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NOTES ON MAMMALS OF WESTERN MEXICO

BY EMMET T. HOOPER

THE following notes result from the study of specimens obtained in western México in 1953 by a party from the University of Michigan Museum of Zoology. The party consisted of Irving Cantrall, Gordon Garlick and myself. Cantrall was concerned primarily with the distribution and ecology of certain groups of insects, Orthoptera especially. Garlick and I focused our efforts on acquiring data on tree squirrels for use in a systematic review of Mexican *Sciurus* that is now in progress. Notes on *Nelsonia* comprise an earlier report (Hooper, 1954). The information herein pertains to mammals other than *Sciurus* and *Nelsonia*. For the use of specimens in the U.S. Fish and Wildlife Service collections I am grateful to Viola S. Schantz.

COLLECTING LOCALITIES

Following is a list of localities where mammals listed herein were obtained. Mileages are airline (map distances) unless otherwise noted. Altitudes are from our altimeter or from U.S. Air Force World Aeronautical Charts or American Geographical Society maps, scale one to one million; the error may amount to several hundred feet.

Aguascalientes

Rincón de Romos.—This is a town on the Aguascalientes–Durango highway 25 miles north of Aguascalientes. In the period 6–8 March we camped in the ill-tended *jardinita* that marks the source of the town's water supply. This garden is situated at an elevation of 6100 feet, one-half mile west of the town's central square. Immediately to the west of the garden are arid, boulder-strewn hills and rimrock at the margins of mesas. Mesquite, cactus, a few yuccas, composites, and short grasses were noted there. The substrate is rocky, and there is no ground litter.

Sierra Fría.—The mountains in Aguascalientes and Zacatecas to the west of Rincón de Romos are known as the Sierra Fría. Features of

the country and of our trapping stations are described elsewhere (Hooper, 1954). Briefly, the range consists of a series of arid mesas and rounded prominences rising from essentially treeless grassland. Open pine and oak forests and grasses cover the upper slopes. Junipers occur with and below the pine. The densest, coolest forests are on north-facing slopes of steep-sided canyons. Our collecting stations were situated between Cerro la Ardilla and Cerro del Jagüey on the eastern slopes of the range. On 9–11 March we worked in the upper reaches of the Barranco del Río, altimeter elevations 8200–9000 feet, and on 12 March in the Barranco de Juan Francisco, elevation 8000 feet.

Colima

Colima.—On 10 February we trapped in an open, riparian forest and adjoining "monte" three miles south of Colima on the Jiquilpan–Colima highway, at an elevation of 1400 feet. "Monte" is characteristic of the arid, tropical Pacific lowlands of México. It is the vernacular name applied to the growth of tall brush (perhaps up to 20 feet in height) and small trees that covers most of the hills, dry valleys, and plains. Many of the trees and shrubs are thorny.

Paso del Río.—This is a village on the Río Armería where the river leaves the foothills and enters the narrow coastal plain. It lies about 25 miles southwest of Colima at an elevation of approximately 200 feet. In the period 10–17 February we collected on a large coconut (*coco de agua*) and oil-palm (*coco de aceite* or *coquito*) plantation that extends north from Paso del Río. Monte covers the hills. The palm plantation occupies bottom lands where, naturally or through irrigation, the ground is moist. A few fig, primavera, and other tropical broadleaf trees persist in the nut-palm groves.

Durango

Ciudad (La).—The town of La Ciudad is the site of a former lumber mill. It is on the Durango–Mazatlán highway about four miles northeast of Buenos Aires and 13 miles southwest of Las Rucias. Pine forests, broken by meadows and cleared flats, are typical of the area.

Huehuento (Cerro).—Cerro Huehuento, or Huehueto, is the highest prominence in Durango. It is situated in the Sierra Madre about 70 miles west of the city of Durango and ten miles east of the Sinaloa boundary. Forests of oak, madrone, pine, and fir cover the slopes of the peak. Pine is predominant; both yellow and white types are present. Douglas fir occurs principally above 8500 feet in canyons and on north-facing slopes; in some places it forms mature, pure stands.

The upper two or three hundred feet of the Cerro is sheer rock. On the summit are lichens, sedums and other low rock plants, clumps of grass, and dwarf juniper. On the night of 26 March we trapped at an altimeter elevation of 9500 feet on the east slope of the Cerro.

Laguna (La).—La Laguna del Progreso is a village and lumber mill east of Cerro Huehuento and San Luis and about 25 miles north-northwest of El Salto, elevation 8000 feet. This is in the heart of the pine and oak forests that blanket the Sierra Madre. Pine is predominant on exposed hilltops, rocky areas, and south slopes. Live and deciduous oaks and madrones are commoner in more protected situations where the soil is deeper. Large junipers grow in the lower parts of deep, moist barrancas, of which there are many in the region. We worked within a mile radius of the lumber mill in the period 18–22 March.

Revolcaderos.—Revolcaderos is a settlement of a few houses—a refreshment stop for truck drivers and other motorists—on the Durango–Mazatlán highway. By our speedometer it lies 55 miles from El Salto, Durango, and 53 miles from Concordia, Sinaloa. On 29 March we camped for the night about one-half mile (by highway) south of the settlement. Our altimeter read 6600 feet in camp; the next day near sea level at Mazatlán it read 550 feet. Pine, oak, and madrone are predominant there, as at La Laguna and San Luis. Unlike the vegetation at those places, however, "drooping" and other long-needle pines are common, there are a few broadleaf tropical trees in the canyon, and epiphytes and pendent lichens drape many of the trees. Clouds frequently bathe the slopes.

San Luis.—The town of San Luis consists of approximately 30 houses. It is situated three or four miles east of the summit of Cerro Huehuento in the headwaters of the Río Piaxtla. On the night of 27 March we camped and trapped in an open meadow at the southern end of La Boquilla canyon, about one-half mile east of the village. Our altimeter indicated 7700 feet. Forests of oak, pine, and madrone are predominant. For the period 23–26 March we worked in the vicinity of the lumber mill, San Luis del Río. It is situated at an elevation of 8000 feet on a branch of the Río Piaxtla approximately one and one-half miles west of the village. It lies about 16 miles by road (probably about ten miles airline) west of La Laguna. For further description of the area see Hooper (1954).

Jalisco

Autlán (mountains southeast of).—These are mountains that rise over 9000 feet above sea level to the southeast of Autlán, Jalisco, and

approximately 30 airline miles north of Manzanillo, Colima. Some residents refer to them as the Sierra de Manantlán. The southern slopes are well forested. The flanks of the mountains and the valleys and low hills southward to the sea coast are covered with tall, arid, tropical brush (monte). Above the monte are forests of pine, oak, and madrone, with expanses of grass on exposed hilltops. The slopes above approximately 6000 feet and some south-facing canyons are frequently engulfed by clouds. Clouds bathed the mountains each afternoon while we were there, forming first at the heads of canyons then gradually enveloping much of the upper parts of the sierra. The lush vegetation reflects the cool moist conditions produced by the clouds. It resembles that of mountains of southeastern United States. In the forests are species of *Tilia, Cornus, Alnus, Ostrya, Clethra,* and *Abies.* Epiphytes are abundant.

We sampled three areas in the mountains. In the period 25–27 February we collected in forests of mature pine, oak, and fir and in forest-enclosed, bunch-grass (sacaton) meadows at an elevation of 8200 feet, 20 miles southeast of Autlán. Our trap lines were about one-third of a mile north of the sawmill known as La Neveria. There are many epiphytes on the trees, and the sun is frequently hidden by clouds; nevertheless, the vegetation is not as luxuriant as at lower elevations nearer the center of the cloud zone. There was ice in our water bucket the morning of 27 February. From 28 February to 1 March we worked in the cloud belt at 6500 feet elevation, 20 miles south-southeast of Autlán. In that cloud belt the trees are festooned with orchids, bromeliads, and lichens, and there is a dense understory. The growth is less dense on crests of hills and in other exposed places. Our third camp was situated approximately one mile south of, and 1000 feet lower than, the preceding locality. This was near the lower limit of pines. Hilltops and flats are covered with grass and with open forests of pine and deciduous oaks. Mesic conditions obtain in steep-sided canyons, where there are dense growths of mosses, liverworts, and ferns, and the vegetation resembles that in the cloud belt.

Navidad.—Barro de Navidad is a small resort situated on a sand bar that separates a lagoon from Navidad Bay. It lies about 28 miles west-northwest of Manzanillo, Colima. Mangroves line the lagoons, coconut and coquito palms intermixed with fig and other native tropical trees cover much of the flatlands, and tall monte blankets the hills and uncultivated lowlands. In the period 20–22 February we trapped in a mixed growth of coquito palm, fig, primavera, and other large native trees on a ranch three miles east of Navidad, elevation approximately

50 feet. The forests there were being cleared to make way for planting of coco palms. On the morning of 23 February collections were made in coquito palm and broadleaf hardwood forests, one-half mile north of Navidad, elevation 25 feet.

Magdalena.—The night of 18 April we camped in a group of fig trees near the Guadalajara–Tepic highway two miles north-northwest of the town of Magdalena at an elevation of 4500 feet. Immediately to the south and west lies the dry basin of Lago de Magdalena and adjoining grass-covered hills. A hundred yards to the east are rocky hills covered with mesquite and shrubs, with stands of live oak in some canyons.

Mazamitla.—Mazamitla is a town on the Jiquilpan–Colima highway about 25 miles west-southwest of Jiquilpan. The terrain west of Jiquilpan is predominantly arid, with cactus, mesquite, and deciduous trees in evidence. Near the Michoacán–Jalisco state line the highway ascends into the Sierra del Tigre, the upper slopes of which are covered with open oak and pine forests. In the period 6–8 February we worked in the pine forests at an elevation of 7000 feet one-half mile northwest of Mazamitla. In the morning of 8 February we also trapped at an elevation of 6500 feet in the oak belt one and one-half miles north of the town.

San Andrés.—Hacienda San Andrés is situated in the western part of the Magdalena lake basin ten miles west of Magdalena. The mountains west of San Andrés are arid; grass predominates. Pine and deciduous oak occur on the upper slopes; in canyon bottoms they become numerous enough to be termed a forest. The night of 17 April we camped in those dry hills two miles west of San Andrés, elevation 5500 feet.

Tepatitlán.—Tepatitlán de Morelos is a town 40 miles northeast of Guadalajara on the highway to Aguascalientes. The Mexican Plateau there is predominantly grassland, dotted with mesquite. Deciduous oak and pine occur on hills and mesas. We camped overnight 15 April in a stand of oaks seven miles north-northwest of Tepatitlán, elevation 6300 feet.

Tequila.—Tequila is a large town and manufacturing center on the Guadalajara–Tepic highway. About one and one-half miles north of Tequila in a small canyon tributary to the Río Santiago there are large springs, the water from which irrigates mango groves that cover the slopes and valleys below the springs.

México

Acambay.—Acambay is a town 35 miles south-southeast of San Juan del Río on the Toluca–San Juan del Río highway. The night of 3 Feb-

ruary we trapped in the vicinity of kilometer 163, six miles north-northwest of Acambay, at the southeastern base of Cerro Pelón del Nado. Pine forests on the upper slopes of the Cerro give way at lower elevations (at about 8000 feet on the north side) to oak and madrone forests, brush, and grassland. Among the shrubs present were species of *Arctostaphylos, Baccharis,* and *Solanum.*

Michoacán

Coalcomán.—Coalcomán is the principal town in the mountain mass in Michoacán south of the Río Tepalcatepec. It is situated in the valley of the Río de Coalcomán at an elevation of 3600 feet. There is striking diversity of habitats in the area. The valley floor is mostly cultivated, but there are areas of open grassland, riparian forests, and hyacinth-choked ponds. On the hillsides are stands of dense brush, thorny trees and shrubs, scrub oak, and oak and pine. Clouds swirl around some of the crests; they probably keep the vegetation there perennially moist. For other notes on the biota in the vicinity of Coalcomán see Peters (1954). Hooper trapped one-half mile southeast of the town's plaza the night of 14 February and one-half mile east of the plaza the following night.

Nayarit

San Blas.—The fishing and resort town of San Blas is situated on a strip of land bounded by the ocean on the west and estuaries on the east. Figs, coconut groves, and stands of thorny brush occur in places in the town. Mangroves line the estuaries and fill some of the lowlands as far as three miles inland. Tall monte and tropical broadleaf forests intermixed with coquito palms cover the hills. We worked in the area from 8 to 11 April, collecting in the town, on a volcanic prominence two miles east of town, elevation 50 feet, and in the upland forests three miles east, elevation 100 feet.

Sinaloa

Chele.—Hacienda Chele is situated 15 miles north of Rosario at an elevation of 300 feet in the valley of the Río Pánuco, a tributary to the Río Buluarte. The terrain is covered with monte. Where there is adequate ground moisture, as in stream beds and ravines, there are fig and other trees and shrubs that retain their leaves in the dry season. Several springs at Chele supplement the flow in the river and provide water throughout the year. We trapped about one-half mile northeast of the hacienda buildings in the period 2–5 April.

Isla Palmito de la Virgen is a long, low spit of land extending from the Río del Presidio, south of Mazatlán, southeastward along the coast. In the dry season it is not an island; at least the northern parts of the mud flats comprising the Laguna del Caimanero, which bound the island on the east, are dry. The flats are almost bare of plant life. The island is covered with tall dense monte. Numerous natural or man-made open areas in the monte are covered with short grass. Specimens were obtained on the island on 7 April.

Zacatecas

Calabazal.—Calabazal is a town on the Zacatecas–Durango highway northwest of Fresnillo and near the Durango–Zacatecas state boundary. On 17 March we collected on hills four miles by highway east of Calabazal, or three miles east of Ojo del Agua. The terrain in the region is gently rolling, rocky and grass covered; the grass was green even at that time of year. Parklike stands of a small short-needle pine occur on some hills. Scrub oak and juniper also were noted.

LIST OF SPECIES

Didelphis marsupialis subsp.—A skeleton was found near camp ½ mi. NW Mazamitla, Jalisco.

Marmosa canescens canescens Allen.— Two examples were trapped in tangles of vines, brush, and palm fronds along an unused road through a nut-palm–tropical broadleaf forest 3½ mi. E San Blas, Nayarit.

Sorex oreopolus Merriam.—A specimen was caught beside a rotted log in a moist forest of fir, pine, and oak at an elevation of 8200 feet southeast of Autlán. It resembles the single topotype of *oreopolus* at hand. Topotypes of *S. saussurei* are larger in all dimensions, but relative to condylobasal length they are smaller in cranial and maxillary breadth. Compared with a specimen of *S. vagrans* from Volcán de Toluca, México, the example from Autlán is larger in all dimensions, and the cranium is disproportionately broader.

Sorex durangae Jackson.—Three specimens of this shrew were obtained in runways in moss on the south wall of a moist canyon 1½ mi. W San Luis. Douglas fir and juniper formed a leafy canopy above the ground.

These examples fit Jackson's (1928:115) description and measurements of *durangae*. The specimens also resemble topotypes of *S. saussurei* in coloration and in external measurements. The skulls of the Durangan specimens are slightly shorter than those of *saussurei,* but all are alike in proportions, and it is likely that *saussurei* and *durangae* are conspecific. Compared with an example of *Sorex vagrans orizabae*

from Volcán de Toluca, México, the Durangan specimens are larger, the tail is longer, and the cranium is much broader and heavier.

Chilonycteris rubiginosa mexicana Miller.—One specimen was shot while it flew among fruiting fig trees growing along a creek at Chele, Sinaloa.

Corynorhinus rafinesquei mexicanus Allen.—Three specimens were captured from a group of about six bats found in a stairwell and turret in a building at Hacienda San Andrés, Jalisco.

Urocyon cinereoargenteus madrensis Burt and Hooper.—A native brought a specimen of gray fox into camp at La Laguna, Durango. The skin and skeleton were preserved.

Citellus mexicanus mexicanus Erxleben.—This ground squirrel is common on the grasslands northeast of Guadalajara. Garlick shot an individual near the highway 10 mi. SW Tepatitlán, 5500 feet, Jalisco.

Citellus variegatus variegatus Erxleben.—A specimen of the rock squirrel was obtained on a rocky hillside at each of the following localities: ½ mi. W Rincón de Romos, Aguascalientes, and 1½ mi. N Tequila, 3700 feet, Jalisco.

Citellus annulatus annulatus Audubon and Bachman.—We secured three specimens of this ground squirrel at Paso del Río, Colima. The species inhabits dense, tropical, deciduous forest (monte). We did not see it in palm plantations or in broadleaf evergreen forests. One of two females contained four embryos measuring 10–15 mm. in length. A male was heavily infested with botfly larvae.

Eutamias bulleri durangae Allen.—Specimens, all males, are from localities in Durango as follows: La Laguna, 3; Cerro Huehuento, 1; 6 mi. ENE La Ciudad, 1.

These chipmunks were secretive and difficult to see in their habitat among the rocks, logs, and litter on the floor of forests of pine, oak, and madrone. One animal was obtained as it emerged from a cavity, apparently its den, in a rock outcrop near La Laguna. The individual from Cerro Huehuento was shot in a forest of Douglas fir and pine.

Thomomys umbrinus subsp.—Aguascalientes: Sierra Fría, 3. Durango: La Laguna, 5; 1½ mi. W San Luis, 7; ½ mi. E San Luis, 2; E slope Cerro Huehuento, 1. Sinaloa: Chele, 1.

The specimens from Sierra Fría are smaller than those from Durango. For example, in specimens of similar age greatest length of skull amounts to 35.2 mm. in a female from Sierra Fría and 37.3 in a female from Durango. The same dimension in a young male from each area is 33.5 and 36.5, respectively.

In their review of *Thomomys* of México Nelson and Goldman (1934)

listed 30 forms of *T. umbrinus,* 21 of which were described as new. Subsequent descriptions have increased the number of nominal forms until there is now a different name for almost every sample. The number of names for samples exceeds the number of facts on populations. More biology and less terminology seems to be called for.

Liomys irroratus jaliscensis Allen.—Two specimens of this pocket mouse were obtained in a fencerow of blackberry, bush *Salvia,* and willow ½ mi. NW Mazamitla, Jalisco, and six were caught in dense cover (about 7 feet high) afforded by standing cornstalks, grass, and weeds in a fallow cornfield 1½ mi. N Mazamitla.

Liomys pictus subsp.—Colima: 3 mi. SE Colima, 1; Paso del Río, 18. Jalisco: ½ mi. N Navidad, 3; 3 mi. E Navidad, 3. Michoacán: ½ mi. SE Coalcomán, 1. Nayarit: 3½ mi. E San Blas, 19. Sinaloa: Chele, 28.

The specimens were caught under shrubs and piles of palm fronds and other litter on the floor of oil-palm forests at Paso del Río and Navidad, under brush and litter along a roadway through an oil-palm forest at San Blas, beneath thickets of vines and shrubs bordering a stream at Chele, and under leafless shrubs and thorny trees on a rocky hillside at Colima and Coalcomán. Records of embryos per female, with length (in mm.) of each embryo indicated in parentheses, follow: Chele: 3 (20), 4 (15), 3 (15), 3 (15), 3 (10). San Blas: 2 (12), 2 (5).

In attempting to identify those specimens I found it necessary to review all readily available samples of *Liomys pictus* from west-central México. These comprise series from the vicinity of Santa Isabel, San José del Conde, and Ixtlán (Nayarit), Ameca, Autlán, La Resolana, Tenacatita, and Chamela (Jalisco), Tzitzio (Michoacán), and Zihuatanejo and Iguala (Guerrero). Clear-cut geographic differences are evident in the skulls but not in the skins. Pelage coloration varies greatly, but none of the variations appears to be peculiar to one geographic area. In the samples from coastal Jalisco, for example, representing all seasons, sexes, and ages, the range in color encompasses the color variations in all other samples. Significant cranial characters are distributed as follows: In the samples from Chele, Santa Isabel, Ixtlán, and San José del Conde the interparietals tend to be small and unfused, and the nasals are short. These are traits of *L. p. escuinapae* (Goldman, 1911: 38). In size of skull, length of nasals, and size and fusion of the interparietals the sample from San Blas fits better with the samples from Jalisco and Colima, to which the name *L. p. pictus* applies. The samples from Coalcomán, Tzitzio, and Iguala form a third group with traits of *L. p. parviceps* (Goldman, 1911).

Perognathus pernix pernix Allen.—Thirteen specimens from Chele,

Sinaloa, were collected under a dense network of vines and thorny shrubs that bordered a fallow field and a creek lined with fig trees. One female contained 1 embryo, 5 mm. in length; another contained 3, each 15 mm.

Perognathus nelsoni nelsoni Merriam.—Four specimens were trapped on cactus- and mesquite-studded rocky hills ½ mi. W Rincón de Romos, Aguascalientes.

Dipodomys merriami atronasus Merriam.—A specimen was caught at the base of a clump of cactus on hard, rocky ground ½ mi. W Rincón de Romos, Aguascalientes.

This small, richly colored, four-toed kangaroo rat apparently is an example of *D. merriami* rather than of *D. ornatus*. It lacks the white caudal tip and black auricular spots ascribed to *ornatus*. The type locality of *ornatus* lies about 40 miles north of Rincón. That of *D. m. atronasus* is situated approximately 120 miles to the east. Dalquest (1953: 116) presented evidence that *D. ornatus* and *D. merriami* are specifically distinct. The specimen is much more deeply colored than specimens of *D. m. merriami* from San Juan (12 mi. W. Lerdo), Durango, and Lake Tulio (4 mi. S Hipolito), Coahuila. It is but slightly darker than examples of *D. m. atronasus* from Tula, Tamaulipas. The anteroposterior diameter of each maxillary arch is greater than in any of the specimens with which it was compared.

Reithrodontomys megalotis saturatus Allen and Chapman.—Thirteen specimens of this harvest mouse were taken at our stations ½ mi. NW Mazamitla, Jalisco. In six females there was no indication of active breeding.

Both *R. megalotis* and *R. fulvescens* were common at this locality. Each occurred in an undergrowth of sacaton and weeds in an open pine forest. They also lived in a dense, brushy fencerow of willow, sage, blackberry, hazelnut, and other shrubs. So far as our records go, the two species were present in approximately equal numbers in both of those situations. We saw no ecological distinctions between them at this locality.

Reithrodontomys megalotis zacatecae Merriam.—Specimens were caught in the following places: one example at the base of a hollow juniper stump that stood within the border of a small sacaton-covered meadow in the Sierra Fría, Aguascalientes; two among grass and herbs on a dry, steep, south-facing slope 1½ mi. W San Luis, Durango; five in runways beneath bunch grass on a large meadow ½ mi. E San Luis, Durango.

Reithrodontomys sumichrasti nerterus Merriam.—Jalisco: 20 mi. SSE

Autlán, 6500 ft., 5; 20 mi. SE Autlán, 8200 ft., 2; ½ mi. NW Mazamitla, 1.

R. sumichrasti apparently was rare at our stations near Mazamitla. Of the 25 specimens of *Reithrodontomys* collected there, one is an example of *sumichrasti*. It was obtained along with *R. fulvescens* among blackberry, currant, and other shrubs growing between large boulders in a dry creek bottom. The specimens from the mountains southeast of Autlán were taken in thickets of shrubs, located variously at the edge of a sacaton meadow, on a cut-over hillside, and within coniferal and broadleaf forests. The single female from the mountains south of Autlán was lactating.

Reithrodontomys fulvescens griseoflavus Merriam.—Aguascalientes: ½ mi. W Rincón de Romos, 1. Jalisco: 2 mi. W San Andrés, 2; ½ mi. NW Mazamitla, 9; 1½ mi. N Mazamitla, 2; 7 mi. NNW Tepatitlán, 4.

The specimens were trapped in the following situations: among sacaton, mint, and various composites on the floor of an open pine forest; in a fencerow of willow, hazel, blackberry, *Salvia* and other shrubs; among boulders and a few shrubs in an eroded gulley (Mazamitla); on dry grassland interspersed with mesquite and a few deciduous oaks (Tepatitlán); among cactus and mesquite at the boulder-strewn edge of a small mesa (Rincón); beneath brush bordering a creek in a dry, deciduous oak forest (San Andrés). None of the 16 females collected in the period 7 February–18 April was pregnant or lactating.

In the sample from Mazamitla, characters of *griseoflavus, toltecus,* and *nelsoni* are evident. In two specimens the teeth and brain case are as large as in examples of *toltecus* from México. One specimen is as small as examples of *nelsoni* from coastal Jalisco. The remainder are intermediate. If a subspecific name must be used in referring to the sample, *griseoflavus* is applicable. The specimen from Rincón is paler than the others; in this respect it grades toward *canus*.

Reithrodontomys fulvescens tenuis Allen.—Six specimens from Chele, Sinaloa, were trapped beneath a canopy of vines and thorny shrubs bordering a riparian forest of figs and other tropical broadleaf trees. The two females in the sample were lactating (4 April).

Reithrodontomys fulvescens nelsoni Howell.—A male was caught in ground litter at the edge of a tropical broadleaf forest of figs, ceibas, oil palms, and other trees, 3 mi. E Navidad, Jalisco.

Reithrodontomys fulvescens mustelinus Howell.—Eight specimens were obtained in open stands of deciduous brush and mesquite on a rocky hillside bordering a permanent creek near Coalcomán, Michoacán. The cinnamon tones are more reddish, less yellowish, in these

specimens than in the examples from Mazamitla, a fact which may warrant use of the name *mustelinus* instead of *griseoflavus*.

Reithrodontomys mexicanus riparius, new subspecies

HOLOTYPE.—Adult female, skin and skull; UMMZ 98658; México, Michoacán, 2½ mi. SW Coalcomán, 3600 feet elevation; collected 6 August 1951 by W. E. Duellman; original No. 14.

RANGE.—Known only from the type locality, but probably found on Pacific coastal slopes of Michoacán, Guerrero, and Oaxaca.

CHARACTERS AND COMPARISONS.—A race of *R. mexicanus* characterized by pale coloration and a small skull with large, oval brain case and short incisive foramina. The specimens differ from specimens of *R. m. mexicanus* from Puebla and Veracruz in features as follows: paler dorsally, the buffy bands near Cinnamon (Ridgway, 1912) or Pinkish Cinnamon (rather than Tawny or Orange-Cinnamon) and with less black intermixed with the buffy; tail monocolor, ears blackish, and hind feet with dorsal dusky stripe from ankle to base of toes as in *mexicanus;* cranium smaller; brain case broader and shorter relative to length of skull, more constricted interorbitally, and oval, not elongate, when viewed dorsally; incisive foramina shorter (less than 18 per cent of skull length in the specimens at hand, compared with 20 per cent or more in *mexicanus).*

The contrast between the specimens of *riparius* and *scansor* is less pronounced. Compared with topotypes of *scansor* the specimens of *riparius* are slightly smaller and slightly darker dorsally; the buffy hues are deeper in tone. The cranium is shorter and the brain case is broader, deeper and shorter relative to length of skull.

MEASUREMENTS (in mm.).—Measurements of, respectively, the holotype (molars well worn) and a young male (teeth slightly worn) follow: total length, 169, 175; tail, [93], 100; hind foot, 17, 19; ear from notch, 15, 17; length of skull, 22.3, 21.7; zygomatic breadth, 11.7, 11.1; breadth of brain case, 11.3, 10.7; interorbital breadth, 3.3, —; length of rostrum, 7.7, 7.3; length of palate, 4.0, 3.7; length of molar row, 3.3, 3.2; length of incisive foramen, 3.9, 3.9; breadth of zygomatic plate, 1.4, 1.5; breadth of mesopterygoid fossa, 1.4, 1.7.

REMARKS.—The specimens from Coalcomán constitute the first records of occurrence of *R. mexicanus* on the Pacific slopes of México, and they extend the known occurrence far to the west of previous records (Hooper, 1952*a*). There are three specimens of *riparius* in the University of Michigan Museum of Zoology. The first one to come to hand, the holotype, was obtained in 1951. A Mexican boy using a rock

knocked it out of a deserted wasp nest. The nest was situated about 20 feet above ground in a perote tree. The specimen was recovered by William Duellman and donated to the University by Albert Schwartz. I obtained the other two specimens in February, 1953, about ½ mi. SE Coalcomán. Both are subadults in fresh pelage. One specimen was trapped on the ground under a row of cane grass and deciduous brush that separated a banana grove from a rocky hillside covered with open stands of deciduous thorny trees and shrubs. Specimens of *R. fulvescens* were trapped about ten feet away in the same habitat. The second example was trapped at the base of a mesquite tree growing on an irrigation ditch. These and additional data on habits of *R. mexicanus* indicate that when the species ranges into arid regions it clings to rivers and other permanent water courses where there are fig and other trees in which it lives.

Baiomys taylori paulus Allen.—Thirty-seven specimens from Chele, Sinaloa, were collected among grass, shrubs, and vines bordering a fallow field and in a tangle of shrubs and vines bordering a streamside forest of figs.

The range in size in this sample is sufficient to suggest that both *musculus* and *taylori* may be represented. In the largest skull, that of an old male, the greatest length of the skull (18.9 mm.) and zygomatic breadth (10.4 mm.) are almost or quite as great as in *B. musculus* (Hooper 1952*b:* 93). Perhaps it was large skulls such as this which Osgood (1909:258) tentatively identified as *B. musculus*. In any event, this and all other individuals in the series are of the one species, *B. taylori;* cranial dimensions of the sample are not unusual for *B. taylori* (Hooper, 1952*b*). Means and their standard errors for 19 specimens from Chele are as follows: greatest length of skull, 17.8±.12 mm.; zygomatic breadth, 9.6±.08; breadth of brain case, 8.2±.06.

Baiomys taylori analogus Osgood.—Specimens are from Jalisco as follows: three from a fallow field covered with grass 2–3 feet high intermixed with mesquite, 7 mi. NNW Tepatitlán; two from dry grassland 2 mi. NNW Magdalena; and nine from grass-and-weed-covered fields and a shrubby fencerow near Mazamitla. None of eight females from Mazamitla gave evidence of breeding.

Baiomys musculus musculus Merriam.—Colima: 3 mi. SE Colima, 5; Paso del Río, 18. Jalisco: 3 mi. E Navidad, 11. Michoacán: ½ mi. SE Coalcomán, 15.

The examples were trapped in the following situations: in sparse grass in an open thorn forest on a rocky hillside bounding a stream (Colima); beneath shrubs and litter on the floor of a nut-palm forest

(Paso del Río); in a growth of cane grass, shrubs, and mesquite near an irrigation ditch (Coalcomán). None of the specimens gave evidence of breeding.

The examples from Coalcomán are warm brown dorsally, distinctly darker and not as gray as the other specimens.

Peromyscus maniculatus labecula Elliot.—Specimens are as follows: six from a group of fig trees in an open, grassy plain, 2 mi. NNW Magdalena, Jalisco; four from a sparse growth of grass and weeds in open pine and oak forests, at the lower edge of the pine belt ½ mi. NW and 1½ mi. N Mazamitla, Jalisco; and two from an open stand of *Baccharis, Solanum,* and grass bordering a highway 6 mi. NNW Acambay, México.

Both gray and buff color phases are represented. The examples from Mazamitla are in the gray phase; they are blackish dorsally. One from Acambay, also gray, is much paler than the Mazamitla examples. The remainder are in the buff phase.

The characters ascribed to *blandus* and *labecula* are blended in the specimens from Magdalena. All are in the buff phase. They are smaller and darker than examples of *blandus* from New Mexico; nonetheless the contrast here is less than that between the Magdalena sample (and another from Guadalajara as well) and samples of *labecula* from Michoacán. The Magdalena specimens are much smaller and paler than specimens of *labecula* from the highlands of Michoacán and México. In their small size they resemble individuals from the lowlands of Nayarit, where minimum size for the species in México apparently obtains. For convenience in filing them, I apply the name *labecula* to the Magdalena specimens. They fit well with no samples of named populations.

Peromyscus melanotis Allen and Chapman.—Six specimens, all males, were trapped on a bunch-grass meadow surrounded by pine forests ½ mi. E San Luis, Durango. These are smaller and paler than examples of comparable age and pelage from Jalisco and Veracruz.

Peromyscus boylei spicilegus Allen.—Durango: La Laguna, 19; 1½ mi. W San Luis, 25; ½ mi. E San Luis, 1; E slope Cerro Huehuento, 11; ½ mi. S Revolcaderos, 4. Jalisco: 2 mi. W San Andrés, 15; 2 mi. NNW Magdalena, 18; 20 mi. SSE Autlán, 5500 ft., 19; 6500 ft., 7.

The specimens were trapped in situations as indicated: rock outcrops with a sparse covering of deciduous oak, manzanita, and pine (La Laguna); common in open pine and oak forest on south-facing slopes of a V-shaped canyon; less common in cool, mossy Douglas fir forests on north-facing slopes of that canyon (San Luis); rocks and slash piles in open pine forest (Cerro Huehuento and Revolcaderos); rocks and cut-

banks covered with deciduous oak and pine in canyon bottom (San Andrés); live oak woods, brush and grass in a boulder-strewn canyon bordered by rocky cliffs (Magdalena); beneath moss-covered roots, logs, and rocks in a cool moist canyon (Autlán). There was no evidence of breeding in any specimen.

To apply the name *spicilegus* to all of these specimens accords with Osgood's review (1909), but at the same time it propagates what may be serious errors in the systematics of the *P. boylei* species group. The specimens from Durango are readily separable from those from Jalisco. Cranially the Durangan material fits with *rowleyi* and *boylei,* whereas the Jaliscan samples, *spicilegus* proper, probably belong with *evides* and other subtropical populations. Evidence derived from these and other series at hand strongly suggests that, as Osgood suspected, *P. boylei* is polyphyletic, consisting of two or more groups of populations that may or may not hybridize. The evidence at hand, not yet completely analyzed, will form the basis of a subsequent report. In the meantime I follow Osgood and rely largely on size and coloration in applying subspecific names to the samples of *P. boylei.*

Peromyscus boylei simulus Osgood.—Two specimens were caught on a lava outcrop sparsely covered with tropical vegetation, 2 mi. E San Blas, and two were taken in brush along a trail in an oil-palm forest, 3½ mi. E San Blas, Nayarit. Thirty-two examples are from a dense growth of tropical shrubs and figs bordering a wet creek bed at Chele, Sinaloa. Eleven of 16 females from Chele were sexually active. In three of them the uterus was swollen. The remainder contained embryos as follows (length in mm.): 1 specimen, 2 emb. (5); 3 specimens, 3 emb. (5); 1 specimen, 1 emb. (8); 1 specimen, 2 emb. (7); 2 specimens, 3 emb. (20). In one of the two females from San Blas the uterus was enlarged.

Two sets of characters are evident in these samples, just as in the series of *spicilegus.* The specimens from San Blas, the type locality of *simulus,* are distinctly larger and darker than the examples from Chele. Moreover, their hind feet are slightly dusky and they have a supraorbital shelf. They resemble specimens of *spicilegus* from the highlands of Jalisco and Michoacán. On the other hand, the holotype of *simulus* as described and figured by Osgood (1909) is small and is otherwise apparently like the specimens from Chele. Thus, there are two morphological types of *P. "boylei"* in coastal Nayarit and Sinaloa. The possibility that these types represent reproductively isolated populations needs to be explored.

Peromyscus boylei levipes Merriam.—Jalisco: 2 mi W San Andrés, 2; 20 mi. SE Autlán, 8200 ft., 1. México: 6 mi. NNW Acambay, 1.

P. b. levipes and *P. b. spicilegus* are ecologically as well as morphologically distinct. Fourteen specimens of *P. boylei* were trapped at San Andrés. Twelve of them came from a relatively moist canyon bottom. Two were collected in rimrock exposed on the crest above the canyon. The twelve are referable to *spicilegus,* the two to *levipes.* In the mountains south of Autlán *spicilegus* was taken in subtropical situations at 5500 and 6500 feet. The only specimen of *P. boylei* obtained in the fir belt at 8200 feet is referable to *levipes.* It was trapped in brush bordering a bunch-grass meadow; those from 5500 and 6500 feet were taken on mats of liverworts and mosses beneath roots and logs in wet forests. The specimen from Acambay was trapped among live oak and manzanita on a cut-bank of a permanent creek.

Peromyscus boylei rowleyi Allen.—Twelve specimens are at hand from cactus- and mesquite-studded rock outcrops ½ mi. W Rincón de Romos, Aguascalientes. *P. truei* was also common at this locality and both species were obtained in the same trap line. To judge from our trapping records, *P. boylei* was concentrated in protected situations at cliffs and boulders. *P. truei* occurred principally in more open situations on flats both below and above the brow of the cliffs. None of eight females was pregnant or lactating.

These specimens are distinctly paler than any other specimens herein listed under the name *P. boylei.* Externally and cranially they resemble *rowleyi* from southern Arizona.

Peromyscus hylocetes Merriam.—Fifteen specimens were caught under logs and piles of slash and underbrush (largely *Salvia)* in a mature pine, oak, and fir forest, 8200 feet elevation, 20 mi. SE Autlán, and three examples are from dense underbrush in a lichen-draped cloud forest at 6500 feet elevation, 20 mi. SSE Autlán. One of six females from 8200 feet contained three embryos and another contained two; each embryo measured about 20 mm.

Peromyscus truei gentilis Osgood.—Aguascalientes: ½ mi. W Rincón de Romos, 18. Durango: La Laguna, 13; ½ mi. E San Luis, 1; 1½ mi. W San Luis, 1. Jalisco: 7 mi. NNW Tepatitlán, 3. Zacatecas: 4 mi. E Calabazal, 1.

The specimens were trapped in the following places: on open rocky slopes and outcrops dotted with mesquite, cactus, and yucca (Rincón); among grass, pine, and deciduous oak growing on a rocky cliff, where *P. boylei* also was common (La Laguna); in sacaton and weeds bordering a meadow and an oak-covered rocky hill (½ mi. E San Luis); on a dry, rocky, south-facing hillside sparsely covered with yellow pine and oak (1½ mi. W San Luis); in a mesquite-covered rock fence bordering

a sandy wash (Tepatitlán); among oak, pine, and grass in rimrock above open pine-studded grassland (Calabazal). None of seven females for which records were kept gave evidence of breeding.

The specimens from Tepatitlán approach specimens of *gratus* from Distrito Federal. They have smaller auditory bullae than the examples from Zacatecas and Durango and they are darker, with more black on the upper parts and more rufescent buffy hues. In the series from Durango there is much variation in size of bullae and ears. The length of the ears, measured fresh, amounts to as much as 27 mm. in some specimens, equaling that in *P. bullatus*. The specimens from Aguascalientes and Zacatecas are the palest of the lot. Their bullae and ears are, in size, between those of the Durangan and Tepatitlán specimens.

Peromyscus difficilis difficilis Allen.—Thirty-nine specimens from Sierra Fría, Aguascalientes, five from 1½ mi. W San Luis, Durango, and three from 4 mi. E Calabazal, Zacatecas, were trapped in rock outcrops or rimrock where there were numerous crevices and ledges. The habitat at San Luis was exceptionally moist; three individuals were caught in wet runways in moss beneath rocks and roots of Douglas fir, and two were trapped under mossy logs. None of 21 females was reproductively active.

Specimens from the northern part of the Sierra Madre of northwestern México differ cranially from examples from the central part of those mountains, although all are currently known by the name *P. d. difficilis* (Osgood, 1909). Laid out before me in geographic order are the specimens listed above and others from the vicinity of Guadalupe y Calvo and Batopilas, Chihuahua, and El Salto, Durango. Those from El Salto, La Laguna, Batopilas, and Guadalupe y Calvo have uniformly smaller auditory bullae and a shallower zygomatic notch. They also average smaller in body and skull. Mean cranial lengths (greatest length of skull in mm.) for the samples follow: 6 specimens from Guadalupe y Calvo, 29.0±.25; 3 specimens from Batopilas, 29.1; 11 from San Luis and El Salto, 28.5±.15; 2 from Calabazal, 30.0; and 11 from Sierra Fría, 29.8±.21. Minimum size obtains in the Durangan sample; its mean cranial length is significantly less than that of the sample from Aguascalientes.

The animals from El Salto and localities to the north resemble *P. nasutus* in many features, especially those of the skull. *P. nasutus* and *P. difficilis* may be conspecific as Osgood suspected (1909: 180). Complete intergradation between those two forms is not evident in present samples, however. In size of hind foot and length of tail, for example, the specimens of *difficilis* from northwestern México are distinct from specimens of *nasutus* from Arizona and New Mexico.

The examples from El Salto and San Luis are similar in size to specimens of *P. polius* from Colonia García (greatest length of skull averages 29.3 mm. in four adult *polius*). In *polius,* however, the ear is smaller (when dry, measuring 19 mm. or less—averaging 18—in nine specimens of *polius* compared with 19 mm. or more—usually over 20—in the specimens of *difficilis*); the bullae are slightly smaller relative to cranial length; and the nasals are more attenuate, extending farther posteriorly relative to the premaxillae. I fail to see any significant difference between *polius, difficilis,* and *nasutus* in the color of the tarsi. They are lightly dusky dorsally in all specimens at hand. *P. polius* is reported to have white tarsi (Osgood, 1909).

Peromyscus difficilis filipensis Merriam.—Three specimens from the locality 6 mi. NNW Acambay, México, were trapped at a rock outcrop sparsely covered with live oak, manzanita, *Baccharis,* and grass. There was no evidence of active breeding in the specimens.

Peromyscus melanophrys micropus Baker.—Nine individuals were caught in a cluster of fig trees and boulders situated in open grassland 2 mi. NNW Magdalena, Jalisco. The boulders and two adjoining trees served as a silo for cornstalks. Sixteen traps set one night at the base of the trees and among the boulders yielded 9 *Peromyscus melanophrys,* 6 *P. maniculatus,* and 2 *Neotoma.* Some, possibly all, of the *P. melanophrys* trapped at the bases of the trees entered the traps from the trees. *P. boylei* was abundant on rocky hills one hundred yards to the east. Like an example from 1 mi. E Ixtlán, Nayarit, these specimens are distinctly smaller than examples of *zamorae* from the vicinity of Zamora and Cuitzeo, Michoacán. A small body and skull is diagnostic of *micropus* (Baker, 1952).

Peromyscus perfulvus chrysopus, new subspecies

HOLOTYPE.—Adult female, skin and skull; UMMZ 100471; México, Jalisco, ½ mi. N Barro de Navidad, 50 feet elevation; collected 23 February 1953 by Emmet T. Hooper; original No. 3559.

DISTRIBUTION.—Known only from the coastal lowlands of Jalisco.

CHARACTERS AND COMPARISONS.—A mouse of moderate size with dusky hind feet and hairy tail. Similar externally to *P. p. perfulvus* from Michoacán and Guerrero (see Osgood, 1945: 299) but smaller and with upper surfaces of forefeet buffy rather than white. Skull smaller. Molars 1 and 2 usually with ectostylids and complete mesolophs (in *perfulvus* ectostylids absent and mesolophs absent or short, not reaching the labial border of the tooth). Nasals acute posteriorly, their limits short

of posterior limits of ascending branches of premaxillae (premaxillae extending posterior to nasals in 13 *chrysopus* and no *perfulvus;* nasals and premaxillae conterminous in 3 *chrysopus* and 1 *perfulvus;* and nasals exceeding premaxillae in 2 *chrysopus* and 6 *perfulvus*).

MEASUREMENTS (in mm.).—Averages and extremes of 15 specimens: total length, 223 (208–246); tail, 119 (110–134); hind foot, 24 (23–25); ear from notch, 19 (18–20); greatest length of skull, 28.2 (27.3–29.0); zygomatic breadth, 14.7 (14.1–15.7); breadth of brain case (measured above root of zygomata about at squamosal-parietal junction), 12.8 (12.5–13.1); length of rostrum (from tip of nasal to notch, lateral to lacrymal, on superior inner border of zygomatic arch), 10.2 (9.8–10.7); interorbital breadth, 4.7 (4.5–4.9); anteroposterior length of interparietal (excluding attenuations), 3.3 (2.8–3.8); length of palate, 3.9 (3.7–4.2); length of molar row, 4.2 (4.1–4.5); length of incisive foramen, 5.7 (5.1–5.9).

REMARKS.—Skulls of *P. melanophrys* from 1 mi. E Ixtlán, Nayarit, and Nochixtlán, Oaxaca, resemble skulls of *P. perfulvus. P. melanophrys* and *P. perfulvus* may not be as distantly related as Osgood intimated (1945). A short rostrum, large brain case, slight zygomatic notch, supraorbital shelf, large interparietal, short palate, small teeth with inconstant mesolophs, and large sphenopalatine vacuities are cranial features common to both species.

Field notes on specimens at hand indicate that *P. perfulvus* is an inhabitant of humid situations and dense vegetation in arid tropics. It probably is scansorial. Specimens were trapped in the following situations: in a dense stand of shrubs (some thorny), vines, grass, and small trees in open arid tropical scrubland south of Tzitzio; one example in grass at the base of a coconut and another in dense brush and grass along an irrigation ditch in a tropical fruit orchard at Apatzingán (specimens of *P. banderanus,* also obtained at Apatzingán, were trapped only on a dry, shrub-covered hill outside of the town); at the bases of fig and other large tropical trees 3 mi. E Navidad (two examples of *P. banderanus* were caught under debris on the floor of the same forest); at the base of fig trees and as much as 10 feet above ground on their buttresses in a luxuriant oil-palm and tropical broadleaf forest ½ mi. N Navidad.

SPECIMENS EXAMINED.—*P. p. chrysopus.* Jalisco: ½ mi. N Navidad, 9; 3 mi. E Navidad, 8; shores of Bahía Tenacatita, 1. *P. p. perfulvus.* Guerrero: Apaxtla, 4500 ft., 3. Michoacán: 12 mi. by road S Tzitzio, 3500 ft., 1; Apatzingán, 1500 ft., 3.

Peromyscus banderanus banderanus Allen.—Colima: 3 mi. SE Coli-

ma, 3; Paso del Río, 7; Jalisco: 3 mi. E Navidad, 2. Michoacán: ½ mi. SE Coalcomán, 6; ½ mi. E Coalcomán, 3.

The specimens were collected in the following situations: on a rocky bank of a shallow barranca, the bank lined with figs, and thorny shrubs and trees (Colima); under litter, shrubs, and forbs on the floor of an oil-palm forest (Paso del Río and Navidad); under grass and brush at the edge of a banana grove and a river; and on a boulder-strewn hillside covered with weeds and a few mesquite trees (Coalcomán).

Ventral coloration in the sample from Coalcomán and in that from Colima varies from pale buff to pinkish cinnamon; a pectoral spot is present in some specimens, absent in others.

Oryzomys couesi mexicanus Allen.—Colima: Paso del Río, 16. Jalisco: ½ mi. N Navidad, 2; 3 mi. E Navidad, 13. Michoacán: ½ mi SE Coalcomán, 3. Sinaloa: Chele, 4. The examples were trapped in the following places: in brush, in tangles of vines, piles of palm fronds, and in other debris on the floor of oil-palm forests (Paso del Río and vicinity of Navidad); in trails in stands of cane grass and deciduous brush that separated a banana grove from a thorny, shrub-covered hillside (Coalcomán); in a dense growth of shrubs growing below fig trees bordering a creek (Chele). Each of two females from Chele contained 3 embryos measuring 5 mm. in one female and 12 mm. in the other.

Oryzomys melanotis colimensis Goldman.—Twenty specimens were trapped among debris and sparse vegetation on the floor of a tropical palm forest at Paso del Río, Colima; one was caught in a similar habitat ½ mi. N Navidad, Jalisco; and one is from a dense growth of shrubs and forbs on a stream bank in a moist forest at 6500 feet, 20 mi. SSE Autlán, Jalisco. Of ten females from Paso del Río one contained four embryos (10–15 mm. in length) and in another the uterus was enlarged. The considerable variation evident in the series from Paso del Río gives one reason to doubt that *colimensis* is distinguishable from *melanotis*.

Oryzomys fulvescens lenis Goldman.—One specimen was trapped at the base of a palm in a sparse growth of annuals and brush in an oil-palm forest at Paso del Río, Colima.

Sigmodon hispidus major Bailey.—Two specimens of cotton rat were obtained under palm fronds and brush at the edge of a trail through an oil-palm forest 3½ mi. E San Blas, Nayarit. These are tentatively identified as *major*. The relationships of *major, mascotensis,* and *alleni* are not understood.

Sigmodon hispidus mascotensis Allen.—Two examples are from a rocky slope in an open thorn forest 3 mi. SE Colima, Colima; ten are from brush, piles of palm fronds, and other litter on the floor of an

oil-palm forest at Paso del Río, Colima; and three are from a growth of grass, blackberry, *Salvia,* and other understory plants in a pine forest ½ mi. NW Mazamitla, Jalisco.

Sigmodon leucotis Bailey.—Seven specimens of this gray-eared cotton rat were trapped in trails under bunch grass on a large meadow ½ mi. E San Luis, Durango.

These closely resemble topotypes of *S. leucotis.* A noteworthy cranial character of *leucotis* is the short interparietal. In 12 specimens varying in age from juveniles to old adults, the anterior-posterior length of the interparietal does not exceed 1.7 mm., which is not more than 26 per cent of the length of the molar row. In samples of four specimens of *S. alleni* and 35 specimens of *S. hispidus,* the length of the interparietal usually exceeds 2.5 mm. (it is less than 2.0 in three of the 35 specimens), which amounts to at least 35 per cent of the length of the molar row. The specimens of *S. alticola* at hand (from México and Oaxaca) also have a short interparietal.

Sigmodon melanotis Bailey.—A single specimen of cotton rat obtained among grass, weeds, cactus, scrub oak, and a few shrubs 1½ mi. W Mazamitla, Jalisco, differs from specimens caught higher in the pine belt ½ mi. NW Mazamitla. It contrasts with them in the same way that topotypes of *S. melanotis* contrast with specimens of *S. hispidus* from the highlands of Michoacán. It has a hairy, monocolor tail and buffy underparts, rather than a sparsely haired, lightly bicolor tail and whitish or pale buffy underparts. The basal bands of the dorsal hairs are black (rather than plumbeous) against which the long buffy bands stand out as pale streaks, as is seen in *S. minimus.* The postpalatal pits are deeper, the interparietal shorter (1.6 mm. compared with 2.3 and 2.5), the mesopterygoid fossa is narrower and the auditory bullae are larger. The skull matches skulls of *S. melanotis* rather than of *S. hispidus.*

In the highlands of west-central México apparently the contrast between pelages of the wet and dry seasons is as great in *S. melanotis* as in *S. hispidus.* In *hispidus* during the wet season the buffy bands of the hairs are everywhere much more reddish; the mass effect of the pelage is reddish brown. Gray is dominant in the dry season pelage. Similarly, wet season pelages of *melanotis* from Pátzcuaro are reddish brown dorsally and cinnamon ventrally. In contrast, the example from Mazamitla taken in the dry season is predominantly gray dorsally and light pinkish cinnamon ventrally.

Neotoma albigula leucodon Merriam.—Nine specimens of the white-throated woodrat were trapped at rock outcrops covered sparsely with

mesquite and cactus ½ mi. W Rincón de Romos, Aguascalientes, and another was caught among rocks and junipers 4 mi. E Calabazal, Zacatecas. None of four adult females from Rincón evidenced recent breeding.

Neotoma mexicana sinaloae Allen.—Two juveniles from Chele, Sinaloa, were obtained in a riparian forest of fig trees and other tropical plants. One specimen was trapped in a large cavity in a fig tree, the other on a log in a thicket bordering the forest.

Neotoma mexicana madrensis Goldman.—Specimens are from localities as follows: Durango: La Laguna, 1; 1½ mi. W San Luis, 2; ½ mi. S Revolcaderos, 1. Zacatecas: 4 mi. E Calabazal, 3.

The specimens were trapped in the following situations: in a rock outcrop adjoining a stream in pine-oak forest (La Laguna); among boulders, pine, and oak on the south-facing wall of a canyon (San Luis); beneath a boulder in a forest of pine and oak bedecked with epiphytes (Revolcaderos); in rock outcrops on open grassland dotted parklike with short-needle pines, juniper, and scrub oak (Calabazal). An old female collected 24 March near San Luis contained two embryos, each 20 mm. long.

In the specimen from Revolcaderos the auditory bullae are small, resembling bullae in examples of *sinaloae* and *tenuicauda.*

Neotoma mexicana tenuicauda Merriam.—Three specimens are from rock outcrops bordered by an open forest of pine, juniper, and live and deciduous oaks in the Sierra Fría, Aguascalientes; two are from a pile of cornstalks on boulders and branches of a fig tree, 2 mi. NNW Magdalena, Jalisco; and one is from rocks on a canyon wall above a dry creek bed in deciduous oak forest 2 mi. W San Andrés, Jalisco. There was no evidence of active breeding in a female from the Sierra Fría or in another from Magdalena.

The distinctions between *N. mexicana* and *N. ferruginea* break down in samples of *N. f. tenuicauda,* and one is led to the conclusion that *mexicana* and *ferruginea* are conspecific. Specimens at hand from Jalisco, Aguascalientes, Durango, and Sinaloa form a series in which the characters of *N. ferruginea tenuicauda,* on the one hand, grade into those of *N. mexicana madrensis* and *N. m. sinaloae,* on the other. Intergradation is seen in coloration of upper parts and of hind feet, in shape of skull, in size of auditory bullae, and in other characters that elsewhere distinguish the two nominal species. The specimens from Sierra Fría are more ferruginous dorsally than topotypes of *tenuicauda,* and they are slightly darker than examples of *madrensis* from Calabazal. In topotypes of *tenuicauda* many of the hairs on the upper surfaces of the

hind feet are dusky basally. In the examples of *madrensis* at hand they are white. In the specimens from San Andrés, Magdalena, and the Sierra Fría an intermediate condition obtains. The small auditory bullae of topotypes of *tenuicauda* are matched in specimens from Durango and Sinaloa. The evidence points toward genetic continuity of the populations of *N. mexicana* and *N. ferruginea*. A map showing the distribution of *N. mexicana,* as I understand the species, thus should include the ranges of *N. mexicana* and *N. ferruginea* and probably also those of *N. torquata, N. distincta,* and *N. griseoventer*. Dalquest (1951) considers those three forms to be conspecific with *ferruginea*.

Microtus mexicanus phaeus Merriam.—One specimen from Durango was trapped in a runway in moss beneath a log and a canopy of Douglas fir 1½ mi. W San Luis, and eight were caught in runways on a bunchgrass meadow surrounded by pine and oak ½ mi. E San Luis.

Microtus mexicanus neveriae, new subspecies

Holotype.—Adult male, skin and skull; UMMZ 100740; México, Jalisco, mountains about 20 mi SE Autlán, near lumber mill of La Neveria, 8200 feet elevation; collected 26 February 1953 by Emmet T. Hooper; original No. 3568.

Distribution.—Known range confined to mountains south and southeast of Autlán, Jalisco; vertical range 6500–9000 feet.

Characters and Comparisons.—A race of *Microtus mexicanus* characterized by small body and skull, dark reddish brown upper parts and cinnamon underparts, short nasals, deep palatine fossae and small auditory bullae. Similar to *phaeus* in size of body and skull (greatest length of skull averages 26.9±.17 in 11 adult male topotypes of *phaeus,* compared with 26.5±.12 in 15 adult males of *neveriae*). Upper parts darker, due principally to a deeper, more reddish (less yellowish) tone of the buffy bands. Underparts Orange-Cinnamon, the cinnamon bands wide, mostly obscuring the black basal bands (in *phaeus,* tips of hairs narrow and whitish or pale buffy, not well obscuring the Blackish Plumbeus basal bands). Nasals shorter (mean length 7.4±.06 mm. and 7.8±.06 mm., respectively, in *neveriae* and *phaeus*). Auditory bullae smaller (the diameter 6.1±.04, compared with 6.5±.07 in *phaeus*).

Similar to *salvus* in size and in shape of skull, but with shorter nasals and smaller bullae. In the two adults of *salvus* at hand, the nasals measure 7.5, 7.9 mm. in length and the bullae 6.5, 6.5 in diameter. The pelages of the two specimens of *salvus,* representing the wet season, are

not comparable to those of the other races. Those wet season pelages of *salvus* are similar to dry season pelages of *neveriae*. Since pelages of the wet season are typically darker than dry season pelages, presumably *neveriae* is darker than *salvus*.

Smaller than *fundatus* in all measurements (greatest length of skull averages 27.9±.20 mm. in 12 adult males from the vicinity of Pátzcuaro, compared with 26.5±.12 mm. in *neveriae*). Auditory bullae smaller relative to length of skull. Nasals absolutely shorter, but scarcely or not at all shorter relative to cranial length. Upper parts more reddish in tone, the basal bands of the hairs black in both forms, but the buffy tips Orange-Cinnamon or Mikado Brown in *neveriae* and Pinkish Cinnamon or Vinaceous Cinnamon in *fundatus*. Underparts buffy in both, but a yellower and paler buff in *fundatus* (Pinkish Cinnamon in *fundatus* compared with Orange-Cinnamon in *neveriae*).

MEASUREMENTS (in mm.).—Means and extremes of 15 males from the Autlán mountains: total length, 145 (137–156); tail vertebrae, 33 (29–36); hind foot, 19 (19–20) ear from notch, fresh skin, 14 (13–15); greatest length of skull, 26.5 (25.6–27.3); occipitonasal length, 26.3 (25.5–27.2); zygomatic breadth, 15.3 (14.6–16.4); greatest length of nasals, 7.4 (7.0–7.8); alveolar length of molar row, 6.8 (6.5–7.0); diameter of auditory bullae (measured from lateralmost point on superior lip of meatus to medial face of bulla), 6.1 (5.8–6.4).

REMARKS.—Samples of *N. m. neveriae* are at hand from three areas in the mountains southeast of Autlán. In April, 1949, we secured 19 specimens in a sacaton meadow at about 9000 feet on ridges east of Rancho Manantlán. The meadow, bordered by thickets of willow and red *Salvia* and other shrubs, was situated in a mature parklike pine forest, then virgin. In February, 1953, we worked in areas farther south in the mountains. Twenty-two specimens were obtained at 8200 feet elevation in runways on a sacaton meadow and beneath adjoining *Salvia* thickets surrounded by a mature fir, pine, and oak forest. Two examples were trapped in runways through moss and a lush growth of forbs and shrubs on wet rocky banks of a narrow canyon at 6500 feet elevation.

The females were sexually active in February. There were few embryos per female. Numbers of embryos per female with estimates of the length (in mm.) of each embryo (in parentheses) are as follows: 1 (30), 1 (20), 1 (10), 3 (5), 1 (5).

SPECIMENS EXAMINED.—*M. m. fundatus*. Michoacán: 6 mi. S Pátzcuaro, 8000 ft., 2; 10 mi. SE Pátzcuaro, 9200 ft., 29. *M. m. neveriae*. Jalisco, mountains south of Autlán: 9000 ft., 19; 20 mi. SE Autlán,

8200 ft., 22; 20 mi. SSE Autlán, 6500 ft., 2. *M. m. phaeus.* Jalisco, El Nevado de Colima: NW slopes, 8000 ft., 2; NW slopes, 9500 ft., 23; N slopes 10,600 ft., 3; N slopes 12,300 ft., 25. *M. m. salvus.* Michoacán: Cerro de Tancítaro, 3½ mi. ENE Apo, 2.

Sylvilagus cunicularius insolitus Allen.—One specimen was shot on Isla Palmito de la Virgen. There were two kinds of rabbits on the "island." We obtained no examples of the larger kind.

Odocoileus sinaloae Allen.—A ramus of a small deer, probably of this species was found at Paso del Río, Colima. Poaching of deer is reported to be a common practice in the lowlands of Colima.

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