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BIOLOGICAL INVESTIGATIONS IN THE SELVA
LACANDONA, CHIAPAS, MEXICO

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WITH ONE PLATE

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*No. 4 — Biological Investigations in the Selva Lacandona,
Chiapas, Mexico*

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I

INTRODUCTION

By

RAYMOND A. PAYNTER, JR.

In northeastern Chiapas, bordered on one side by the Río Usumacinta and on the other by the Río Jataté, with northern limits near Palenque and southern limits along the Guatemalan border, there is a vast area of about 15,000 square kilometers of almost unexplored and very sparsely inhabited virgin forest (Map). The region is known as the Selva Lacandona, because of the presence of scattered family groups of Lacandon Indians, primitive and isolated remnants of the once vast Maya empire.

The Indians, who number less than 200 individuals, have been the subject of considerable publicity over the past decade, particularly after the discovery at Bonampak of well-preserved murals in some ruined temples which are occasionally utilized by the Lacandons. Several expeditions of archaeologists and an-

thropologists have been into the Selva Lacandona (see, e.g., Blom and Duby, 1955), principally in the vicinity of Bonampak, but no biologists have reconnoitered the region, with the exception of the Goodnights (1953), who studied the Phalangids, and Miranda (1953), who made a botanical survey. Both investigations were made at Monte Líbano, on the edge of the forest, and probably are only indications of what occurs in the interior.

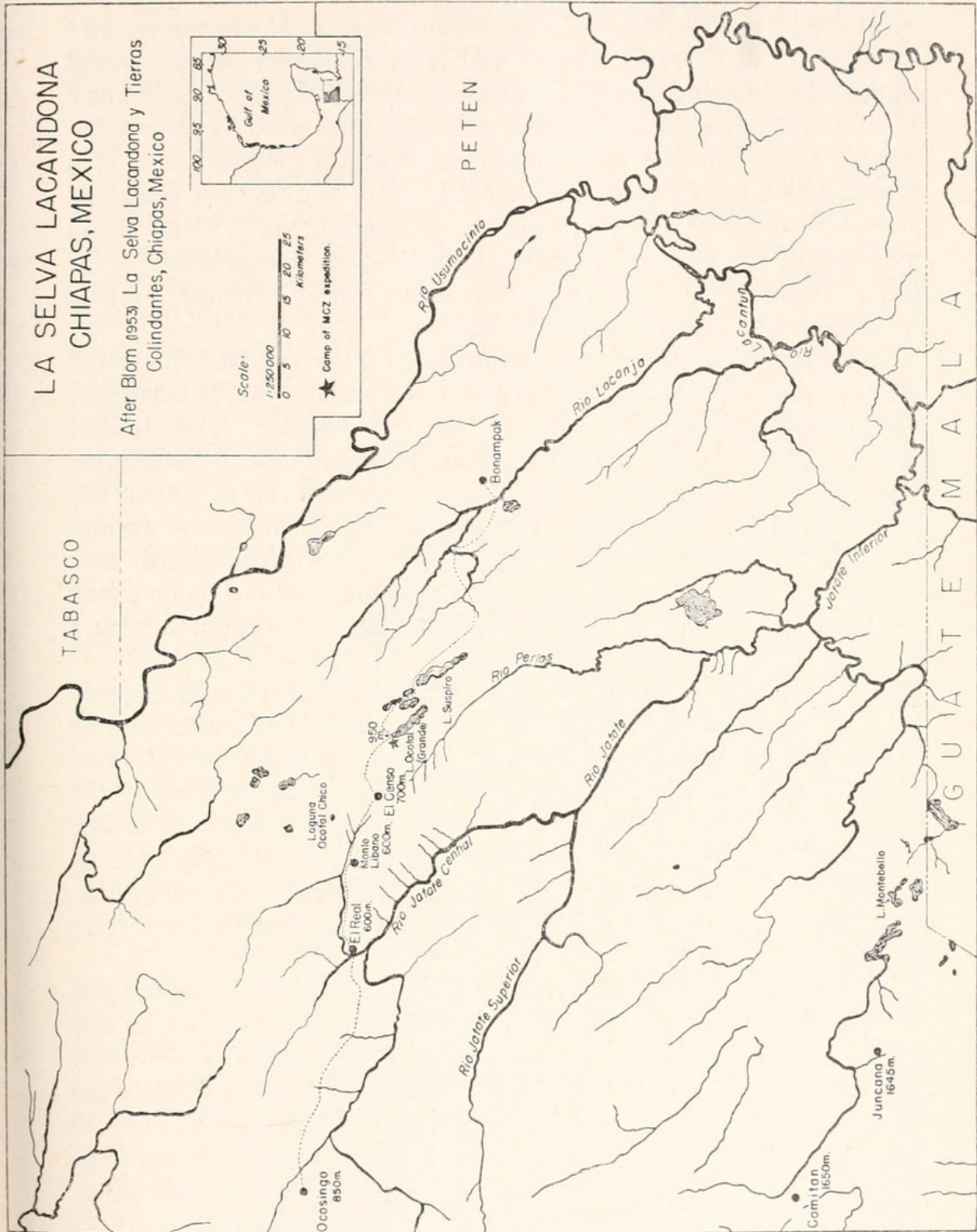
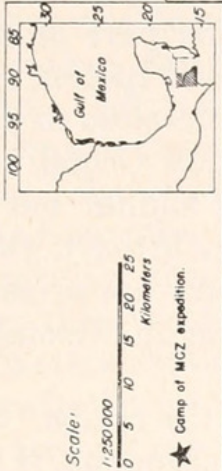
The Selva Lacandona is on the northeastern slope of the central highlands of Chiapas. There is a gradual decline in altitude from a maximum of approximately 1400 meters, near the Río Jataté, to about 100 meters, at the Río Usumacinta. Between the two principal rivers are many lesser streams whose courses are very poorly known, but which generally parallel one another in a northwest-southeast direction. Scattered throughout are a number of sizable lakes (*lagunas*), the largest of which are Laguna Suspiro and Laguna Ocotal Grande (Plate, upper figure), nine and seven kilometers in length, respectively. The natives call the latter lake simply "Laguna Ocotal," and all the zoological material obtained there was so labeled, but on a map prepared by Frans Blom (see Map) the longer name is used, in contradistinction to Laguna Ocotal Chico, a much smaller lake to the northeast.

It is unfortunate that nothing certain is known of the drainage of these important lakes. While they may drain southeast into the Río Lacanjá, thence into the Río Lacantun, and finally into the Usumacinta basin, there is no evidence that this is the case, despite the predilections of cartographers for drawing connecting streams between known lakes and known rivers. From personal observations, limited to the region about Laguna Ocotal, I am inclined to believe that these lakes have formed within closed-end solution valleys. The heavily karsted limestone strongly suggests such an origin. Underground drainage to the Usumacinta basin is possible, of course.

Miranda (1952) has prepared a generalized vegetation map of Chiapas in which the Selva Lacandona is depicted as being covered by high evergreen forest, with areas of pines and oaks at the lakes and along the southwestern boundary of the region. It should be realized, however, that "high evergreen forest" is a broad term embracing a great diversity of vegetational assem-

LA SELVA LACANDONA
CHIAPAS, MEXICO

After Blom 1953 La Selva Lacandona y Tierras
Colindantes, Chiapas, Mexico



blages. For example, at Monte Líbano the forest is high, luxuriant, and has a relatively clear understory. It is what is usually referred to as "rain forest," which in this part of the world commonly contains, among other characteristic species, mahogany (*Swietenia humilis*) and *ramón* (*Trophis racemosa* or *Brosimum alicastrum*). On the other hand, at Laguna Ocotal there is a forest which seems physiognomically quite similar but which is markedly different in composition, lacking, in part, *ramón* and mahogany, while gigantic oaks (*Quercus* spp.) are present. A detailed description of the vegetation about Laguna Ocotal is found in Dressler's account (pp. 200-203).

Nothing is known of the climatology of the region. Since the altitude and vegetation vary in the Selva Lacandona, it is reasonable to suppose that the climate is also variable. The nearest location from which weather records are available is Tenosique, Tabasco, a town at a somewhat lower elevation (60 m.) than the lowest point in the Selva Lacandona. Here the mean annual rainfall is 1697 mm., with June being the wettest month and March the driest; the warmest month is May, which has a mean temperature of 30.4°C. and the coolest month is January, with a mean of 22.9°C. (Ward and Brooks, 1936).

In 1954, with generous support from the American Academy of Arts and Sciences and from the Chapman Memorial Fund of the American Museum of Natural History, a party was formed in order to make the first biological survey of the interior of the Selva Lacandona. The group consisted of the author, as leader and ornithologist, Robert T. Paine, 3rd, as assistant ornithologist, Elisha F. Lee, as mammalogist, Robert L. Dressler, as botanist, and Mrs. Ruth Oberg, also a botanist, specializing in the Orchidaceae.

In early July the party flew from the capital of Chiapas, Tuxtla Gutiérrez, to Ocosingo (alt. 850 m.), a village about one hundred kilometers to the northeast. Heavy rains had raised the level of the nearby rivers and delayed for several days the arrival of our pack animals. Finally, on the morning of July 10 we started for Finca El Real (alt. 600 m.), which is approximately 40 kilometers to the east, and reached there in the afternoon of the following day.

At El Real additional supplies, mules, and men were secured and on July 15, with 18 mules and 9 *arrieros*, trail-cutters, etc.,

we moved 20 kilometers east to the settlement of Monte Líbano (alt. 600 m.). During the night a number of the mules strayed and we were unable to recover them and move on until July 18. The trail-cutters had been sent ahead to clear the way and prepare bridges, but progress was slow and difficult owing to the mud and obstructions in the trail. About seven hours after leaving Monte Líbano we arrived at El Censo (alt. 700 m.), an uninhabited camping spot in magnificent rain forest. The following morning the trail was poor during the first hour of travel, but then became worse due to an escarpment which rises over 300 meters above the country to the east. Ascent was made by steep switchbacks which were barely surmounted by the pack animals. Beyond this point the trail improved somewhat. In the middle of the afternoon our destination was reached and a camp was prepared at the northwestern end of Laguna Ocotál (Plate, lower figure), at an altitude of 950 meters. Because of insufficient forage at the lake, most of the mules were returned to El Real, but four men remained to assist with the collecting and maintenance of the camp.

The forest is dense and the terrain rough around Laguna Ocotál, which means that it is seldom practicable to work far from a trail. The only trails existing in the area are the one by which we entered, and a badly obstructed path leading to Bonampak. Consequently, we were not able to range as far as desired and even after a month of intensive collecting did not reach the opposite end of the lake or the pine-covered ridges along its southwestern side. Future workers in the region would do well to employ an additional man or two to cut new trails, thereby enabling the collectors to sample a larger area.

The campsite was situated on a narrow strip of ground which has cut off a small arm of the lake, impounding the water and forming a swamp. Most of the mammals, and many of the amphibians were collected here.

Although each member of the party concentrated on his field of interest, unrelated material was collected whenever possible. For this reason the bird, mammal, and botanical¹ collections are probably the most nearly representative samples from the region, while the fish, reptile, amphibian, and inverte-

¹ No complete report on the botanical collections has been prepared. A list of the Orchidaceae has been compiled by Mrs. Ruth Oberg (in press).

brate collections contain, in the main, only the more conspicuous elements of their faunas.

At the end of a month the mules were brought back from the ranch and on August 20 the camp was abandoned. We returned to El Real by the same route used in entering the forest and on August 30 were flown from the ranch to Tuxtla Gutiérrez.

An especial debt of gratitude is owed to the members of the field party. Their whole-hearted cooperation is evident from the large amount of material which was collected, although the period was brief and conditions difficult. During preparations, and while in the field, we received much assistance and many courtesies from Horacio Albores of Ocosingo, José Tárano and Juan Bulnes of Finca El Real, and Frans Blom of San Cristóbal de las Casas. I wish, also, to express my appreciation to Joseph C. Bequaert, Charles H. Blake, William L. Brown, Jr., Frances L. Burnett, Robert L. Dressler, Charles P. Lyman, Robert Rush Miller, and Benjamin Shreve, who have submitted the following reports based on material obtained during the expedition.

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The northern end of Laguna Ocotal. The pine-covered ridges parallel the southwestern shore of the lake.

Photo by Lee



A small hill covered by pines projects from a low deciduous forest (*monte*; see Dressler, pp. 200) near the campsite at Laguna Ocotal. The lofty tropical evergreen forest begins behind the hill and is not visible.

Photo by Lee

II

THE VEGETATION ABOUT LAGUNA OCOTAL

By

ROBERT L. DRESSLER¹

Only a preliminary characterization of the plant cover can be made at this time. Many important species were not in flower or fruit, and the upper stories of the rich tropical evergreen forest were sampled only through occasional windfalls.

Four main vegetation types may be recognized in the area: (1) Pine Forest, or *ocotal*, which is usually at a higher level on a given slope than is *monte* or *selva*, but occurs down to the lake shore near the campsite. Pine forest is said to extend southward for some distance on the ridge west of the lakes. (2) *Monte*, a dense transition of small, usually slender, hardwoods. This vegetation generally occurs between the *ocotal* and the *selva* or the lake shore. (3) Tropical Evergreen Forest (*selva*). This, the “*montaña*” of the natives, makes up the bulk of the Selva Lacandona of eastern Chiapas and apparently surrounds the lake area. (4) Cloud Scrub, a distinctive type limited to promontories overlooking the lake.

(1) Pine Forest. The pine stands include some splendid, large specimens of *Pinus tenuifolia* Benth (probably the only species present), but are not continuous or very extensive in the area studied. The pines probably occupy only slopes and hilltops which are too well drained for the more mesic forest types. Open park-like sites, which are few and quite small, have a grassy ground cover including *Cyperus*, *Scleria*, *Dichromena*, and *Panicum*. In favored sites an understory is formed by small hardwood trees, such as *Hauya heydeana* Donnell-Smith, a reddish-barked tree with much the aspect of *madroño*, *Saurauia subalpina* Donnell-Smith, and *Myrica cerifera* L. These trees are often quite mossy and bear a rich epiphyte flora of many species of orchids and ferns, most of which also occur in the upper stories of the *selva*. The pines themselves bear many epiphytes, but these are of relatively few species, the genera *Tillandsia*,

¹ Gray Herbarium, Harvard University, Cambridge, Massachusetts.

Catopsis, and *Epidendrum* being conspicuous. *Chimaphila maculata* (L.) Pursh was found on one slope, and a small fan-palm (*Brahea*) occurs in dry sites. The greater part of the pine forest has a great deal of undergrowth and might be considered as a marginal type passing into the *monte*.

(2) Transition Forest or *Monte*. This is a somewhat diverse assemblage of vegetations which is characterized by its relatively low height (mostly about 5-10 m.) and great density, its position between the pine forest and the *selva*, and a very poor epiphyte flora. Only a few of the trees making up this vegetation have been identified. A pink-fruited *Hoffmannia* is frequent, *Acalypha gummifera* Lundell and *Cnidosculus multilobus* (Pax) Johnston are local, and *Cecropia* was observed in one stand. A slender *Verbesina* and *Calliandra houstoniana* (Miller) Standley are frequent in drier sites. Undergrowth is relatively scant in most parts of the *monte*, but the shrubby *Cephaelis tomentosa* (Aublet) Vahl is abundant on the *selva* side of the transition, and the fern, *Nephrolepis cordifolia* (L.) Presl, is locally very abundant on the *ocotal* side.

This vegetation may, on an abrupt slope, form a very narrow zone, or it may be more widespread. In one or two sites near the camp it is fairly extensive in small areas that have been disturbed (cut over for fire wood and poles for camp construction, burnt over, and doubtless heavily grazed by mules at infrequent intervals). At the north end of the lake clear evidence of disturbance is found in a nearly pure stand of small "pomarosa", *Eugenia* (*Syzygium*) *jambos* L. (which may be considered a local phase of the *monte*). This Asiatic species is certainly introduced. There are two or three very large examples of *pomarosa* and two large clumps of bamboo near the Bonampak trail, which may date to its original introduction. On a slope nearby, in the *ocotal*, there is a small area where *Lantana camara* L., *Trema micrantha* (L.) Blume, *Euphorbia hirta* L., and *Psidium* (probably *P. guajava* L.) occur together. None of these weedy species was seen elsewhere in the region, and they surely indicate past disturbance. Many of the elements of the *monte* are probably those that would occur in secondary growth anywhere in the area (for example, *Cnidosculus*, *Cecropia*).

(3) Tropical Evergreen Forest or *Selva*. This is the *Selva Alta Siempre Verde* of Miranda (1952). I have used “*selva*” rather than the local “*montaña*” in my notes and discussion to avoid confusion with “*monte*”. This fine forest is similar to (and continuous with) that near Monte Líbano, which has been described by Miranda (1953b), though the forest about Laguna Ocotal lacks chicozapote, ramón, mahogany, and the fiendishly spiny palm, *Hexopetion*. Ground cover in the *selva* is relatively sparse and walking about is easy. Fallen fruits and flowers indicate that *Talauma mexicana* (de Candolle) Don and *Cymbopetalum penduliflorum* (Dunal) Baillon are frequent, and the fruits of *Sloanea* were seen at one place. Oaks (*Quercus Skinneri* Benthams and perhaps other species) occur frequently, especially in the drier phases of the *selva*. These slightly more open, less humid stands, curiously enough, are not to be found near the drier *ocotal*, but at some distance from the lake, along the Bonampak trail. The *selva* adjoining the *ocotal* (or transition) usually shows its wetter phases. The upper stories of the *selva* are rich in epiphytes of many kinds. The lower tree trunks bear ferns, peperomias, gesneriads and a few species of orchids (such as *Chondrorhyncha lendyana* Reichenbach fil., *Pleurothallis cardiothallis* Reichenbach fil., *Maxillaria maleolens* Schlechter, and *M. nasuta* Reichenbach fil.) which are largely or quite restricted to this habitat. *Collinia*, *Eleutheropetalum*, and several species of *Chamaedorea* were the only palms seen in the *selva*; tree ferns (*Cyathea*) are locally abundant.

(4) Cloud Scrub. This vegetation, probably comparable to the “elfin woodland” of the West Indies, was found only on cliff tops overlooking the west side of the lake (the prevailing winds are from the east, across the water). These local and relatively inaccessible sites were not visited by the expedition zoologists. The limestone promontories are very well drained and, probably for this reason, support only relatively small trees (predominantly *Clusia rosea* Jacquin?), but, while the arboreal elements are comparable in size and form to *monte bajo* or chaparral, the great atmospheric moisture supports an abundance of epiphytes. These epiphytes are largely mosses and ferns, but some orchids, *Ericaceae* and other epiphytes of the high *selva* also flourish in the *Clusia* scrub.

These collections and notes are too scanty and our knowledge of the Lacandon Forest, as a whole, too slight to say much about the geographic affinities of the Laguna Ocotal region. A number of the expected "Guatemalan" and "Honduran" species, new to the known flora of Mexico, were found, especially in the rich orchid flora (Oberg, in press). The pine forest itself is relatively poor in distinctive elements, but this is perhaps to be expected from its small and discontinuous area. It is possible that this *ocotal* has lost ground to the *monte* in relatively recent times through the occasional disturbances caused by chicleros, anthropologists, and others who have used this campsite on the Bonampak trail. A more long-term vegetational change may be indicated by the pine logs found in *selva* near Monte Líbano (Miranda 1953b).

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III

LAND AND FRESHWATER MOLLUSKS OF THE
SELVA LACANDONA, CHIAPAS, MEXICO

By

JOSEPH C. BEQUAERT

To conform with the general plan of the reports on the collections made by Dr. Raymond A. Paynter, Jr., and his associates in Mexico, during the summer of 1954, only the 39 species obtained in the Selva Lacandona have been fully treated below. However, in order to make the paper more generally useful, a list is appended of 49 additional species definitely reported from the State of Chiapas. In this list localities are recorded for 9 species obtained by Dr. Paynter's party outside the Lacandona area. In all, 88 species of inland mollusks are thus known at present from the State of Chiapas, 73 of them terrestrial and 15 aquatic.

As Chiapas has not been visited thus far by a professional malacologist, the 88 species obviously represent only a fraction of the actual molluscan fauna. A comparison with the better known adjoining areas of Mexico (Veracruz) and Guatemala (Petén and Alta Vera Paz), where the ecology and topographical conditions are similar, suggests that the molluscan fauna of Chiapas should comprise some 180 to 200 species. The known 88 species came from several distant localities and were obtained by different collectors during the past 100 years. They may be regarded as a random sample of at least the more common and more conspicuous forms, sufficiently representative to determine the dominant features of the molluscan fauna of the State, as well as of the Selva Lacandona. It should be kept in mind, moreover, that the mollusks of the better explored adjoining territories are as yet far from being completely known.

The 73 terrestrial species will be considered first, as they form the bulk of the fauna and are most interesting from our point of view. At present 26 of them, or about one-third of the total, are known only from Chiapas or extend in a few cases just north of the boundary to Tabasco. Although this figure seems to point to a fairly high degree of endemism, it is prob-

ably deceptive. Several of these "endemic" species are poorly known, often only from single specimens and not from one or more populations. In fact I am personally acquainted with only eight of these supposedly endemic forms. I suspect that eventually many of them will be recognized as identical with, or within the range of intraspecific variation of more widespread species, recorded under other names from adjoining areas.

The largest group comprises 28 species (slightly over one-third of the total) which generally extend from the western section of Veracruz, through Tabasco and Chiapas, to Guatemala and British Honduras. Of these, 15 are at present recorded from Chiapas (and sometimes Tabasco) to Guatemala, 9 from Veracruz, Tabasco and Chiapas, and 4 from Veracruz to Guatemala; but there can be little doubt that all of them actually occur throughout the whole area. As suggested above, this group will eventually grow by the addition of several of the species now supposedly endemic in Chiapas. It appears to be the dominant and characteristic molluscan assemblage for what may perhaps be called the Chiapas-Guatemalan Subregion of Central America. In all, 54 of the 73 terrestrial species known from Chiapas have not been recorded outside this Subregion.

The remaining species are much more widely distributed. Most of them reach their northern limit in Veracruz, although usually extending southward far beyond Guatemala, in some cases even to Costa Rica and Panama. Four of them are "followers of man," who has spread them far and wide outside their original home, which is now sometimes in doubt.

The very limited freshwater fauna consists of only 15 species. As is often the case for freshwater mollusks in the tropics, they are not particularly characteristic. Seven species are widely distributed throughout Mexico and Central America, or some even beyond; 5 are possibly restricted to the Veracruz-Chiapas-Guatemala area, like the bulk of the terrestrial species; and 3 freshwater clams are at present known only from Chiapas, probably due to insufficient knowledge of the Central American naiad fauna as a whole.

HELICINIDAE

OLIGYRA FLAVIDA (Menke)

Helicina flavida Menke, 1828, Synopsis Meth. Moll., 1st Ed., p. 79 ("Jamaica," [erroneous locality]). Sowerby, 1842, Thesaur. Conchyl., 1, Pt. 1, p. 9; Pl. 3, figs. 117 and 134; 1866, *Op. cit.*, 3, Pts. 24-25, p. 287; Pl. 272, figs. 233-236 (Guatemala).

Laguna Ocotal, 950 m.

A common species in southern Mexico (Veracruz, var. *strebeli* Pfeiffer; Tabasco; Chiapas), Guatemala (Petén), and the Republic of Honduras (Copán).

OLIGYRA OWENIANA (Pfeiffer)

Helicina oweniana Pfeiffer, 1849 (April), Proc. Zool. Soc. London, (for 1848), p. 123 (Chiapas); 1850, Syst. Conch.-Cab., 1, Abt. 18, Pt. 1, p. 40; Pl. 7, figs. 35-36 (type).

A common species in Chiapas, Tabasco, Guatemala and Costa Rica. Two forms are represented in the collection from the Selva Lacandona.

1. var. *coccinostoma* Morelet. *Helicina coccinostoma* Morelet, 1849, Test. Noviss. Ins. Cub. Amer. Centr., 1, (19 Petén).—Laguna Ocotal, 950 m.

2. var. *anozona* von Martens. *Helicina anozona* von Martens, 1876 (April), Proc. Zool. Soc. London, (for 1875), p. 649 (Cobán); 1876, Jahrb. deutsch. Mal. Ges., 3, p. 261; Pl. 9, fig. 7.—Monte Líbano, 600 m.; El Real, 600 m.

HELICINA AMOENA Pfeiffer

Helicina amoena Pfeiffer, 1849 (April), Proc. Zool. Soc. London, (for 1848), p. 119 (Honduras); 1850, Syst. Conch.-Cab., 1, Abt. 18, Pt. 1, p. 55; Pl. 5, figs. 13-15 (type).

Laguna Ocotal, 950 m.; El Censo to Laguna Ocotal, 1000 m.; Ocosingo, 850 m.; El Real, 600 m.; Monte Líbano, 600 m.

Known from southern Mexico (Campeche and Chiapas), Guatemala, British Honduras, the Republic of Honduras, Nicaragua, and Panama.

HELICINA TENUIS Pfeiffer

Helicina tenuis Pfeiffer, 1849 (April), Proc. Zool. Soc. London, (for 1848), p. 124 (Yucatán); 1850, Syst. Conch.-Cab., 1. Abt. 18, Pt. 1, p. 40; Pl. 7, figs. 33-34 (type).

Helicina chiapensis Pfeiffer, 1856 (December), Mal. Blätt., 3, p. 237 (Chiapas); 1857 (May), Proc. Zool. Soc. London, (for 1856), p. 380. Sowerby, 1866, Thesaur. Conchyl., 3, Pts. 24-25, p. 288; Pl. 7, figs. 255-257 (? type from Cuming Collection).

El Real, 600 m.; Monte Líbano, 600 m.

This species is widespread from southern Mexico (Jalisco; Veracruz, Chiapas; Tabasco, Yucatán), to Guatemala (Petén; Alta Vera Paz, and the Pacific slopes of the Cordillera), Nicaragua, Costa Rica, and Panama.

SCHASICHEILA ALATA (Pfeiffer)

Helicina alata "Menke" Pfeiffer, 1849 (January), Zeitschr. f. Malakoz., 5, (for June 1848), p. 87 (Mexico); 1850, Syst. Conch.-Cab., 1. Abt. 18, Pt. 1, p. 43; Pl. 5, figs. 18-20 (type).

Menke's name was given in MS and the original description was written by Pfeiffer, to whom the name should be credited. According to a note on page 96, dated January 10, 1849, the June issue of the Zeitschr. f. Malakoz. for 1848 could not have been published before January 1849.

Monte Líbano, 600 m.

Known from southern Mexico only (Veracruz and Chiapas).

SCHASICHEILA PANNUCEA (Morelet)

Helicina pannucea Morelet, 1849, Test. Noviss. Ins. Cub. Amer. Centr., 1, p. 21 (San Luis, Petén).

Schasichila pannucea Fischer and Crosse, 1892, Mission Scientif. Mexique, Moll. Terr. Fluv., 2, Pt. 13, p. 448; Pl. 54, figs. 5 and 5a (type from Morelet).

Monte Líbano, 600 m.

Known from much of Mexico (Chiapas; as var. *misantlensis* Fischer and Crosse from Veracruz and Puebla; and as var. *hidalgoana* Dall from Hidalgo, San Luis Potosí and Tamaulipas) and Guatemala (Petén and Alta Vera Paz).

LUCIDELLA LIRATA (Pfeiffer)

Helicina lirata Pfeiffer, 1847, Zeitschr. f. Malakoz., **4**, p. 150 (Yucatán); 1850, Syst. Conch.-Cab., **1**, Abt. 18, Pt. 1, p. 14; Pl. 4, figs. 40-43 (type).

Laguna Ocotal, 950 m.; Laguna Ocotal to El Censo, 1000 m.

Known from southern Mexico (Veracruz; Chiapas; Tabasco; Yucatán; Quintana Roo), Guatemala, British Honduras, the Republic of Honduras, Nicaragua, Costa Rica, and Panama; and as subsp. *lamellosa* Guppy from Venezuela and Trinidad.

CYCLOPHORIDAE

NEOCYCLOTUS DYSONI AUREUS (Bartsch and Morrison)

Aperostoma (*Neocyclotus*) *dysoni aureum* Bartsch and Morrison, 1942, Bull. U. S. Nat. Mus., **181**, p. 209; Pl. 28, figs. 13-15 (Panistlahuaca, Oaxaca).

Neocyclotus dysoni aureum Solem, 1956, Proc. Acad. Nat. Sci. Philadelphia, **108**, p. 53 (Oaxaca: Gamboa. Guatemala: Amatitlán. El Salvador: Lake Coatepeque).

Neocyclotus dysoni Fischer and Crosse, 1888, Mission Scientif. Mexique, Moll. Terr. Fluv., **2**, Pt. 10, p. 164 (in part: specimens from Chiapas only). Not typical *N. dysoni* (Pfeiffer, 1853).

Laguna Ocotal, 950 m.; El Sumidero, Tuxtla-Gutiérrez, 1000 m.

N. dysoni is a common widespread and variable species in southern Mexico (Veracruz; Oaxaca; Tabasco; Chiapas; Campeche; and Yucatán), Guatemala, El Salvador, the Republic of Honduras, Nicaragua, Costa Rica and Panama. The subspecies *aureus* is known from Oaxaca, Chiapas, Tabasco, western Guatemala and El Salvador.

AMPHICYCLOTUS PALENQUENSIS (Pilsbry)

Aperostoma (*Amphicyclotus*) *palenquense* Pilsbry, 1935, Proc. Acad. Nat. Sci. Philadelphia, **87**, p. 3; Pl. 1, figs. 3 and 3a-b (district of Palenque, Chiapas).

Megacyclotus palenquensis Bartsch and Morrison, 1942, Bull. U. S. Nat. Mus., **181**, p. 183; Pl. 24, figs. 16-18 (type).

Amphicyclotus (*Amphicyclotus*) *palenquense* Solem, 1956, Proc. Acad. Nat. Sci. Philadelphia, **108**, p. 44 (Veracruz: Motzorongo).

Laguna Ocotal, 950 m.; Monte Líbano, 600 m.; El Censo to

Laguna Ocotal, 700-1000 m.; Monte Líbano to El Censo, 600-700 m.

The 30 specimens from the Lacandona area agree well in shape and in sculpture with the descriptions and figures of Pilsbry and of Bartsch and Morrison. When well preserved, the sculpture consists of microscopic, spiral, slightly wavy, densely crowded lines and coarser diagonal, curved threads, spirally ascending forward and crossing the irregular, vertical growth lines. The retractive threads are often irregular or interrupted by coarse malleations and are usually best marked at the periphery, below which they are sometimes nearly horizontal.

The species was known thus far from only three specimens. The type measured 20.7 mm. in height, 34 mm. in greater diameter and 25.9 mm. in lesser diameter. The corresponding figures for the paratype were 21.7 mm., 34.3 mm. and 26.1 mm. As will be seen from the subjoined table, some of the 22 fully adult shells of the Selva Lacandona approach these measurements closely; a few are slightly smaller (down to 29.8 mm. in greater diameter and 18 mm. high), and several are decidedly larger (up to 41.5 mm. in greater diameter and 24.7 mm. high). The larger specimens seem to bridge the gap between *A. palenquensis* and *A. ponderosus* (Pfeiffer), so far as size is concerned. To judge from the specimens of *A. ponderosus* at the M.C.Z., that species has, however, a decidedly higher spire and a less flattened, more convex body-whorl, as well as a deeper and somewhat narrower umbilicus, than *A. palenquensis*. The sculpture seems to be about the same in both species.

The specimen of *A. ponderosus* figured by Bartsch and Morrison was of about the size of our largest *A. palenquensis*. Other known specimens are, however, much larger (up to 48.5 mm. in greater diameter and 29 mm. high in a series of 4 specimens from northern Guatemala at M.C.Z.). It is therefore possible that *A. ponderosus*, definitely recorded only from Guatemala (Alta Vera Paz) and British Honduras, actually grows larger than *A. palenquensis*. The latter is known only from northeastern Chiapas, the Selva Lacandona being some 70 km. south of Palenque.

In general shape, measurements, depressed spire and widely open umbilicus *A. palenquensis* resembles *Amphicyclotus megaplanus* Morrison (1955, Proc. Washington Acad. Sci., **45**, p. 160,

figs. 29-31), from El Ocote, some 35 km. south of Ocozacoautla, Chiapas and some 180 km. west of the Selva Lacandona. However, the sculpture of the later whorls of *megaplanus* is described as "consisting of fine irregular axial vermiculate ribbing," being similar to that of *Amphicyclotus texturatus* (Sowerby). Solem suggests that *megaplanus* may be only a local race of *texturatus*.

Measurements of Adult *Amphicyclotus palenquensis* (in mm.)

Height	Width		Aperture		Whorls	
	Greater	Lesser	Height	Width		
20.3	38.4	29	19.2	17.7	5½	Laguna Ocotal
20	36.2	27.4	17	15.5	5½	" "
20	35	27.3	16.8	15.5	5⅓	" "
20	34.5	27.5	18	14.4	5⅓	" "
23.7	38	30	18	16.5	5½	Monte Líbano
20.7	37.3	29.3	19.8	16.8	5½	" "
21.5	37	28	18.3	17	5½	" "
21.5	36	28	18	17	5½	" "
20.8	35	27	18	16	5⅓	" "
21	35	27	16.6	15.2	5⅓	" "
21	34.5	27.2	16	15.2	5⅓	" "
20	33.6	27.5	16.5	15.4	5¼	" "
20.8	32.5	25	15.8	15	5¼	" "
18	31.5	26.4	14	13.5	5¼	" "
18.3	31	23.5	15.3	13.7	5¼	" "
19	29.8	24	14.3	13.7	5⅓	" "
24.7	38.7	30.4	19.8	18.8	5½	El Censo to L. Ocotal
21.2	37.6	27	18.4	16.2	5½	" "
22.8	37.3	27	18.6	16.7	5½	" "
20.5	38	30	18	15.7	5½	Monte Líbano to El Censo
20	36.5	27	17.2	15.2	5⅓	" "
22	36.4	28.5	17.3	16	5⅓	" "

PILIDAE (AMPULLARIIDAE)

POMACEA FLAGELLATA GHIESBRECHTII (Reeve)

Ampullaria ghiesbrechtii Reeve, 1856 (December), Conch. Icon., 10, *Ampullaria*, Pl. 26, fig. 123 (Chiapas).

Ampullaria ghiesbreghti Binney, 1865, Land Fresh-Water Shells North America, 3, (Smithson. Misc. Coll. No. 143), p. 7 (emendation of *ghiesbrechtii*).

Ampullaria livescens Reeve, 1856 (August), Conch. Icon., 10. *Ampullaria*, Pl. 5, fig. 21 (no locality).

Ampullaria miltocheilus Reeve, 1856 (December), Conch. Icon., 10. *Ampullaria*, Pl. 25, figs. 102a-b (Chiapas).

Pomus giganteus Tristram, 1863, Proc. Zool. Soc. London, p. 414 (Lake of Petén, Guatemala).

Ampullaria flagellata var. *gigantea* von Martens, 1899, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 412; Pl. 23, fig. 6 (cotype received from Tristram).

Ampullaria malleata var. *chiapasensis* Fischer and Crosse, 1890, Mission Scientif. Mexique, Moll. Terr. Fluv., 2, Pt. 11, p. 235; Pl. 48, fig. 5 (Las Playas, Chiapas; [immature shell duplicated by some specimens from Laguna Ocotal]).

Laguna Ocotal, 950 m., many young shells. The largest measures 53 mm. in length, 50 mm. in greatest width, with the aperture 40 mm. by 24 mm.

Pomacea flagellata (Say) is the common ampullariid snail in Mexico and Central America, from Veracruz southward, as far as Panama and northern Colombia. It is extremely variable in shape and size (when adult), even in the same population. Some 30 names have been proposed for these variations and, as some of these have been proposed either for unusual or freak specimens or for immature or juvenile snails, it is extremely difficult to dispose of them as synonyms of the few races or geographical forms that may be usefully recognized.

One of the best characterized of these races, seemingly restricted to Tabasco, Chiapas and northern Guatemala, is nearly globular in shape, usually about as high as its greatest width, sometimes slightly higher or slightly lower. Under optimum conditions it may reach greater dimensions than any of the other races of the species. "Giant" specimens are particularly common in Lake Petén, whence Tristram described his *P. giganteus*. The original measurements given by Tristram were: height, 95 mm.; greatest diameter, 90 mm.; lesser diameter, 85 mm.; aperture, 66 by 39 mm. The cotype figured by von Martens is 92 mm. high, with the aperture 69.5 mm. long. The largest specimen I have seen from Lake Petén is 102.5 mm. high, 88 mm. in greatest width, with the aperture 74.3 by 42 mm., of about 6 whorls. The largest of several collected by Mr. F. G. Thompson 4 miles south of Villahermosa, Tabasco, is 83 mm. high and 75 mm. wide.

There can be little doubt that the type of Reeve's *A. ghiesbrechtii* was a slightly smaller specimen of *P. giganteus* with unusually bright vermilion margins of the aperture. A brightly colored aperture occurs sporadically in several species of *Pomacea*, but is never a reliable specific character. The color may be more or less pronounced, and, moreover, is often more orange, as in Fischer and Crosse's figure of *A. ghiesbrechtii* from the Usamacinta River in Tabasco (Miss. Scientif. Mexique, Moll. Terr. Fluv., **2**, Pl. 48, fig. 8), where it is present only over the outer margin of the mouth. Reeve's figure of the type of *ghiesbrechtii* is 85 mm. high, 73 mm. in greatest width, with the aperture 59 mm. by 36.5 mm.

A. miltocheilus Reeve appears to be no more than a small specimen of *A. ghiesbrechtii*; it was collected by the same person in Chiapas also, and both may have come from the same population. The figure is 48 mm. high, 43 mm. in greatest width, with the aperture 36.5 mm. by 21.5 mm. The aperture has the same bright vermilion color as the type of *ghiesbrechtii*.

A. livescens Reeve agrees well with some young specimens of *A. ghiesbrechtii* found in Lake Petén with the giant specimens. Although the name was published some months before *ghiesbrechtii*, I prefer to use the latter, because it was based on a fully adult shell from a precise locality and dates from the same year.

POMATIASIDAE

CHONDROPOMA RUBICUNDUM (Morelet)

Cyclostoma rubicundum Morelet, 1849, Test. Noviss. Ins. Cub. Amer. Centr., **1**, p. 22 (Petén and Vera Paz, Guatemala).

Chondropoma rubicundum Fischer and Crosse, 1890, Mission Scientif. Mexique, Moll. Terr. Fluv., **2**, Pt. 11, p. 205; Pl. 41, figs. 5f-h (cotype from Vera Paz).

Laguna Ocotal, 950 m.

Known from Tabasco, Chiapas and Guatemala (Petén and Alta Vera Paz).

BULIMIDAE (HYDROBIIDAE)

AMNICOLA GUATEMALENSIS Fischer and Crosse

Paludina hyalina Morelet, 1851, Test. Noviss. Ins. Cub. Amer. Centr., 2, p. 21 (Lake Amatitlán, Guatemala). Not of Anton, 1839.

Amnicola guatemalensis Fischer and Crosse, 1891, Mission Scientif. Mexique, Moll. Terr. Fluv., 2, Pt. 12, p. 264; Pl. 50, figs. 5 and 5a-b (cotypes; new name for *hyalina* Morelet).

Laguna Ocotal, 950 m.; many dead specimens in a silt deposit on the shore.

The species, known thus far from several localities in Guatemala (Amatitlán; Petén; etc.), is now reported for the first time from Chiapas. Guatemalan specimens were compared.

COCHLIOPA INFUNDIBULUM von Martens

Cochliopa (?) *infundibulum* von Martens, 1899, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 429; Pl. 23, fig. 3 (Guatemala, without precise locality; surmises it may be from Lake Petén).

Laguna Ocotal, 950 m. Many dead specimens in a silt deposit on the shore.

Previously known only from Lake Petén and Laguna de Eckibix, in northern Guatemala (Goodrich and Van der Schalie, 1937, Mus. Zool. Univ. Michigan, Misc. Publ. No. 34, p. 37); now reported for the first time from Chiapas. Guatemalan specimens were compared.

THIARIDAE (MELANIIDAE)

PACHYCHILUS INDIORUM (Morelet)

Melania indiorum Morelet, 1849, Test. Noviss. Ins. Cub. Amer. Centr., 1, p. 25 (Palenque, Chiapas).

Melania indorum Petit, 1853, Jour. de Conchyliologie, 4, p. 162; Pl. 5, fig. 7 (cotype received from Morelet).

Melania laevissima var. *costato-plicata* Brot, 1875, Syst. Conch.-Cab., 1, Abt. 24, p. 35; Pl. 5, fig. 5 (Palenque, Chiapas).

Pachychilus laevissimus var. *varicosa* Fischer and Crosse, 1892, Mission Scientif. Mexique, Moll. Terr. Fluv., 2, Pt. 13, p. 329; Pl. 53, fig. 6 (Palenque, Chiapas).

Monte Líbano, 600 m.; El Censo, 700 m.; Ocosingo, 850 m.; El Real, 600 m. Also many dead shells, found with bones in a rock

shelter near Laguna Ocotal, and others from gopher diggings nearby. No specimens were found alive either in the Laguna or in the streams in the vicinity. The specimens were compared with topotypes collected by Dr. L. Mazotti.

A common freshwater snail in the smaller streams and rivers of Chiapas, Tabasco, Oaxaca, and of eastern and northern Guatemala (Petén, Alta Vera Paz).

PLANORBIDAE

HELISOMA CARIBAEUM (d'Orbigny)

Planorbis caribaeus d'Orbigny, 1841, in de la Sagra, Hist. Fis. Pol. Cuba, Moll., Pt. 1, p. 103; Pl. 13, figs. 17-19 (Havana, Cuba; and Veracruz, Mexico).

Planorbis ancylostomus var. *chiapasensis* Fischer and Crosse, 1880, Mission Scientif. Mexique, Moll. Terr. Fluv., 2, Pt. 8, p. 63; Pl. 34, figs. 5 and 5a-b (Chiapas).

Laguna Ocotal, 950 m.; Río Amarillo at the Sumidero near Las Casas (Mrs. L. Whitaker).

A common species throughout Central America, from Veracruz to Panama, and in the Antilles, from Cuba to Barbados.

TROPICORBIS OBSTRUCTUS (Morelet)

Planorbis obstructus Morelet, 1849, Test. Noviss. Ins. Cub. Amer. Centr., 1, p. 17 (Island of Carmen, Campeche).

Planorbula obstructa Fischer and Crosse, 1880, Mission Scientif. Mexique, Moll. Terr. Fluv., 2, p. 78; Pl. 33, figs. 8 and 8a-d (type from Morelet); Pl. 34, figs. 7 and 7a-c (var. *berendti* Tryon from Orizaba or Veracruz).

Laguna Ocotal to El Censo; a few dead, but fairly fresh specimens.

Definitely known from southern Mexico (Veracruz; Campeche; Oaxaca; Yucatán; Chiapas), Guatemala and British Honduras: The species possibly extends to southern Texas.

TAPHIUS SUBPRONUS (von Martens)

Planorbis (Taphius) subpronus von Martens, 1899, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 396; Pl. 21, 4 figs. 15 (Amatitán, State of Tabasco, Mexico).

? *Taphius subpronus* F. C. Baker, 1945, Molluscan Family Planorbidae, p. 79; Pl. 131, figs. 36-40 (Turrialba, Costa Rica; U.S.N.M. No. 162827).

Laguna Ocotal, 950 m., many dead specimens in a silt deposit on the shore. I have also seen some fresh specimens of this remarkable snail from Lake Coatepeque, El Salvador (N. C. Fassett Coll. — Received through Dr. H. W. Levi).

Von Martens commented upon the close similarity of *subpronus* and *Taphius pronus* von Martens of Lake Valencia, Venezuela. It is, indeed, impossible to point out a reliable difference in the general shape, the method of coiling, the degree of deflection of the aperture, the shape of the aperture and the relative width and depth of the umbilicus, particularly as *T. pronus* varies greatly in all these characters. There remains only the fine spiral striation of the shell, present in fresh specimens of *T. pronus*. There is no trace of this, neither on the weathered specimens from Laguna Ocotal (where they might be worn), nor on the very fresh specimens from Lake Coatepeque. The largest specimen from Laguna Ocotal is 8 mm. in greatest width and 2.8 mm. thick. The largest of the 5 specimens from Lake Coatepeque is 4.5 mm. in greatest width and 2 mm. thick, approximating von Martens' original measurements of 5 mm. and 2 mm.

I am not fully satisfied that F. C. Baker's figures, cited above, actually represent true *T. subpronus*.

ANCYLIDAE

FERRISIA EXCENTRICA (Morelet)

Ancylus excentricus Morelet, 1851, Test. Noviss. Ins. Cub. Amer. Centr., 2, p. 17 (Lake Itzá [= Petén], Guatemala).

Ancylus (*Ancylastrum*) *excentricus* Fischer and Crosse, 1880, Mission Scientif. Mexique, Moll. Terr. Fluv., 2, Pt. 7, p. 37; Pl. 30, figs. 16-16a (type from Morelet).

Laevapex excentricus B. Walker, 1924, The Anacylidae of South Africa, p. 10.

Ferrisia (*Laevapex*) *excentrica* Goodrich and Van der Schalie, 1937, Mus. Zool. Univ. Michigan, Misc. Publ. No. 34, p. 34.

Laguna Ocotal, 950 m., several living specimens in floating vegetation.

Known from southern Texas to Costa Rica.

SUBULINIDAE

LAMELLAXIS EXIGUUS (von Martens)

Leptinaria exigua von Martens, 1898, *Biologia Centr.-Amer.*, Terr. Fluv. Moll., p. 318; Pl. 18, fig. 10 (Teapa in Tabasco).

Laguna Ocotal, 950 m.; Ocosingo, 1000 m.

As von Martens suspected, the original specimens, 5 mm. long, were immature. The lot from Laguna Ocotal comprises three immature shells agreeing with the original description and figure, and one adult, 11.2 mm. long, 5.5 mm. in greatest width, the aperture 5 mm. by 3 mm., of $6\frac{1}{2}$ whorls; the body-whorl is 7 mm. long in front view. The spaced, costulate sculpture of the earlier (post-nepionic) whorls changes gradually to close, finer vertical striae on the later whorls; the striation is replaced by exceedingly fine vertical engraved lines below the periphery of the body-whorl; the first 2 (nepionic) whorls are smooth. In the full-grown shell the columella is shaped about as originally drawn for the young, but the median fold is slightly more pronounced. The outer columellar area is broad and its margin is spread over the wide and deep umbilicus.

The species is known only from Tabasco and Chiapas.

SYNOPEAS BECKIANUM (Pfeiffer)

Bulimus beckianus Pfeiffer, 1846, *Symbolae Hist. Helic.*, **3**, p. 82 (Opara I. ?); 1848, *Monogr. Helic. Viv.*, **2**, p. 164; 1854, *Syst. Conch.-Cab.*, **1**, Abt. 13, Pt. 1, p. 125; Pl. 36, figs. 29-31 (type).

Opeas micra von Martens, 1898, *Biologia Centr.-Amer.*, Terr. Fluv. Moll., p. 294; Pl. 17, figs. 10-11. Not of d'Orbigny, 1835.

Opeas beckianum Pilsbry, 1906, *Man. Conch.*, (2), **18**, p. 189; Pl. 27, figs. 42-46 and 54-55.

Ocosingo, 850 m.; Laguna Ocotal, 950 m.; Monte Líbano to El Censo, 600-700 m.

Widely distributed throughout tropical America, from Veracruz to São Paulo, Brazil, and Peru, as well as throughout the Antilles. It has possibly been spread by man. Pfeiffer's original locality appears to have been erroneous.

The species is evidently not a true *Opeas* and I have followed H. B. Baker (1927, *Occ. Papers Mus. Zool.*, Univ. Michigan, No. **182**, p. 7) in placing it in *Synopeas* Jousseaume (1899). This generic name appears to be antedated, however, by *Synopeas* Foerster (1856) and a substitute may have to be proposed.

OLEACINIDAE

SPIRAXIS SCALARIOPSIS (Morelet)

Bulimus scalariopsis Morelet, 1851, Test. Noviss. Ins. Cub. Amer. Centr., 2, p. 11 (Petén, Guatemala).

Spiraxis scalariopsis Fischer and Crosse, 1877, Mission Scientif. Mexique, Moll. Terr. Fluv., 1, Pt. 6, p. 609; Pl. 25, figs. 1 and 1a-b (type from Morelet's collection).

Monte Líbano to El Censo, 600-700 m.

Known only from Chiapas and Guatemala (Petén).

SPIRAXIS SIMILARIS (Strebel)

Volutaxis similaris Strebel, 1882, Beitr. Mexikan. Land- Süßwasser-Conch., 5, p. 122; Pl. 7, fig. 11; Pl. 17, fig. 18 (Veracruz: Pacho near Jalapa).

Laguna Ocotal to El Censo, 600-700 m., on *Philodendron*.

Known only from Veracruz and Chiapas.

STREPTOSTYLA CHIAPENSIS Pilsbry

Spiraxis parvula Pfeiffer, 1856 (December), Malakoz. Blätt., 3, p. 234 (Chiapas); 1857 (May), Proc. Zool. Soc. London, (for 1856), p. 379 (Chiapas). Not *Achatina parvula* Chitty, 1853, now placed rather doubtfully in *Spiraxis*.

Streptostyla limnaeiformis var. *parvula* von Martens, 1892, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 100; Pl. 5, fig. 24 (specimen from Chiapas, in Pfeiffer's Coll., but probably not the type).

Streptostyla limneiformis chiapensis Pilsbry, 1909, Man. Conch., (2), 20, p. 111 (new name for *Spiraxis parvula* Pfeiffer, 1856).

Laguna Ocotal, 950 m.

The specimen collected at Laguna Ocotal, 6.5 mm. long, shows the deep lines of growth mentioned by von Martens. I regard *chiapensis* as specifically distinct from *S. limneiformis* (Shuttleworth, 1852). *Streptostyla oblonga* (Pfeiffer, 1856) differs from *chiapensis* in the smooth surface of the shell.

Known only from Chiapas.

EUGLANDINA MONILIFERA (Pfeiffer)

Glandina monilifera Pfeiffer, 1845 (October), Proc. Zool. Soc. London, p. 75 (Cobán, "Veracruz" [error for Vera Paz, Guatemala]).

Achatina monilifera Reeve, 1849, Conch. Icon., 5, *Achatina*, Pl. 14, fig. 50 (Cobán; from Dennison Coll.).

Monte Líbano, 600 m.; Monte Líbano to El Censo, 600-700 m.
Known from Veracruz, Guerrero, Chiapas, Guatemala (Petén;
Alta Vera Paz), and Costa Rica.

EUGLANDINA GHIESBREGHTI (Pfeiffer)

Oleacina ghiesbreghti Pfeiffer, 1856 (December), Malakoz. Blätt., **3**, p. 235 (Chiapas).

Achatina (*Oleacina*) *ghiesbreghti* Pfeiffer, 1857 (May), Proc. Zool. Soc. London, (for 1856), p. 379 (Chiapas).

Glandina ghiesbreghti Strebel, 1875, Beitr. Mexikan. Land- Süßwasser-Conch., **2**, p. 39; Pl. 10, figs. 31 and 31a-d (possibly 2 paratypes?).

Laguna Ocotal, 950 m.; El Censo to Laguna Ocotal, 700-1000 m.

This species was known thus far from Chiapas and Tabasco; but I have seen a specimen from Yepocapa, Dept. Chimaltenango, Guatemala (H.T. Dalmat Coll.), some 125 km. east of Chiapas.

SAGDIDAE

THYSANOPHORA IMPURA (Pfeiffer)

Helix impura Pfeiffer, 1866, Malakoz. Blätt., **13**, p. 79 (Mirador, Veracruz).

Thysanophora impura Strebel, 1880, Beitr. Mexikan. Land- Süßwasser-Conch., **4**, p. 30; Pl. 4, 3 figs. 2 (Mirador, topotype; not Pfeiffer's holotype, which was never figured). Pilsbry, 1926, Proc. Acad. Nat. Sci. Philadelphia, **78**, p. 121, figs. 36A-B (Veracruz: Antigua; Pacho; Veracruz. Yucatán: Tekanta; Tunkas; Mérida). Thiele, 1931, Handb. Syst. Weichtierk., **2**, p. 582, fig. 664.

Ocosingo, 850 m.

Known definitely at present from southeastern Mexico (Veracruz, Chiapas and Yucatán). Published records from elsewhere are open to question because the species has often been confused with *T. conspurcatella* (Morelet, 1851).

THYSANOPHORA PILSBRYI H. B. Baker

Thysanophora pilsbryi H. B. Baker, 1922, Occ. Papers Mus. Zool., Univ. Michigan, No. **106**, p. 54; Pl. 17, figs. 11-14 (Veracruz: La Laja near the Hacienda de Cuatotolapan).

Laguna Ocotal, 950 m.

Known only from Veracruz and Chiapas.

THYSANOPHORA FUSCULA (C. B. Adams)

Helix fuscula C. B. Adams, 1849, Contributions to Conchology, No. 2, p. 35 (Jamaica).

Thysanophora fuscula Pilsbry, 1920, The Nautilus, 33, Pt. 3, p. 94, 2 figs. 1 (on p. 93, after a cotype; synonymizes with it *T. fischeri* Pilsbry, 1904).

Thysanophora fischeri Pilsbry, 1904 (January 30), Proc. Acad. Nat. Sci. Philadelphia, (for 1903), p. 763; Pl. 49, figs. 6-6a (Tamaulipas: 4 miles west of Victoria).

Laguna Ocotal, 950 m.; Monte Líbano, 600 m.

Known from Tamaulipas, Veracruz, Chiapas and Jamaica.

ZONITIDAE

HABROCONUS TROCHULINUS (Morelet)

Helix trochulinus Morelet, 1851, Test. Noviss. Ins. Cub. Amer. Centr., 2, p. 10 ("H. non frequens in sylvas Petenenses, circa Sancti-Ludovici pagum;" [=San Luis, Petén, probably the locality of that name in about 16°15'N., 89°25'W.]).

Guppya trochulina von Martens, 1892, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 120; Pl. 6, figs. 17 and 17a-d (Morelet's type, "the only specimen which still exists in his collection").

Habroconus trochulinus H. B. Baker, 1930, Occ. Papers Mus. Zool., Univ. Michigan, No. 220, p. 22; Pl. 7, figs. 10-11 (Veracruz: Penuela to Sumidero, 2625-3400 ft.; Necaxa, 2215-4925 ft.; "common at lower altitudes on leaves of shrubs and trees, quite arboreal").

Laguna Ocotal to El Censo, 700-1000 m., on *Philodendron*; El Real, 600 m.

The specimens from Chiapas agree with H. B. Baker's interpretation of Morelet's *H. trochulina*, which fortunately is in accord with Morelet's type as figured by von Martens. That figure shows the body-whorl even more angulate at the periphery than figured by Baker.

Von Martens concluded that *Helix selenkai* Pfeiffer (1866) could not be separated from *H. trochulinus*, whereas H. B. Baker regards them as distinct (although recognizing that they may only represent two ecological forms). The material before me is too small to decide the matter. A lot of 27 specimens, from the T. Bland Collection, collected at Mirador, Veracruz, by Berendt, who distributed them as *H. selenkai*, appear to be all

H. trochulinus; but the carina at the periphery varies from very strongly marked (more so than drawn by von Martens) to barely indicated, with all transitional stages between these two extremes.

If restricted as H. B. Baker does, *H. trochulinus* is known definitely only from Veracruz, Chiapas and Petén.

OMPHALINA BILINEATA (Pfeiffer)

Helix bilineata Pfeiffer, 1846 (February), Proc. Zool. Soc. London, (for 1845), p. 128 ("locality unknown"); 1852, Syst. Conch.-Cab., 1. Abt. 12, Pt. 2, p. 96; Pl. 83, figs. 23-25 (type; no locality).

Hyalina (Zonyalina) bilineata Pfeiffer, 1865, Malakoz. Blätt., 12. p. 16 (Veracruz).

Omphalina bilineata von Martens, 1892, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 109; Pl. 6, fig. 6 (several localities for the typical form and the varieties, all in the State Veracruz).

Mesomphix (Zonyalina) bilineatus H. B. Baker, 1930, Occ. Papers Mus. Zool., Univ. Michigan, No. 220, p. 28; Pl. 9, figs. 2-4 (anatomy; 2 localities in Veracruz).

Omphalina (Zonyalina) bilineata Thiele, 1931, Handb. Syst. Weichtierk., 2, p. 590.

Laguna Ocotal, 950 m.

Known thus far only from Veracruz and now recorded also from Chiapas.

BULIMULIDAE

BULIMULUS UNICOLOR (Sowerby)

Bulinus unicolor Sowerby, 1833 (July 12), Conchol. Illustr., Pt. 34, Pl. of *Bulinus*, fig. 43 (with name in accompanying printed list; Panama); 1833 (September 26), Proc. Zool. Soc. London, p. 73 (Island of Perico, Gulf of Panama).

Bulimulus unicolor Pilsbry, 1897, Man. Conch., (2), 11. p. 53; Pl. 10, fig. 73. Ocosingo, 1000 m.

Widespread in Central America, from Tabasco and Chiapas to Panama.

DRYMAEUS MORICANDI (Pfeiffer)

Bulinus moricandi Pfeiffer, 1847 (January), Proc. Zool. Soc. London, (for 1846), p. 113 (Cobán, [Guatemala]). Reeve, 1848, Conch. Icon., 5.

Bulimus, Pl. 45, fig. 283 ("Central America;" ? type from Cuming Coll.).

Bulimulus (Drymaeus) moricandi Fischer and Crosse, 1875, Mission Scientif. Mexique, Moll. Terr. Fluv., 1, Pt. 5, p. 497; Pl. 24, figs. 9-9a (Guatemala: Cobán; Vera Paz; Dueñas; with var. *hyalino-albida*, p. 498, from Chiapas).

Drymaeus moricandi Pilsbry, 1899, Man. Conch., (2), 12, p. 78; Pl. 4, figs. 62 (after Reeve) and 63-64 (after Fischer and Crosse).

El Censo to Laguna Ocotal, 700-1000 m.

The five mostly adult specimens collected belong to the var. *hyalino-albida* Fischer and Crosse (1875), being clear whitish, although very fresh. Apart from color, they agree not only with the published figures of Reeve and of Fischer and Crosse, but also with specimens from the Bland Collection (now at M.C.Z.), labeled Guatemala.

There has been some doubt about the specific distinctness of *D. moricandi* and *Drymaeus sulphureus* (Pfeiffer, 1857), probably because of the similarity in color (both species having a pure white and a citron-yellow phase) and the fact that they may occur together in Guatemala. In the series I have compared, full-grown *moricandi* differs consistently in being broader at the body-whorl, with a wider spire, in the longer aperture (which reaches at least half of the total length of the shell), in a relatively wider columellar area, and in a more open and perforate umbilicus. Immature shells are, however, difficult to separate. The largest shell seen from Chiapas is 29 mm. long, 14 mm. in greatest width, the aperture 17 mm. by 9.5 mm.

D. moricandi is only known with certainty from Chiapas and the adjoining northeastern section of Guatemala. *D. sulphureus* is more widely distributed from Veracruz to Costa Rica.

SIMPULOPSIS SIMULA (Morelet)

Bulimus simulus Morelet, 1851, Test. Noviss. Ins. Cub. Amer. Centr., 2, p. 11 (Petén, Guatemala).

Simpulopsis simula Fischer and Crosse, 1877, Mission Scientif. Mexique, Moll. Terr. Fluv., 1, Pt. 6, p. 578; Pl. 24, figs. 13-13a (type from Morelet).

Laguna Ocotal to El Censo, 700-1000 m., on *Philodendron*.

Known only from northern Guatemala (Petén) and Chiapas. This appears to be the second record for the species, which is

probably overlooked because of its extreme fragility and its habitat on leaves of epiphytic plants.

ORTHALICUS PRINCEPS (Broderip)

Bulinus princeps Broderip, 1833 (May 3), Conchol. Illustr., Pt. 27, Pl. of *Bulinus*, 2 figs. 18 (with name in printed list; "Conchagua, Central America" [El Salvador]).

Oxystyla princeps Pilsbry, 1899, Man. Conch., (2), 12, p. 113; Pl. 16, figs. 1-9; Pl. 17, figs. 10-12.

Monte Líbano, 600 m.; Monte Líbano to El Censo, 600-700 m.; San Lorenzo, midway between Ocosingo and El Real.

Known from southern Mexico (Veracruz and Sinaloa) to Panama.

UROCOPTIDAE

EUCALODIUM MEXICANUM (Pfeiffer)

Cylindrella mexicana "Cuming" Pfeiffer, 1860 (February-June), Proc. Zool. Soc. London, p. 139 ("Mexico").

Eucalodium (*Eucalodium*) *mexicanum* Pilsbry, 1902, Man. Conch., (2), 15, p. 6; Pl. 1, figs. 2-3; Pl. 7, figs. 8-10.

Monte Líbano, 600 m.

Known only from Chiapas and Tabasco.

COELOCENTRUM TOMACELLA (Morelet)

Cylindrella tomacella Morelet, 1849, Test. Noviss. Ins. Cub. Amer. Centr., 1, p. 10 (Tabasco).

Coelocentrum tomacella Fischer and Crosse, 1873, Mission Scientif. Mexique, Moll. Terr. Fluv., 1, Pt. 3, p. 342; Pl. 15, fig. 11 (type from Morelet; Tabasco and Palenque in Chiapas).

Laguna Ocotal, 950 m.; Monte Líbano to El Censo, 600-700 m.

Known from Tabasco, Chiapas and eastern Guatemala (Cobán).

MICROCERAMUS CONCISUS (Morelet)

Cylindrella concisa Morelet, 1849, Test. Noviss. Ins. Cub. Amer. Centr., 1, p. 12 (Yucatán).

Macroceramus concisus Fischer and Crosse, 1873, Mission Scientif. Mexique, Moll. Terr. Fluv., 1, Pt. 4, p. 421; Pl. 18, figs. 1 and 1a-b (type from Morelet).

Microceramus concisus Pilsbry, 1903, Man. Conch., (2), 16, p. 155; Pl. 25, figs. 7-12.

Laguna Ocotal, 950 m.; Ocosingo, 1000 m.

Known from Chiapas, Yucatán, Guatemala, Utila I. off the coast of Honduras, and Costa Rica. Most probably *M. concisus* is not specifically distinct from *M. gossei* (Pfeiffer, 1846), from Jamaica and (probably) Cuba, the Bahamas, and Hispaniola.

CEPOLIDAE

LEPTARIONTA TRIGONOSTOMA (Pfeiffer)

Helix trigonostoma Pfeiffer, 1844 (October), in Philippi, Abbild. Besch. Conchyl., 1, Pt. 7, p. 154 (or p. 24); Pl. 5 [misabeled 4] of *Helix*, 2 figs. 8 ("provincia Honduras Americae centralis"); 1845 (August), Proc. Zool. Soc. London, p. 41 ("Veracruz, Province of Honduras, Central America;") [a fictitious, truly Cumingian locality].

Helix (Geotrochus) trigonostoma Fischer and Crosse, 1872, Mission Scientif. Mexique, Moll. Terr. Fluv., 1, Pt. 2, p. 291; Pl. 11, figs. 6 and 6a-d (Guatemala: Petén; Vera Paz; San Augustin; Sierra del Mico, near Izabal).

Helix (Oxychona) trigonostoma Pilsbry, 1889, Man. Conch., (2) 5, p. 132; Pl. 14, figs. 1-4; Pl. 18, figs. 1-2. von Martens, 1892, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 154; Pl. 9, figs. 1, 1a, 9, 9a, 11 and 12, (additional localities in Guatemala: Senahu, N. side of Polochic Valley, above Panzas; Vera Paz; Cobán; near Guatemala City, 5000 ft.; San Juan Riv.; Cerro Zunil, Pacific Slope near Quezaltenango; El Reposo between Retalhuleu and the Pacific; slope of Cordillera, at 2500-4500 ft., at Hacienda San Francisco, Miramar and Helvetia, Buena-vista).

Oxychona trigonostoma Pilsbry, 1894, Man. Conch., (2), 9, p. 190.

Leptarionta trigonostoma Pilsbry, 1897, The Nautilus, 11, No. 8, p. 88.

Laguna Ocotal, 950 m.; El Censo to Laguna Ocotal, 700-1000 m.; Monte Líbano to El Censo, 600-700 m.

The species is now for the first time recorded from reliable Mexican localities, in Chiapas. The supposed occurrence in "Veracruz" has never been confirmed and was evidently one more of the many erroneous localities in the Cuming Collection. The record from "Honduras" is likewise based on an error from the same source. *L. trigonostoma* is restricted to Guatemala and Chiapas, so far as known at present. Dr. H. T. Dalmat collected specimens in Guatemala at Yepocapa, Dept. Chimaltenango, and at the Finca Montequina, Atitlán, Dept. Solola.

The species varies somewhat, not only in the banding, but also in the shape and slope of the spire. I agree with Pilsbry (1899) that it is scarcely useful to distinguish these variants by names, except as collector's items.

AVERELLIA COACTILIATA (Deshayes)

Helix coactiliata "Férussac" Deshayes, 1839, in Férussac, Hist. Nat. Gén. Part. Moll. Terr. Fluv., 1, p. 19; Pl. 75, figs. 1-5 (Real-Llejos, Nicaragua; and "environs de Touspan, au Pérou" [error for Tuxpan, Veraacruz, Mexico]).

Helix (Patula) coactiliata Fischer and Crosse, 1872, Mission Scientif. Mexique, Moll. Terr. Fluv., 1, Pt. 2, p. 234.

Helix (Patula, Discus, Trichodiscus) coactiliata Pilsbry, 1887, Man. Conch., (2), 3, p. 49; Pl. 5, fig. 2.

Helix (Trichodiscina) coactiliata von Martens, 1892, Biologia Centr.-Amer., Terr. Fluv. Moll., p. 133.

Epiphragmophora (Trichodiscina) coactiliata Pilsbry, 1894, Man. Conch., (2), 9, p. 199.

Averellia (Trichodiscina) coactiliata Thiele, 1931, Handb. Syst. Weichtierk., 2, p. 698.

As neither the original description nor the figures were written or published by Férussac (who died in 1836), the name should be credited to Deshayes.

Laguna Ocotal, 950 m.; El Real, 600 m.

A widely distributed snail, perhaps transported sometimes by man. It is known from Tamaulipas, San Luis Potosí, Michoacán, Veraacruz, Tabasco, Chiapas, Yucatán, Guatemala, British Honduras, Nicaragua, Panama, Venezuela and Trinidad.

I am unable to separate *Helix cordovana* Pfeiffer (1857) from *A. coactiliata*.

Additional Species Recorded From Chiapas

The following list of species known from Chiapas, but not mentioned in the preceding pages, is based on published records, as well as on specimens collected by Dr. R. A. Paynter, Jr. and his associates, and more recently (1956) by Mrs. L. Whitaker, outside the Lacandona area. Precise localities are mentioned whenever available; but some species have been recorded thus far merely from "Chiapas." Species of doubtful occurrence or identification have been omitted. The general distribution out-

side the State has been added. Asterisks mark the species which I have seen from Chiapas.

Helicina ghiesbreghti Pfeiffer, 1856. Chiapas. Known also from Tabasco, Guanajuato and Guatemala.

Tomocyclus gealei Crosse and Fischer, 1872. Chiapas. Known also from Guatemala.

Amphicyclotus texturatus (Sowerby, 1850). Chiapas: Chiquihuite, 6200 ft.; Escuintla, Sonconusco. Known also from Veracruz and Guatemala.

Amphicyclotus megaplanus Morrison, 1955. Chiapas: El Ocote, S. of Ocozocoautla.

**Choanopoma chiapasense* Crosse and Fischer, 1877, Chiapas.

**Choanopoma sumichrasti* Crosse and Fischer, 1874. Chiapas: El Sumidero near Tuxtla-Gutiérrez, 1300 m. (R. A. Paynter, Jr.).

Chondropoma vespertinum (Morelet, 1851). Chiapas: Palenque.

**Pachychilus chrysalis* (Brot, 1872) (= *Melania larvata* Brot, 1877). Chiapas: San Pedro in the Cerro de la Gineta; Ixtacomitan. Reported also from Nicaragua by von Martens.

**Pachychilus pyramidalis* (Morelet, 1849). Chiapas: Meyapoc near Ocozocoautla, 1000 m. (R. A. Paynter, Jr.); Rancho El Edén, 2 miles from Ocozocoautla (Mrs. L. Whitaker); Palenque. Also the var. *maximus* (Lea, 1851) from Lake Tzibal, about 50 miles west of Tenosique (D. W. Amram, Jr.). The species is known also from Tabasco, Guatemala and the Republic of Honduras.

**Physa berendti* Strebel, 1874. Chiapas: Río Amarillo at the Sumidero near Las Casas (Mrs. L. Whitaker). Known also from Puebla, Jalisco, Mexico City, Veracruz, Tabasco and Oaxaca.

Vaginula moreleti (Crosse and Fischer, 1872). Chiapas: Palenque.

**Succinea brevis* Pfeiffer, 1850. Chiapas: El Real, 600 m. (R. A. Paynter, Jr.). Known also from Mexico City and the State of Hidalgo.

Lamellaxis gracilis (Hutton, 1834). Chiapas. World-wide in the Tropics; spread by man.

Lamellaxis (?) *semistriatus* (Morelet, 1851). Chiapas: Palenque.

Pseudosubulina (?) *chiapensis* (Pfeiffer, 1856). Chiapas.

Pseudosubulina (?) *trypanodes* (Pfeiffer, 1856). Chiapas.

**Spiraxis nitidus* (Strebel, 1882). Chiapas: El Sumidero near Tuxtla-Gutiérrez, 1300 m. (R. A. Paynter, Jr.). Known also from Veracruz.

Spiraxis sulciferus (Morelet, 1851). Chiapas: Palenque. Known also from Veracruz and Guatemala.

Salasiella pulchella (Pfeiffer, 1856). Chiapas. Known also from Costa Rica.

Streptostyla dubia (Pfeiffer, 1856). Chiapas.

**Streptostyla oblonga* (Pfeiffer, 1856). Chiapas: El Sumidero near Tuxtla-Gutiérrez, 1300 m. (R. A. Paynter, Jr.).

**Streptostyla streptostyla* (Pfeiffer, 1846). Chiapas: El Sumidero near Tuxtla-Gutiérrez, 1300 m. (R. A. Paynter, Jr.).

Streptostyla irrigua var. *shuttleworthi* (Pfeiffer, 1857). Chiapas. Known also from Veracruz and Tabasco.

Streptostyla lurida (Shuttleworth, 1852) (= *S. bocourti* Crosse and Fischer, 1868; *S. lurida* var. *major* von Martens, 1891). Chiapas. Known also from Veracruz, Tabasco, Guatemala and Costa Rica.

Streptostyla nebulosa Dall, 1896. Chiapas: San Cristóbal.

Polygyra chiapensis (Pfeiffer, 1856). Chiapas.

**Polygyra yucatanea* var. *helictomphala* (Pfeiffer, 1856). Chiapas: El Real, 600 m. (R.A. Paynter, Jr.). Known also from Guatemala.

Hawaia minuscula (A. Binney, 1840). Chiapas: Palenque. Nearly world-wide in the Tropics; spread by man.

**Omphalina zonites* (Pfeiffer, 1846). Chiapas: El Sumidero near Tuxtla-Gutiérrez (R. A. Paynter, Jr.).

Pseudohyalina cidariscus von Martens, 1892. Chiapas: Palenque.

Drymaeus chiapasensis (Pfeiffer, 1866) (= *Otostomus chiapensis* von Martens, 1893). Chiapas: Cumbre de Manzanilla. Known also from Veracruz and Puebla.

Drymaeus recluzianus (Pfeiffer, 1847). Chiapas. Known also from Costa Rica (var. *martensianus* Pilsbry, 1899).

**Drymaeus ghiesbreghti* (Pfeiffer, 1866). Chiapas: the Sumidero near Las Casas (Mrs. L. Whitaker). Known also from Colima, Oaxaca and Guatemala.

**Eucalodium decollatum* var. *ghiesbreghti* (Pfeiffer, 1856).

Chiapas. Known also from Guatemala.

**Eucalodium walpoleanum* Crosse and Fischer, 1872. Chiapas: Palenque. Known also from Guatemala.

Eucalodium sumichrasti Crosse and Fischer, 1878. Chiapas.

Coelocentrum attenuatum (Pfeiffer, 1856). Chiapas. Possibly only a variant of *C. tomacella* (Morelet).

Coelocentrum clava (Pfeiffer, 1856). Chiapas. Possibly only a variant of *C. tomacella* (Morelet).

Coelocentrum nelsoni Dall, 1897. Chiapas: Tuxtla-Gutiérrez.

Coelocentrum pfefferi Dall, 1897. Chiapas: Ocozocoautla, 1200 m.

Holospira berendti (Pfeiffer, 1866). Chiapas. Known also from Veracruz.

Epirobia berendti (Pfeiffer, 1866). Chiapas.

Epirobia gassiei (Pfeiffer, 1867). Chiapas. Possibly not separable from *E. berendti*.

**Lysinoë ghiesbreghtii* (Nyst, 1841). Chiapas: Zinacantan, 2000 m. (R.A. Paynter, Jr.); Rancho Nuevo, 8 miles from Las Casas (Mrs. L. Whitaker); mountain above the Sumidero near Las Casas (Mrs. L. Whitaker). Known also from Guatemala, the Republic of Honduras, and El Salvador (Volcán de Santa Ana)

**Xanthonyx chiapensis* (Pfeiffer, 1856). Chiapas.

Elliptio sentigranous (von dem Busch, 1845) (= *Unio corium* Reeve, 1864). Chiapas. Known also from Veracruz.

Elliptio (*Nephronaias*) *calamitarum* (Morelet, 1849); including var. *prolongata* Fischer and Crosse, 1894; var. *nephretica* Fischer and Crosse, 1894; and var. *arcuana* Fischer and Crosse, 1894. Chiapas: Baluntie River near Palenque.

Elliptio (*Nephronaias*) *aeruginosus* (Morelet, 1849). Chiapas: Michol River near Palenque.

Anodontites bambousetarum (Morelet, 1851). Chiapas: Palenque.

IV

ANTS FROM LAGUNA OCOTAL (HYMENOPTERA :
FORMICIDAE)

By

WILLIAM L. BROWN, JR.

The ants from Laguna Ocotal were collected for the most part by Robert L. Dressler, and, unless otherwise indicated, the collections were made from epiphytes, particularly bulbous-based *Tillandsia*, growing in the pine forest or the adjacent tropical evergreen forest. Among the 21 species represented in the collection, 17 can be determined to species in accordance with present-day classifications; the remainder belong to difficult groups in need of revision, or else the sample is in some way unsatisfactory for species determination, so that identification is carried only to genus.

All of these species belong to the tropical American fauna, and all are either widespread in South and Central America or else range at least through Central America and extend northward into Veracruz and neighboring Mexican states. Very few ants have been recorded from Chiapas (see Brown, 1950, *Wasmann Jour. Biol.*, 8: 241-250), but with the present series we have accumulated a sample sufficient to confirm the expected close similarity of the Chiapas ant fauna to those of Guatemala and Veracruz. A few of the records of ants received from E. O. Wilson, collected by him in Veracruz during 1953, are mentioned below where relevant. I also possess a small number of Chiapas ants collected by C. J. Goodnight and L. J. Stannard during the last five years, mostly from soil and leaf-litter berlesates, including new species of dacetines and basicerotines that will be described elsewhere. The soil and soil-cover samples are, of course, quite different from the epigaeic-arboreal collections reported below; on the forest floor, *Wasmannia auropunctata* (Roger), small species of *Pheidole* and *Solenopsis*, *Prionopelta modesta* Forel, and several of the smaller Dacetini are the commonest forms, present in nearly every Berlese sample taken, while *Pachycondyla harpax* (Fabricius), *Ponera nitidula* Emery, *Ponera* spp., and *Brachymyrmex* are rather frequent.

As is well known, some of the forms listed below have been involved in considerable taxonomic uncertainty, due chiefly to unrecognized synonymy. Wherever such synonymy has become obvious from the augmented samples now available in the Museum of Comparative Zoology, I have taken the minimum formal steps necessary to list and justify it.

PLATYTHYREA PUNCTATA F. Smith

From a nest in a fallen log, August 3. Winged forms were present, the males being fully pigmented and apparently active, while most of the females were still in the callow stage or were not yet eclosed. Wilson found this ant foraging on tree trunks after dark in Veracruz and Cuba; the nocturnal tree-climbing habit seems characteristic of many members of tribe *Platythyreini*.

TYPHLOMYRMEX ROGENHOFERI Mayr

Typhlomyrmex rogenhoferi Mayr, 1862, Verh. zool.-bot. Ges. Wien. 12: 737, worker. Type locality: Amazonas.

Typhlomyrmex rogenhoferi race *robustus* Emery, 1890, Bull. Soc. Ent. Ital., 22: 40, worker. Type locality: Alajuela, Costa Rica. NEW SYNONYMY.

Typhlomyrmex robustus subsp. *manco* Wheeler, 1925, Ark. f. Zool., 17A (8): 2, worker. Type locality: Pablobamba, Peru. NEW SYNONYMY.

Prionopelta marthae Forel, 1909, Deutsch. ent. Zeitschr., p. 240, worker. Synonymy by Brown, 1953, Psyche, 59: 104.

This species is very widespread in the forested regions of tropical America, but a single female stray from a log is the first sample so far recorded from Chiapas. Series from different nests from many localities in the Museum of Comparative Zoology show wide diversity in size and in allometric characters, including relative head width, general robustness of body, and sculpture. However, there is often considerable variation in these characters within single nest series, and one particular series, from San Juan Pueblo, Honduras, leg. W. M. Mann, contains extremes of the variation as well as all intergrades; bracketed are the "diagnostic" characters for *robustus* and *manco*, as reviewed for types and metatopotypes, or both, of these two variants before me.

NEOPONERA LINEATICEPS Mayr

A small colony of this rather uncommonly collected ant was taken from a *Tillandsia* base, which is apparently a preferred habitat. It has been taken in Veracruz and Costa Rica on several occasions, but this is the first record from Chiapas. The specific name derives from the peculiar coarse, regular longitudinal striation covering the central part of the upper surface of the head, a feature that will identify the species at a glance under magnification.

NEOPONERA APICALIS (Latreille)

Formica flavicornis Latreille, 1802, Hist. Nat. Fourmis, p. 202, pl. 7, figs. 42B, 43 (?), worker, female, *nec* Fabricius. NEW SYNONYMY.

Formica apicalis Latreille, 1802, *ibid.*, p. 204, pl. 7, fig. 42A (?), worker.

Neoponera Latreillei Forel, 1905, Ann. Soc. Ent. Belg., 49: 161, *nom. pro* *N. flavicornis* (Latreille). NEW SYNONYMY.

Neoponera apicalis var. *verenae* Forel, 1922, Rev. Suisse Zool., 30: 90, worker. NEW SYNONYMY.

A single worker was taken foraging on an epiphyte. This species and the closely related *N. obscuricornis* Emery have been confused through the literature, and the confusion extends to most of the ant collections rich in neotropical material to this day. The outstanding differences between these two species as I see them are: (1) *N. apicalis* has the five or six apical funicular segments a bright, contrasting yellow, whereas in *N. obscuricornis*, the apex of the funiculus is little or not at all lightened, and does not form a sudden contrast with the rest of the antenna. Faded or teneral specimens may seem to be intermediate, but these are rare and are easily identified by the remaining characters. (2) *N. apicalis* has the sides of the petiolar node nearly flat, scarcely or not at all concave or sulcate just next to the posterolateral angles, so that these angles are blunt, whereas in *obscuricornis*, the same angles are thrown into relief by a slight but distinct sulcation extending along the posterior sides of the node from top nearly to base. (3) Of the two species, *apicalis* is slightly but distinctly larger on the average, though there is some overlap in size between the two forms. (4) *N. apicalis* is more opaquely sculptured than is *N. obscuricornis*, though both species are strongly opaque; direct comparison is really

needed to reveal the difference. A study of numerous nest series, in addition to stray workers, convinces me that the foregoing characters are consistently linked in one or the other combination. No difficulty has arisen in assigning fresh worker specimens to one or the other species, and no intergrades have been seen, despite the fact that the two species frequently occur in close proximity over a vast area reaching from the Amazon Basin to southern Mexico. In the Museum of Comparative Zoology, collections of both species at single localities have been made as follows: Kartabo and Kamakusa, British Guiana, leg. W. M. Wheeler; Barro Colorado I., Panama Canal Zone, leg. N. Banks; Laguna Encantada, Veracruz, leg. Q. Jones and R. L. Dressler; Pueblo Nuevo, near Tetzonapa, and Las Hamacas, near Santiago Tuxtla, both in Veracruz, leg. E. O. Wilson. Both species live in plant cavities in arboreal situations, but nothing has been recorded concerning their ecological occurrence in any detail.

While it seems clear enough that two and only two species exist in this complex, the application of names to these entities is still in some doubt. The earliest recognized description of a member of the complex appeared when Latreille claimed to have described two species at once, giving them the names *flavicornis* and *apicalis*. The former name was supposed by Latreille to apply to a *Formica flavicornis* earlier named by Fabricius, but Fabricius' insect is apparently an attine species having nothing to do with *Neoponera*; *flavicornis* is thereby a preoccupied name. Nearly everything about Latreille's characterization of *flavicornis* and *apicalis* is either confused or patently in error, and the confusion extends to the correspondence of the plate figures with their respective descriptions. No reliable difference is mentioned or shown by Latreille that will serve to separate the two forms, and the description of the antennal coloration, if nearly accurate, would indicate that both are referable to *apicalis* in the present sense. This is my interpretation, made without recourse to types, but a thorough examination of the original references in conjunction with fairly good samples of the complex shows that it is the simplest solution to a problem that bothered Latreille, Emery, and Wheeler, among others, to the point where the essentially simple species-to-species relationship became lost to view. The name *latreillei* is an objective synonym

of *flavicornis*. I do not follow Emery's "Genera Insectorum" assignment of *latreillei* as a variety of *obscuricornis* — an assignment which expressed his lack of confidence in *latreillei* as a named entity in his characteristically mild, but in this case totally confusing, fashion. The variety *verenae* was described by Forel in his familiar "final melange" paper of 1922, in which several other formicid variants, since synonymized by various authors, were named on the basis of the most doubtful-appearing evidence. Forel mentions no character that would serve to distinguish *verenae* from typical *apicalis*, and *verenae* comes from the middle of the range of the species.

NEOPONERA UNIDENTATA (Mayr)

Pachycondyla unidentata Mayr, 1862, Verh. zool.-bot. Ges. Wien, 12: 720, worker, female.

Neoponera unidentata var. *rugosula* Emery, 1902, Rend. Accad. Sci. Ist. Bologna, (n.s.) 6: 30, worker; variant spellings are "rugatula" of Santschi and "rugulosa" of Wheeler. NEW SYNONYMY.

Neoponera unidentata, Wheeler, 1929, Zool. Anz., Wasmann-Festband, pp. 29-30, typical form, with the following varieties: var. *eburneipes* Wheeler, p. 29, worker, female. NEW SYNONYMY. var. *maya* Wheeler, p. 30, worker. NEW SYNONYMY. var. *trinidensis* Wheeler, p. 30, worker. NEW SYNONYMY.

Wheeler conceived the named variants above (plus also the "subspecies" *sulcatula* Santschi, *q.v. infra*, which belongs in the *crenata*, not the *unidentata*, complex) as "local varieties" based on differences in color, sculpture, form of petiole, pilosity and some lesser details. There is no doubt that variation exists in these various features, and it is clear that both Emery and Wheeler understood that the variation was graded from series to series even in the limited samples examined by these authors. It is also clear, from the present augmented sample drawn from many parts of the species distribution, that the different characters do not vary according to the same geographic plan. The region of the Upper Amazon Basin shows the strongest variation, especially in sculpture, and the range of the variation there leaves little encouragement for racemakers. While it is possible to trace some series to their general area of origin by the study of trends in individual characters, other samples are ambiguous or contradictory in the display of the same characters. Clearly,

a study of geographical variation by individual characters is required before further attempts are made to classify the populations making up *N. unidentata*.

At the Laguna Ocotal collecting area, the species is characterized in general by a petiolar node a bit less thick from front to rear, as viewed from the side, than in the average Amazonian series. However, I am unable to separate some samples in the Chiapas lot from some taken in the Amazon-Guianas region. According to the locality and the characteristics of the most extreme examples, I suppose the Chiapas series would fall under Wheeler's concept of var. *maya*. This species is common in bulbous-based *Tillandsia* at the Laguna, if Dressler's collections are a fair indication of relative abundance.

N. unidentata and *N. crenata* (Roger), and also *N. carinulata* (Roger), range widely over tropical America. All three inhabit plant cavities, and all are very similar in general habitus, but the types of petiolar node formation are widely divergent.

NEOPONERA CRENATA (Roger)

Ponera crenata Roger, 1861, Berlin. ent. Zeitschr., 5: 3, female, *nom. pro*

Ponera pallipes Fr. Smith, 1858, p. 98 *nec* p. 87.

The series from Laguna Ocotal (and most collected elsewhere in southern Mexico) agree best with the form described by Forel as *N. stipitum*, of which a cotype rests in the Museum of Comparative Zoology. For the present, I am unable to find any satisfactory characters to separate *stipitum* from *crenata*, and I incline to the belief that a thorough study, with resort to the scattered types of these and other named variants of the complex, will see them all merged under the name *crenata*. Meanwhile, we may tentatively associate various morphological tendencies with the names attached to the several inadequate descriptions involved.

The populations of which I have samples vary widely in size from nest to nest, although intranidal variation is relatively restricted. Weakly correlated with size is the shape of the petiolar node; this correlation holds best at the extremes of the size range, but is poor in intergradient series. Larger specimens (*ca.* 11 to 12.5 mm. in TL, or total outstretched length of body, including head and mandibles) have the posterior nodal face vertical

throughout, and distinct from the dorsal face, and the compound eyes tend to be farther from the front of the sides of the head, e.g., Kartabo, British Guiana, nos. 60, 425, leg. W. M. Wheeler. These correspond to my idea of "typical" *crenata* (= *pallipes* F. Smith preocc.).

In smaller specimens, such as the Wheeler Kartabo series nos. 495, 708, 679, 286, 507, 671, 148 and 621, among many others, TL averages only 6 to 8 mm. In these, the eyes may be closer to the anterior cephalic margins and the posterior nodal face is often (not always) more convex, with the surface curving continuously into the dorsal face; such specimens correspond to *stipitum* Forel. It is worth noting that the female node, as usual among ponerines, is higher and thinner in lateral-view profile than in the workers from the same nest. This caste difference appears to have caused some confusion in the complex in the past.

A specimen from Espiritu Santo, Brazil (TL 8.8 mm.) and some others away from the Kartabo locality appear to be transitional between the large and small forms, but this would not necessarily preclude the specific distinction between two closely related forms where sympatric, as at Kartabo and elsewhere in the Amazon-Orinoco Basins (perhaps a case of "character displacement"). The intermediate forms seem to be the same as *moesta* Mayr, the var. *moesta* of authors. The polynomials *N. crenata fiebrigi* Forel, *N. crenata confusa* Santschi, *N. crenata confusa lata* Santschi and *N. unidentata sulcatula* Santschi seem from their descriptions to represent minor southern nest variants in the small-to-medium size range of the *crenata* complex; these names are almost sure to prove synonymous when properly studied. In view of the insufficiency of my present sample (though it is considerably better than exists in other collections known to me) and the difficulty of seeing all the types involved, I have left formal synonymy in this group to some future worker.

ECITON BURCHELLI (Westwood)

Workers were taken from a raiding column near the Laguna Ocotal camp. These specimens would undoubtedly be placed as "race *parvispinum*" by Father Borgmeier; however, the head

of the largest major (soldier) in the series is dingy yellowish-white in color.

PSEUDOMYRMEX PALLIDUS F. Smith

A few workers from a *Tillandsia*.

PSEUDOMYRMEX GRACILIS (Fabricius)

This is the common bicolored form of the species often known as var. or subsp. *mexicanus*. It may be that the bicolored form is suppressed in northern South America where other bicolorous species of similar size and appearance become common. The geographical variation of this complex, while outstandingly conspicuous, has never been carefully and thoroughly investigated.

PHEIDOLE PUNCTATISSIMA Mayr

Two colonies were taken in epiphytic plants.

PHEIDOLE spp.

Two indeterminate species of *Pheidole* were taken in *Tillandsia*. One of these is in the confusing *biconstricta* group, and the other is a much smaller species. *Pheidole* is one of the very large (1,000-plus named forms) ant genera currently "out of control" taxonomically. Until adequate revisions of these groups become available, description of isolated new species only adds to the confusion and the unrecognized synonymy. Possibly one half of the names currently remaining unchallenged in *Pheidole* are synonyms of older names, and identification of species with any certainty is hopeless in most faunas, even where helpful preliminary revisionary attempts have been published.

PROCRIPTOCERUS SCABRIUSCULUS Emery

A stray worker from foliage. E. O. Wilson also took a worker during 1953 at Las Hamacas, near Santiago Tuxtla, Veracruz. This and the following two cephalotine species were determined from revisionary papers on the cephalotines by W. W. Kempf. The work of Father Kempf is refreshingly sound and useful as

compared to the majority of publications on neotropical ants with which the would-be identifier has to grapple.

PARACRYPTOCERUS CRISTATUS (Emery)

A stray soldier. E. O. Wilson took a colony of this species at Las Hamacas, Veracruz, on August 27, 1953, occupying three internodes of a living *Cecropia* tree about 15 feet tall in tropical evergreen forest.

PARACRYPTOCERUS SCUTULATUS (F. Smith)

A soldier and workers. The species is widespread from southern Mexico to Venezuela.

SMITHISTRUMA EPINOTALIS (Weber)

This little dacetine normally lives in plant cavities well above the ground. The collection at Laguna Ocotál was made from a *Tillandsia*, but collections from Veracruz, sent by N. L. H. Krauss and by E. O. Wilson, were taken from hollow twigs of standing shrubs and trees.

ACROMYRMEX OCTOSPINOSUS (Reich)

Foraging workers of this fungus-growing ant stole rice from the Laguna Ocotál camp. The species has been discussed at length by W. M. Wheeler (1937, "Mosaics and other anomalies among ants," Harvard Univ. Press. Cf. pp. 69-74), who detailed the ambiguity of the characters supposed to separate it from *A. hystrix* (Latreille). Wheeler suggested as a better separatory character the presence or absence of bilateral tubercles or carinae on the propodeal dorsum; however, Wheeler's own series of the two forms in the Museum of Comparative Zoology appear to grade through on this basis without a break.

The distinction of the "races" *echinator* Forel, *inti* Wheeler, *volcanus* Wheeler, *ekchuah* Wheeler and *cubanus* Wheeler seems to me at least as precarious as the specific separation of *hystrix* from *octospinosus*. The differences supposed to separate these forms are weak and variable, and seem to mark mere individual or nest varieties in some cases; even if they prove later to follow

to some degree geographical trends, there seems little to be gained by placing formal names upon these samples at this time. As seems to be the case with a large number of the subspecies so far described in the animal kingdom, these examples are based on entirely inadequate samples from restricted localities, and in their description scant thought seems to have been given to the overall trends in variation of the characters within the whole species.

AZTECA sp.

A small brownish form, represented by minor workers only.

BRACHYMYRMEX OBSCURIOR Forel

Specimens from *Tillandsia* seem to agree best with descriptions and other determined material of this species, though determinations in this genus are doubtful in the absence of anything better than Santschi's revision.

NYLANDERIA ?GUATEMALENSIS (Forel)

This slender yellowish form is usually placed as a subspecies of *vividula*, but since the taxonomy of this genus is so poorly worked out, I feel that it is better to accord provisional species rank to those names not obviously synonyms. The *guatemalensis* syntype in the Museum of Comparative Zoology is badly damaged, rendering the comparison uncertain.

CAMPONOTUS CIRCULARIS Mayr

Stray workers and a small colony or colony-fragment from *Tillandsia* plants.

V

FISHES FROM LAGUNA OCOTAL

By

ROBERT RUSH MILLER¹

Since no special collecting equipment was available, *only a very limited sample of the fish fauna of this lake was obtained. Forty-seven specimens, representing four species in three families, were secured by dipnet, bent pin, and rifle (using .22 caliber dust shot) between July 21 and August 14, 1954, by various members of the expedition. Many of the examples are twisted, with broken fins and missing scales, thus rendering a careful study difficult or impossible. One viviparous species cannot be identified with certainty to genus since no males were obtained. Although two new species appear to be represented, no suitable type material is available and further well-preserved series, including both sexes, are needed to clarify their status. The following report, therefore, is necessarily of a preliminary nature.

The specimens listed below have been divided between the Museum of Comparative Zoology and the Museum of Zoology of the University of Michigan.

Despite the small size of the collection, a most interesting fish fauna is indicated for Laguna Ocotal. Isolation no doubt has been a potent factor in the differentiation of endemic species in this remote area.

CHARACIDAE

Characins

ASTYANAX FASCIATUS (Cuvier). Banded tetra.

This is one of the widest ranging freshwater fishes of the Americas. It is known from Argentina northward on the Atlantic slope to western Texas and adjacent parts of New Mexico, and on the Pacific slope from Colombia to western Mexico (Río Armería basin of Colima and Jalisco).

¹ Museum of Zoology of the University of Michigan, Ann Arbor, Michigan.

There are 10 adults, 59 to 107 mm. in standard length. The number of anal fin-rays varies as follows: 22(4), 23(4), and 24(2). Recognition of subspecies of *A. fasciatus* is currently made largely on the basis of the anal-ray count. The above specimens could be assigned to *A. f. aeneus* (Günther) or they might be interpreted as intergrades between that lowland form and the highland subspecies, *A. f. mexicanus* (de Filippi). I prefer to postpone assignment until a good series is available from Laguna Ocotál, especially since these specimens have a more oblique mandible and more posterior dorsal fin than specimens of *A. f. aeneus* from the Usumacinta basin in Guatemala.

The following color notes were made in Ann Arbor on October 29, 1954. The fins of the three largest fish (98, 105 and 107 mm. S.L.) are bright yellow-orange to deep red-orange as follows: over seven-eighths of the pelvic fins (tips of rays clear), the anteriormost 9 rays to all of the rays of the anal fin, the outer one-half of the caudal rays (except 3 to 4 rays of each lobe, which are colored their entire lengths), and the median part of the pectoral rays (weakly colored). The dorsal fin is clear in one, faintly yellowish on the distal half in another, and yellow-orange on the same rays in the third. The seven smaller fish show weaker color on these fins or none at all.

POECILIIDAE

Livebearers

PSEUDOXIPHOPHORUS BIMACULATUS (Heckel)

This species is known along the Atlantic slope of Middle America from Veracruz, Mexico, to Miranda, Nicaragua; its altitudinal distribution is from near sea level to about 3,500 ft.

Twenty-three young to adult specimens, 16 to 49 mm. long, including 3 mature males, were obtained. The scale crescents are conspicuously blackened. Dorsal-ray counts are as follows: 13(3), 14(12), and 15(8). According to current practice, this sample is assignable to *P. b. taeniatus* Regan (see Hubbs, 1935, Univ. Mich. Misc. Publ. No. 28: 9-10, and references cited therein), a subspecies known to range from Mexico to Honduras.

Undetermined genus and species.

There are 2 adult females of a species of poeciliid which I cannot identify with any known member of the family. In the absence of males, I am uncertain to which genus the species belongs. Reference to the Poeciliidae (rather than to some other cyprinodont family) is assured from the nature of the first 3 rays of the anal fin (unbranched) and of the neuromasts or pit organs on the scale rows (see Hubbs and Miller, 1954, *Zoologica*, 39 (1) : 2).

The general body form is similar to that of *Lucania parva* (Baird and Girard), a species of the oviparous family Cyprinodontidae, although it is more angulate anteriorly, both in dorsal and ventral profiles. The dorsal fin is long, containing 12 rays in each specimen; the anal fin has 9 rays. The origin of the dorsal fin is midway between the base of the caudal fin and the tip of the snout. There is a faint, dark line along the midside of the body that fades out anteriorly, and the skin beneath the anterior half of the exposed part of each scale on the back and sides shows a concentration of coarse chromatophores. There are no distinctive markings.

The mandible is short and nearly vertical, indicating a surface-feeding habit. The teeth are distinctive: those in the outer row of each jaw are large and asymmetrical (shaped like the tip of a tableknife blade), and are tilted obliquely away from the center towards the outer margin of the jaws; they are most strongly oblique nearest the midpoint of each jaw, becoming almost erect at the margins. There is a toothless gap at the midpoint in the lower jaw. Inside of each outer row of teeth is an irregular series of small, conical teeth.

The body shape, long dorsal fin, oblique mouth, and distinctive dentition comprise characters which set this species apart from any poeciliid known to me from Middle America. The jaw dentition of *Xiphophorus helleri* (Heckel) is very similar and the species in question may pertain to that genus; it does not represent that species, however, which differs in coloration, mouth width, a less oblique lower jaw, the more robust body, etc. The dentition of the outer jaws is similar also in specimens of *Phallichthys pittieri* (Meek), but the teeth of that species are more loosely attached and more numerous and other marked differences indicate no intimate relationship.

CICHLIDAE

Mojarras

CICHLASOMA species

Twelve specimens, 51 to 96 mm. long, represent a species of the "Section" (or subgenus) *Parapetenia* of Regan (1906, *Biologia Centrali-Americana, Pisces*, 8: 26). However, I cannot place the present form with any of those treated by Regan or by subsequent authors. What remains of the color pattern is suggestive of both *C. salvini* and *C. urophthalmus*, but the Ocotlán specimens otherwise differ in many ways from both of those species. There are rather definite to indistinct vertical to oblique bands along the sides, numbering not more than 10 or 11, the anteriormost 2 to 3 extending obliquely forward across the nape (as in *C. nigrofasciatum*). An irregular, usually disrupted, lateral band extends from the upper angle of the opercle, reaching backward not farther than to below the middle of the soft dorsal fin. Some specimens have a prominent black spot at the base of the upper half of the caudal fin (and lying entirely above the posterior extension of the lateral line) which is surrounded by a light area, as in *C. urophthalmus* (see Günther, 1868, *Trans. Zool. Soc. London*, 6: Pl. 72, fig. 1); this spot is indistinct or obsolete in other specimens. The two largest fish are entirely black (a melanistic phase?) and have a shorter pectoral fin (not reaching origin of anal), but otherwise agree with the ten smaller fish. In the latter, the pectoral fin extends to above or slightly beyond the origin of the first anal spine. It is possible that the two black specimens represent a different species, but this point cannot be determined satisfactorily on the basis of the present material.

The spinous dorsal is long and low, comprising 18 spines in 9 and 19 in 3 specimens; the soft dorsal has 9 rays in all; the anal spines are numerous: 8 in 7 and 9 in 5; and the soft rays of the anal fin vary as follows: 6(1), 7(7), 8(3), and 9(1). A narrow but definite frenum is present in each specimen and the gillrakers (total number, including rudiments) number 9(1), 10(9), and 11(2). The premaxillary spines extend posteriorly from about the front to the middle of the orbit.

The large number of dorsal and anal spines (with correspondingly few soft rays), the body form, and the coloration appear to be among the distinguishing characters of this species.

VI

REPTILES AND AMPHIBIANS FROM
THE SELVA LACANDONA

By

BENJAMIN SHREVE

As this section of the report deals only with the reptiles and amphibians collected during 1954 in the Selva Lacandona, it is perhaps fitting to mention that Raymond A. Paynter, Jr. and Robert L. Dressler collected reptiles and amphibians in other parts of Chiapas and elsewhere in Mexico. Although not included in this study, these are much appreciated.

Of those collected in Chiapas, a specimen of *Stenorhina f. freminvillii* Duméril, Bibron and Duméril from Ocosingo, should be mentioned as representing the first record of this race for the state. It will be seen that of those species discussed in the report, several are new to Mexico or to Chiapas.

It seems advisable to mention that the wholesale restriction of type localities by Smith and Taylor (1950, Univ. Kansas Sci. Bull., **33**, pp. 313-380) is not followed here because of the numerous instances of error and poor judgment, aside from being considered unnecessary. See comments of Dunn and Stuart (1951, Copeia, p. 55; and 1951, Science, **113**, p. 677).

CROCODYLUS MORELETII Duméril and Duméril

Crocodylus Moreletii Duméril and Duméril, 1851, Cat. Meth. Rept., p. 28; Lake Petén, Guatemala.

imm. ♂ (M.C.Z. 53860) Laguna Ocotal, Aug. 12.

cranium (M.C.Z. 53903) Laguna Ocotal, July-Aug.

The remains of what appears to be an immature *Pseudemys scripta ornata* (Gray) were found in the stomach of M.C.Z. 53860, now a made up skin.

KINOSTERNON LEUCOSTOMUM Duméril and Duméril

Kinosternon Leucostomum Duméril and Duméril, 1851, Cat. Meth. Rept., p. 17; Mexico, etc.

1 (M.C.Z. 53861) Laguna Ocotal, July-Aug.

ANOLIS TROPIDONOTUS SPILORHIPIS Alvarez del Toro and Smith

Anolis tropidonotus spilorhipis Alvarez del Toro and Smith, 1956, *Herpetologica*, **12**, p. 9: Cerro Ombligo, 1280 m., Chiapas, Mexico.

6 (M.C.Z. 53855-7) Monte Líbano, July 16-18.

4 (M.C.Z. 53858-9) Laguna Ocotal, July-Aug.

11 (M.C.Z. 53887-91) Laguna Ocotal to El Censo, Aug. 20.

8 (M.C.Z. 53894-7) El Censo to Monte Líbano, Aug. 21.

On comparing this series with one from near El Potrero, Veracruz, identified as *tropidonotus*, I find that the former has a differently colored dewlap, smaller ventrals as compared with the dorsals, and possibly larger head scales. These are mentioned by the two authors of this new form as differences between their new race and the typical form.

ANOLIS LIMIFRONS RODRIGUEZII Bocourt

Anolis rodriguezii Bocourt, 1873, *Miss. Sci. Mex., Rept.*, p. 62, pl. 13, fig.

1: Panzos, Alta Vera Paz, Guatemala.

3 (M.C.Z. 53862-4) Laguna Ocotal, July-Aug.

I am doubtful about the validity of *microlepis* Alvarez del Toro and Smith (1956, *Herpetologica*, **12**, p. 4) as a race.

ANOLIS CAPITO Peters

Anolis (Draconura) capito Peters, 1863, *Monatsb. Akad. Wiss. Berlin*, p. 142: Costa Rica.

2 (M.C.Z. 53865-6) Laguna Ocotal, July-Aug.

1 (M.C.Z. 53893) El Censo to Monte Líbano, Aug. 21.

This is the first record of *capito* from the state of Chiapas.

BASILISCUS VITTATUS Wiegmann

Basiliscus vittatus Wiegmann, 1828, *Isis von Oken*, **21**, p. 373: Mexico.

1 (M.C.Z. 53850) Monte Líbano, July 16-18.

7 (M.C.Z. 53867-71) Laguna Ocotal, July-Aug.

1 (M.C.Z. 53898) El Censo to Monte Líbano, Aug. 21.

CORYTHOPHANES HERNANDEZII (Wiegmann)

Chamaeleopsis Hernandezii (sic) Wiegmann, 1831, *Isis von Oken*, **3**, p. 298: Mexico.

5 (M.C.Z. 53872-6) Laguna Ocotal, July-Aug.

LYGOSOMA ASSATUM CHERRIEI (Cope)

Mococa cherriei Cope, 1893, Proc. Amer. Philos. Soc., **31**, p. 340: Palmar, Costa Rica.

3 (M.C.Z. 53877-8) Laguna Ocotal, July-Aug.

1 (M.C.Z. 53892) Laguna Ocotal to El Censo, Aug. 20.

Recently Mittleman (1950, Herpetologica, **6**, p. 19) proposed *Scincella* for all New World members of *Lygosoma*. However, Schmidt (1953, Check List N. Amer. Amph. Rept., p. 147) treats *Scincella* as a subgenus of *Lygosoma*, which seems a better course.

RHADINAEA DECORATA DECORATA (Günther)

Coronella decorata Günther, 1858, Cat. Snakes Brit. Mus., p. 35: Mexico.

♂ (M.C.Z. 53899) El Censo to Monte Líbano, Aug. 21.

Midbody scale rows 17; ventrals 118; subcaudals 73+.

LAMPROPELTIS DOLIATA POLYZONA Cope

Lampropeltis polyzona Cope, 1860, Proc. Acad. Nat. Sci. Philadelphia, **12**, p. 258: Cuatupe, near Jalapa, Veracruz, Mexico.

♀ (M.C.Z. 53849) Monte Líbano, July 16-18.

♀ (M.C.Z. 53879) Laguna Ocotal, July-Aug.

Midbody scale rows 21-23; ventrals 233-238; subcaudals 54+ -56. This form was previously unrecorded from Chiapas.

SIBON DIMIDIATUS (Günther)

Leptognathus dimidiata Günther, 1872, Ann. Mag. Nat. Hist. (4) **9**, p. 31: Mexico.

♀ (M.C.Z. 53882) Laguna Ocotal, July-Aug.

Midbody scale rows 15; ventrals 182; subcaudals, with some doubt, 109. James A. Peters, who is revising the *Dipsas* group, tells me this species belongs in the genus *Sibon*, and that if a subspecies is recognizable this Ocotal snake belongs to the typical form.

This specimen provides the first definite locality record for Mexico, although *dimidiatus* is known from Piedras Negras, Petén, just over the Guatemalan border.

IMANTODES CENCHOA LEUCOMELAS Cope

Himantodes leucomelas Cope, 1861, Proc. Acad. Nat. Sci. Philadelphia, **13**, p. 296: Mirador, Veracruz, Mexico.

♂ (M.C.Z. 53881) Laguna Ocotal, July-Aug.

Midbody scale rows 17; ventrals 249; subcaudals 161.

CONIOPHANES FISSIDENS FISSIDENS (Günther)

Coronella fissidens Günther, 1858, Cat. Snakes Brit. Mus., p. 36: Mexico.

♂ (M.C.Z. 53880) Laguna Ocotal, July-Aug.

Midbody scale rows 21. Neither ventral nor subcaudal counts can be supplied as the specimen is decayed anteriorly and much of the tail is missing. The snake was found dead.

Though this is the first Chiapas record of typical *fissidens*, as defined by Smith and Taylor (1945, Bull. U. S. Nat. Mus., 187, p. 39), it may not have much significance as the races of this species still appear in need of revision.

MICRURUS AFFINIS APIATUS (Jan)

Elaps apiatus Jan, 1858, Rev. Mag. Zool., p. 522, col. pl. 1; Vera Paz, Guatemala.

♂, ♀, imm. (M.C.Z. 53883-5) Laguna Ocotal, July-Aug.

Midbody scale rows 15; ventrals 205 (♂), 217 (♀), 226 (imm.); subcaudals 50 (♂), 41 (♀), 37 (imm.). These specimens show evidence of intergradation with *alienus*, but are nearer *apiatus*. In one snake the white blotch on the end of the snout is reduced; in another it is absent. In one the number of black body annuli is reduced to 29, which is one in excess of the maximum given for *alienus*, and one higher than the minimum for *apiatus*.

MICRURUS ELEGANS ELEGANS \geq VERAEPACIS

Elaps elegans Jan, 1858, Rev. Mag. Zool. p. 524, col. pl. 2: Mexico.

Micrurus elegans veraepacis Schmidt, 1933, Zool. Ser. Field Mus. Nat. Hist., 20, p. 32; Campur, Alta Vera Paz, Guatemala.

♀ (M.C.Z. 53900) El Censo to Monte Líbano, Aug. 21.

Midbody scale rows 15; ventrals 217; subcaudals 32. The ventral and caudal counts are intermediate between those given by Schmidt (*loc. cit.*) for the two races mentioned above.

BOTHROPS ATROX (Linnaeus)

Coluber atrox Linnaeus, 1758, Syst. Nat. ed. 10, 1, p. 222: "Asia" (in error; restricted to Surinam by Schmidt and Walker, 1943).

♂ (M.C.Z. 53886) Laguna Ocotal, July-Aug.

Midbody scale rows 25; ventrals 212; subcaudals 70. Smith and Taylor (1945, Bull. U. S. Nat. Mus., **187**, p. 180) regard *asper* (*sic*) as a race of *atrox*, but it seems better to use the binomial pending a revision of the species. As *Bothrops* is of feminine gender, *aspera* is the proper rendering for this adjectival name when used with that genus.

BUFO MARINUS (Linnaeus)

Rana marina Linnaeus, 1758, Syst. Nat. ed. 10, **1**, p. 211: America.

1 (M.C.Z. 28212) Monte Líbano, July 16-18.

On comparing this specimen with toads from Veracruz, Nuevo León, and Guerrero, I failed to find the differences mentioned by Taylor and Smith (1945, Proc. U. S. Nat. Mus., **95**, p. 551) as distinguishing their Chiapas material from the rest of their Mexican toads, although they referred all to *Bufo horribilis* Wiegmann. These authors fail to state how *horribilis* differs from the several other forms that undoubtedly have been included in what is conventionally regarded as *marinus*, whose type locality was probably Surinam. Head and body length 150 mm.

BUFO VALLICEPS Wiegmann

Bufo valliceps Wiegmann, 1833, Isis von Oken, **26**, p. 657: Mexico.

4 (M.C.Z. 28213-6) Monte Líbano, July 16-18.

20 tadpoles (M.C.Z. 28239) Laguna Ocotal, July-Aug.

13 (M.C.Z. 28240-4) Laguna Ocotal to El Censo, Aug. 20.

4 (M.C.Z. 28251-4) El Censo, Aug. 20.

6 (M.C.Z. 28259-63) El Censo to Monte Líbano, Aug. 21.

The tadpoles are only tentatively referred to this species.

LEPTODACTYLUS MYSTACEUS LABIALIS (Cope)

Cystignathus labialis Cope, 1877, Proc. Amer. Philos. Soc., **17**, p. 90: Probably Mexico.

1 (M.C.Z. 28255) El Censo, Aug. 20.

This form seems to differ from typical *mystaceus* only in size, while no differences at all could be detected between *mystaceus* and the West Indian *albilabris*. Possibly some color differences might be found with living material.

ELEUTHERODACTYLUS ALFREDI CONSPICUUS Taylor

Eleutherodactylus conspicuus Taylor, 1945, Proc. U. S. Nat. Mus., **95**, p. 567:

Piedras Negras, Petén, Guatemala, near Mexico-Guatemalan border.

1 (M.C.Z. 28224) Laguna Ocotal, July-Aug.

Trinomials are used as *conspicuus* is probably just the southern representative of *alfredi*. The differences between the two forms appear to be very slight. Although the type locality of *conspicuus* is in nearby Petén, this is the first time that this subspecies has been recorded from Mexico.

ELEUTHERODACTYLUS LATICEPS (Duméril)

Hylodes laticeps Duméril, 1853, Ann. Sci. Nat. Paris (3), zool., **19**, p. 178: Yucatán, Mexico.

1 (M.C.Z. 28220) Monte Líbano, July 16-18.

7 (M.C.Z. 28225-9) Laguna Ocotal, July-Aug.

2 (M.C.Z. 28245-6) Laguna Ocotal to El Censo, Aug. 20.

These specimens agree closely with Kellogg's description of *laticeps* (1932, Bull. U. S. Nat. Mus., **160**, pp. 93, 106), which was taken from the unique type. Kellogg does not mention the length of the tarsal fold, which in our material extends from about one-half to two-thirds the length of the tarsus. The entire underside of the lower jaw and throat, *not* just the sides of the throat as in the type, is stippled with brown. In one specimen (M.C.Z. 28246) the usual black side of the upper jaw is reduced to a spot under the eye.

The largest example (M.C.Z. 28227) has a head and body length of 78 mm. The much larger size of *laticeps* and its somewhat different coloring seem to be the chief characters separating it from the closely related Central American *E. gollmeri* (Peters). But in color *gollmeri* sometimes shows the same variation as is described above for M.C.Z. 28246.

ELEUTHERODACTYLUS RUGULOSUS (Cope)

Liyla rugulosa Cope, 1869, Proc. Amer. Philos. Soc., **11**, p. 160: Pacific region of the Isthmus of Tehuantepec, Mexico.

1 (M.C.Z. 28221) Monte Líbano, July 16-18.

2 (M.C.Z. 28222-3) Laguna Ocotal, July-Aug.

4 (M.C.Z. 28247-50) Laguna Ocotal to El Censo, Aug. 20.

1 (M.C.Z. 28258) El Censo to Monte Líbano, Aug. 21.

All are subadult so that some are referred to *rugulosus* with considerable doubt.

HYLA LOQUAX Gaige and Stuart

Hyla loquax Gaige and Stuart, 1934, Occ. Pap. Mus. Zool. Univ. Michigan, no. 281, p. 1: Ixpuc Aguada, north of La Libertad, Petén, Guatemala.

♂ (M.C.Z. 28238) Laguna Ocotal, July-Aug.

The color pattern differs somewhat from that of our two paratypes and the original description. A blackish suffusion on the dorsum extends forwards about as far as the insertion of the forelimbs, the anterior border being nearly straight; head and body length 41 mm. Although known from Piedras Negras, Petén, just across the Guatemalan frontier, this is the first record from Chiapas.

HYLA PHAEOTA CYANOSTICTA Smith

Hyla phaeota cyanosticta Smith, 1953, Herpetologica, 8, p. 150: Piedras Negras, Petén, Guatemala.

3 (M.C.Z. 28217-9) Monte Líbano, July 16-18.

The largest of these unquestionably belongs to this race. The two smaller examples (M.C.Z. 28218-9) are less certain. They do not show the reticulation or spotting on the limbs and sides displayed by the large specimen.

This constitutes the first Mexican record for both the species and the race, as Smith's material came from the Guatemalan side of the Chiapas-Guatemala line (see type locality above).

RANA PALMIPES Spix

Rana palmipes Spix, 1824, Nov. Spec. Test. Ran., p. 29, pl. 5, fig. 1: Amazon River, Brazil.

28 (M.C.Z. 28234-7) Laguna Ocotal, July-Aug.

2 (M.C.Z. 28270) Laguna Ocotal to El Censo, Aug. 20.

1 (M.C.Z. 28256) El Censo, Aug. 20.

1 (M.C.Z. 28257) El Censo to Monte Líbano, Aug. 21.

It is likely that these Mexican frogs are subspecifically distinct from topotypic Brazilian material. A revision is needed.

RANA PIPIENS Schreber

Rana pipiens Schreber, 1782, Der Naturforscher, Halle, 18, p. 185, pl. 4: Raccoon, Gloucester County, New Jersey (restricted to White Plains, New York, by Schmidt, 1953).

4 (M.C.Z. 28230-3) Laguna Ocotal, July-Aug.

Without a revision of the species, it is not known to what race the above material should be referred.

VII

BIRDS OF LAGUNA OCOTAL

By

RAYMOND A. PAYNTER, JR.

INTRODUCTION

An investigation of the avifauna was one of the primary objectives of the Museum of Comparative Zoology expedition to the Selva Lacandona, Chiapas. Between July 21 and August 19, 1954, while at Laguna Ocotal (alt. 950 m.), 490 birds were prepared as skins. While these specimens are a good sample of the resident avifauna, there can be little doubt that additional species occur in the region but were not observed. In a heavily forested region collecting is difficult even under the most favorable conditions. We were at work at the end of the breeding season when most birds are silent and secretive—obviously the most difficult collecting period.

The following list is based on the specimens collected, as well as on unequivocal field observations. The specimens were weighed on a double-pan balance. The means of the measurements are accompanied by their standard errors (σ_m). The Hippoboscidae (bird-flies) were identified by Joseph C. Bequaert.

ANNOTATED LIST

TINAMUS MAJOR ROBUSTUS Sclater and Salvin

1 ♀, Aug. 7.

The species was heard on a few occasions and seen twice. The bird weighed 1090.5 grams.

CRYPTURELLUS BOUCARDI BOUCARDI (Sclater)

1 ♀, July 22; 1 ♂, Aug. 10; 1 ♂, Aug. 11.

Although by no means common, this is the more abundant tinamou. Occasionally it was found in the tropical evergreen forest but it occurred principally in the *monte*. The males weighed 291.4 and 403.3 grams; the female 351.0 grams.

PHALACROCORAX BRASILIANUS MEXICANUS (Brandt)

1 ♂, July 30.

On an undisturbed lake one would expect to find water birds in abundance, but the cormorant was the only exclusively aquatic form and even they were in small flocks. The weight of the bird was 1165.0 grams.

BUTORIDES VIRESCENS VIRESCENS (Linnaeus)

1 ♀, Aug. 11.

The specimen is immature and weighed 93.1 grams. Green Herons were uncommon.

SARCORAMPHUS PAPA (Linnaeus)

One was observed, within a flock of Turkey Vultures, on August 3.

CATHARTES AURA subsp.

A few vultures came to the camp at irregular intervals.

ELANOÏDES FORFICATUS subsp.

Two kites were noted on July 26 and three on August 1.

ACCIPITER STRIATUS subsp.

A single individual flew back and forth over the lake on August 16. It would seem an early date for a migrant. Probably the bird was a resident, possibly *A. s. chionogaster*.

BUTEOGALLUS URUBITINGA RIDGWAYI (Gurney)

1 ♂, Aug. 15.

This is the only example of the species which was seen. It harbored three species of Hippoboscidae: *Ornithoctona erythrocephala*, *Lynchia angustifrons*, and *L. wolcottii*.

I concur with Amadon (1949), and Amadon and Eckelberry (1955), that the genera *Hypomorphnus* and *Buteogallus* should be united.

SPIZAËTUS TYRANNUS subsp.

Paine, on August 17, saw a single Black Eagle-Hawk in the *selva*.

HERPETOTHERES CACHINNANS subsp.

Laughing Falcons were heard several times.

MICRASTUR SEMITORQUATUS NASO (Lesson)

1 ♀, Aug. 17.

Although the dense, undisturbed, forests surrounding the lake appeared ideally suited for certain of the birds of prey, such as those of the genera *Micrastur*, *Spizastur*, and *Spizaëtus*, hawks were excessively rare. Only one example of *M. semitorquatus* was seen. It was host to the bird-flies *Ornithoctona erythrocephala* and *Lynchia wolcotti*, and weighed 749.8 grams.

MICRASTUR RUFICOLLIS GUERILLA Cassin

1 ♂, Aug. 14.

The specimen was taken in the low forest near the edge of the lake. On several occasions others were found in the thickest parts of the evergreen forest.

FALCO RUFIGULARIS subsp.

On August 10 a pair of Bat Falcons flew near the camp, where they could be seen distinctly.

CRAX RUBRA RUBRA Linnaeus

1 ♂, 1 ♀, Aug. 8; 1 ♀, Aug. 15.

Curassows were fairly abundant but not so numerous as guans. The specimen collected on August 15 is about one-third grown.

PENELOPE PURPURASCENS PURPURASCENS Wagler

1 ♂ ?, July 24.

Guans were common, ranging through all types of forest, but were most abundant where the pine and broadleaf forests met. In

the early morning they were often perched in the pines where apparently they had spent the night. *Ornithoctona erythrocephala* was taken from the specimen.

ORTALIS VETULA VETULA (Wagler)

1 ♂, July 26; 1 ♀, Aug. 1; 1 ♂, Aug. 6; 1 ♀, Aug. 7; 1 ♀, Aug. 8;
2 ♂, 1 ♀, Aug. 10; 1 ♂, Aug. 14; 2 ♀, Aug. 15; 1 ♂, 3 ♀, Aug. 16.

Chachalacas were very abundant in the transition zone between the broadleaf forest and the pines, and in the *monte* at the end of the lake. Specimens of *Ornithoctona erythrocephala* were obtained from four birds and *Lynchia plaumanni* from one. Six males ranged in weight from 319.1 to 448.5 grams, with a mean of 402.30 ± 16.82 ; nine females from 309.6 to 394.8, with a mean of 356.21 ± 10.31 grams.

ODONTOPHORUS GUTTATUS (Gould)

2 ♂, July 25; 1 ♀, July 30; 1 ♀, Aug. 12.

Wherever the floor of the forest is dark these birds were seen with fair regularity. The two males weighed 284.0 and 286.9 grams; the two females 314.1 and 316.3 grams.

ARAMUS GUARAUNA DOLOSUS Peters

1 ♀, Aug. 1; 1 ♀, Aug. 11.

There seems to be no specific record of the species in Chiapas, although Alvarez del Toro (1952) mentions that it is abundant in the state. The shores of the lake are strewn with the empty shells of the snail *Pomacea flagellata*, the preferred food of limpkins, suggesting the presence of many of these birds. However, none was heard and just a few lone individuals were seen.

ARAMIDES CAJANEA subsp.

A wood rail called in the evening of July 30. This is another species which had been expected to occur in large numbers but which was inexplicably rare.

LATERALLUS RUBER (Sclater and Salvin)

1 ♂, 1 ♀, July 21.

In the marshes near the camp, Ruddy Rails abounded, although they were seldom seen. Their call is a rattle, similar to that of a

small kingfisher, but somewhat slower. The male is an adult and weighed 49.0 grams. The female retains a portion of the immature plumage and weighed 40.5 grams. Elsewhere (Paynter, 1955) I have given my reasons for recognizing no subspecies of *L. ruber*.

COLUMBA NIGRIROSTRIS Sclater

1 ♂, Aug. 4; 1 ♂, 1 ♀, Aug. 7; 1 ♂, Aug. 11; 1 ♂, Aug. 12; 1 ♀, Aug. 15.

Short-billed Pigeons were heard frequently, and sometimes could be seen in the tallest trees of the broadleaf forest. The specimens, however, were taken principally in the low forest and edges where they came to feed in fruiting trees.

The males weighed 154.3, 154.4, 159.0, and 166.1 grams; the females 132.5 and 148.2 grams.

LEPTOTILA CASSINII CERVINIVENTRIS Sclater and Salvin

1 ♂, July 22; 1 ♀, July 25; 1 ♂, July 30; 1 ♂, July 31.

Although the species has been recorded in Mexico only from Santa Rosa, Comitán, Chiapas (Berlioz, 1939) and from two localities on the Río Usumacinta in Tabasco (Brodkorb, 1943), it was reasonably abundant in the deep forest at Laguna Ocotal. The apparent absence of *Leptotila verreauxi* and *L. plumbeiceps*, species which are widely distributed in southern Mexico, was surprising. However, most forms of *Leptotila* are secretive and difficult to collect and I would feel certain of the absence of these species only if more time had been spent in the field.

Two adult males and a female weighed 167.2, 176.5, and 152.1 gram, respectively; a female in juvenal plumage 138.0 grams.

ARA MACAO (Linnaeus)

Small flocks of Scarlet Macaws flew over quite regularly in the morning and evening. They did not seem to feed in the vicinity of the lake and, as a consequence, alighted rarely, and then only in the tops of tall pines or on conspicuous dead trees in the *selva*.

PIONUS SENILIS SENILIS (Spix)

1 ♀, Aug. 14; 1 ♀, Aug. 16.

Although parrots passed over each day at dawn and dusk, they were nearly absent from the forest surrounding Laguna Ocotál. Late in our stay a small flock of *Pionus senilis* began to roost for the night in the pines at the edge of the broad-leaf forest on the eastern side of the lake. It is from this group that the specimens were secured. The birds weighed 220.4 and 221.5 grams.

The genus *Amazona* was represented in the flocks of parrots seen in the air. *A. ochrocephala* was tentatively identified, but another species seemed to be present also; there may have been still others.

PIAYA CAYANA subsp.

On August 12 there was a Squirrel Cuckoo in the top of a pine standing in small clearing. No other was observed.

NYCTIDROMUS ALBICOLLIS YUCATANENSIS Nelson

1 ♂, July 29; 1 ♂, Aug. 10; 1 ♀, Aug. 17.

Common within the burned area in the pines. The males weighed 65.5 and 68.5 grams; the female 74.5 grams.

PHAETHORNIS SUPERCILIOSUS LONGIROSTRIS (DeLattre)

1 ♀, July 31; 1 ♂, Aug. 9.

No approach to *P. s. veraecrucis* is exhibited by the specimens, although birds from Palenque, which is about 100 kilometers to the north, either were referred to that race (Brodkorb, 1943, Tashian, 1952) or said to be intermediate (Friedmann, Griscom, and Moore, 1950). The weight of the male was 6.4 grams; that of the female 5.9 grams. Dressler reported seeing one of these hummingbirds feeding at a dwarf *Heliconia* (*H. tortuosa* Griggs), a plant with red bracts and long, curved, yellow flowers, for which the bird's bill is well suited.

ABEILLIA ABEILLEI ABEILLEI (Lesson and DeLattre)

1 ♀, July 27; 1 ♂, 1 ♀, Aug. 8.

The female weighed 3.5 grams; the male, which is immature, 3.0 grams. No adult males were seen.

AMAZILIA CANDIDA CANDIDA (Bourcier and Mulsant)

1 ♀, July 24; 1 ♂, Aug. 11.

The male and female weighed 3.8 and 3.6 grams, respectively. This species and the females and immature males of *Abeillia abeillei* were impossible to differentiate in the field; their relative abundance is not known. Among the least common hummingbirds, they occurred in the high broadleaf forest in localities where the sun reaches the ground and encourages the growth of flowering plants and shrubs.

AMAZILIA BERYLLINA DEVILLEI (Bourcier and Mulsant)

1 ♂, Aug. 11.

The specimen displays none of the characters ascribed to *A. b. lichtensteini* or to the nominate race and is, therefore, the first record of *A. b. devillei* from the Atlantic slope of Chiapas. It was taken in the tropical evergreen forest and was the only example seen. It weighed 4.6 grams.

EUPHERUSA EXIMIA EXIMIA (DeLattre)

1 ♂, July 24; 1 ♂, 1 ♀, July 25; 1 ♂, July 26; 1 ♀, July 27; 1 ♂, July 29; 2 ♂, July 30; 1 ♂, 1 ♀, Aug. 1; 2 ♂, Aug. 2; 2 ♀, Aug. 3; 1 ♂, Aug. 4, 1 ♂, Aug. 6; 1 ♂, Aug. 7; 2 ♂, Aug. 8; 1 ♀, Aug. 9; 2 ♂, Aug. 10; 1 ♂, Aug. 13; 1 ♀, Aug. 14; 1 ♂, Aug. 16; 1 ♀, Aug. 17; 1 ♂, Aug. 19.

Where there were plants flowering in the tall broadleaf forest this hummingbird was almost always present. It was by far the most common Trochilid. Twenty males ranged from 3.5 to 4.7 grams, with a mean of $4.18 \pm .06$; seven females from 3.0 to 4.0 grams, with a mean of $3.65 \pm .14$.

LAMPORNIS VIRIDI-PALLENS VIRIDI-PALLENS (Bourcier and Mulsant)

1 ♂, July 23; 2 ♂, 1 ♀, July 27; 1 ♀, July 31; 1 ♂, Aug. 1; 1 ♀, Aug. 5; 1 ♀, Aug. 6; 1 ♂, Aug. 9; 2 ♂, Aug. 11.

These hummingbirds occurred in the same biotope as *Eupherusa eximia* and were almost as numerous.

I have examined 15 specimens of the species from and near

Mt. Ovando, Chiapas, the type locality of *L. v. ovandensis*, and conclude that, although recognizable, it is an extremely weak race. The coloration of the dorsal surface is variable and no consistent difference between the two races is distinguishable. The bill length is also inconstant; there appears to be a complete overlap between the forms in this character. The only differentiating features I can appreciate are the faintly lighter abdomen and slightly greater area of white on the lower throat of *L. v. ovandensis*.

Seven males ranged in weight from 5.3 to 6.5 grams, with a mean of 5.80 ± 0.14 grams. Four females weighed 4.7, 4.7, 4.8, and 5.2 grams.

TROGON MASSENA subsp.

A single bird was seen on August 15 in a fruiting tree at the edge of the pines.

TROGON COLLARIS PUELLA Gould

1 ♂, July 21; 1 ♀, Aug. 5; 1 ♂, Aug. 12.

Within the heavy forest this species was noted with regularity, but it was uncommon.

The males weighed 63.7 and 64.5 grams; the females 63.4 grams. It is of interest to compare these weights with those obtained on the Yucatán Peninsula (Paynter, 1955). There two males weighed 47.6 and 53.5 grams, and two females 41.1 and 53.9 grams. This suggests that the Peninsular birds are smaller in mass, although no differences in linear measurements are evident. A larger series is needed to confirm the proposal.

TROGON VIOLACEUS BRACCATUS (Cabanis and Heine)

1 ♀, Aug. 6.

The specimen, the only one of the species seen, was collected in the transition forest. It weighed 57.1 grams.

CHLOROCERYLE AMERICANA SEPTENTRIONALIS (Sharpe)

1 ♂, July 25; 1 ♀, Aug. 3; 1 ♀, Aug. 5; 1 ♂, Aug. 9.

Two adult females and a male weighed 40.7, 43.1, and 39.7 grams, respectively; an immature male 37.3 grams.

CHLOROCERYLE AENEA STICTOPTERA (Ridgway)

1 ♀, Aug. 10; 1 ♂, Aug. 11; 1 ♂, Aug. 15.

Both species of kingfisher were common. The two males weighed 15.5 and 16.8 grams, the female 20.8 grams.

HYLOMANES MOMOTULA MOMOTULA Lichtenstein

1 ♂, Aug. 2; 1 ♂, 1 ♀, Aug. 3; 1 ♀?, Aug. 7.

These small motmots were seldom seen, but because of their silent, sluggish behavior may have been more numerous than it appeared.

The two males weighed 32.5 and 32.7 grams; the female 29.7 and the bird of doubtful sex 31.0 grams. None possessed more than a trace of fat. Van Tyne (1935) gave the weight of five males from Petén as ranging from 27.0 to 28.5 grams, and noted that the heaviest bird was fatty; two females weighed 26.5 and 27.5 grams. The apparent difference in weight between the two populations should be investigated when more data are available.

MOMOTUS MOMOTA LESSONII Lesson

1 ♂, Aug. 6.

No more than ten of these birds were seen during the period spent at the lake. The specimen weighed 131.6 grams, which is considerably heavier than the previously reported maximum of 119.5 grams (Van Tyne, 1935).

Tashian (1952) listed *M. m. goldmani* from Palenque, but gave no reason for resurrecting the race which Van Tyne (1935), Wetmore (1943), and Berlioz (1952), have shown to be synonymous with *M. m. lessonii*. I, too, am unable to appreciate the supposed characters of *M. m. goldmani*.

PTEROGLOSSUS TORQUATUS TORQUATUS (Gmelin)

1 ♂, Aug. 3; 1 ♂, Aug. 11.

The birds weighed 209.5 and 221.0 grams, further strengthening Van Tyne's (1935) assertion that the nominate race is markedly heavier than *P. t. erythrozonus*. The maximum and minimum weights recorded for *P. t. erythrozonus* are: males,

177.0 (Van Tyne, 1935) and 169.2 grams (Paynter, 1955); females, 181.1 (Paynter, 1955) and 147.0 grams (Van Tyne, 1935). Those for the nominate form are: males 240.0 and 209.5 grams (Van Tyne, 1935); female (only record) 230.0 grams (Van Tyne, 1935).

Araçaris were fairly common.

RAMPHASTOS SULFURATUS SULFURATUS Lesson

1 ♂, July 30; 1 ♂, Aug. 18.

This large toucan was more abundant than *Pteroglossus torquatus*.

Van Tyne (1935) found, in Petén, the weights of males of the race range from 362.0 to 449.5 grams. These specimens weighed 483.5 and 496.4 grams and are apparently the heaviest yet recorded.

PICULUS RUBIGINOSUS YUCATANENSIS (Cabot)

1 ♂, July 23; 1 ♀, Aug. 15.

The specimens collected were the only ones seen. They exhibited no approach toward *P. r. maximus* of the mountains of Chiapas and Guatemala. The male weighed 83.0 and the female 75.4 grams.

CENTURUS PUCHERANI PERILEUCUS (Todd)

1 ♀, July 29; 1 ♂, Aug. 18; 1 ♀, Aug. 19.

Within the pines this species was moderately numerous, but it usually ranged in the tops of the trees, out of gunshot. One of the specimens was collected in the pines and the other two in the zone of transition between the pine and broadleaf forests. It was rare, however, in the latter locality. The weight of the male was 53.0 grams; that of the females 48.9 and 49.4 grams.

Amadon and Eckelberry (1955), in commenting on the failure of many authors to unite *Centurus* with *Melanerpes*, as was done by Peters (1948), state that "... the barred (*sic*) immature plumage of the Red-headed Woodpecker (*M. erythrocephalus*) and the color pattern of *M. portoricensis*, do tie the two groups together." I fail to appreciate this. The plumage of the immature *M. erythrocephalus* is streaked, not barred, and notably

similar to that of the adult Acorn Woodpecker (*M. formicivorus*). No species of *Centurus* approximates such a condition.

M. portoricensis, an insular species presumably at the end of an evolutionary line, rather than a link, bears no resemblance to the *Centurus* group, with the exception of its red abdomen and brown sides. Dorsally it is similar to *M. formicivorus* with a glossy black back, white rump, and white forehead; it lacks only the red head of that species (and of *Centurus*). Its behavior is said to be like that of the Acorn Woodpecker (Wetmore, 1927). The coloration of the throat and upper chest of *M. portoricensis* is similar to that of *M. erythrocephalus*, even to the remnant of a black pectoral band. The extension of red to the abdomen, when the chest is red, is a small evolutionary step and is certainly a logical explanation for the existence of this character in *M. portoricensis*.

Thus, the only real similarity between this species and the *Centurus* group is the brown coloration of the sides. It seems most likely that this character was acquired independently by an *M. formicivorus*-like progenitor, which was isolated in the Antilles. Alternative explanations are that *M. portoricensis* is a primitive species exhibiting the first indications of the divergence of *Centurus* from *Melanerpes*, or, that *Centurus* is the older group and *M. portoricensis*, retaining only its brown sides, betrays the origin of *Melanerpes*. These are obviously spurious hypotheses.

It is unexpected that Amadon and Eckelberry (1955) should accept the unification of *Centurus* and *Melanerpes*, but maintain *Tripsurus*, a genus also reduced to the synonymy of *Melanerpes* by Peters (1948). It is true that the species usually placed within *Tripsurus* are separated from *Centurus* (*sensu stricto*) by gaps greater than those existing between most species of *Centurus*, but I believe the group is not of generic rank and is best considered a subgenus of *Centurus*.

VENILIORNIS FUMIGATUS SANGUINOLENTUS (Sclater)

1 ♂, Aug. 4; 1 ♂, Aug. 6; 1 ♂, Aug. 12; 1 ♂, Aug. 15; 1 ♀, Aug. 17.

Where trees have fallen in the broadleaf forest, and on the edges of other clearings, there is usually a stand of shrubs and young trees. It is in such a habitat that this woodpecker is found. It is, therefore, localized and uncommon.

The female weighed 29.3 grams and the males 32.0, 34.1, 35.0, and 39.3 grams.

PHLOEOCEASTES GUATEMALENSIS GUATEMALENSIS (Hartlaub)

1 ♂, 2 ♀, July 31; 1 ♀, Aug. 2; 1 ♂, Aug. 8.

An abundant resident in the high forest. The males weighed 234.0 and 237.0 grams; the females 222.5, 223.0, and 226.4 grams.

DENDROCINCLA ANABATINA ANABATINA Selater

1 ♂, July 23; 1 ♂, Aug. 7; 1 ♂, Aug. 11; 1 ♂?, Aug. 17.

There appears to be no specific record of this species in the state. Alvarez del Toro (1952), however, has included it in his book. The weight of three males was 34.2, 37.3, and 38.3 grams.

DENDROCINCLA HOMOCHROA HOMOCHROA (Selater)

1 ♀, July 23; 1 ♀, July 25; 1 ♀, Aug. 9.

Two males weighed 33.8 and 35.5 grams. Both species of *Dendrocincla* were present in moderate numbers and seemed about as common as I have found them in the rain forest of the Yucatán Peninsula.

SITTASOMUS GRISEICAPILLUS SYLVIODES Lafresnaye

1 ♀, July 23; 1 ♀, July 24; 1 ♂, 1 ♀, July 25; 1 ♂, Aug. 4; 1 ♀, Aug. 5; 1 ♂, Aug. 8; 1 ♀, Aug. 12; 1 ♀, Aug. 13; 1 ♂, 1 ♀, Aug. 14; 1 ♀, Aug. 16; 2 ♀, Aug. 17; 1 ♀, Aug. 18; 1 ♂, Aug. 19.

The linear dimensions of *S. g. sylvioides* and *S. g. gracileus* have been shown to be markedly different (Paynter, 1955). It is not unexpected that a substantial difference in the average weight of the races also can be demonstrated. The weight of five males of *S. g. sylvioides* from Laguna Ocotál ranged from 12.8 to 14.2 grams, with a mean of 13.52 ± 0.21 ; that of six females from 11.1 to 13.8 grams, with a mean of 12.53 ± 0.12 . On the Yucatán Peninsula, where *S. g. gracileus* is found, seven males ranged from 9.0 to 12.1 grams, with a mean of 11.01 ± 0.35 ; four females from 8.6 to 10 grams, with a mean of 9.25 ± 0.34 (Paynter, 1955).

Within the *selva* this was the most abundant of the Dendrocolaptidae.

DENDROCOLAPTES CERTHIA SANCTI-THOMAE (Lafresnaye)

1 ♀, July 26; 1 ♀, Aug. 9; 1 ♂, Aug. 13.

A bird of the high evergreen forest, but at times seen on the trunks of pines when they were adjacent to its preferred habitat. No woodhewer was more shy.

When more birds have been weighed there may be evident a difference in mass between this subspecies and *D. c. legtersi* of the Yucatán Peninsula. The male and the two females weighed, respectively, 67.3, 66.0, and 68.3 grams. Tashian (1952) found a female to weigh 63.0 grams. Paynter (1955) recorded two males of *D. c. legtersi* as weighing 52.7 and 60.8 grams, and three females of *D. c. sancti-thomae*, which exhibited an approach toward the Yucatán Peninsula endemic, as 54.3, 55.9, and 61.3 grams.

XIPHORHYNCHUS ERYTHROPYGIUS PARVUS Griscom

1 ♀, 1 ?, July 27; 2 ♀, July 31, 2 ♀, 1 ?, Aug. 1; 1 ♀, Aug. 3; 1 ♂, Aug. 4; 1 ♂, Aug. 5; 1 ♀, Aug. 6; 1 ♀, Aug. 7; 1 ♂, Aug. 16; 1 ♀, Aug. 17; 1 ?, Aug. 18.

Nine females ranged in weight from 39.7 to 43.7 grams, and had a mean of 41.78 ± 0.43 grams. Three males weighed 43.0, 44.0, 44.9 grams. These were abundant birds in the broadleaf forest and occasionally ranged to the edge of the pines.

LEPIDOCOLAPTES SOULEYETHI INSIGNIS (Nelson)

2 ♀, July 26; 1 ♀, Aug. 16; 1 ♂, Aug. 18.

L. affinis and the present species occurred sympatrically in the pines. They are morphologically so similar it was not possible to distinguish them in the field; their relative abundance is unknown. As an aggregate, however, they were not common.

An adult male and two females weighed 30.8, 29.8, 30.9 grams, respectively; a juvenal female 30.7 grams.

LEPIDOCOLAPTES AFFINIS AFFINIS (Lafresnaye)

1 ♀, Aug. 5.

It is regrettable that it was not possible to study the species carefully while in the field. *L. souleyetii* is a lowland form which usually occurs in rain forest, while *L. affinis* is found in pines or

other types of forest characteristic of the highlands. The fact that at Laguna Ocotal *L. souleyetii* abandoned the broadleaf forest for the pines suggests that it may have found a more easily exploitable niche within the conifers. Neither species was common and probably they were able to exist sympatrically without competing.

The specimen weighed 27.6 grams.

ANABACERTHIA STRIATICOLLIS VARIEGATICEPS (Sclater)

1 ♂, Aug. 2.

The specimen, which was the only one seen, weighed 23.6 grams.

AUTOMOLUS OCHROLAEMUS CERVINIGULARIS (Sclater)

1 ♂, July 31; 1 ♂, Aug. 2; 1 ♂, Aug. 3; 1 ♂, Aug. 5; 1 ♂, Aug. 6;
2 ♀, Aug. 7; 1 ♀, Aug. 10; 2 ♂, 2 ♀, Aug. 17.

None of the Furnariidae was more abundant than this species, which was a conspicuous element of the heaviest *selva*.

Seven males ranged in weight from 44.7 to 50.4 grams, with a mean of 47.34 ± 0.87 ; five females from 37.5 to 44.0 grams, with a mean of 40.48 ± 1.12 .

XENOPS MINUTUS MEXICANUS Sclater

1 ♀, Aug. 5; 1 ♀, Aug. 16.

Very few Plain Xenops were present. The birds weighed 10.5 and 11.8 grams.

SCLERURUS MEXICANUS MEXICANUS Sclater

1 ♂, July 23; 1 ♀, 1 ♀, July 24; 1 ♀, July 27; 1 ♀, Aug. 17.

These birds were seen on the average of about once a day in the most dense forest. The weight of the male and three females was 28.0, 25.0, 26.6, and 30.0 grams, respectively.

THAMNOPHILUS DOLIATUS INTERMEDIUS Ridgway

1 ♀, July 29; 1 ♂, Aug. 4; 1 ♂, Aug. 18.

Antshrikes were restricted to the *monte* and thickets at the end of the lake. The male taken on August 4 had enlarged testes and was one of the few birds collected which showed indications of reproductive activity. The males weighed 28.4 and 28.8 grams; the female 30.0 grams.

DYSITHAMNUS MENTALIS SEPTENTRIONALIS Ridgway

2 ♂, 1 ♀, July 24; 1 ♂, July 31; 1 ♂, Aug. 3; 1 ♀, Aug. 6.

Traylor (1941) collected two examples of this species in southern Campeche, adding the species to the known Mexican avifauna. At Laguna Ocotal, it was common, and often associated with *Myrmotherula schisticolor*, in the shrubs bordering trails through the thickest parts of the deciduous forest.

Three of the males are immature and weighed 11.6, 12.7, and 13.5 grams. An adult male and two females weighed 13.6, 12.9, and 13.8 grams, respectively.

MYRMOTHERULA SCHISTICOLOR SCHISTICOLOR (Lawrence)

1 ♂, July 24; 1 ♀, Aug. 6; 1 ♂, Aug. 14; 1 ♀, Aug. 16; 1 ♂, 1 ♀, Aug. 17.

Berlioz (1939) recorded seven specimens from Santa Rosa in the district of Comitán; no other record from Mexico is known. It seemed to be localized in the forest, but often occurred in loose flocks. The respective weights of three males and three females were 7.3, 9.2, 9.2, 8.5, 8.8, and 9.6 grams.

FORMICARIUS ANALIS MONILIGER Selater

1 ♂, Aug. 18.

Antthrushes were noted only four times but undoubtedly were more abundant than it seemed. On the Yucatán Peninsula I found them exceedingly difficult to collect during the wet season, but when the forest was dry they were heard moving about in the leaves, much like tinamous, and could be taken with little difficulty. The specimen from Laguna Ocotal was snared in a trammel net in the *monte*, although previously the species had been seen only in the high forest. It weighed 51.3 grams.

GRALLARIA GUATIMALENSIS GUATIMALENSIS Prevost and Des Murs

1 ♂ Aug. 1.

Only this bird was seen. Its weight was 99.0 grams.

ATTILA SPADICEUS FLAMMULATUS Lafresnaye

1 ♀, July 24.

This specimen came to a fruiting tree (*Clusia* sp.) at the camp. It was the only one noted during the month at the lake. It weighed 44.2 grams.

PLATYPSARIS AGLAIAE SUMICHRASTI Nelson

1 ♂, July 27.

The bird is almost in full adult plumage and weighed 31.5 grams. It was taken in the *monte*. No others were seen.

TITYRA SEMIFASCIATA PERSONATA Jardine and Selby

2 ♂, Aug. 9.

Masked Tityras were observed on a few occasions in the tops of pines or broadleaf trees. The birds weighed 77.9 and 86.3 grams.

PIPPA MENTALIS MENTALIS Sclater

1 ♂, July 26; 1 ♀, Aug. 2; 1 ♀, Aug. 3; 1 ♂, Aug. 5; 2 ♀, Aug. 6; 1 ♂, Aug. 15; 1 ♀, Aug. 16; 1 ♂, Aug. 18.

One of the females collected on August 16 is a fledgling barely able to fly. This species is among the latest breeders found in the region and also was one of the most common birds wherever there were bushes and small trees in the broadleaf forest. Adult males made up about one quarter of the birds seen.

Adult males weighed 17.8, 17.9, and 19.1 grams; an immature male 15.8 grams; adult females 16.6, 17.1, 17.2, and 17.4 grams; a juvenal female 17.4 grams.

SCHIFFORNIS TURDINUS VERAEPACIS (Sclater and Salvin)

1 ♀, Aug. 2; 1 ♀, Aug. 8; 1 ♂, Aug. 17.

Few of these manakins were in the area. The male and the two females weighed 32.1, 32.3, and 32.7 grams, respectively.

TYRANNUS MELANCHOLICUS CHLORONOTUS Berlepsch

1 ♂, 1 ♀, Aug. 4.

The paucity of clearings made this a very uncommon species. The few birds seen were in the pine burn or at the edge of the lake. The male weighed 41.4 grams; the bird whose sex could not be determined 36.1 grams.

MEGARHYNCHUS PITANGUA MEXICANUS (Lafresnaye)

1 ♀, Aug. 3; 1 ♂, Aug. 13.

As uncommon a bird as *Tyrannus melancholicus* and apparently for the same reasons. The weights of the male and female were 65.4 and 66.3 grams, respectively.

MYIOZETETES SIMILIS TEXENSIS (Giraud)

1 ♀, Aug. 6; 1 ♀, Aug. 13.

Slightly more abundant than the preceding two species. The specimens weighed 28.0 and 33.9 grams.

MYIARCHUS TUBERCULIFER CONNECTENS Miller and Griscom

1 ♂, July 26; 1 ♀, Aug. 5; 1 ♂, Aug. 10; 2 ♀, Aug. 12; 1 ♂, Aug. 18.

The specimens from Laguna Ocotal are referable to *M. t. connectens*, although they are rather small and fall within the upper size range of a series of 24 specimens of *M. t. platyrhynchus*, the smallest of the races, from the Yucatán Peninsula. They are, however, dark dorsally and have varying amounts of rufous on the underside of the rectrices, two characters distinguishing *M. t. connectens* from *M. t. platyrhynchus*. The race seems not to have been reported from Chiapas, although it is to be expected along the northern and northeastern Guatemalan border.

Recently (1955) I noted that one character distinguishing *M. tuberculifer* from *M. yucatanensis* is its horn-colored, rather than black, bill. It was not realized at the time that the lighter colored bill is not always found in *M. tuberculifer*. *M. t. connectens* and *M. t. lawrenceii* occasionally have horned-colored bills, but in the vast majority it is black. On the other hand, within the remaining races horn-colored bills are frequent and black bills are somewhat of an exception; only *M. t. platyrhynchus*, and apparently *M. t. nigricapillus*, seem to have consistently light bills.

Enough data have accumulated so that a slight difference in weight between several races seems to be evident. Six males of *M. t. platyrhynchus* ranged from 14.7 to 19.7, with a mean of 17.15 ± 0.74 grams; females of the race weighed 15.0, 16.0, 17.3, and 17.9 grams (Paynter, 1955). *M. t. connectens* has larger linear dimensions and the specimens from Laguna Ocotal suggest that heavier weight may be an added character. Three males weighed 19.0, 19.9, and 19.2 grams, a female 19.2 grams, and two birds of undertermined sex 18.0 and 19.1 grams. *M. t. lawrenceii*, the race with the greatest linear dimensions of the three, may also weigh the most. Paynter (1955) recorded males from Ocozocoautla, Chiapas as weighing 21.8 and 22.5 grams; Martin, Robins, and Heed (1954) found males in Tamaulipas

to weigh 21 and 22 grams. Females from Chiapas (Paynter, 1955) weighed 20.0 and 22.0 grams.

CONTOPUS PERTINAX PERTINAX Cabanis and Heine

1 ♀, Aug. 5.

Greater Pewees were restricted to the *ocotal* where they were uncommon and much more shy than I have found them elsewhere. The bird was in heavy molt and weighed 22.0 grams.

EMPIDONAX MINIMUS (Baird and Baird)

1 ♂, Aug. 10.

Although this is an early date for the species, Tashian (1952) has recorded it at Palenque, Chiapas on August 6. The specimen weighed 10.6 grams.

EMPIDONAX FLAVESCENS DWIGHTI van Rossem

1 ♂, July 31; 1 ♀, Aug. 13.

One bird was taken in the pines, where it was to be expected, but the other was in the dense broadleaf forest. No more were seen. The weight of the male was 12.4 and that of the female 12.2 grams.

MYIOBIUS BARBATUS SULPHUREIPYGIUS (Sclater)

1 ♂, July 29; 1 ♀, 1 ?, July 31; 1 ♂, Aug. 4; 2 ♀, Aug. 8; 1 ♂, 1 ?, Aug. 10; 1 ♂, Aug. 13; 1 ♂, Aug. 14; 1 ?, Aug. 16.

The species was a conspicuous constituent of the *selva*. Five males ranged in weight from 12.5 to 13.3 grams, with a mean of 12.92 ± 0.15 grams. Three females weighed 9.1, 9.9, and 10.4 grams.

ONYCHORHYNCHUS CORONATUS MEXICANUS (Sclater)

1 ♂, Aug. 17.

The specimen was the only individual observed. It weighed 21.4 grams.

PLATYRINCHUS MYSTACEUS CANCROMINUS Sclater and Salvin

1 ♂, July 21; 1 ♂, July 24; 2 ♂, 1 ♀, 1 ?, July 27; 1 ♂, 1 ♀, 1 ?, July 31; 1 ♂, Aug. 9; 1 ♀, Aug. 13.

Some of the birds show a reduction in the streaking on the abdomen, indicating an approach toward *P. m. timothei*, but they are very richly colored, have breast bands, etc. — characters of *P. m. cancrominus*. They frequented the underbrush of the broadleaf forest in considerable numbers.

The weights of the males ranged from 10.0 to 12.0 grams, with a mean of 11.16 ± 0.30 . Females weighed 8.7, 9.7, 9.9 and 10.2 grams; two of indeterminate sex 9.3 and 13.0 grams.

RHYNCHOCYCLUS BREVIROSTRIS BREVIROSTRIS (Cabanis)

1 ♂, July 26; 2 ♂, July 31; 1 ♂ Aug. 5; 1 ♀, Aug. 8.

Rather an uncommon resident of the broadleaf forest. The males weighed 22.3, 23.1, 23.8, and 24.1 grams; a female 23.8 grams.

ONCOSTOMA CINEREIGULARE CINEREIGULARE (Sclater)

1 ♂, July 25; 1 ♀, Aug. 8; 1 ♂, Aug. 12.

These birds are slightly heavier than a series from the Yucatán Peninsula. The males weighed 7.6 and 7.8 grams; the female 7.4 grams. Peninsular males ranged from 5.2 to 6.7 grams, with a mean of $5.96 \pm .18$ grams and two females 5.0 and 5.6 grams. The species was scarce.

LEPTOPOGON AMAUROCEPHALUS PILEATUS Cabanis

1 ?, July 24.

This bird, the only example of the species which was seen, was in the heavy forest. It weighed 12.7 grams. Tashian (1952) recorded a female weighing 15.2 grams and Van Tyne (1935) a male weighing 10.8 grams.

PIPROMORPHA OLEAGINEA ASSIMILIS (Sclater)

1 ♀, July 22; 1 ♀, July 23; 1 ?, July 24; 1 ♂, July 27; 2 ♀, July 28; 1 ♂, July 29; 1 ♂, Aug. 18.

The most abundant of the Tyrannidae, and possibly of any

family. It was ubiquitous in the broadleaf forest and was found in lesser numbers in the *monte*. Although lacking in the pines, it was a regular visitor to an isolated fruiting tree (*Clusia* sp.) at the camp. Males weighed 12.7, 13.7, and 14.1 grams; females 12.2, 12.8, 14.8, and 15.2 grams.

XANTHOURA YNCAS VIVIDA Ridgway

1 ♀, July 21; 1 ♂, Aug. 2; 1 ♂, 1 ♀, Aug. 5; 1 ♀, Aug. 9; 1 ♀, Aug. 12; 1 ♀, Aug. 17.

These specimens are intermediate between *X. y. centralis* and *X. y. vivida*. They are nearer to the latter in that ventrally all are well washed with green, but few are as green as typical *X. y. vivida*. In size they fall within, or above, the upper half of the range for *X. y. centralis*, as given by Paynter (1955). All the specimens are worn or in molt; it is possible that in fresh plumage there would be less overlap with *X. y. centralis*.

Two males weighed 72.1 and 87.1 grams; five females from 84.0 to 88.0 grams, with a mean of 86.08 ± 0.68 .

Jays occurred commonly in the *selva*. They were present, but less abundant, in the pines and *monte*.

THRYOTHORUS MACULIPECTUS UMBRINUS Ridgway

1 ♂, 1 ♀, July 22; 1 ♀, July 28; 1 ♀, July 29; 1 ♂, July 30; 1 ♂, Aug. 3; 1 ♂, Aug. 4; 1 ♂, 1 ♀, Aug. 8; 1 ♂, Aug. 11; 1 ♀, Aug. 13; 1 ♀, Aug. 15; 1 ♀, Aug. 18.

It is probable that *T. m. umbrinus* and *T. m. canobrunneus* may be distinguishable by a difference in weight. At Laguna Ocotál, six males ranged from 16.0 to 18.7 grams, with a mean of 16.76 ± 0.47 ; five females from 13.4 to 15.4 grams, with a mean of 14.44 ± 0.46 . On the Yucatán Peninsula (Paynter, 1955), seven males ranged from 13.3 to 15.0 grams, with a mean of 14.36 ± 0.77 ; 11 females from 11.9 to 12.8 grams, with a mean of 11.90 ± 0.95 .

These wrens ranged through the low forest in abundance. Occasionally they were found in the high broadleaf forest and in the brush at the edge of the pine zone.

TROGLODYTES MUSCULUS INTERMEDIUS Cabanis

1 ♂, July 23; 1 ♂, Aug. 2; 1 ♀, Aug. 3; 1 ♂, Aug. 17.

In the scrubby pine burn the species was common, but it was one of the most difficult birds to collect because of its excessively shy nature.

At Ocosingo, where one specimen (male ?) was collected on July 8, and at El Real, where a female and male were taken on July 13 and 14, the species lived in the vicinity of houses and behaved like its northern counterpart, *T. aëdon*.

The weights of the males were 11.1, 11.2, 11.4, and 12.0 grams; those of the females 10.6 and 10.6 grams.

HENICORHINA LEUCOSTICTA PROSTHELEUCA (Sclater)

1 ♀, July 22; 1 ♀, July 23; 1 ♀, July 24; 1 ♂, 1 ♀, July 25; 1 ♂, July 27; 1 ♂, July 30; 1 ♀, Aug. 1; 1 ♂, 1 ♀, Aug. 2; 1 ♀, Aug. 5; 1 ♂, Aug. 6; 1 ♂, Aug. 8; 1 ♂, Aug. 14; 1 ♂, Aug. 18.

A very abundant resident of the undergrowth in the broad-leaf forest.

Seven adult males weighed between 14.4 and 17.3 grams, with a mean of $15.81 \pm .32$; five females from 14.1 to 16.7 grams, with a mean of $15.40 \pm .41$.

HENICORHINA LEUCOPHRYS CASTANEA Ridgway

1 ♀, July 25; 1 ♂, Aug. 2.

These specimens apparently represent the first record of *H. l. castanea* from Mexico, although Hellmayr (1934) had predicted that it would be found there on the Atlantic slope. The respective weights of the male and female were 16.6 and 16.1 grams.

H. leucophrys and *H. leucosticta* were found in what seemed to be exactly the same habitat. No behavioral differences were noted. The darker breast of *H. leucophrys* could not be recognized in the dark undergrowth, making it impossible to distinguish between the two species. They were, therefore, collected at random. Presumably the ratio between the species in the collection also represents the true ratio at Laguna Ocotal.

MICROCERCULUS MARGINATUS PHILOMELA (Salvin)

1 ♀, July 26; 1 ♂, Aug. 9.

There is no doubt that this wren was uncommon but it was by no means rare, as the dearth of specimens would seem to indicate. Its call is distinctive and was heard about once a day while collecting in the broadleaf forest. It was seldom seen because of its preference for the darkest areas of the forest floor, where it blended ideally with the background.

The male weighed 18.1 grams; the unsexed bird 18.4 grams.

TURDUS ALBICOLLIS LEUCAUCHEN Selater

1 ♀, July 28; 1 ♂, Aug. 14.

The male retains the juvenal plumage on its throat, upper breast, wing coverts, neck, and pileum. The remainder of the plumage is slaty with a faint wash of olive. The other bird, an adult female, is decidedly olivaceous dorsally; the throat markings are brownish black. It agrees with specimens of *T. a. leucauchen* from Guatemala.

The weight of the male was 66.7 grams; that of the female 70.3 grams.

MYADESTES UNICOLOR PALLENS Miller and Griscom

1 ♂, July 31; 1 ♂, Aug. 1; 1 ♀, Aug. 7; 2 ♀, Aug. 11; 1 ♀, Aug.

12; 1 ♂, Aug. 15; 1 ♂, Aug. 18.

The type of *M. u. veraepacis*, 56 specimens of *M. u. pallens* from Honduras and Nicaragua, one specimen from Veracruz and three from "Mexico" of *M. u. unicolor*, and the present series from Chiapas have been examined. It is concluded that *M. u. pallens* is barely distinguishable from the nominate form, on the basis of its paler ventral color, and that *M. u. veraepacis*, which was described as an intermediate form, is referable to *M. u. pallens*. The supposed differences in size between the forms cannot be confirmed with the present material.

Because this is a montane species, it is presumed that the population north of the Isthmus of Tehuantepec has no contact with that which occurs from Chiapas southward. It is, therefore, not surprising that the series from Laguna Ocotál is referred to the more southern population, *M. u. pallens*. It

is strange, however, that the species does not subspeciate more markedly, since it is a member of a genus whose species are rather plastic.

Adult males weighed 34.1 and 38.2 grams; an adult female 36.1 grams; two males and a female which were in almost complete adult plumage 39.5, 40.7, and 36.3 grams, respectively.

CATHARUS MEXICANUS CANTATOR Griscom

1 ♂, 1 ♀, July 25; 1 ♂, July 30; 1 ♀, Aug. 5; 1 ♀, Aug. 12;
1 ♀, Aug. 15.

Berlioz (1939) recorded the species from Chiapas for the first time, but lacking comparative material was unable to assign his series to a race.

The beautiful song of this thrush was often heard in the late afternoon and sometimes in the morning. It must have been fairly abundant, but it was very difficult to approach. Had it not been for the song, it would have been assumed to be a rare species. It was collected in the darkest parts of the broadleaf forest.

A young, spotted female weighed 29.0 grams; two females which were not quite adult 31.9 and 32.6 grams; two adult males and an adult female 33.1, 37.5, and 32.6 grams, respectively.

SMARAGDOLANIUS PULCHELLUS PULCHELLUS (Sclater and Salvin)

1 ♀, Aug. 3; 1 ♂, Aug. 12; 1 ♀, Aug. 13.

Alvarez del Toro (1952) has recorded this species in Chiapas, apparently for the first time. Blake (1953) also lists the bird from there but has informed me (*in litt.*), that his citation of the race *S. p. verticalis* from Chiapas is a *lapsus*.

Being a species which ranges in the tops of trees it is difficult to judge its abundance. It seemed to be uncommon. The male weighed 25.3 grams; the females 24.3 and 26.2 grams.

HYLOPHILUS OCHRACEICEPS OCHRACEICEPS Sclater

1 ♂, 1 ♀, July 25; 1 ♂, July 27; 1 ♂, Aug. 1; 1 ♀, Aug. 12.

Prior to Alvarez del Toro's book (1952) the species does not seem to have been noted from Chiapas. It was common at Laguna Ocotal in the broadleaf forest.

Males weighed 11.1, 11.4, and 11.5 grams; females 10.5 and 10.8 grams.

MNIOTILTA VARIA (Linnaeus)

1 ♀, Aug. 12; 1 ♀, Aug. 15.

Black and White Warblers were first seen on August 11. The birds weighed 10.7 and 10.8 grams.

PARULA AMERICANA INORNATA Baird

1 ♀, Aug. 12.

Parula "*pitiayumi*" appears to be only a morphologically pronounced subspecies group of *P. americana*. Unless sympatry can be shown to exist, the logical course seems to be to treat the groups as conspecific.

A pair of the warblers was in a flowering tree in the *monte* on August 12. No others were seen while at the lake.

The specimen weighed 6.9 grams, as did a female collected at Ocosingo on July 7.

DENDROICA GRACIAE DECORA Ridgway

1 ♀, July 22; 1 ♂, July 30; 1 ♀, Aug. 18; 2 ♂, Aug. 19.

The species was abundant in the tops of the pines. It was noted in the broadleaf forest a few times.

The specimens exhibit no approach toward *D. g. ornata*, a distinctive form, which has been found in western Chiapas (e.g., Edwards and Lea, 1955) but for which there seems to be no published report in eastern Chiapas. In the Museum of Comparative Zoology there are, however, specimens referable to this race from Santa Rosa (Escuintla) and Nuevo Amatenango, localities near the Guatemalan border.

The respective weights of three males and a female were 7.3, 8.5, 8.7 and 7.6 grams. One bird was host to the hippoboscid *Ornithoctona fusciventris*.

SEIURUS MOTACILLA (Vieillot)

1 ♂, July 25; 1 ♀, Aug. 2; 1 ♂, Aug. 13.

After the first of August, Louisiana Waterthrushes were seen

at the rate of about one per day. The specimen collected on July 25 is a very early arrival, but at Palenque in 1949 Tashian (1952) observed the species on July 12.

The male weighed 18.4 grams; the females 16.7 and 18.9 grams.

GRANATELLUS SALLAEI SALLAEI (Bonaparte)

1 ♀?, Aug. 10; 1 ♂, Aug. 13.

A rare inhabitant of the low forest at the end of the lake. The male weighed 14.0 grams, suggesting that this race is heavier than *G. s. boucardi*, six males of which are known to have ranged from 9.2 to 10.6 grams, with a mean of $10.00 \pm .22$ (Paynter, 1955). The bird whose sex could not be determined with certainty weighed 11.6 grams.

I have examined the type of *G. s. griscomi* van Rossem, a male, and find, as the describer claimed (1934), that dorsally it is less slaty and gray than most specimens of the species. The supposed differences in the distribution and shade of the red of the underparts, and of the gray on the throat, cannot be recognized by me.

The bird was received, as a mount, by the Museum of Comparative Zoology in 1880. It is presumed to have been collected at least a few years earlier. It was, therefore, well over fifty years old, at a minimum, when named as the type. It is soiled and has the oily texture that is often noticed in specimens which have been mounted and on display for many years. The characters ascribed to the race are without doubt functions of age and dirt. This belief is strengthened when old and fresh specimens of *G. s. boucardi*, or of *G. s. sallaei*, are compared. The older specimens are often noticeably darker.

MYIOBORUS MINIATUS INTERMEDIUS (Hartlaub)

1 ♂, July 26; 1 ♂, July 27; 1 ♂, July 31; 1 ♀, Aug. 3; 1 ♂, Aug. 13;
1 ♂, Aug. 14; 1 ♂, Aug. 16; 1 ♂, 2 ♀, Aug. 17; 1 ♂, Aug. 18;
2 ♂, Aug. 19.

The redstart was abundant in the *selva*. Two females weighed 9.0 and 9.1 grams; ten males ranged from 8.2 to 9.6 grams, with a mean of 8.86 ± 0.14 .

BASILEUTERUS CULICIVORUS CULICIVORUS (Lichtenstein)

1 ♂, 1 ♀, July 22; 1 ♀, July 23; 1 ♀, 1 ?, July 24; 1 ♀, July 25;
1 ♂, July 26.

These were among the most abundant birds at the lake. They occurred in all types of habitat, with the exception of the pines, although they were most often found in the higher broadleaf forest.

Females weighed 8.8, 10.0, 10.3, and 10.4 grams; two males 9.8 grams each.

BASILEUTERUS RUFIFRONS SALVINI (Cherrie)

1 ?, July 14; 1 ♀, July 20; 1 ♂, July 23; 1 ♂, 1 ♀, Aug. 12.

This species replaced *B. culicivorus* in the pines, where it was common but usually too high to collect. Two males weighed 11.4 and 11.8 grams; two females 10.3 and 10.8 grams.

Todd (1929) and Griscom (1932) to the contrary, it appears that Ridgway (1902) was correct in treating *delatirii*, *salvini*, and *rufifrons* as conspecific. Griscom (1932) chose to regard each as a distinct species, claiming that all three forms are sympatric in the western cordillera of Guatemala, and that *salvini* and *rufifrons* are sympatric in Vera Paz. However, it is significant to note that one or another of these forms has been collected at approximately twenty localities in Guatemala (*vide* Griscom, 1932, and Todd, 1929, for lists), but at no given place has more than a single form been taken. Even when two collectors' stations are adjacent, there seems always to be a difference in their altitudes. Thus sympatry does not appear to exist. No intergradation between *B. r. delatirii* and either *B. r. rufifrons* or *B. r. salvini* is known but this may be of little significance since even in the comparatively well-studied region of Veracruz integration between *B. r. rufifrons* and *B. r. salvini* was undetected until 1943 (Wetmore).

COEREBA FLAVEOLA MEXICANA (Sclater)

1 ♂, July 28; 1 ♀, Aug. 11; 1 ♂, Aug. 16.

Bananquits were rare and found only in the *monte*.

A mature male and female weighed 10.0 and 8.7 grams, respectively. An immature male 10.7 grams. The adult male had

fully enlarged testes. It was one of the few species exhibiting sexual activity at this season.

AMBLYCERCUS HOLOSERICEUS HOLOSERICEUS (W. Deppe)

1 ♂, Aug. 11.

This bird, which weighed 67.0 grams, was found in a dense tangle of vines near the shore of the lake. No more were seen.

ICTERUS MESOMELAS MESOMELAS (Wagler)

1 ♂, July 27; 1 ♀, Aug. 12.

The male weighed 42.7 grams; the female 35.0 grams. *Orni-thoctona fusciventris* was found on the latter.

The dearth of clearings meant that habitats for most of the Icteridae were lacking. The almost total absence of orioles was one of the impressive ornithological features of the Laguna Ocotol region.

An oropendola was seen in the forest by one of the party, but whether it was *Zarhynchus wagleri* or *Gymnostinops montezuma* is unknown.

TANAGRA LAUTA LAUTA Bangs and Penard

1 ♂, Aug. 2; 1 ♀, Aug. 4; 1 ♂, Aug. 17.

One bird was taken in the pines and the others in the low forest. The species was rather uncommon.

The male collected August 2 had slightly enlarged gonads; that taken August 17 retained about half of its juvenal plumage but had fully enlarged testes. Breeding in transitional plumage has been reported before (e.g., Skutch, 1954).

The first male weighed 14.8 and the second 16.4 grams; the female 17.6 grams.

TANAGRA GOULDI GOULDI (Sclater)

1 ♀, July 21; 1 ♂, July 23; 1 ♀, July 26; 1 ♂, 1 ♀, July 31; 1 ♀, Aug. 4; 1 ♂, Aug. 5; 1 ♀, Aug. 6; 1 ♂, Aug. 14; 1 ♂, Aug. 16; 1 ♂, Aug. 18.

These were the most abundant of the tanagers, ranging through the broadleaf forest to the edge of the pines.

Six males had a mean weight of 13.73 ± 0.11 grams, with a

range from 12.7 to 14.5. The mean of five females was 14.00 ± 0.47 grams and their range 12.9 to 15.3.

TANGARA NIGROCINCTA LARVATA (Du Bus)

1 ♂, 1 ♀, July 28; 1 ♀, Aug. 6; 1 ♂, Aug. 12; 1 ♀, Aug. 13; 1 ♀, Aug. 18.

The specimens were taken in either the *monte* or the *Clusia* tree at our camp.

Males weighed 18.6 and 19.7 grams; females 20.2, 20.3, and 21.9 grams.

THRAUPIS ABBAS (W. Deppe)

1 ♀, July 25; 1 ♀, July 28; ♀, Aug. 1; 1 ♀, Aug. 9; 1 ♂, Aug. 13.

The species was seldom noted in the tropical evergreen forest, but was very abundant in the pines, frequently moving through the tops of the trees in flocks of about ten individuals.

A male weighed 46.2 grams; females 40.3, 46.2, 47.4, and 48.4 grams.

PHLOGOTHRUPIS SANGUINOLENTA SANGUINOLENTA (Lesson)

1 ♂, July 25; 1 ♂, July 26; 1 ♂, Aug. 12; 1 ♀, Aug. 13.

The weights of the males were 38.8, 40.0, and 44.2 grams.

The species was moderately common but more shy than most tanagers. It came to exposed areas at times but generally was present in the heavier *selva*.

PIRANGA LEUCOPTERA LEUCOPTERA (Trudeau)

1 ♀, July 22; 1 ♂, Aug. 4; 1 ♂, Aug. 11; 1 ♀, Aug. 16; 2 ♂, Aug. 18.

Usually these birds were found in small flocks along the edges of trails and in the *monte*.

The mean weight of five males was $16.68 \pm .32$. They ranged from 15.5 to 17.4 grams.

One specimen harbored the bird-fly *Ornithoctona fusciventris*.

HABIA RUBICA RUBICOIDES (Lafresnaye)

1 ♀, July 22; 1 ♂, July 23; 1 ♀, July 24; 1 ♀, July 30; 1 ♂, 2 ♀, July 31; 1 ♂, Aug. 8; 1 ♀, Aug. 11; 1 ♂, Aug. 16; 1 ♂, Aug. 17; 3 ♂, Aug. 18.

This form was more common than *H. gutturalis*. Both species occurred throughout the broadleaf forest, with occasional appearances in the *monte*. There was no noticeable difference in habitat preference between the two forms.

These specimens lend credence to the suggestion (Paynter, 1955) that *H. r. nelsoni* may weigh less than *H. r. rubicoïdes*, although this still cannot be proved. Six adult male *H. r. rubicoïdes* ranged from 35.8 to 40.5 grams, with a mean of $38.00 \pm .71$; five adult females from 27.8 to 33.6 grams, with a mean of 31.04 ± 1.07 . Adult males of typical *H. r. nelsoni* were reported (Paynter, 1955) to weigh 27.7, 30.4, 31.5, and 32.1 grams; a female 27.5 grams.

HABIA GUTTURALIS SALVINI (Berlepsch)

1 ♀, July 23; 1 ♂, July 24; 1 ♂, July 27; 1 ♂, July 30.

The unsexed specimen weighed 42.9 grams; the remaining birds all of which are immature, 42.7, 43.6, and 43.7 grams.

This series is unsatisfactory for subspecific determination. It seems, however, to be more similar to immature specimens from the range of *H. g. salvini* than to the limited material I have seen of immature *H. g. littoralis*, a weak or possibly invalid, race.

CHLOROSPINGUS OPHTHALMICUS DWIGHTI Underdown

1 ♂, 1 ♀, July 21; 1 ♂, 1 ♀, July 22; 2 ♂, 1 ♀, July 23; 1 ♂, 1 ♀, July 24; 1 ♂, Aug. 1; 1 ♂, Aug. 2; 1 ♀, Aug. 7; 1 ♀, Aug. 10.

Along the edges of trails and within the broadleaf forest, wherever there was low vegetation, these birds swarmed.

Adult males weighed 18.6, 18.7, and 19.7 grams; females 17.2 and 17.4 grams. Juvenal males weighed 18.6, 18.6, 18.7, and 18.8 grams; females 16.0 and 17.3 grams.

CHLOROPHANES SPIZA GUATEMALENSIS Selater

1 ♀, July 31.

Only this bird was seen. It weighed 22.1 grams and was fatty.

CYANERPES CYANEUS CARNEIPES (Selater)

1 ♂, July 20; 1 ♂, July 24; 1 ♂, July 25; 1 ♂, July 30; 1 ♀, Aug. 18.

The species was most often seen in the *Clusia* tree at the camp.

Adult males weighed 13.1 and 13.3 grams; an immature male 12.2 grams; females 12.3 and 13.4 grams.

SALTATOR ATRICEPS ATRICEPS (Lesson)

1 ♂, Aug. 9; 1 ♀, Aug. 10.

The gonads of the male were very enlarged and that of the female moderately enlarged.

None of the saltators was common, but this was the most frequently observed of the three. All the forms frequented the brush where the broadleaf and pine forests joined.

The weights of the male and female were 77.3 and 85.5 grams, respectively.

SALTATOR MAXIMUS GIGANTOIDES Cabanis

1 ♀, Aug. 3; 1 ♂, Aug. 12.

These specimens have only a trace of green on the pelium, leaving no doubt that they are referable to this race rather than to *S. m. magnoides*, which has been recorded from near Comitán (Berlioz, 1939).

The male, which had enlarged testes, weighed 52.3 grams. The female, whose ovary was slightly enlarged, weighed 48.4 grams.

SALTATOR COERULESCENS YUCATENENSIS Berlepsch

1 ♂, July 27.

To find this race at Laguna Ocotal was unexpected, but the specimen is pale, has only a faint wash of buffy on the breast, and has a light crissum, all characters differentiating *S. c. yucatenensis* from *S. c. grandis*. Although it may be an aberrant bird, additional specimens from the region will probably confirm the identification, inasmuch as Brodkorb (1943) found a series from eastern Tabasco to be closer to *S. c. yucatenensis* than to *S. c. grandis*.

The bird, which was reproductively active, weighed 54.2 grams.

CARYOTHTRAUSTES POLIOGASTER POLIOGASTER (Du Bus)

1 ♂, 1 ♀, Aug. 10; 1 ♀, Aug. 18.

Flocks of these birds were seen regularly in one area of transi-

tion between the *selva* and *ocotal*, where the vegetation was fairly high but not dense. They were seldom seen elsewhere.

The male weighed 48.6 grams; the females 49.3 and 50.7 grams.

CYANOCOMPSA CYANOIDES CONCRETA (Du Bus)

1 ♂, July 27; 1 ♀, July 31; 1 ♂, Aug. 14; 1 ♂, Aug. 19.

The male taken July 27 had enlarged testes. That collected on August 14, an immature bird, was host to *Ornithoctona fusciventris*.

Adult males weighed 30.5 and 30.9 grams; an immature male 27.6 grams; an adult female 30.4 grams.

SPOROPHILA TORQUEOLA MORELLETI (Bonaparte)

1 ♂, July 26; 1 ♂, Aug. 8; 1 ♂, Aug. 13.

In the vicinity of the marsh near the campsite, seedeaters were seen and heard daily. A few were also found in the pine burn, but none elsewhere.

The bird taken on August 13, which is immature, weighed 8.7 grams. The remaining birds were in full breeding condition and weighed 8.9 and 9.6 grams.

ORYZOBORUS FUNEREUS Sclater

1 ♂, 1 ♀, Aug. 2.

The birds, both of which had fully enlarged gonads, were collected in the pine burn. The area was searched for additional birds, but this pair was the only one found. The species was reported from Chiapas once before (Brodkorb, 1943).

The weights of the male and female were 14.3 and 14.7 grams, respectively.

ATLAPETES ALBINUCHA (Lafresnaye and d'Orbigny)

1 ♂, July 30; 1 ♂, Aug. 3.

The August 3 specimen is a fledgling, which was barely able to fly; the other a juvenal. Both birds were taken in the underbrush of the pine burn. Only one other was seen during the month at the site.

The fledgling weighed 32.5 and the juvenal 33.2 grams.

DISCUSSION

One hundred and twenty-two species of birds were collected or observed during the period spent at Laguna Ocotal. Of this number, 119 are presumed to breed in the vicinity and three are known to be visitors (*Empidonax minimus*, *Mniotilta varia*, and *Seiurus motacilla*).

The avifauna of the lowlands to the north and to the east of the Selva Lacandona is fairly well known, affording a useful basis for comparison with that which was found at Laguna Ocotal. Brodkorb (1943) has surveyed the birds of Tabasco and adjacent areas in Veracruz, Campeche, and Chiapas; Tashian's report (1952) on the birds of Palenque, Chiapas, is an informative supplement. To the east, the district of Petén, Guatemala, has been investigated by Van Tyne (1935) and Taibel (1955). The localities encompassed by these papers are situated at altitudes below 250 meters, with a few insignificant exceptions. A large part of the region is covered by "high evergreen forest," to use the terminology of Miranda (1952). However, the composition of the forest differs from that at Laguna Ocotal and is the type commonly called "rain forest." The distinction between the high evergreen forest at Laguna Ocotal and that which is found at lower altitudes is considered in the paper introducing this series pp. 193-199).

The birds in the highlands contiguous with the Selva Lacandona are not so well known. Berlioz's (1939) report on a collection from the district of Comitán is the nearest approach to a detailed study, but it seems that the collector (Mario del Toro Avilés) was selective and did not attempt to obtain representatives of all the species in the region. The paucity of rap-torial and aquatic species is particularly noticeable. The collector spent a few days, in April and October, at Comitán (alt. 1650 m.), a sizable town on a plain, with oak and coniferous forests a short distance away. He collected for 20 days in August and for four days in October at Juncana (alt. 1645 m.), a village situated in the oaks and pines, 40 kilometers southeast of Comitán. From May to August he worked at Santa Rosa, which, Prof. Brodkorb (*in litt.*) informs me, is a finca, at an altitude of about 1200 meters, near the Guatemala border and east of Laguna Montebello, roughly seventy kilometers southeast of

Comitán. According to Prof. Brodkorb, this region is characterized by high rainfall and by the presence of the Sweet Gum (*Liquidambar styraciflua*). Miranda (1952) maps the area within the zone of "temperate deciduous woods," one of whose key species is *Liquidambar*.

When the resident birds at Laguna Ocotal are compared with those known from adjacent Veracruz, Tabasco, Chiapas, Campeche, and Petén (Brodkorb, 1943; Tashian, 1952; Van Tyne, 1935; Taibel, 1955), it is seen (Table 1, p. 284) that 24 of the 119 species (22 per cent) have not been found in the lowlands encompassed by these studies. Of these 24 birds, four (*Spizaetus tyrannus*, *Micrastur semitorquatus*, *M. ruficollis*, and *Chlorophanes spiza*) are uncommon species which have been collected at low altitudes nearby, e.g., on the Yucatán Peninsula (Paynter, 1955), and in time probably will be found in the regions under consideration. The 20 species remaining are characteristic of higher elevations, with none having been found below roughly 300 meters, at least in northern Middle America.

With the exception of the pines, the vegetation at Laguna Ocotal is physiognomically similar to that of the lowlands. Therefore, the presence of the conifers might logically seem to be the cause of the difference in composition of the two avifaunas. However, this is not the case. Only four species are confined to the pines at Laguna Ocotal. These are *Lepidocolaptes souleyetii*, *L. affinis*, *Contopus pertinax*, and *Basileuterus rufifrons*; *Dendroica graciae* was abundant in the pines but was seen in the broadleaf forest on a few occasions. Of these five species, only *Lepidocolaptes affinis* and *Dendroica graciae* do not occur in the adjacent lowlands. More subtle differences in the environments must be responsible for the discrepancy between the avifaunas of the two regions.

If the resident birds of Laguna Ocotal are compared with those listed by Berlioz (1939) for the District of Comitán, Chiapas (2100 to 1650 m.), it is seen (Table 2, p. 285) that 54 species (45 per cent) have not been recorded at the higher elevations. Owing to what certainly was discriminating collecting in the highlands (e.g., *Cathartes aura* is not recorded), the difference between the two avifaunas is doubtless exaggerated, but still it must be substantial. Most of the species in Table 2 are forms which frequent lower altitudes and would be unexpected in the District

of Comitán. It is interesting to note that of the 24 birds listed in Table 1 as not occurring in the nearby lowlands, 18 are recorded in the highlands (Berlioz, 1939), including the so-called "lowland forms" *Micrastur ruficollis* and *Chlorophanes spiza*.

From this it may be concluded that the composition of the avifauna of Laguna Ocotal is intermediate between that of the adjacent lowlands and highlands, with a stronger element from the lowlands. The presence of pines at Laguna Ocotal, the one strikingly marked vegetational difference between the lowlands and the lake district, has almost no effect on the composition of the avifauna.

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TABLE 1

Species of birds found at Laguna Ocotal but not recorded from adjacent lowlands.

<i>Accipiter striatus</i>	<i>Myrmotherula schisticolor</i> *
<i>Spizaetus tyrannus</i>	<i>Empidonax flavescens</i> *
<i>Micrastur semitorquatus</i>	<i>Microcerculus marginatus</i> *
<i>Micrastur ruficollis</i> *	<i>Myadestes unicolor</i> *
<i>Abeillia abeillei</i> *	<i>Catharus mexicanus</i> *
<i>Amazilia beryllina</i>	<i>Smargdolanus pulchellus</i>
<i>Eupherusa eximia</i> *	<i>Parula americana</i>
<i>Lampornis viridi-pallens</i> *	<i>Dendroica graciae</i> *
<i>Xiphorhynchus erythropygius</i> *	<i>Myioborus miniatus</i> *
<i>Lepidocolaptes affinis</i> *	<i>Chlorospingus ophthalmicus</i> *
<i>Anabacerthia striaticollis</i> *	<i>Chlorophanes spiza</i> *
<i>Sclerurus mexicanus</i> *	<i>Atlapetes albinucha</i> *

*Recorded from Comitán District (Berlioz, 1939).

TABLE 2

Species of birds found at Laguna Ocotal but not recorded from adjacent highlands.

<i>Phalacrocorax brasilianus</i>	<i>Dendrocincla anabatina</i>
<i>Butorides virescens</i>	<i>Dendrocincla homochroa</i>
<i>Sarcoramphus papa</i>	<i>Dendrocolaptes certhia</i>
<i>Cathartes aura</i>	<i>Lepidocolaptes souleyetii</i>
<i>Elanoides forficatus</i>	<i>Xenops minutus</i>
<i>Accipiter striatus</i>	<i>Dysithamnus mentalis</i>
<i>Buteogallus urubitinga</i>	<i>Platypsaris aglaiae</i>
<i>Spizaetus tyrannus</i>	<i>Tyrannus melancholicus</i>
<i>Herpetotheres cachinnans</i>	<i>Megarhynchus pitangua</i>
<i>Micrastur semitorquatus</i>	<i>Myiozetetes similis</i>
<i>Crax rubra</i>	<i>Myiobius barbatus</i>
<i>Penelope purpurascens</i>	<i>Onychorhynchus coronatus</i>
<i>Ortalis vetula</i>	<i>Leptopogon amaurocephalus</i>
<i>Aramus guarauna</i>	<i>Xanthoura yncas</i>
<i>Aramides cajanea</i>	<i>Henicorhina leucosticta</i>
<i>Laterallus ruber</i>	<i>Smaragdolanus pulchellus</i>
<i>Columba nigristrois</i>	<i>Hylophilus ochraceiceps</i>
<i>Ara macao</i>	<i>Parula americana</i>
<i>Amazilia candida</i>	<i>Granatellus sallaei</i>
<i>Amazilia beryllina</i>	<i>Icterus mesomelas</i>
<i>Trogon massena</i>	<i>Tanagra laeta</i>
<i>Trogon violaceus</i>	<i>Tanagra gouldi</i>
<i>Chloroceryle aenea</i>	<i>Tangara nigrocineta</i>
<i>Pteroglossus torquatus</i>	<i>Habia gutturalis</i>
<i>Ramphastos sulfuratus</i>	<i>Saltator coerulescens</i>
<i>Centurus pucherani</i>	<i>Cyanocompsa cyanoides</i>
<i>Veniliornis fumigatus</i>	<i>Oryzoborus funereus</i>

VIII

DESIGN QUANTITIES OF SOME CHIAPAS BIRDS

By

CHARLES H. BLAKE

What an airplane or a bird is capable of in the way of flight is largely deducible from a few rather simple ratios. Obviously, ability to perform as well as the design permits depends on an adequate power plant and a sufficiently strong and responsive control system. We do not yet know how to assess these latter properties in a bird, but the design quality of the wings can be discussed in general from the quantities here presented.

Three quantities are considered here: wing loading, span loading, and aspect ratio. These are derived from three measurements: weight, wing area, and wing span. English units are used to render comparison with airplanes easier.

The area is that of the slightly flattened wings. Ideally it should be the projected area of the wings fully outstretched in flight. This can only be closely approximated.

The span is twice the length of the wing beyond the edge of the body in the attitude in which the area is measured. This is less than the tip to tip distance or wing expanse.

Wing loading is expressed as pounds of weight per square foot of wing area. Similarly span loading is in pounds per foot of span.

The aspect ratio is dimensionless and most conveniently calculated as the square of the span divided by the wing area.

The wing loading is an indicator of the relative power required for acceleration. Takeoff and climbing are more difficult with higher wing loading. On the other hand, stability varies in the same sense as wing loading. Span loading is a measure of maneuverability. Birds with high span loadings will have difficulty in turning rapidly unless the aspect ratio is very low. The aspect ratio is related to lift. The higher the aspect ratio the greater the lift in proportion to the wing area. In general, birds with high aspect ratios glide and soar readily or remain in the air for long periods or both. It is also generally true that a high aspect ratio improves stability at low speeds. Similar effects

can be obtained by high wing camber or an appropriate dihedral angle between the wings.

I am greatly indebted to Raymond A. Paynter, Jr. for making (in the field) the outlines of the wings of 21 birds comprising 18 species, shown in the table, and recording the weights of the individuals drawn. The series is important because it gives us our first information on almost all the included families, and it is the first sizable series of sedentary species. I also thank the Geological Survey Department, Jamaica, B. W. I., for the use of a planimeter.

There is, of course, great risk in speaking definitely about the flight of species one has never seen alive. Some general remarks may be made on the basis of the quantities themselves. The wing loadings are very diverse. *Tinamus* has a loading that is high even for a bird weighing nearly $2\frac{1}{2}$ pounds. By contrast, the specimen of *Ortalis* has less than one-third the weight but more than two-thirds the wing area of the *Tinamus*. One would readily believe that *Tinamus* would take off with difficulty and even reluctantly. It might, however, fly well on a straightaway after it was up to speed. This is a matter of motor rather than wings. If the motor is only sufficiently powerful to maintain cruising speed, then takeoff becomes virtually impossible. This is probably not quite true of any bird. With a high wing loading considerable excess power must be available. These remarks also apply, with less force, to the toucan, *Pteroglossus*, and the parrot, *Pionus*. If the figures for other parrots are similar to those for *Pionus*, their rather labored, although rapid, flight is understandable. At the other extreme are a hummingbird, *Abeillia*, and a woodhewer, *Sittasomus*, whose wing loadings are close to the lowest on record. Their flight should be about equally unstable but in other respects entirely different.

Turning to the span loadings, *Tinamus* is again unusual in its high loading. No other bird in the list exceeds 0.5 and span loadings above this latter figure are very rare. The two hummingbirds show the lowest loadings. It should be noted that *Eupherusa* has about twice the wing loading as well as about twice the span loading of *Abeillia*. It would be expected, *a priori*, that the flight of these two birds would be quite different. *Abeillia* ought to be the more maneuverable. It is possible that

the curious flitting flight occasionally shown by some of the larger hummingbirds, notably *Trochilus* and *Anthracothorax*, is connected with the very low loadings and high aspect ratios.

The aspect ratio shows clearly that only the hummingbirds would be likely to fly continuously for any length of time. But two other species in the list even attain a ratio of 5.0 and one of these is the parrot. These low ratios may well be characteristic of nearly non-migratory species. Generally the aspect ratio of North American passerines seems to be from 5.5 to 7. I have recently measured a specimen of *Coccyzus americanus*, migratory but not appearing to be a strong flyer, and found an aspect ratio of 5.9.

In this connection it is of more than incidental interest that one of Otto Lilienthal's later gliders had an aspect ratio of about $3\frac{1}{2}$. Such a machine would have very low stability at low speeds and his control system was slow and cumbersome. It is no wonder that he met his death in a crash. On the other hand, a small bird has such low terminal velocity that the legs can take up the shock of a fall from almost any height. The bird gets into trouble by running into some barrier beak first in full flight or attempting to land while its forward speed is much in excess of stall speed.

In two cases, as shown, two individuals of the same sex were available. The derived ratios agree within 10 per cent; quite a reasonable agreement.

With a few exceptions, the general picture is one of low speed, short and unstable flight. It is probable that most of these birds do not venture out in the open where they might encounter both wind and turbulence.

TABLE 1
MEASUREMENTS AND QUANTITIES

FAMILY	NAME	WT.	AREA	SPAN	WING LOAD- ING	SPAN LOAD- ING	ASPECT RATIO
Tinamidae	<i>Tinamus major robustus</i> ♀	2.41	0.918	1.85	2.63	1.30	3.7
Cracidae	<i>Ortalis v. vetula</i> ♀	0.682	0.660	1.46	1.03	0.467	3.2
Psittacidae	<i>Pionus s. senilis</i> ♀	0.488	0.402	1.50	1.21	0.325	5.6
Alcedinidae	<i>Chloroceryle americana septentrionalis</i> ♀	0.090	0.134	0.75	0.67	0.120	4.2
Momotidae	<i>Hylomanes m. momotula</i> ♂ ¹	0.073	0.104	0.65	0.70	0.113	4.2
"	<i>Momotus momota lessoni</i> ♂	0.289	0.348	1.31	0.83	0.221	4.9
Rhamphastidae	<i>Pteroglossus t. torquatus</i> ♂	0.462	0.347	1.09	1.33	0.425	4.0
Trochilidae	<i>Eupherusa e. eximia</i> ♂	0.0095	0.017	0.38	0.56	0.025	8.5
"	<i>Abeillia a. abeillei</i> ♂ imm.	0.0066	0.025	0.46	0.24	0.014	8.5
Dendrocolaptidae	<i>Dendrocincla a. anabatina</i> ♂	0.082	0.152	0.81	0.54	0.101	4.3
"	<i>Sittasomus griseicapillus sylvioides</i> ♂	0.023	0.088	0.65	0.26	0.035	4.8
"	<i>Xiphorhynchus erythropygius parvus</i> ♂	0.095	0.194	0.85	0.49	0.112	3.7
"	<i>Xiphorhynchus erythropygius parvus</i> ♀	0.093	0.155	0.78	0.60	0.119	3.9
Furnariidae	<i>Anabacerthia striaticollis variegaticeps</i> ♂	0.052	0.084	0.56	0.62	0.093	3.7
"	<i>Automolus ochrolaenus cervinigularis</i> ♂ ¹	0.105	0.133	0.67	0.79	0.157	3.3
Formicariidae	<i>Grallaria g. guatemalensis</i> ♂	0.218	0.200	0.88	1.09	0.248	3.9
Cotingidae	<i>Tityra semifasciata personata</i> ♂	0.171	0.189	0.97	0.91	0.177	5.0
Pipridae	<i>Pipra m. mentalis</i> ♀	0.037	0.075	0.57	0.49	0.065	4.3
"	<i>Schiffornis turdinus verae-pacis</i> ♀	0.072	0.126	0.69	0.57	0.104	3.8

¹ Average of 2 specimens.

IX

MAMMALS COLLECTED AT LAGUNA OCOTAL

By

FRANCES L. BURNETT AND CHARLES P. LYMAN

This collection was made at Laguna Ocotal, Chiapas, Mexico, between July 22 and August 19, 1954, by R. A. Paynter, Jr., and Elisha F. Lee. The specimens were all collected in the vicinity of the camp, and consist of skins and skulls, unless otherwise noted.

The mammals are for the most part lowland forms, with a few subspecies which are so widespread that they are found in the highlands as well. In subspecies with restricted ranges, the races from Laguna Ocotal are in general similar to those collected by Kuns and Tashian (1954) from Palenque to the northwest, while Murie's (1935) collection from Uaxactún, Petén, Guatemala, to the northeast contains more species endemic to the Yucatán Peninsula. Of the mammals which tend to be restricted to the Yucatán Peninsula, the fruit bat *Artibeus jamaicensis yucatanicus* is the only race represented in the collection from Laguna Ocotal.

We wish to thank Dr. Charles O. Handley, Jr., of the United States National Museum for comparing our spider monkey with material in the United States National Museum. Also we gratefully acknowledge the loan of comparative material from the following institutions: Museum of Zoology, Ann Arbor, Michigan; American Museum of Natural History, New York City; Fish and Wildlife Service, United States Department of the Interior, Washington, D.C.; Chicago Museum of Natural History, Chicago, Illinois; and Museum of Natural History, Lawrence, Kansas. In particular, we thank Miss Barbara Lawrence for her help in preparation of the manuscript.

DIDELPHIS MARSUPIALIS ?subsp.

1 ♂, 2 ♀ ♀ (M.C.Z. 47274-47276)

These young opossums are relatively too large to be *yucatanensis* and could be assigned to *tabascensis* on geographic

grounds. One difference between the latter subspecies and *mesamericana* (= *marsupialis* Allen, 1901) was said to be the greater length of tail compared to head and body. Using Allen's tables it is found that the average of the individual ratios of tail length to head and body length for 42 *mesamericana* is 89.8 (expressed in per cent) with a standard deviation of ± 7.5 while the ratio for 21 *tabascensis* is 91.9 with a standard deviation of ± 11.5 . Obviously this difference has no statistical value. The Laguna Ocotál specimens have ratios of tail length to head and body length of 84, 88 and 91.

Long nasals, terminating posteriorly in a sharp point, were also used to characterize *tabascensis*. However, in four specimens in the M.C.Z. collection, all taken within a few days in the vicinity of Córdoba, Veracruz, one (M.C.Z. 39772) has nasals which come to a sharp point in the midline, while the posterior portion of the nasals of another (M.C.Z. 39770) are rounded in outline. The two others (M.C.Z. 39771 and 39767) have nasals which are intermediate between the extremes. There is no indication that the shape of the nasals is dependent on the age or the sex of the animals. As the length of the nasals depends partly on the shape of their posterior border, measurements of nasal length on skulls of the same size would then vary according to the outline.

Our evidence supports Hershkovitz's (1951) opinion that there is only one widespread form of *Didelphis marsupialis* in Mexico and in Central America north of the highlands of Nicaragua.

ARTIBEUS JAMAICENSIS YUCATANICUS J. A. Allen

4 ♂ ♂, 3 ♀ ♀ (M.C.Z. 47278-47284)

The measurements of these fruit bats correspond with those that Andersen (1908) gives for *yucatanicus* rather than those for the larger race, *jamaicensis*. Andersen did not group his results according to sex, but forearm length and various skull measurements of the Laguna Ocotál specimens indicate that the females tend to be smaller than the males. Our Chiapas skulls are smaller than *jamaicensis* skulls of the same sex from Veracruz, British Honduras, and Honduras.

Other scattered records indicate that this subspecies ranges into northern Guatemala (Murie, 1935) and northeastern Chiapas (Kuns and Tashian, 1954).

ALOUATTA PALLIATA PIGRA Lawrence

2 ♂ ♂, 1 ♀ (M.C.Z. 47266-47268) Skins and skeletons

This series of howler monkeys was all collected in August from a band of five individuals. The skin of the female is typically black and in this resembles a male topotype from British Honduras collected in April. The males, on the other hand, have an extensive region between the shoulders, fading to a point in the middle of the back, where the bases of the hairs are pale. In addition, similarly colored hairs are interspersed among the darker hairs under the forearms of one of these skins. All have longer, denser hair than has the single topotype. The skulls of the males are even more massive than the topotype while that of the female is, as would be expected, considerably smaller.

The collection of these specimens extends the range of *pigra* 125 miles to the west and south of the type locality of Uaxactún, Guatemala. Kuns and Tashian (1954) report a specimen from Palenque, Chiapas as *mexicana*.

ATELES GEOFFROYI VELLEROSUS Gray

1 ♀ (M.C.Z. 47269) Skin and skeleton

Dr. Charles O. Handley, Jr. very kindly identified this specimen of spider monkey as *vellerosus* through comparison with material in the United States National Museum. He writes that the Laguna Ocotul skin is very similar to one from Palenque in Chiapas, but somewhat darker and more richly colored than specimens from Oaxaca and Veracruz. No comparison was needed with *pan* from Guatemala, which is very much blacker, nor *yucatanensis* which is smaller and paler. This specimen was collected well within the range of this widespread subspecies (Kellogg and Goldman, 1944).

Paynter reports that there were fewer spider monkeys than howler monkeys at the lake. Small bands of three or four *Ateles* were seen every few days, while bands of howler monkeys could be heard around the camp almost every evening.

SCIURUS DEPPEI DEPPEI Peters

5 ♂ ♂, 3 ♀ ♀ (M.C.Z. 47289-47296)

These small tree squirrels are as dark as typical *deppei* from

central Veracruz but are a little smaller when compared to the measurements given by Nelson (1899). Apparently the north-easterly extent of the range of this subspecies runs approximately from the western side of Lago de Izabal (Goodwin, 1934) northwest through Laguna Ocotal to Palenque (Kuns and Tashian, 1954). To the northeast Murie (1935) found the brighter colored *vivax*. At Laguna Ocotal the habitat of this squirrel was restricted to the tropical evergreen forest.

SCIURUS AUREOGASTER AUREOGASTER F. Cuvier

1 ♂, 2 ♀ ♀ (M.C.Z. 47286-47288)

The collection of fire-bellied squirrels at Laguna Ocotal extends the limits of their range more to the south and closer to the Guatemalan border, though Dr. Remington Kellogg and Dr. Charles O. Handley, Jr. write us that no specimen of *aureogaster* has yet been taken in Guatemala proper. In comparison with more northern specimens no noticeable differences in the skulls could be found, but these Chiapas squirrels are not as dark in color. However, as Kelson (1952) has pointed out, *aureogaster* varies considerably in the degree of melanism in various areas of its range.

Paynter found these squirrels on the forest edges, amid thick tangles of small trees and vines, in contrast to the deep forest habitat of *deppei*.

HETEROMYS DESMARESTIANUS DESMARESTIANUS Gray

1 ♂, 1 ♀ skins and skeletons, 1 ♀ (M.C.Z. 47298-47300)

Laguna Ocotal is near the central point of the range of this widespread subspecies, and the specimens taken match Goldman's (1911) description.

ORYZOMYS COUESI COUESI (Alston)

30 ♂ ♂, 23 ♀ ♀, 1 ? sex (M.C.Z. 47331-47354, 47356-47385)

Fifty-one skins and skulls, as well as three skulls only, were collected of this larger rice rat. Most of these animals were quite young, ranging from sub-adults with the upper third molars just erupting to adults with slightly worn molars. The pelage of these animals is darker than that of specimens from Yaruca,

Honduras, which Goldman (1918) considered typical *couesi*. This darker cast is due to a more plumbeous color in the bases of the dorsal hairs, with the guard hairs being black instead of brownish. A detailed comparison of the skulls of these specimens with over 90 *couesi* of similar ages (as indicated by tooth wear) from other localities revealed no significant differences in the Laguna Ocotal specimens. Topotypical adults of *pinicola* from Pine Ridge, British Honduras, were smaller than mature but younger animals from Laguna Ocotal.

O. c. couesi appears to be a very widespread subspecies, and, except for the somewhat darker color, our specimens are typical of the race.

ORYZOMYS ALFAROI PALATINUS Merriam

9 ♂ ♂, 7 ♀ ♀ (M.C.Z. 47303-47305, 47319-47330, 47355)

Although some of these smaller rice rats have a dorsal pelage dark enough to fit the description of *saturator*, others are almost as pale as Panamanian specimens of *alfaroi*, which *palatinus* resembles in coloration. All of the Laguna Ocotal animals have whitish underparts, rather than the buffy ones ascribed to *saturator*, and are hence referred to *palatinus*. As Goldman points out (1918), *palatinus* and *saturator* inhabit the same mountain range, and intergradation between the two races is probable.

OTOTYLOMYS PHYLLOTIS GUATEMALAE Thomas

3 ♂ ♂ (M.C.Z. 47301, 47302, 47386)

Two skins and skulls, and an additional single skull, were taken of this smaller genus of tree climbing rats. The diagnostic characters given by early authors (Merriam, 1901, Thomas, 1909, and Sanborn, 1935) do not hold when applied to the present specimens and the descriptions by Laurie (1953) were not sufficiently definitive to clarify the situation. Furthermore, the published records of the distribution of this group are confused.

Although these animals are generally rare in collections, it was possible to borrow seventy specimens, including one series from Esmeralda, Quintana Roo, Mexico, and another from Uaxactún, Petén, Guatemala. Examination of these specimens showed that *Ototylomys* could be divided into two groups. One

group consists of a smaller animal with an upper molar tooth row measuring 5.9 to 6.5 mm., from the Yucatán Peninsula south to Petén, and the other group consists of a larger animal with an upper tooth row of 6.9 to 7.5 mm., from Chiapas and Alta Vera Paz. Our specimens belong to the group of larger mammals which also include *connectens* and *guatemalae*. Sanborn states that *connectens* is the only race in which the belly hairs have slaty bases. However, in eight specimens within the stated range of *connectens* the bases of the hair of the belly vary from slaty gray (Finca Chama and Chimoxan, Guatemala) to almost pure white (Concepción). Furthermore, two specimens of *guatemalae* from Palenque, Chiapas, show a slaty cast of the belly fur, particularly in the midline.

Our specimens from Laguna Ocotal also have slaty based fur on the belly, otherwise they are closest to Thomas' description of *guatemalae*. They are too small to be referred to Sanborn's *connectens* and hence are considered to be the former race. It seems apparent, however, that *Ototylomys* shows considerable variation within a relatively small geographic area, and it is suspected that some of the characters which have been used to separate races will be found not to hold when more specimens are available for comparison.

PEROMYSCUS MEXICANUS TEAPENSIS Osgood

8 ♂ ♂, 3 ♀ ♀ (M.C.Z. 47308-47318)

According to Osgood (1909) the various races of *mexicanus* are only slightly differentiated. The Laguna Ocotal specimens are referred to *teapensis* on the basis of color as well as on geographic grounds. Although the pelage is very much darker, the skulls closely resemble a series of *mexicanus* from Veracruz, in that they lack the broader nasals, heavier rostrum, and more massive molars ascribed to *teapensis*. Kuns and Tashian (1954), while identifying their specimens from Palenque as *teapensis*, also noted that the skulls showed no evidence of the thickened rostrum.

SIGMODON HISPIDUS SATURATUS V. Bailey

2 ♀ ♀ (M.C.Z. 47306, 47307)

One adult cotton rat and one subadult were collected. Both animals are very similar to specimens in the M.C.Z. collection from British Honduras, except that the tips of the belly hairs of the adult are generally more whitish than yellowish. Laguna Ocotal lies well within the range of this widespread subspecies.

NASUA NARICA NARICA (Linnaeus)

1 ♀ (M.C.Z. 47277)

One very young coati with the third molars still unerupted resembles very closely older specimens of *narica* in color of pelage.

ODOCOILEUS VIRGINIANUS subsp.

Robert Dressler found fragments of two tibiae, two femora, one scapula and one vertebra (M.C.Z. 47476-47481) of white-tailed deer in an Indian rock shelter near the camp at Laguna Ocotal. Paynter found no evidence that this deer occurs naturally in the area, and it appears probable that the remains may have been carried there by travelling Indians. Associated with the bones were shells of varieties of snails found in the nearby lake and more distant streams.

MAZAMA sp.

Bones of these small deer were also found in the rock shelter by Dressler, along with those of the larger white-tail. *Mazama* fragments consisted of a ramus, a scapula, and a vertebra (M.C.Z. 47482-47484).

Brocket deer were seen by Paynter several times in the "burn" near the camp at Laguna Ocotal. One particular spot was noted where single animals were found bedded down on a number of occasions.

DASYPUS NOVEMCINCTUS subsp.

The shell of one animal was found near camp, and one live armadillo was seen in the area.

TAPIRELLA BAIRDII (Gill)

One tapir was seen, but not collected, at El Censo. Footprints were seen around the shore of Laguna Ocotal. Natives reported that they were very numerous around the lake during the dry season.

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