore, and feed largely on crustaceans, have well-worn teeth even before all the sutures are closed in the cranium. Further, they appear to be smaller, on the average, than inland raccoons, and they have relatively short, broad crania. In the small series available there is great variation in size between individuals of approximately equal age and of the same sex. Unfortunately, the series is too small to subject to statistical treatment. Goldman (1950) assigned only the Barra de Santiago specimens to *dickeyi* Nelson and Goldman; the remainder of the Salvadoran material was assigned to *crassidens* Hollister. Felten (1958c) and Hall and Kelson (1959) apparently followed Goldman. I see no justification for recognizing more than one subspecies in El Salvador—*dickeyi*.

Genus *Nasua* (Coati)

Size of small dog; long, uniformly-colored tail; long snout, grayish on top and sides of nose. Five toes on each foot; feet blackish brown; claws on front feet large and curved; ears small, rounded, whitish on inside and rim. Dental formula as in *Procyon*.

Nasua narica Linnaeus

SIZE.—(2 ♂, 5 ♀) Length, ♂, 1130–1246, ♀, 1000–1080; tail, 553–635, 482–700; hind foot, 100–115, 96–110. Skull: condylobasal length, 122.6–132.2, 114.3–124.3; zygomatic breadth, 69.8–76.5, 62.2–66.4; mastoidal breadth, 48.3–48.7, 41.7–46.8; least interorbital constriction, 29.2–31.2, 24.8–28.5; palatilar length, 78.0–82.4, 71.8–78.3; length of maxillary tooth row, including canine, 51.5–52.1, 47.4–48.8; width across upper molars, 36.9 (one specimen), 32.6–36.1.

DESCRIPTION.—The specimens from El Salvador are intermediate in color between those occurring to the north and those found in Panamá.

DISTRIBUTION IN EL SALVADOR.—Specimens from Chilata, Cerro de los Naranjos, Lake Olomega, Puerto del Triunfo, Río San Miguel, Volcán de San Miguel, Los Esesmiles, and Barra de Santiago. Felten (1958c) recorded one specimen from Talnique. They are assigned to the subspecies *narica* Linnaeus.

Genus *Potos* (Kinkajou)

Superficially, monkey-like in appearance; golden brown, sometimes with darkened dorsal area; tips of toes and facial area slightly darkened; underparts paler than sides and back except for a mid-ventral dark brown area and a round dark area on throat in some individuals. Five toes on each foot. Eyes large; ears short and rounded; tail about as long as head and body, nearly same color except for darkened tip. Dental formula: I 3/3; C 1/1; PM 3/3; M 2/2 \times 2 = 36.

Potos flavus Schreber

SIZE.—(8 ♂, 6 ♀) Length, ♂, 940–1045, ♀, 870–1010; tail, 400–500, 420–500; hind foot, 80–115, 75–115. Skull: condylobasal length, 82.1–91.2, 80.6–87.9; zygomatic breadth, 59.0–67.1, 57.5–63.6; least interorbital constriction, 19.0–22.5, 17.5–21.2; mastoidal breadth, 44.5–49.3, 44.1–47.7; breadth of brain case, 39.1–41.5, 37.8–40.5; maxillary tooth row, 25.3–27.0, 24.6–26.5.

DESCRIPTION.—As for the genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Cerro de los Naranjos, Volcán de Santa Ana, Colinas de Jucuarán, Río San Miguel, Volcán de San Miguel, Los Esesmiles, Barra de Santiago, Zapotitán, La Libertad, Lake Olomega, Mt. Cacagatique, and Puerto del Triunfo. Also reported from Hac. Los Planes, Hac. San Antonio, and km 80 between San Salvador and San Miguel by Felten (1958c). The subspecies is *campechensis* Nelson and Goldman.

REMARKS.—Four specimens from Los Esesmiles are more grayish, less golden brown, than the others. They possess a longer softer pelage. The pelages probably are not comparable; curiously all those from the higher altitudes differ from all those taken lower down. The dark brown ventral patch varies from being prominent in two individuals to being barely apparent in two others.

FAMILY BASSARISCIDAE (RINGTAILS)

Members of this family have long slender bodies and long tails (about equal to length of head and body) with a series of white rings which gradually disappear toward the tip. The claws are curved and sharp; general color, iron gray; no black mask across face. Dental formula: I $\frac{3}{3}$; C $\frac{1}{1}$; P $\frac{4}{4}$; M $\frac{2}{2} \times 2 = 40$.

Jentinkia sumichrasti Saussure

SIZE.—(1 ♂) Length, 875; tail, 435; hind foot, 85; ear 25. Skull: condylobasal length, 84.3; zygomatic breadth, 61.3; breadth of brain case, 37.0; palatilar length, 38.5; alveolar length of maxillary tooth row, including canine, 33.7; across M¹–M¹, 26.5; postorbital constriction, 16.0; least interorbital width, 18.5; mastoidal breadth, 38.1.

DESCRIPTION.—As for the genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, Chilata, and Volcán de Santa Ana. Felten (1958c) reported one from "El Salvador" under the subspecies *variabilis*.

REMARKS.—A young individual is paler throughout than the adults, and has the white rings on the tail more distinct. The genus *Jentinkia* has been synonymized under *Bassariscus* and considered not a distinct genus by many authors. The baculum, however, supports the thesis that it is a distinct genus (Burt, 1960).

FAMILY MUSTELIDAE (WEASELS, OTTERS, AND SKUNKS)

Members of this family vary greatly in size and color. Usually, their bodies are long and slender. They have five toes on each foot, short rounded ears, and anal scent glands. The cranium is low and broad, the auditory bullae flattened and elongate, and the upper molar is broad with the transverse diameter as great or greater than the longitudinal diameter.

Genus *Mustela* (Weasels)

Dental formula: I $\frac{3}{3}$; C $\frac{1}{1}$; P $\frac{3}{3}$; M $\frac{1}{2} \times 2 = 34$

Mustela frenata Lichtenstein

SIZE.—(1 ♂) Length, 500; tail, 185; hind foot, 55; ear, 10. Skull: condylobasal length, 55.3; zygomatic breadth, 30.5; breadth of brain case, 24.0; palatal length, 23.0; alveolar length of maxillary tooth row, including canine, 15.1; width across upper carnassials, 16.4; least postorbital constriction, 10.8; least interorbital width, 11.3; mastoidal breadth, 26.6.

DESCRIPTION.—Long slender body, reddish brown, becoming dark brown on head and tip of tail; white bridle across face; underparts yellowish.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, Cerro de los Naranjos, and La Ceiba, near San Salvador; reported as “La Cebia” (= La Ceiba) by Hall (1951). Felten (1958c) reported them from San Andres and Volcán de San Vicente. The subspecies is *goldmani* Merriam.

Genus *Eira* H. Smith (Tayra)

Large, long-bodied, weasel-like animals; black with gray head, neck, and shoulders; usually a white patch on throat. Dental formula as in *Mustela*.

Eira barbara Linnaeus

SIZE.—One young male, still retaining some of the milk dentition and with the molars just beginning to erupt: length, 868; tail, 325; hind foot, 108; ear, 15. Skull: condylobasal length, 99.8; zygomatic breadth, 58.5; mastoidal breadth, 50.8; least interorbital constriction, 21.8; least postorbital constriction, 26.1.

DESCRIPTION.—The one young specimen available from El Salvador has a rather large irregular white patch on its throat.

DISTRIBUTION IN EL SALVADOR.—Specimen from Lake Olomega. Probably the subspecies *inserta* J. A. Allen.

Genus *Spilogale* (Spotted Skunk)

Small skunk; black with irregular white stripes and spots over most of body. Dental formula as in *Mustela*.

Spilogale putorius Linnaeus

SIZE.—Two adult males from Puerto del Triunfo, respectively: length, 381, 383; tail, 122, 122; hind foot, 46, 44; ear, 9, 11. Skull: basilar length, —, 46.2; occipitonasal length, 50.5, 49.3; zygomatic breadth, 34.2, 32.4; mastoidal breadth, 29.3, 28.5; least interorbital constriction, 14.8, 15.3; palatilar length, —, 18.5; alveolar length of upper tooth row, including canine, —, 16.1.

Three adult males from Los Esesmiles and one young adult female from Colima, respectively: length, ♂, 372, 352, 360, ♀, 335; tail, 107, 110, 106, 100; hind foot, 42, 40, 42, 30; ear, 12, 11, 13, 8. Skull: basilar length, 45.4, —, 45.4, 41.0; occipitonasal length, 50.0, 47.5, 49.6, 44.3; zygomatic breadth, 32.1, 32.4, 31.4, 28.5; mastoidal breadth, 27.3, 27.1, 27.2, 24.5; least interorbital constriction, 13.8, 13.7, 14.0, 12.2; palatilar length, 18.3, 17.6, 18.9, 16.4; alveolar length of upper tooth row, including canine, 15.4, 15.7, 16.2, 14.6.

DESCRIPTION.—The two specimens from the coast have relatively broad skulls, across mastoids, and there is a distinct white patch at the base of the tail. The highland specimens have relatively little white at the base of the tail and the side stripes are narrower, less whitish, than in those from the lowland.

DISTRIBUTION IN EL SALVADOR.—Specimens from Lake Olomega, Puerto del Triunfo, Colima, and Los Esesmiles.

REMARKS.—Van Gelder (1959) assigned the Salvadoran material to the subspecies *elata* A. H. Howell. With this I concur.

Genus *Mephitis* (Striped Skunk)

Size of large house cat; black with white on top of head and either one or two white stripes on upper sides, or, white mixed with black on back. Dental formula as in *Mustela*.

Mephitis macroura Lichtenstein

SIZE.—(12 ♂, 6 ♀) Length, ♂, 498–602, ♀, 549–770; tail, 251–310, 260–280; hind foot, 50–60, 50–56; ear, 10–18, 10–14. Skull: condylobasal length, 57.0–62.0, 54.4–59.3; basilar length of Hensel, 49.5–54.6, 47.1–51.8; zygomatic breadth, 36.4–44.0, 36.6–38.8; mastoidal breadth, 31.5–35.2, 29.5–33.5; least interorbital constriction, 16.4–19.3, 16.5–17.6; length of palate, 20.5–22.2, 19.9–22.0; maxillary tooth row, 18.3–21.2, 18.8–21.1; breadth across upper molars, 21.5–25.2, 21.8–23.8.

DESCRIPTION.—As for the genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Río San Miguel, Lake Olomega, Divisadero (Monte Cristo Mine), Volcán Conchagua, Los Esesmiles, Río Goascorán, and Colima. Recorded by Felten (1958c) from Rosario de Mora and Laguna de Aramuaca.

REMARKS.—Felten (1958c) assigned his Salvadoran material to the subspecies *macroura*. Hall and Kelson (1959), apparently without seeing material, indicate that El Salvador is within the range of *vittata*.

Genus *Conepatus* (Hognose Skunk)

Dental formula: I 3/3; C 1/1; P 2/3 or 3/3; M 1/2 × 2 = 32 or 34

Conepatus leuconotus Lichtenstein

SIZE.—(9 ♂, 5 ♀) Length, ♂, 550–636, ♀, 496–550; tail, 140–235, 150–200; hind foot, 75–85, 57–67; ear, 9–14, 8–14. Skull: basilar length of Hensel, 58.2–67.8, 53.7–58.8; zygomatic breadth, 39.1–50.2, 42.2–44.3; least interorbital constriction, 20.7–24.8, 20.2–22.8; maxillary tooth row, 21.3–24.2, 20.9–22.8; labial length of M¹, 8.3–9.2, 7.8–8.4.

DESCRIPTION.—Black on lower sides, belly, legs, and feet; white on top of head, back, upper sides, and tail; snout long and naked above on terminal inch; front claws long and prominent.

DISTRIBUTION IN EL SALVADOR.—Specimens from Puerto del Triunfo, Divisadero, Los Esesmiles, Lake Olomega, Volcán de San Miguel, and Mt. Cacaguatique. Observed at Río San Miguel. The subspecies is probably *nicaraguae* J. A. Allen.

Genus *Lutra* (River Otter)

Large, rich brown animal with short dense fur; tail thick at base, tapering gradually toward end; feet entirely webbed; ears inconspicuous. Dental formula: I 3/3, C 1/1, P 4/3, M 1/2 × 2 = 36.

Lutra annectens Major

SIZE.—(1 ♀) Length, 930; tail, 393; hind foot, 104; ear, 20. Skull: greatest length, 104; mastoidal breadth, 65.7; interorbital constriction, 22.3; post orbital constriction, 16.4.

DESCRIPTION.—Same as for genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Zapotitán (Río Sucio) and Río Sansona (a skin only from Dr. Van Severen).

REMARKS.—The name *annectens* is employed because it is in current usage. The Central American otters are probably conspecific with *canadensis* Schreber, which occurs farther north.

FAMILY CANIDAE (DOGS AND FOXES)

Genus *Canis* (Coyote)

Size and build of medium-sized dog; pointed nose, small feet, ears always erect. Dental formula: I 3/3; C 1/1; P 4/4; M 2/3 \times 2 = 42.

Canis latrans Say

SIZE.—(1 ♂, type of *Canis latrans dickeyi* Nelson, and 1 ♀) Length, ♂, 1280, ♀, 1184; tail, 380, 368; hind foot, 250, —. Skull: condylobasal length, 193, 182; zygomatic breadth, 101.0, 95.5; interorbital constriction, 31.4, 29.1; postorbital constriction, 32.2; 31.1; mastoidal breadth, 64.5, 62.1; length of nasals, 81.0, 75.7; alveolar length of maxillary tooth row, 86.5, 83.2; outside border of upper carnassial, 19.9, 20.0; width across M¹⁻¹, 58.7, 58.5.

DESCRIPTION.—A rather large, reddish-yellow coyote with an overlay of black-tipped hairs on middle of back, rump, and tail. The legs and feet are yellowish.

DISTRIBUTION IN EL SALVADOR.—Specimens from Río Goascorán (Serro Mogote Mt.); seen at El Tablón.

Genus *Urocyon* (Gray Fox)

Size of small dog; upper parts and sides pepper and salt gray; sides of neck, back of ears, legs and feet reddish yellow; top of bushy tail with black hairs its full length; tail tipped with black. Dental formula as in *Canis*.

Urocyon cinereoargenteus Schreber

SIZE.—(17 ♂, 8 ♀) Length, 797–940; tail, 300–400. Skull: condylobasal length, 101.4–122.4; zygomatic breadth, 56.5–65.2.

DESCRIPTION.—As for the genus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Lake Olomega, Puerto del Triunfo, Río San Miguel, Pine Peaks (Volcán Conchagua), Barrios and San Pedro mines, Río Goascorán, Volcán de San Miguel, Cerro de los Naranjos, Colima, Los Esesmiles, El Tablón, Divisadero, Mt. Cacaguatique, and Barra de Santiago. Also reported from Hac. Los Planes, Hac. San Diego, Hac. Miraflores, and Amate de Campo by Felten (1958c).

REMARKS.—Felten (1958c) assigned the subspecific name *fraterculus* to Salvadoran material. Hall and Kelson (1959) consider El Salvador to be within the range of *guatemalae*.

FAMILY FELIDAE (CATS)

Claws sharp, curved, retractile.

Genus *Felis* (Cats)

Dental formula: I 3/3; C 1/1; P 3/2; M 1/1 \times 2 = 30

Felis concolor Linnaeus (Cougar)

SIZE.—From Hall and Kelson (1959): length, ♂, 1710–2743, ♀, 1500–2332; tail, 660–784, 534–815; hind foot, 240–292, 220–267. Skull: greatest length, 172–237, 158.3–203.0; zygomatic breadth, 126.4–164.3, 107.2–140.7; maxillary tooth row, 52.5–72.0, 48.8–62.5.

DESCRIPTION.—Largest of the cats recorded from El Salvador; uniformly colored, tawny.

DISTRIBUTION IN EL SALVADOR.—Specimen (skull and part skeleton) from Lake Olomega. This is within the range of the subspecies *mayensis* Nelson and Goldman, as given by Hall and Kelson (1959).

Felis wiedi Schinz (Margay Cat)

SIZE.—(2 ♂) Length, 862, 966; tail, 352, 394; hind foot, 100, (125?); ear, 40, 45. Skull: condylobasal length, 89.6, 91.5; zygomatic breadth, 65.4, 64.6; interorbital constriction, 16.7, 17.8; breadth of brain case, 45.0, 44.5; mastoidal breadth, 41.6, 42.6; maxillary tooth row, 29.4, 28.3; width across P⁴⁻⁴, 34.1, 32.9; outer border of upper carnassial, 11.3, 8.9.

DESCRIPTION.—A small cat with buffy ground color. Broken dark brown longitudinal stripes on neck (four) and back (one). Brown spots on sides irregular in shape, some of them with dark buffy centers, giving a rosette-like appearance. Belly white with dark brown spots; tail with indistinct brown and buffy rings. By size and spotting this species may be distinguished (smaller than *pardalis*, with relatively longer tail).

DISTRIBUTION IN EL SALVADOR.—Specimens from Mt. Cacagatique and Colinas de Jucuarán. The subspecies is probably *salvinia* Pocock; it should be compared with *nicaraguae* J. A. Allen.

Felis pardalis Linnaeus (Ocelot)

SIZE.—From Hall and Kelson (1959): length, ♂, 950–1367, ♀, 920–1209; tail, 280–400, 270–371. Skull (1 ♂, 1 ♀): greatest length, 133.3, 136.0; zygomatic breadth, 90.5, 89.7; maxillary tooth row, 40.8, 41.6.

DESCRIPTION.—Larger than *wiedi* with relatively shorter tail. Ground color grayish to cinnamon; two distinct black stripes on each cheek, four or five on neck; blackish-bordered spots on back and sides elongate, form indistinct stripes; tail with blackish spots.

DISTRIBUTION IN EL SALVADOR.—Specimens from San Antonio. The subspecies is probably *pardalis* Linnaeus.

Felis yagouaroundi Geoffroy (Jaguarundi Cat)

SIZE.—Two specimens, both young; permanent P⁴ erupted (in no. 11085) far enough to measure; it is 11.1 mm in length.

DESCRIPTION.—A small, short-legged, uniformly grizzled brown cat without spots or stripes.

DISTRIBUTION IN EL SALVADOR.—Specimens from Río San Miguel, Lake Olomega, and Puerto del Triunfo. The subspecies is probably *fossata* Mearns.

ORDER RODENTIA

FAMILY SCIURIDAE (SQUIRRELS)

Genus *Sciurus* (Tree squirrels)

Squirrels with long bushy tails, prominent ears, large eyes, and sharp claws that are distinctly curved. Five toes on hind foot, four on front. Dental formula: I 1/1; C 0/0; P 2/1; M 3/3 \times 2 = 22.

Sciurus variegatoides variegatoides Ogilby

SIZE.—(from Harris, 1937:28) (18 ♂ and ♀) Length, 542.92 \pm 3.24; tail, 272.08 \pm 2.7; hind foot, 64.29 \pm 0.72. Skull; condylo-premaxillary length, 54.171 \pm 0.408; zygomatic breadth, 35.143 \pm 0.228; interorbital breadth, 20.028 \pm 0.227.

DESCRIPTION.—General coloration of upper parts grizzled black and buffy to orange buff; prominent buffy orange patch behind each ear (Fig. 2); ears tufted with long orange hairs, in new pelage; belly and feet buffy to orange buff; tail with white-tipped hairs, sometimes with faint yellowish wash.

DISTRIBUTION IN EL SALVADOR.—Specimens from Lake Olomega, Mt. Cacaguatique, Puerto del Triunfo, Río San Miguel, Volcán de San Miguel, and Pine Peaks. Also, recorded from La Unión by Dickey (1928) and by Harris (1937), and from km 80 between San Salvador and San Miguel as well as from Jucuarán by Felten (1957*b*). The type locality was originally given only as "El Salvador," but was fixed as La Unión by Dickey (1928).

REMARKS.—One specimen, an old male (no. 10282) does not have the vestigial pre-molar that is present in all the others. Color of the belly, feet, and ear patches varies from buffy to orange (two specimens from Volcán de San Miguel and one from Lake Olomega).

Sciurus variegatoides bangsi Dickey

SIZE.—(from Harris, 1937:28) (16 ♂ and ♀) Length, 539.5 \pm 5.34; tail, 268.5 \pm 6.68; hind foot, 65 \pm .76. Skull: condylo-premaxillary length, 55.914 \pm .367; zygomatic breadth, 35.393 \pm .212; interorbital breadth, 20.5 \pm .159.

DESCRIPTION.—Upper parts grizzled black and white or black and yellowish; ear patches white (except one specimen from Los Esesmiles and one from San José del Sacare, which are buffy, Fig 2); belly and feet white or white faintly washed with yellowish (except two specimens noted above); tail hairs tipped with white or soiled white.

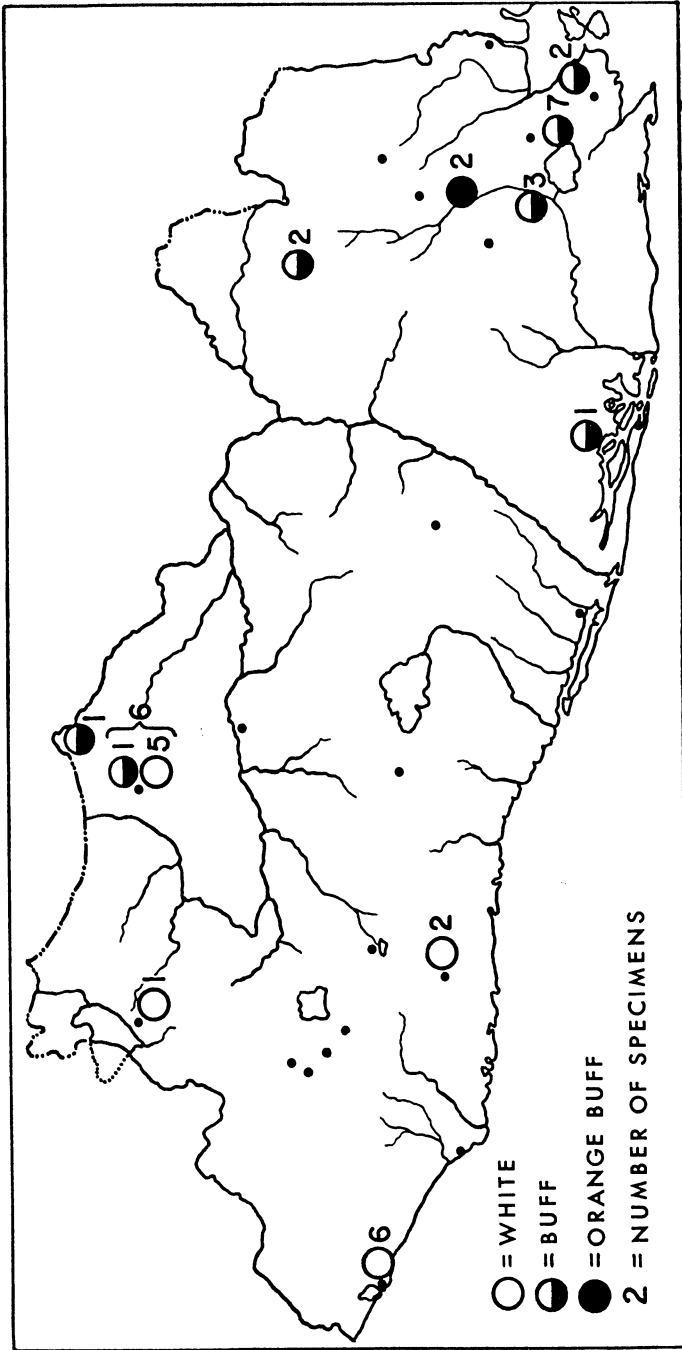


FIG. 2. Distribution of color of ear patches in *Sciturus variegatoides*. Specimens from Cerro de los Naranjos and Cerro del Aguila not examined.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barra de Santiago (type locality, see Dickey, 1928), San José del Sacare, Los Esesmiles, Chilata, Cerro de los Naranjos, Cerro del Aguila, and El Tablón. Recorded from Los Hojas and Corinto (intergrade) by Felten (1957b).

REMARKS.—Within the boundaries of El Salvador there is a change in color of belly, feet, and ear patches of *variegatoides*, from white to orange as one passes from northwest to southeast. In the area about San José del Sacare and Los Esesmiles, there seems to be a mixture of genes that determine color, as shown by two specimens that contain much of the buffy while three of the specimens, from San José del Sacare, contain no buff in the color of the pelage, and two others have but a trace of it. Additional material from the area between Los Esesmiles and Mt. Cacaguatique should shed light on the change from white to orange.

Sciurus deppei Peters

SIZE.—(8 ♂, 9 ♀) Length, 350–400; tail, 150–180; hind foot, 50–57. Skull (6 ♂, 8 ♀): greatest length, 50.5–54.2; zygomatic breadth, 28.4–31.5.

DESCRIPTION.—A small squirrel; upper parts dark olive brown overlaid with light buff; hairs of tail tipped with white on top, with buff beneath; belly washed with buff or orange; three pairs of mammae.

DISTRIBUTION IN EL SALVADOR.—Specimens from San José del Sacare, Los Esesmiles, Volcán de Santa Ana, Cerro de los Naranjos, and Cerro del Aguila. Also reported from Cerro Verde by Felten (1957b).

REMARKS.—The Salvadoran material is assignable to the subspecies *deppei*.

FAMILY GEOMYIDAE (POCKET GOPHERS)

Burrowing rodents with long claws on front feet, short naked tails, small ears and eyes, external cheek pouches lined with fur, and powerful incisor teeth with grooves running lengthwise on the front surfaces of the uppers. Four toes on front foot, five on hind foot. Dental formula: I 1/1; C 0/0; P 1/1; M $3/3 \times 2 = 20$.

Genus *Orthogeomys* (Giant Pocket Gophers)

Orthogeomys grandis Thomas

SIZE.—(2 ♂, 8 ♀) Length, 330–392; tail, 98–132; hind foot, 48–54. Skull (4 ♂, 7 ♀): greatest length, 62.0–70.2; zygomatic breadth, 36.0–41.5.

DESCRIPTION.—Head and body rich brown; scattered silvery or white-tipped hairs on throat, breast, and undersides of legs; tail naked; three pairs of mammae, 2 inguinal, 1 pectoral.

DISTRIBUTION IN EL SALVADOR.—Specimens from Mt. Cacaguatique (type locality of *pygacanthus* Dickey), Los Esesmiles, Chilata, Cerro de los Naranjos, and Volcán de Santa Ana. Also reported from Finca El Carmen and Volcán de San Vicente (type locality of *engelhardi*) by Felten (1957b).

REMARKS.—Dickey (1928:9–10) described *Orthogeomys pygacanthus* as a full species and Felten (1957b:151–52) described *engelhardi* as a subspecies of *Orthogeomys grandis*. It is my opinion that *pygacanthus*, also, is no more than a subspecies of *grandis*. From the few specimens available, it would appear to be the smallest of the Salvadoran populations and *engelhardi* the largest, but the differences are not great. If specimens of comparable ages were available, these differences might disappear. From his illustrations, I gather that Felten's type of *engelhardi* was an old individual; it has a prominent sagittal crest. None of the specimens of *pygacanthus* has a sagittal crest.

Skulls of specimens from Los Esesmiles and Mt. Cacaguatique, when viewed from the front and above, have distinctly broader zygomatic processes of the maxillae than do those from Volcán de Santa Ana. It would appear from Felten's illustration that *engelhardi* also has broad processes.

The systematic status of the Salvadoran *Orthogeomys* is not satisfactory. However, there is insufficient material available to work out the variation so this must await further field work in the area.

FAMILY HETEROMYIDAE

Medium-sized mice with external cheek pouches lined with fur, spine-like hairs on back and rump, large hind feet, and relatively long tails. Dental formula: I 1/1; C 0/0; P 1/1; M $\frac{3}{3} \times 2 = 20$.

Genus *Heteromys* (Central American Pocket Mice)

Heteromys desmarestianus Gray

SIZE.—(18 ♂, 13 ♀) Length, 266–345; tail, 149–190; hind foot, 33–38. Skull (14 ♂, 14 ♀): greatest length, 33.3–38.2; zygomatic breadth, 15.5–18.2; interorbital constriction, 8.2–10.3.

DESCRIPTION.—A small, olive brown rat with pale, cream-colored underparts, and external cheek pouches. Tail longer than head and body, scantily haired, with transverse scales showing through prominently, dark above, pale below; hairs of upper parts spine-like; ears thinly covered with short hairs except on borders where hairs may extend five mm or more beyond ear conch. Mammae, two pairs inguinal and one pair pectoral.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, 8000 feet (type locality of *H. d. psakastus* Dickey), and Mt. Cacaguatique. Reported by Felten (1957b) from Hac. Montecristo.

REMARKS.—Dickey (1928) described the subspecies *psakastus* from Los Esesmiles, but Goldman (1937) considered it a synonym of *desmarestianus*. I concur with Goldman in this respect. At Los Esesmiles, *Heteromys* was taken in the cloud forest only.

Genus *Liomys* (Mexican Pocket Mice)

Liomys salvini Thomas

SIZE.—(17 ♂, 29 ♀) Length, 202–250; tail, 95–135; hind foot, 26–31. Skull (23 ♂, 26 ♀): greatest length, 29.6–34.3; zygomatic breadth, 14.3–15.9; interorbital constriction, 6.1–7.5.

DESCRIPTION.—Externally similar to *Heteromys*, but smaller (hind foot more than 32, interorbital constriction more than 8 in *Heteromys*). Anterior border of posterior loop of upper premolar concave, but without deep reentrant angle directed inward and backward (as in *Heteromys*).

DISTRIBUTION IN EL SALVADOR.—Specimens from Lake Olomega, Divisadero, Río Goascorán, Mt. Cacaguatique, Puerto del Triunfo, Río San Miguel, Pine Peaks, Volcán de San Miguel, Barra de Santiago, Chilata, and El Tablón (Lake Guija). Felten (1957b) recorded them as follows: as *salvini salvini*, Laguna de Guija, Hac. San Antonio, Hac. Chilata, San Salvador, Amate de Campo, Hac. Nancuchiname, and Puerto del Triunfo. As *heterothrix*, he recorded them from Finca Raquelina, Isla de la Cabra, and San Salvador.

REMARKS.—There are three possible names available for the Salvadoran *Liomys*—*salvini* Thomas (1893), *crispus* Merriam (1902), and *heterothrix* Merriam (1902). Felten (*ibid.*) recorded both *salvini* and *heterothrix* from San Salvador, indicating two sympatric species. I am not able to separate our series, except arbitrarily, into two or more assemblages. I must conclude, therefore, that they represent one species that is quite variable in both skin and skull characters. Adequate comparative material of *salvini* (3 specimens from Guatemala) or *heterothrix* is not available, but a good series of *crispus* from Chiapas is in the UMMZ. Except for very slightly paler pelage, in comparable wear, the Salvadoran specimens are indistinguishable from *crispus setosus* from Pijijiapan, Chiapas. They are also indistinguishable from the three specimens from Guatemala. If *crispus* should eventually prove to be a synonym of *salvini*, then the latter name, having priority, would be proper. *L. crispus* has page priority over *heterothrix*. Based on the original descriptions, the Salvadoran material would fit equally well in either of the above three species. Because of the similarity to the Guatemalan specimens, the name *salvini* is used here. Some of the apparent confusion probably results from the difference in external appearance of animals with old or new pelage. The new coat is distinctly darker owing to the overhairs that pretty well cover the spinous portion of the pelage. When these are worn off, exposing the spine-like hairs, the whole aspect of the animal changes. Our specimens show many stages of wear and, if correct in interpretation, demonstrate these differences. An immature from Chilata has an indication of a lateral line. The skulls, too, are variable. The branches of the premaxillaries may terminate at or near the posterior ends of the nasals or they may extend considerably beyond them. The nasals may be parallel-sided or wedge-shaped, and truncate or emarginate at their termination. Also, the interparietal is variable in shape. The importance of some of these as taxonomic characters is doubtful. It is obvious that the group is in need of revision, but this is beyond the scope of the present study.

Two females taken on January 8 and 9 each had three embryos. The mammae are: two pairs inguinal, one pair pectoral.

FAMILY CRICETIDAE

In El Salvador, this family of rodents includes all the rats and mice except the pocket mice and the house rat and house mouse. They all have relatively long tails. Dental formula: I 1/1; C 0/0; P 0/0; M $3/3 \times 2 = 16$.

Genus *Reithrodontomys* (Harvest Mice)

Small, brown or reddish brown mice with tails longer than head and body. Belly washed whitish or dull gray. Upper incisor teeth with distinct grooves running their length on front surface. Four species are known from El Salvador.

Reithrodontomys sumichrasti Saussure

SIZE.—(29 ♂, 51 ♀) Length, 147–182; tail, 79–107; hind foot, 18–20; ear, 11–15. Skull: greatest length, 20.4–22.9; zygomatic breadth, 10.5–11.7.

DESCRIPTION.—Dark brown, particularly on back, with a sprinkling of fulvous along sides; fulvous lateral line inconspicuous; belly whitish, sometimes washed with fulvous, especially between front legs; tail dark brown above, gray below; ears dark brown; top of hind feet dusky to whitish.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, 6200–8000 ft. Reported by Felten (1958a) from Hac. Montecristo and Hac. Los Planes.

REMARKS.—Subadults and half-grown young were taken February 9, 15, and March 10. This species did not penetrate the cloud forest; it was restricted to grassy and brushy habitats. Salvadoran material belongs to the subspecies *modestus* Thomas.

Reithrodontomys mexicanus Saussure

SIZE.—(13 ♂, 24 ♀) Length, 170–200; tail, 95–126; hind foot, 18–21; ear, 12–15. Skull: greatest length, 20.5–24.3; zygomatic breadth, 11.1–12.6.

DESCRIPTION.—Largest, on the average, of the harvest mice in El Salvador. General body color, fulvous, with reddish cast in some, sprinkled with blackish hairs, particularly in subadults; underparts white with some plumbeous of bases of the hairs showing through; lateral line inconspicuous; tail dark brown above and below; hind feet, except for white toes, blackish on top, white on sides; definite dark eye ring, in many individuals a dark stripe from anterior corner of eye to side of nose; ears relatively large.

DISTRIBUTION IN EL SALVADOR.—Specimens from Chilata, Volcán de Santa Ana, Los Esesmiles, and Mt. Cacaguatique. Felten (1958a) reported them from Hac. Montecristo and Hac. Los Planes.

REMARKS.—Young are born pretty much through the year as evidenced by half-grown individuals taken December 12 and 13, and subadults taken January 1, 9, 10, February 17, May 6, November 29, and December 20.

Apparently these mice occur in a variety of habitats from grassy and brushy to cloud forest. One was taken ten feet above the ground in thick brush. The subspecies found in most of El Salvador is *orinus* Hooper. Those taken above 7500 feet elevation in the cloud forest at Los Esesmiles were considered *ocotepequensis* Godwin by Hooper (1952).

Reithrodontomys gracilis Allen and Chapman

SIZE.—(2 ♂, incomplete) Length, 186; tail, 100, 107; hind foot, 20; ear, 13. Skull: greatest length, 20.9, 21.6; zygomatic breadth, 10.1, 10.6.

DESCRIPTION.—A small brown mouse heavily washed with fulvous on back and sides; fairly distinct fulvous lateral line between sides and whitish belly; tail dark brown throughout, scantily haired.

DISTRIBUTION IN EL SALVADOR.—Specimens from Divisadero (Monte Cristo Mine). Reported from San Salvador and Amate de Campo by Felten (1958a).

REMARKS.—Specimens from El Salvador have been assigned to the subspecies *anthonyi* Goodwin by Hooper (1952).

Reithrodontomys fulvescens J. A. Allen

SIZE.—(2 ♂, 1 ♀) Length, 155–186; tail, 95–111; hind foot, 19–20; ear, 10–11. Skull: greatest length, 20.4–22.7; zygomatic breadth, 11.1–11.6.

DESCRIPTION.—Upper parts pale brown washed with light fulvous; clear fulvous along lateral line; belly whitish, hairs plumbeous at bases except on chin and upper throat where they are pure white; tail slightly paler below than above.

DISTRIBUTION IN EL SALVADOR.—Specimens from Volcán de San Miguel, 4300 ft., and Mt. Cacaguatique, 3500 ft.

REMARKS.—A female taken January 12 contained five 15-mm embryos. The subspecies found in El Salvador is *chiapensis* Howell.

Genus *Peromyscus* (Deer Mice)

Peromyscus boylei Baird

SIZE.—(23 ♂, 13 ♀ from Mt. Cacaguatique and 5 ♂, 5 ♀ from San José del Sacare) Length, 192–250; tail, 97–132; hind foot, 22–26. Skull: greatest length, 26.9–31.8; zygomatic breadth, 13.4–16.3.

DESCRIPTION.—Back medium brown intermixed with fulvous-tipped hairs; eye ring blackish; cheeks and lower sides pale to bright fulvous; belly hairs tipped with white; feet white; tail bicolor and covered with short hairs; tail equal to or slightly longer than head and body.

DISTRIBUTION IN EL SALVADOR.—Specimens from San José del Sacare and Mt. Cacaguatique. Ondrias (1960) reported them from Los Esesmiles, El Carmen, and Mt. Cacaguatique.

REMARKS.—Dickey (1928a) described two subspecies from El Salvador. Those from San José del Sacare he named *P. b. sacarensis* and those from Mt. Cacaguatique he described as *cordillerae*. The first were taken in March and the second in November and December, so the pelages are not comparable. A richer coloration is apparent in *cordillerae*, and they also average slightly the larger of the two series. One young animal, in gray pelage, was taken in March. The remainder of the series are all in adult pelage. Those from San José del Sacare were taken in or at the edge of oaks.

Peromyscus oaxacensis Merriam

SIZE.—(4 ♂, 3 ♀) Length, 222–263; tail, 113–136; hind foot, 26–27. Skull: greatest length, 29.2–31.7; zygomatic breadth, 14.3–15.6.

DESCRIPTION.—Similar to *boylei*, but usually more black and less fulvous on back and sides; average slightly larger than *boylei* (hind foot 26 or more, in *boylei*, 26 or less); tail longer than head and body.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles (8000 feet). Felten (1958*b*) recorded them from Volcán de San Vicente.

REMARKS.—Young, molting from gray to adult pelage, were taken from February 18 to 23. This species is closely related to and difficult to distinguish from *boylei*. At Los Esesmiles this species was confined to the cloud forest.

Peromyscus mexicanus Saussure

SIZE.—(102 ♂, 69 ♀) Length, 207–285; tail, 99–152; hind foot, 23–30. Skull: greatest length, 29.7–35.2; zygomatic breadth, 13.9–17.0.

DESCRIPTION.—Largest of the *Peromyscus* in El Salvador; tail longer than head and body; buffy to ochraceous mixed with black on back; cheeks and lower sides more nearly buffy or ochraceous; belly hairs white tipped; pectoral patch of ochraceous usually present.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, San José del Sacare, El Tablón, Colima, Volcán de Santa Ana, Chilata, Volcán de San Miguel, Pine Peaks, and Mt. Cacaguatique. Reported by Felten (1958*b*) from Laguna Verde, Cerro Blanco, Hac. Montecristo, Hac. Los Planes, Laguna de Guija, Cerro Verde, Hac. Chilata, Puerto La Laguna, San Salvador, Volcán de San Vicente, and Cerro Cacaguatique. Ondrias (1960) reported them also from SE "Cerna del' Aquila" (= Cerro del Aguila).

REMARKS.—Dickey (1928*a*) described two subspecies from El Salvador, *philombrius* from over 8000 feet altitude (cloud forest), Los Esesmiles, and *salvadorensis* from Mt. Cacaguatique and Pine Peaks. The remainder he considered to be *saxatilis* Merriam. In his description of *philombrius*, the only character he gave to distinguish it from *saxatilis* was greater size. The type has the largest body measurements of the entire series of *mexicanus* from El Salvador, but this was an extremely old individual. However, the skull of the type (greatest length, 35.0) is exceeded in size by an old female (no. 12340) from Volcán de San Miguel (greatest length, 35.2) which he assigned to *saxatilis*. The topotypes of *philombrius* fall well within the size range of other series from El Salvador. I cannot distinguish the series of "*philombrius*" from other series and must conclude that it is a synonym of *saxatilis*.

The series of "*salvadorensis*" may represent a valid subspecies, although Felten (1958*b*) did not think so. The specimens are somewhat darker than the others, but the skins are filled out less and the result is that the hairs are more closely crowded. The darker appearance may, therefore, be misleading.

There are four mammae, all inguinal. Three embryos were recorded for each of four females, taken on January 10 and May 6. Immature mice were taken in January, February, May, November, and December.

Peromyscus stirtoni Dickey

SIZE.—(9 ♂, 5 ♀) Length, 189–215; tail, 84–108; hind foot, 23–25. Skull (7 ♂, 3 ♀): greatest length, 29.2–30.3; zygomatic breadth, 13.7–14.8.

DESCRIPTION.—Back and sides with hairs predominantly tipped with ochraceous buff, interspersed with black; sides clearly buffy; feet and belly white; tail densely covered with black hairs above, whitish below; tail about equal to or shorter than head and body.

DISTRIBUTION IN EL SALVADOR.—Specimens from El Tablón, Río Goascorán (type locality), Pine Peaks, Lake Olomega, and Divisadero.

Genus *Baiomys* (Pygmy Mice)

Baiomys musculus Merriam

SIZE.—(11 ♂, 16 ♀) Length, 98–132; tail, 31–55; hind foot, 13–17. Skull (8 ♂, 11 ♀): greatest length, 17.6–20.2; zygomatic breadth, 9.3–10.8.

DESCRIPTION.—Smallest of Salvadoran mice; uniformly dark, blackish or bluish brown on upper parts; underparts paler with occasional whitish median area on chest and/or belly; tail slightly paler below than above.

DISTRIBUTION IN EL SALVADOR.—Specimens from Volcán de Santa Ana, Chilata, El Tablón, Colima, Mt. Cacaguatique, Divisadero, Potosí Mine, and San Miguel. Reported by Felten (1958*b*) from Cerro Blanco, Laguna de Guija, km 35 between San Salvador and Santa Ana, and San Salvador. Packard (1960) reported them from San Salvador and Los Planes.

REMARKS.—Four females each contained two embryos. They were taken from December 9 to January 9. Felten (*ibid.*) found a nest with three young in November. The Salvadoran material is assigned to the subspecies *grisescens* by Felten, but Packard (*ibid.*) considered them *nigrescens*. I concur with Packard.

Genus *Scotinomys* (Brown Mice)

Scotinomys teguina Alston

SIZE.—(12 ♂, 11 ♀) Length, 116–135; tail, 46–56; hind foot, 15–18. Skull: greatest length, 20.5–22.2; zygomatic breadth, 10.4–11.6.

DESCRIPTION.—Small, dark brown mouse with tail usually shorter than head and body. Tail scantily haired, dark above and below; belly nearly as dark as back, hairs tipped with rufus.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles (7100–8000 feet). Reported by Felten (1958*b*) from Hac. Montecristo, and by Hooper (1960) from Los Esesmiles.

REMARKS.—Because of its nearly uniform color and small size this mouse is easily distinguished from all others. Felten (*ibid.*) assigned them to the subspecies *rufoniger* Sanborn (1935). The Salvadoran series has not been compared with topotypes of *rufoniger*, but from Sanborn's description it would appear that *rufoniger* is larger and darker than the Salvadoran specimens. *S. t. teguina* Alston is probably the proper subspecific name for our series. At Los Esesmiles, taken in the cloud forest only.

One female, taken on February 12, contained three embryos.

Genus *Tylomys* (Climbing Rats)*Tylomys nudicaudus* Peters

SIZE.—(1 ♂, 1 ♀) Length, 330, 400; tail, 157, 213; hind foot, 36, 39. Skull: greatest length, 40.9, 44.5; zygomatic breadth, 21.4, 23.2.

DESCRIPTION.—Large, brownish gray rat with long naked tail (scales distinct); hairs on throat and belly white to bases; ears large, bare, papery, and near color of back; terminal third or more of tail whitish all around, proximal portion paler beneath than above.

DISTRIBUTION IN EL SALVADOR.—Specimens from Chilata.

REMARKS.—The subspecies represented is probably *nudicaudus* Peters.

Genus *Otodylomys* (Climbing Rats)*Otodylomys phyllotis* Merriam

SIZE.—(23 ♂, 9 ♀) Length, 270–340; tail, 123–165. Skull (19 ♂, 9 ♀): greatest length, 37.6–42.8; zygomatic breadth, 19.1–21.8.

DESCRIPTION.—A rather large, brownish gray rat with long, nearly naked tail (scales distinct); hairs on throat and belly white to bases; ears large, thin, papery; usually a dark eye ring; tail dark brown or blackish above and below to tip; feet dusky to whitish on top, toes white. Distinguished from *Tylomys* by smaller size and dark, unicolor tail (no white tip).

DISTRIBUTION IN EL SALVADOR.—Specimens from Chilata, Barra de Santiago, Volcán de San Vicente, Puerto del Triunfo, Río Goascorán, Mt. Cacaguatique, Río San Miguel, Volcán de San Miguel, Lake Olomega, San José del Sacare, Divisadero, and Pine Peaks. Seen at El Tablón. Reported by Felten (1958a) from Laguna de Guija.

REMARKS.—Young animals or embryos are recorded for all months except May, June, and July. Six females contained two embryos each, two had one each. These rats inhabit rocky cliffs and mine tunnels as well as forests, where they are partially arboreal.

The subspecies represented is probably *guatemalae* Thomas.

Genus *Nyctomys* (Vesper Rat)*Nyctomys sumichrasti* Saussure

SIZE.—(7 ♂, 7 ♀) Length, 208–255; tail, 107–130; hind foot, 21–23. Skull (4 ♂, 6 ♀): greatest length, 27.4–30.4; zygomatic breadth, 15.7–17.7.

DESCRIPTION.—A cinnamon or tawny mouse with black eye ring and black spot in front of eye; belly hair white to base; tail hairy, dark brown above and below; tops of hind feet dusky except for toes which are whitish. One of the most beautiful of Salvadoran mice.

DISTRIBUTION IN EL SALVADOR.—Specimens from Volcán de Santa Ana, Chilata, Barra

de Santiago, Puerto del Triunfo, Lake Olomega, Río San Miguel, and Volcán de San Miguel. Observed at El Tablón. Reported by Felten (1958a) from Laguna Chamicco, Sonsonate, and San Salvador.

REMARKS.—This is an arboreal species. Goldman (1937) described the Salvadoran *Nyctomys* as *N. s. florencei*; type locality, Barra de Santiago.

Genus *Neotoma* (Woodrats)

Neotoma mexicana Baird

SIZE.—(1 ♂, 1 ♀, skins only) Length, 327, —; tail, 153, —; hind foot, 34, 34.

DESCRIPTION.—Upper parts orange rufous, purest along the sides; middle of back and top of head darkened by overlying dark hairs; tail blackish above, grayish below; feet dusky on top, toes white; belly white, hairs plumbeous at bases except on chin and throat where they are pure white; rufous of sides extends nearly to mid-ventral line in front of fore legs.

DISTRIBUTION IN EL SALVADOR.—Specimens from Volcán de Santa Ana.

REMARKS.—From the descriptions given by Goldman (1910), the Salvadoran specimens might fit equally well with *ferruginea* Tomes or *chrysomelas* J. A. Allen. On size, they are closer to *ferruginea*, but without skulls age cannot be determined—they are not in immature pelage.

Genus *Rheomys* (Water Mice)

Rheomys thomasi Dickey

SIZE.—(8 ♂, 4 ♀) Length, 216–273; tail, 111–125; hind foot, 29–33. Skull: greatest length, 27.3–29.4; zygomatic breadth, 13.9–15.9.

DESCRIPTION.—Rich brown above, silvery on throat and belly; a few long, white-tipped guard hairs on rump; fur glossy and thick; tail thickly haired, unicolor; ears nearly concealed in fur.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmites, 8000 feet, cloud forest (*R. t. stirtoni* Dickey), and Mt. Cacaguatique (*R. t. thomasi* Dickey).

REMARKS.—When Dickey (1928b) described the Salvadoran *Rheomys*, he considered the two populations represented as subspecifically distinct. There is some doubt as to their distinctness. However, larger series from the vicinity of Los Esesmites is necessary to determine the extent of individual variation.

This is an inhabitant of the small streams. One female contained one 35-mm embryo on February 21. There are four mammae, two pectoral and two inguinal.

Genus *Oryzomys* (Rice Rats)

Oryzomys palustris Harlan

SIZE.—(47 ♂, 40 ♀) Length, ♂, 213–304, ♀, 190–267; tail, 109–194, 113–151; hind foot, 27–33, 25–31. Skull: greatest length, 26.6–31.4, 26.6–30.5; zygomatic breadth, 13.9–17.5, 13.5–16.0; palatine slits, 5.2–7.0, 5.0–6.4; bony palate, 4.7–6.2, 4.8–6.1.

DESCRIPTION.—Largest of the known *Oryzomys* in El Salvador. Upper parts brown sprinkled with or overlaid by varying amounts of fulvous; hairs of underparts tipped with whitish, sometimes washed with fulvous; tail nearly naked with scales showing through, but not as prominently as in other species; hairs on toes do not extend beyond claws.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, San José del Sacare, Colima, Barra de Santiago, Chilata, Puerto del Triunfo, Lake Olomega, Río San Miguel, Río Goascorán, Divisadero, and Mt. Cacaguatique. Felten (1958a) reported them from Laguna de Guija, Hac. San Antonio, Hac. Chilata, San Salvador, Amate de Campo, km 80 between San Salvador and San Miguel, and Hac. Nancuchiname.

REMARKS.—Apparently the most widespread and most numerous of Salvadoran *Oryzomys*. Two females, taken February 17 and 18, contained three and four embryos, respectively; one taken September 18 contained four embryos. Young animals were taken in February, August, September, and December. Preferred habitat is grassy or brushy areas, usually along streams.

There is considerable variation in these rats in El Salvador. Those from San José del Sacare, Colima, and Barra de Santiago are somewhat paler than the others. The series from these localities are small. I see no reason for subspecific distinction at this time. The subspecies represented in El Salvador is *couesi* Alston.

For the use of the specific name *palustris* see Hall (1960).

Oryzomys melanotis Thomas

SIZE.—(1 ♂, 1 ♀) Length, 219, 191; tail, 119, 106; hind foot, 29, 28. Skull: greatest length, 27.6, 24.8; zygomatic breadth, 14.3, 13.3; palatine slits, 4.6, 3.9; bony palate, 6.1, 5.1.

DESCRIPTION.—Small, dark brown mouse washed with fulvous, especially on head and sides; throat and belly hairs tipped with white, lead color at bases; stiff hairs project beyond claws on central toes of hind foot; tail naked, scales evident, paler beneath than above on basal one third; palatine slits do not extend back as far as front borders of first molars; bony palate longer than in *alfaroi* (more than 5.1).

DISTRIBUTION IN EL SALVADOR.—Specimens from Puerto del Triunfo. Felten (1958a) described, as new, his Salvadoran material under the name *Oryzomys rostratus salvadorensis* and reported them from Hac. San Antonio (type locality) and km 80 between San Salvador and San Miguel. Hall and Kelson (1959) considered *rostratus* as a race of *melanotis*.

Oryzomys alfaroi Allen

SIZE.—(4 ♂, 3 ♀) Length, 190–200; tail, 96–111; hind foot, 24–26. Skull: greatest length, 23.7–24.9; zygomatic breadth, 12.6–12.9; palatine slits, 3.7–4.0; bony palate, 4.8–5.1.

DESCRIPTION.—Small dark brown mouse with a faint fulvous wash; underparts white-tipped; tail naked, scales evident, may be slightly paler underneath near base, tip usually dark all around; stiff hairs project beyond claws on central toes of hind foot; slightly smaller than *melanotis* and with palatine slits reaching to or nearly to anterior borders of first molars.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles and Chilata. Felten (1958a) recorded the species, under the subspecific name *satuvator* Merriam, from Hac. Montecristo and Hac. Los Planes.

REMARKS.—A young animal, taken at Los Esesmiles on February 15 (no. 12535) is darker than the adults and the tail is black above and below from base to tip. At this locality they were taken in the cloud forest only.

Oryzomys fulvescens Saussure

SIZE.—(6 ♂, 5 ♀) Length, 167–210; tail, 97–118; hind foot, 20–23. Skull: greatest length, 20.0–21.6; zygomatic breadth, 10.6–12.4; palatine slits, 3.2–4.0; bony palate, 3.0–3.7.

DESCRIPTION.—Small, pale fulvous mouse with white throat and white belly faintly washed with fulvous; tail long, nearly naked, paler below than above; ears near color of back; long, bristle-like hairs on toes of hind feet extend beyond claws; palatine slits extend to or nearly to anterior borders of first upper molars.

DISTRIBUTION IN EL SALVADOR.—Specimens from Puerto del Triunfo, Volcán de San Miguel, Río San Miguel, Lake Olomega, and Mt. Cacaguatique. Felten (1958a) reported them from Hac. Los Planes, Hac. Chilata, and San Salvador.

REMARKS.—Two females, taken on December 6 and January 7, each contained three embryos. Young individuals were taken January 9 and 12. There are eight mammae, four inguinal and four pectoral. This is the smallest of the *Oryzomys* found in El Salvador. The subspecies represented is probably *fulvescens* Saussure.

Genus *Sigmodon* (Cotton Rats)

Sigmodon hispidus Say and Ord

SIZE.—(11 ♂, 5 ♀) Length, 280–331; tail, 110–145; hind foot, 30–36. Skull: greatest length, 33.9–38.7; zygomatic breadth, 19.0–21.6.

DESCRIPTION.—A medium-sized rat with fur of upper parts blackish at base, banded with fulvous, and tipped with black, giving the animal a grizzled appearance; underparts whitish or faintly washed with fulvous; ears nearly concealed in long, hispid fur; tail scantily haired, scales show through.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, San José del Sacare, Colima, Chilata, Puerto del Triunfo, Lake Olomega, Río San Miguel, Volcán de San Miguel, Divisadero, Tabanco, Mt. Cacaguatique, Pine Peaks, and Río Goascorán. Reported by Felten (1958b) from Laguna de Guija, Isla de la Cabra in Lago de Coatepeque, Hac. San Antonio, San Salvador, Amate de Campo, Puerto del Triunfo, and Mineral Montecristo.

REMARKS.—These rats apparently breed during most of the year. Small young or embryos have been found in all months except May and June. It is possible that they do not breed in the middle of the summer. In ten pregnant females, the number of embryos ranged from two to eight. They were taken in February, March, April, September, October, and December. Felten (*ibid.*) has correctly assigned the material from El Salvador to the subspecies *griseus* J. A. Allen. Hall and Kelson (1959) indicated that El Salvador might be within the range of *zanjonensis*, but they did not have the advantage of examining material from El Salvador. The Salvadoran material has been compared with topotypic specimens kindly loaned by the American Museum.

These rats were inhabiting chiefly the grassy areas.

FAMILY MURIDAE (OLD WORLD RATS AND MICE)

Tail long, nearly naked, unicolor; cusps on teeth in three rows. Dental formula as in Cricetidae.

Genus *Rattus* (House Rats)*Rattus rattus* Linnaeus

SIZE.—(1 ♂, 2 ♀) Length, 399–409; tail, 205–288; hind foot, 36–37. Skull: greatest length, 41.4–43.5; zygomatic breadth, 19.9–21.3.

DESCRIPTION.—A large black rat with a few gray hairs interspersed on back in old individuals; tail long, naked, unicolor, with scales showing prominently; underparts slightly paler than back.

DISTRIBUTION IN EL SALVADOR.—Specimens from Los Esesmiles, Cerro de los Naranjos, Puerto del Triunfo, Lake Olomega, Divisadero, Río San Miguel and Mt. Cacaguatique. Reported by Felten (1958b) from Hac. Montecristo, Laguna de Guija, San Salvador, Volcán de San Vicente, Puerto del Triunfo, and Mineral Montecristo.

REMARKS.—Specimen localities above probably do not adequately indicate the distribution of this species. It is likely to be found wherever there are human habitations. Felten (*ibid.*) reported one female with four embryos in March.

Genus *Mus* (House Mice)*Mus musculus* Linnaeus

SIZE.—(From Felten, 1958b) (9 ♂, 9 ♀) Length, 147–172; tail, 77–90; hind foot, 16–18. Skull: (7 ♂, 5 ♀) greatest length, 19.7–21.8; zygomatic breadth, 10.1–11.6.

DESCRIPTION.—Small brown mouse with underparts but slightly paler than back; tail naked, unicolor; teeth with cusps in three rows; incisors smooth.

DISTRIBUTION IN EL SALVADOR.—Specimens from San Salvador, Chilata, Cerro de los Naranjos, and Los Esesmiles. Felten (1958b) records them from Hac. Chilata, San Salvador, and Volcán de San Vicente. Probably occurs wherever there are man-made structures.

REMARKS.—Felten (*ibid.*) recorded four to six embryos in females taken in March and September.

FAMILY ERETHIZONTIDAE (PORCUPINES)

Body covered with long sharp spines. Dental formula: I 1/1; C 0/0; P 1/1; M $3/3 \times 2 = 20$.

Genus *Coendou* (Tropical Porcupine)*Coendou mexicanus* Kerr

SIZE.—(5 ♂, 6 ♀) Length, 595–801; tail, 251–378; hind foot, 60–79. Skull: (4 ♂, 5 ♀) greatest length, 80.0–90.2; zygomatic breadth, 45.2–51.3.

DESCRIPTION.—Soft overhairs of body reddish brown or black (two young animals are reddish brown); sharp spines, thickly covering most of body, white with brown or black tips; end of tail prehensile and without spines; four toes on each foot. Only large rodent in El Salvador that is covered with sharp spines.

DISTRIBUTION IN EL SALVADOR.—Specimens from Colima, Puerto del Triunfo, Río San Miguel, Volcán de San Miguel, Lake Olomega, and Mt. Cacaguatique. Felten (1957b) reported them from Amate de Campo.

REMARKS.—Young animals were taken in December and January. The subspecific designation of the Salvadoran material is *mexicanus* Kerr.

FAMILY DASYPROCTIDAE (CAVIES AND AGOUTIS)

Large rodents with inconspicuous tails; claws on feet hoof-like. Dental formula as in Erethizontidae.

Genus *Agouti* (Paca)*Agouti paca* Linnaeus

SIZE.—(1 ♂, 1 ♀, from Felten, 1957b) Length, 742, 684; tail, 22, 9; hind foot, 110, 100. Skull: greatest length, 151.9, 144.0; zygomatic breadth, 108.1, 87.5.

DESCRIPTION.—Largest rodent in El Salvador; upper parts light chocolate brown with four creamy white lines or rows of spots along each side of body; belly creamy white; tail not apparent; ears scantily haired; four toes on front foot, five on hind foot (inside toe no more than a claw).

DISTRIBUTION IN EL SALVADOR.—Specimens from Colinas de Jucuarán and Mt. Cacaguatique; Felten (1957b) reported them from Pueblo El Triunfo and Hac. Santa Rosa.

REMARKS.—The generic name *Cuniculus* Brisson, formerly used for the paca, is now replaced by *Agouti* Lacépède (see Miller and Kellogg, 1955: 636, footnote no. 60). The subspecies in El Salvador is probably *nelsoni* Goldman.

Genus *Dasyprocta* (Agoutis)*Dasyprocta punctata* Gray

SIZE.—(3 ♂, 3 ♀) Length, 460–540; tail, 21–30; hind foot, 120–129. Skull: greatest length, 97.8–110.3; zygomatic breadth, 37.2–51.8.

DESCRIPTION.—A large, rabbit-like rodent with an overall reddish brown appearance; long, coarse hairs of body (longest on rump) banded alternately with dark brown and light reddish brown; three toes on large hind feet, four toes on front feet; tail inconspicuous.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barra de Santiago, Puerto del Triunfo, El Tablón, Río San Miguel, San Ramon Valley, Lake Olomega, and Mt. Cacaguatique. Reported by Felten (1957*b*) from Hac. Miraflores.

REMARKS.—A female taken on December 11 contained two embryos. Young animals were taken in January, April, August (quite young), and December. The subspecies in El Salvador is currently considered to be *punctata* Gray.

ORDOR LAGOMORPHA (HARES, RABBITS, AND CONIES)

Tail short and cottony; ears usually long; feet furred on soles; incisor teeth rodent-like; two small incisors behind large ones in upper jaw.

FAMILY LEPORIDAE (HARES AND RABBITS)

Dental formula: I 2/1; C 0/0; P 3/2; M 3/3 \times 2 = 28

Genus *Sylvilagus* (Cottontails)

Sylvilagus floridanus J. A. Allen

SIZE.—(10 ♂, 7 ♀) Length, 399–470; hind foot, 85–99; ear, 70–85. Skull: (10 ♂, 4 ♀) greatest length, 70.7–81.3; zygomatic breadth, 34.0–36.5.

DESCRIPTION.—Upper parts mottled grayish brown; nape, behind ears, rufous; throat brown; belly whitish; underside of short tail white.

DISTRIBUTION IN EL SALVADOR.—Specimens from Cerro de los Naranjos, Los Esesmiles, Colima, Barra de Santiago, Puerto del Triunfo, Río Goascorán, Lake Olomega, Mt. Cacaguatique, and Divisadero. Felten (1958*c*) recorded them from Hac. San Antonio, near San Andres, Hac. Miramar, San Salvador, km 20 between San Salvador and San Miguel, Rosario de Mora, Hac. Miraflores, Hac. San Pedro, Puerto del Triunfo, and Mineral Montecristo.

REMARKS.—Embryos were reported by Felten (*ibid.*) as follows, for three females: May (4), June (3), September (2). A nursing female was taken January 20. The subspecies represented is *hondurensis* Goldman.

ORDER ARTIODACTYLA (EVEN-TOED UNGULATES)

Weight borne equally on two hoofs on each foot.

FAMILY TAYASSUIDAE (PECCARIES)

Pig-like; three toes on hind foot; hair bristle-like. Dental formula: I 2/3; C 1/1; P 3/3; M 3/3 \times 2 = 38.

Genus *Tayassu**Tayassu tajacu* Linnaeus (Collared Peccary)

SIZE.—(from Hall and Kelson, 1959) Length, 870–940; tail, 19–55; hind foot, 180–200. Skull (1 specimen, from Felten, 1958c): greatest length, 236; zygomatic breadth, 103.8.

DESCRIPTION.—Small, pig-like animal with extremely coarse hair; dark gray or blackish with yellowish white on cheeks and over front of each shoulder; snout pig-like.

DISTRIBUTION IN EL SALVADOR.—One specimen from Lake Olomega. Reported from Hac. San Pedro by Felten (1958c). The subspecies is *nigrescens* Goldman.

FAMILY CERVIDAE (DEER, MOOSE, ELK)

Four toes on each foot; males bear antlers.

Genus *Odocoileus* (Deer)

Dental formula: I 0/3; C 0/1; P 3/3; M 3/3 \times 2 = 32

Odocoileus virginianus Zimmermann (Whitetail)

SIZE.—(1 ♂, from Kellogg, 1956) Length, 1346; tail, 170; hind foot, 371; height at shoulder, 652. Skull: condylobasal length, 224 \pm . Two females from Puerto del Triunfo and Barra de Santiago, respectively, measured: length, 1196, 1480; tail, 168, 170; hind foot, 335, 335.

DESCRIPTION.—Small, dark, brownish gray deer with relatively large tail that is pure white beneath.

DISTRIBUTION IN EL SALVADOR.—Specimens from Barra de Santiago, Puerto del Triunfo, La Libertad, Colinas de Jucuarán, and Lake Olomega; observed at Mt. Cacaguatique and Río San Miguel. Felten (1958c) reported them from Hac. San Pedro and "El Salvador." Miller and Kellogg (1955) indicate that El Salvador is within the range of the subspecies *nelsoni* Merriam.

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