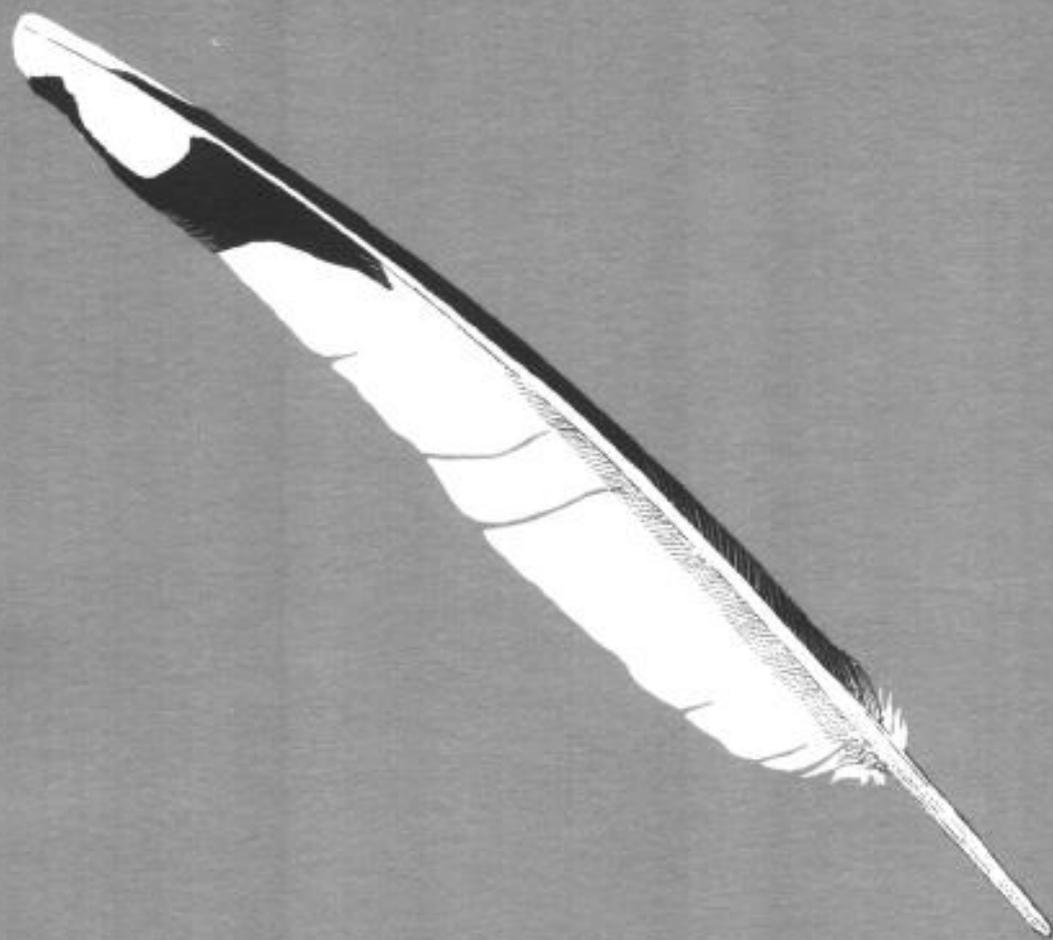


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Ornithological Monographs No. 43

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**A Distributional Survey  
of the  
Birds of the Mexican State of Oaxaca**

*by*

**Laurence C. Binford**

**A DISTRIBUTIONAL SURVEY OF THE  
BIRDS OF THE MEXICAN STATE OF OAXACA**

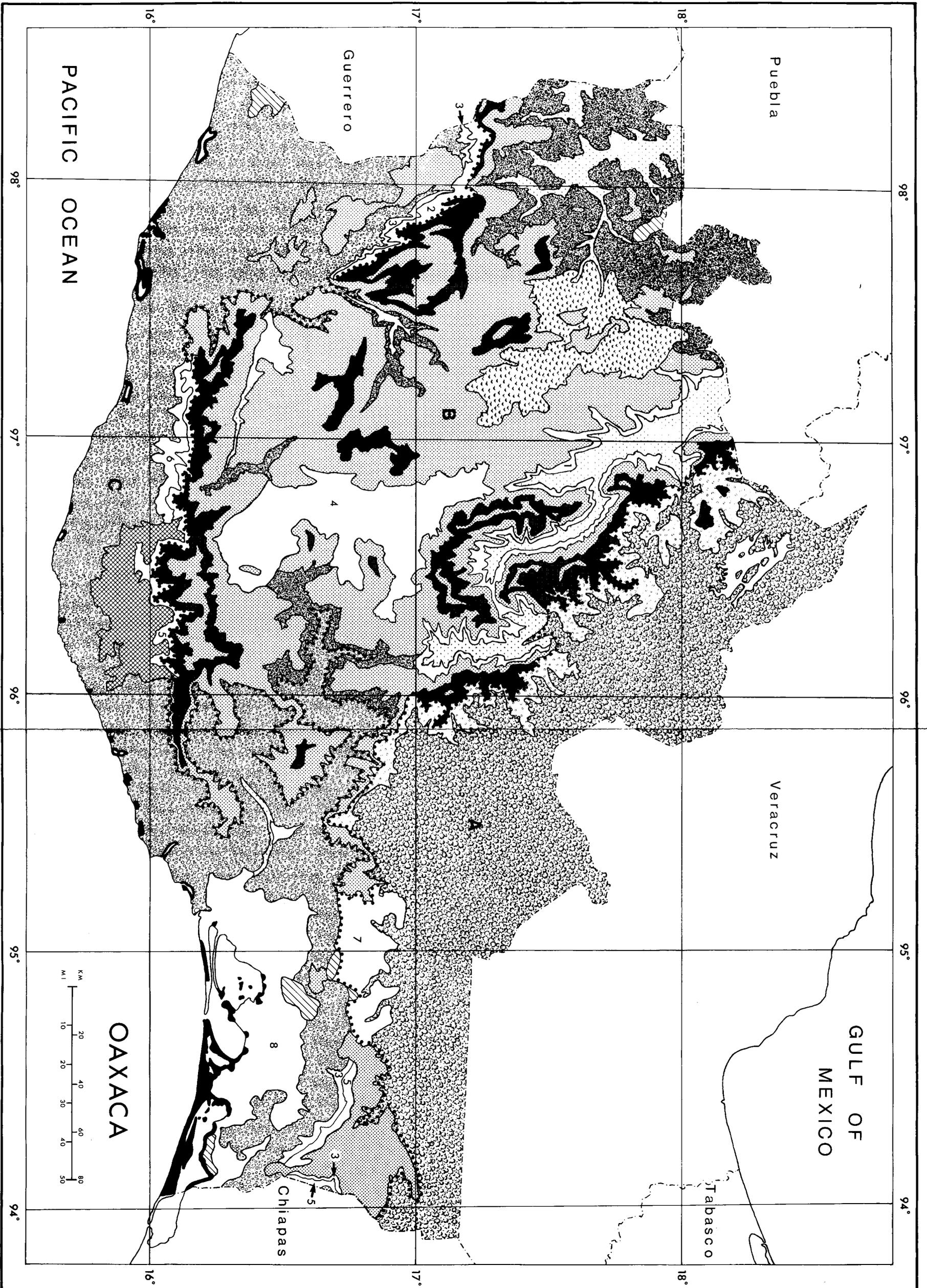
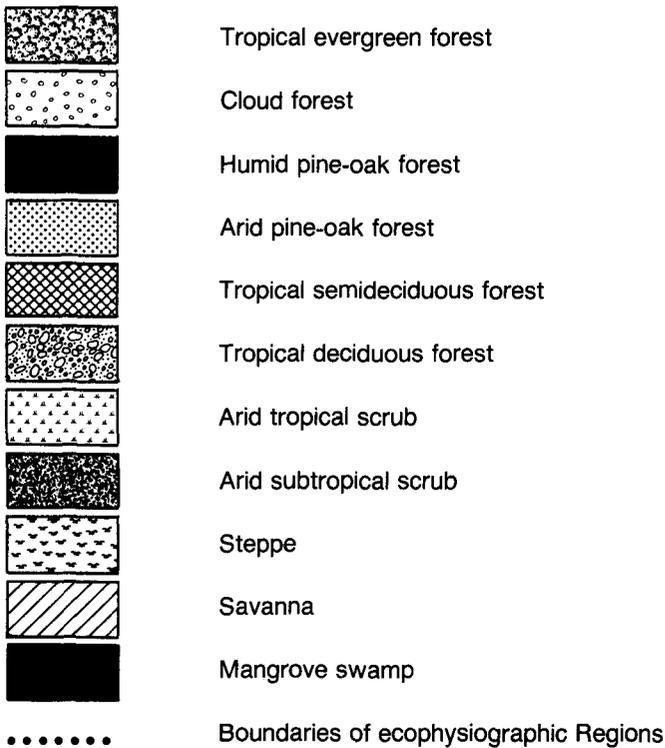


Fig. 1. Distribution of the major habitats in Oaxaca.



Ecophysiological Regions: (A) Atlantic Region; (B) Interior Region; (C) Pacific Region. Mixtures: (1) arid pine-oak forest and arid subtropical scrub; (2) cloud forest, humid pine-oak forest, and arid pine-oak forest; (3) arid pine-oak forest and tropical semideciduous forest; (4) arid subtropical scrub, steppe, and savanna; (5) cloud forest and humid pine-oak forest; (6) humid pine-oak forest and tropical semideciduous forest; (7) tropical evergreen forest, arid pine-oak forest, tropical deciduous forest, arid tropical scrub, and savanna; (8) tropical deciduous forest, arid tropical scrub, and savanna.

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BIRDS OF THE MEXICAN STATE OF OAXACA**

**BY**

**LAURENCE C. BINFORD**

330 Grove Street  
Glencoe, Illinois 60022

**ORNITHOLOGICAL MONOGRAPHS NO. 43**

**PUBLISHED BY  
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**1989**

## DEDICATION

To my mother, Irene E. Binford, for the spark; Ellen L. Stephenson for the means; Charles T. Clark for the approach; and Philip S. Humphrey for the techniques.

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## INTRODUCTION

The Mexican state of Oaxaca supports an avifauna of 680 species, exceeding the 636 (based on my taxonomy) listed for Chiapas (Alvarez del Toro 1971), 661 for Honduras (Monroe 1968), and 662 for Guatemala (Land 1970). This high total is a reflection of the state's geographic position and great diversity of habitats. Oaxaca encompasses portions of both drainage slopes and elevations from sea level to 11,138 ft. It includes the southernmost extension of the Mexican tableland and thus represents the limits of breeding and wintering distributions for many northern birds, especially those inhabiting pine-oak forest or arid subtropical scrub, whereas the Sierra Madre de Chiapas is the northernmost locality for a number of Central American species. The Sierras de Miahuatlán and Yucuyacua are isolated ranges that have given rise to at least one species and several races and harbor other forms endemic to western Mexico. The low Isthmus of Tehuantepec is a major barrier to highland species, an important corridor for contact between the breeding birds of the Atlantic and Pacific lowlands, and an avenue for migrants moving between North and South America. The Atlantic and Pacific lowlands support the large avifaunas of tropical evergreen and tropical deciduous forests, respectively, and are important wintering areas for North American migrants. The Pacific Ocean adds a pelagic element, and the coast provides the mangrove swamps, mud flats, and open shallow waters used by many other aquatic birds.

Since Ferdinand Deppe visited Oaxaca in 1825, numerous ornithologists and professional collectors have studied its birds. Early explorations concentrated in the regions of Oaxaca City and the Isthmus of Tehuantepec. The first major papers on the state were those of Sclater (1858, 1859b, 1862), who reported on collections made in the middle of the century by Adolphe Boucard and Auguste Sallé. In the latter part of the 1800s, A. L. François Sumichrast took up residence on the Pacific side of the Isthmus at Juchitán and later at Santa Efigenia. His collections formed the basis for an important paper by Lawrence (1876) and were later used by Sumichrast himself (1881). Ferrari-Perez (1886) listed the data obtained on a short expedition to the state. The great *Biologica Centrali-Americana* by Salvin and Godman (1879–1904) and the series on *The Birds of North and Middle America* by Ridgway (1901–1919), Ridgway and Friedmann (1941, 1946), and Friedmann (1950) contained numerous Oaxaca records, the latter series including the fruits of the extensive travels of E. W. Nelson and E. A. Goldman. In 1928 Bangs and Peters reported on a collection of some 300 specimens taken by W. W. Brown in 1927 on the Pacific side of the Tehuantepec region. Aside from a paper by Martin del Campo (1942), no further major publications were forthcoming until 1950, when Blake (1950) published on a collection of 542 specimens taken in the vicinity of Tutla by Mario del Toro Avilés, and Friedmann et al. (1950) released the first part of the *Distributional Check-list of the Birds of Mexico*. During the next decade, Amadon and Eckelberry (1955), Graber and Graber (1959), and Coffey (1960) published short reports, and there appeared the second part of the Mexican check-list (Miller et al. 1957) and the Fifth Edition of the *Check-list of North American Birds* (A.O.U. 1957).

I began my work in the state in 1959. Shortly thereafter, interest in Oaxaca ornithology rose dramatically. R. T. Orr, A. R. Phillips, and J. S. Rowley con-

centrated their efforts on the breeding biology and distribution of the birds of the Sierra Madre de Chiapas and the Sierras de Miahuatlán and Yucuyacua. During the first half of the decade, the Western Foundation of Vertebrate Zoology maintained collectors nearly continuously within the state. The fruits of these and other expeditions, including some of my own, appeared in the literature with increasing frequency: Thompson (1962), Lenna (1963), Phillips (1963, 1966, 1986), Webster (1965), Rowley and Orr (1964a, 1964b, 1965), Binford (1965, 1968, 1970), Phillips and Rook (1965), Rowley (1966, 1968, 1984), Orr and Webster (1968), Mees (1970), MacDougall (1971), and Jehl (1974b).

At the beginning of the 1970s, the spate of interest began to wane, but my activities continued to the present. Over the years I spent some 12 months in Oaxaca on six separate trips (1959, 1961, 1964, 1972, and 1974), collecting more than 1,900 specimens and taking extensive notes on the birds and their habitats. I visited most of the major museums in the United States and Mexico, compiling data on over 15,500 additional specimens. I examined some 710 literature titles that mention Oaxaca specifically and 225 more that bear indirectly on the subject. Some museums that I have not visited since the late 1960s probably have received new Oaxaca material, but, to my knowledge, no major collections. I examined two of the most recent and important collections (California Academy of Sciences and Western Foundation of Vertebrate Zoology) in 1980. I scanned the most important literature through 1986. Thus, this survey represents a summary of nearly all available data. I leave to others the task of bringing to light information I might have missed.

Because much of the ornithological investigation in Oaxaca has been rather recent or was accomplished by professional collectors working for individuals uninterested in publication, many specimens have never been recorded in the literature. For space considerations, I have not listed all these herein, but I have used them in developing the summaries for each species (I will supply specimen lists upon request). The most extensive and important of these collections were made by E. W. Nelson and E. A. Goldman, C. C. Lamb, A. R. Phillips, W. Rook, J. S. Rowley, W. J. Schaldach, P. W. Shufeldt, J. D. Webster, and, of course, my field parties. Many of the specimens collected by Mario del Toro Avilés also belong in this category but unfortunately most are not used because their data are untrustworthy (see Plan of the Species Accounts).

Prior to this study, the only publication that attempted to treat all the species found in Oaxaca was the *Distributional Check-list of the Birds of Mexico*. Of the 680 forms treated as full species herein, the Mexican check-list recorded 582 for Oaxaca. Some of these, however, were based on questionable evidence but have since been recorded reliably; others I have relegated to the Hypothetical List. Thus, the total number of species legitimately recorded in the Mexican check-list was 547, 133 fewer than in the present work.

Despite the attention paid to Oaxaca, much remains to be learned, especially in the isolated mountains of the Mesa del Sur. The only major unexplored area is located north of the Sierra Madre de Chiapas and east of the Isthmus, where, according to some maps, an isolated, uninhabited mountain range attains elevations matching those of the Sierra de Tuxtla in Veracruz, an area renowned for its endemic forms. The Sierra de Huautla might also harbor forms new to Oaxaca. The role that the Isthmus of Tehuantepec plays in migration needs detailed study.

Local movements of supposedly sedentary species are unexplained. Many species need taxonomic revision. Throughout this survey, I attempt to point out such gaps in our knowledge.

Future field work will continue to produce additions to the state's avifauna. Most of these will be vagrants, for which the possibilities are immeasurable. On the other hand, the number of unrecorded species that might occur with more than a vagrant status is rather limited; these will consist largely of oceanics, of North American migrants known to range south of Oaxaca or to reach Guerrero, Puebla, or northern Veracruz, and of permanent residents from the humid montane and lowland forests east of the Isthmus. Because discovery of such species will be enhanced if observers are aware of the possibilities, I list here the 81 species I consider most likely to be found. Some of these are discussed in the Hypothetical List. The 37 species marked with an asterisk (\*) are especially good possibilities: \**Pterodroma cookii*, \**Puffinus griseus*, \**Oceanodroma leucorhoa*, \**O. tethys*, \**Phaethon aethereus*, \**Sula nebouxii*, \**Phalacrocorax auritus*, *Agamia agami*, *Jabiru mycteria*, \**Anser albifrons*, \**Chen caerulescens*, \**Anas platyrhynchos*, \**A. cyanoptera*, *Aythya valisineria*, *A. americana*, *Oxyura dominica*, \**Ictinia mississippiensis*, \**Spizaetus tyrannus*, *Oreophasis derbianus*, *Meleagris gallopavo*, *Dendrortyx barbatus*, *Philortyx fasciatus*, *Laterallus jamaicensis*, *Rallus longirostris*, *Aramides axillaris*, *Porzana flaviventer*, *Bartramia longicauda*, \**Aphriza virgata*, *Tryngites subruficollis*, \**Catharacta maccormicki*, \**Larus heermanni*, \**L. argentatus*, \**Sterna paradisaea*, *Anous stolidus*, *Columba cayennensis*, *Claravis mondetoura*, \**Bolborhynchus lineola*, \**Otus flammeolus*, \**Micrathene whitneyi*, *Strix fulvescens*, *Asio stygius*, \**Phalaenoptilus nuttallii*, \**Streptoprocne semicollaris*, \**Archilochus alexandri*, \**Atthis ellioti*, \**Electron carinatum*, *Xenotriccus callizonus*, \**Empidonax alnorum*, *Progne sinaloae*, \**Tachycineta bicolor*, *Notiochelidon pileata*, \**Hirundo fulva*, *Cyanolyca pumilo*, *Thryothorus rufalbus*, *Troglodytes rufociliatus*, *Cistothorus platensis*, *Microcerculus philomela*, *Catharus fuscescens*, *Turdus rufitorques*, *Toxostoma longirostre*, *Melanotis hypoleucus*, *Anthus spragueii*, \**Sturnus vulgaris*, *Vireo pallens*, \**Vermivora luciae*, *Dendroica tigrina*, *D. caerulescens*, \**D. chrysoparia*, *D. castanea*, *D. cerulea*, *Lymnotheryx swainsonii*, *Tangara cabanisi*, *Cyanerpes lucidus*, \**Piranga olivacea*, \**Ramphocelus passerinii*, \**Passerina amoena*, *Arremonops chloronotus*, *Haplospiza rustica*, \**Sicalis luteola*, \**Psarocolius wagleri*, *Carduelis pinus*.

## GENERAL PHYSIOGRAPHY

Oaxaca is located in southern Mexico between north latitudes 15°38' and 18°44' and west longitudes 93°52' and 98°31' (Fig. 31). It is bordered on the south by the Pacific Ocean and on the west, northwest, northeast, and east, respectively, by Guerrero, Puebla, Veracruz, and Chiapas. It is the sixth largest state in Mexico, encompassing a land area of 36,371 mi<sup>2</sup> or the approximate equivalent of the state of Indiana. Elevations range from sea level on the Pacific coast to 11,138 ft at the summit of Cerro Zempoaltepec.

## PHYSIOGRAPHIC REGIONS

Oaxaca can be divided into five major physiographic regions: the Mesa del Sur, Atlantic coastal lowlands, Pacific coastal lowlands, Sierra Madre de Chiapas, and Isthmus of Tehuantepec. These should not be confused with the three ecophys-

iographic Regions (Atlantic Region, Pacific Region, and Interior Region; always capitalized) defined in the Plan of the Species Accounts and shown in Figure 1.

#### MESA DEL SUR

The Mesa del Sur is the extensive highland mass extending southeast from the Guerrero and Puebla borders and comprising the major portion of Oaxaca west of the Isthmus of Tehuantepec. Delimiting its borders are eight major mountain ranges, the Sierras de Yucuyacua, Cuatro Venados, and Miahuatlán on the south side bordering the Pacific lowlands and the Sierras de Huautla, Juárez, Zempoaltepec, los Mijes, and Choapan on the northeast along the Atlantic lowlands. The only other range of consequence is the rather isolated Sierra Aloapaneca.

Northwest of Oaxaca the Sierra de Huautla connects with the Orizaba highlands, a mountain mass in the eastern end of the Sierra Volcanica Transversal. The deep chasm of the Río Santo Domingo effectively separates both ranges from the remainder of the Sierra Madre de Oaxaca. The Sierra de Yucuyacua is narrowly isolated from the Sierra Madre del Sur of Guerrero by the Río Papagayo basin.

The interior portion of the Mesa del Sur presents a rugged picture. Little remains of the former plateau surface. Only on the floors of some of the larger valleys can level land be found. Throughout most of the Mesa, streams have created innumerable, small, deep, V-shaped valleys with precipitous slopes and knife-edged ridges. The eastern end has been extensively eroded by the dendritic basin of the Río Tehuantepec.

Major rivers have formed large interior valleys, connected with the coastal lowlands only through narrow gaps carved in the high mountain ranges bordering the Mesa. Notable among these are the valleys of Hidalgo Yalalag (formed by the Río Cajones), San Miguel Sola de Vega (carved by the lower portion of the Río Atoyac), and San Juan Bautista Cuicatlán (formed by the tributaries of the Río Santo Domingo). In the last valley, the elevation of 1,758 ft at San Juan Quiotepec is the lowest found in the Mesa del Sur outside the area adjoining the Isthmus of Tehuantepec. This valley connects with the valley of Tehuacán, Puebla.

The Oaxaca Valley represents a series of interconnected basins, together the largest in southern Mexico, surrounded by high mountains. It is drained primarily by the headwaters of the Río Atoyac and partially (the southeastern portion) by an upper tributary of the Río Tehuantepec. The flat to gently rolling floor, spotted with occasional isolated hills, has an average elevation of about 5,000 ft. At its northwestern extremity, the Oaxaca Valley nearly connects with one arm of the San Juan Bautista Cuicatlán valley, the two being separated by a narrow ridge at about 6,900 ft. On the southwest the Oaxaca Valley connects with the San Miguel Sola de Vega valley and on the southeast with the Río Tehuantepec basin.

In the northwest the mesa attains its highest average elevation—more than 7,000 ft. Again the river systems, with their numerous intermittent and seasonal streams, have formed a highly dissected landscape. The narrow, arid lowland valleys of the Río Coicoyán and Río Mixteco, the major rivers of the area, pass into Puebla and Guerrero and eventually connect with the Pacific lowlands of Guerrero via the valley of the Río Balsas.

In the general region of Asunción Nochixtlán, the terrain is somewhat more level. Here the base rock is limestone, which is easily eroded, so that the few streams have formed steep canyons with flat stretches of barren rock between.

The highest mountain peaks in the state are located in the Mesa del Sur: Cerro Zempoaltepec (11,138 ft), Cerro Yucuyacua (11,074), Cerro León (10,296), and Cerro San Felipe (10,204).

The continental divide enters Oaxaca from Puebla east of Santiago Miltepec, courses southeast along the high ridge to the northeast of Tamazulapan del Progreso and Asunción Nochixtlán to Rancho de las Rosas, where it swings northeast. After passing Las Sedas, it turns southeast along the crests of the Sierra Aloapaneca, the southern end of the Sierra de Zempoaltepec, and the Sierra de Los Mijes to a point north of Lachiguirí, then north for a short distance into the southern end of the Sierra de Choapan, and southeast again along the southern edges of the Isthmus mountains and Sierra Madre de Chiapas to leave Oaxaca at Cerro de la Gineta.

#### ATLANTIC COASTAL LOWLANDS

The extreme northern edge of Oaxaca along the Veracruz border is occupied by a lowland area continuous with the Atlantic coastal lowlands of eastern Mexico. In Oaxaca the inland termination of these lowlands can be considered to approximate the 300-ft level of elevation. Here the foothills begin their ascent into the bordering mountain ranges: the Sierra Madre de Chiapas, the Isthmus mountains, and the several ranges composing the northeastern front of the Mesa del Sur. The surface of the lowlands is flat in some places, gently rolling in others, frequently dotted with low hills, and, where penetrating inland along major rivers, interdigitated with ridges projecting from the neighboring ranges.

Major rivers in this region originate in the bordering mountains of the Mesa del Sur, Isthmus mountains, and Sierra Madre de Chiapas and pass transversely through Veracruz into the Gulf of Mexico. All rivers of northern Oaxaca, including those of the interior valleys of San Juan Bautista Cuicatlán and Hidalgo Yalalag, are distributed between two major river systems: the Río Papaloapan basin, dominating the western part of northern Oaxaca and emptying into the Gulf of Mexico at Alvarado, Veracruz, and the Río Coatzacoalcos basin, draining the eastern half and emptying into the Gulf at Coatzacoalcos, Veracruz. These two basins approach one another most closely along the headwaters of the Río Trinidad on the west and the Río Jaltepec on the east.

#### PACIFIC COASTAL LOWLANDS

The Pacific coastal lowlands, here defined as the coastal area below 300 ft elevation, vary considerably in width. Only in the extreme southwestern corner of the state and in the Isthmus of Tehuantepec do the lowlands attain substantial proportions. In the former area, the lowlands extend inland a maximum distance of about 15 mi before encountering major foothills and stretch from the Guerrero border east along the coast for about 40 mi. In the Tehuantepec region, the lowlands extend along the coast from near Tehuantepec City to the Chiapas border, a distance of about 80 mi. They attain their maximum width of 30 mi in the western part, narrowing to only 2 mi at the eastern end, where they are broken by the north-south ridges and isolated hills associated with the Sierra Madre de Chiapas.

Along the southern edge of the Mesa del Sur, the lowlands are much narrower, varying from 1 to 10 mi in width. The neighboring mountains descend abruptly into the Pacific Ocean as a series of southward-projecting rocky headlands, which

segment the lowlands into pockets connected only by narrow strips along the shore. Between the headlands, rivers draining the adjacent mountains often form bays or lagoons. Where the headlands descend steeply, deep wide-mouthed bays are produced, some providing excellent anchorage. When the headlands slope more gently or are more widely spaced, barrier sand dunes often build up at the mouths of the rivers, forming shallow saline or brackish lagoons. In areas not influenced by rivers, the headlands form rocky cliffs with beachless shores, small, shallow sandy coves, or deep wide-mouthed bays with rocky or sandy borders.

The largest lagoons in the state are Laguna Superior, Laguna Inferior, Laguna Oriental, and Mar Muerto, located on the Pacific coast of the Tehuantepec region. Other large lagoons, all west of Puerto Escondido, are Laguna Lagartero, Laguna de Pastoria, Laguna de Chacahua, and Laguna de Alotengo.

There are no large islands off the coast, although a big dome-shaped rock is present a few hundred yards offshore just west of Puerto Angel. The surface of Laguna Superior is dotted with numerous islands, some low and mangrove-covered and others much higher, one of them attaining an elevation of 692 ft. Other low islands are found in the western end of Mar Muerto. The lagoons in the Isthmus are separated from the Gulf of Tehuantepec by a long strip of land 1 to 3 mi wide, in its higher portion composed of sand dunes and elsewhere of mangrove-covered mud bars.

In the steep southern escarpments of the Mesa del Sur and Sierra Madre de Chiapas numerous short rivers originate; they drain only small areas before descending abruptly to cut transversely across the lowlands into the sea. The only large river systems emptying into the Pacific Ocean are that of the Río Verde, whose tributaries drain the south face of the Sierra de Yucuyacua (Río de la Cuchara and Río Sordo) and most of the Oaxaca Valley (Río Atoyac), and that of the Río Tehuantepec, whose basin occupies a large area at the eastern end of the Mesa del Sur.

#### ISTHMUS OF TEHUANTEPEC

In the eastern portion of Veracruz and Oaxaca, the continental land mass constricts to its minimum width. A line drawn to intersect the Oaxaca coast at longitude 94°45'W and the Veracruz coast at 94°30'W marks the shortest distance between the oceans—about 135 mi. This constriction is known as the Isthmus of Tehuantepec. For the purposes of ornithological discussions, however, a more useful definition, based on geological origin, is used herein. The Isthmus is a downfaulted, north-south, transverse block athwart the general east-west structural trend of the neighboring mountains and includes portions of both the Atlantic and Pacific coastal lowlands. As here defined, the Oaxaca portion of the Isthmus is a north-south strip of land between the Veracruz border and the Gulf of Tehuantepec, bordered on the west by the foothills of the Sierra de Choapan (approximately, 95°10'W) and on the east by the foothills of the Sierra Madre de Chiapas (approximately, 94°40'W); also included are the plains west of the Río Tehuantepec as far as the eastern base of the Sierra de Miahuatlán. For convenience, the Isthmus in Veracruz is considered to swing slightly eastward from the Oaxaca border and to be delimited on the coast by Punta San Juan on the west and the town of Tonalá on the east.

A range of low mountains, here referred to as the Isthmus mountains, stretches

for about 35 mi between the foothills of the Sierra de Choapan on the west and those of the Sierra Madre de Chiapas on the east, and separates the Atlantic and Pacific coastal lowlands. This range is characterized by isolated hills, or groups of hills, connected by lower ridges that stretch east and west. The continental divide extends along the southernmost crests of this range, passing near Chivela and San Miguel Chimalapa. South of the divide the hills drop abruptly into the narrow Pacific lowlands, whereas north of the divide the ridges become gradually lower, beginning their merge with the wide Atlantic lowlands approximately at the latitude of Matías Romero and finally terminating near the Veracruz border.

In the high ridge composing the southern escarpment, elevations reach 2,500 ft at the tops of isolated peaks, but the general level is much lower, the lowest point along the continental divide being about 800 ft. Just north of this ridge and situated nearly on the continental divide are the Plains of Chivela, a flat to gently rolling area of savanna extending east from Chivela for about 10 mi.

That portion of the Pacific coastal lowlands within the Isthmus is known as the Plains of Tehuantepec. This area extends from the 300-ft level along the southern base of the Isthmus mountains, south to the northern edges of the large coastal lagoons, west just beyond the Río Tehuantepec, and east past the Río Chicapa.

The Atlantic lowlands occupy only a small part of the Oaxaca portion of the Isthmus, being restricted to the valleys of major rivers. Because these rivers reach the continental divide at the southern edge of the Isthmus mountains, however, the lowlands penetrate as far as the latitude of Matías Romero. A more extensive lowland area begins at the Oaxaca border and extends some 70 mi to the Gulf of Mexico; this region is gently rolling and dotted with isolated hills. The rivers draining the Atlantic side of the Isthmus mountains empty into the Gulf of Mexico via the Río Coatzacoalcos.

#### SIERRA MADRE DE CHIAPAS

Delimiting the Isthmus on its eastern side and stretching into Chiapas is a northwest-southeast directed range of high mountains known as the Sierra Madre de Chiapas. The mountain chain of which this range is a part extends along the Pacific coast of Chiapas, passes through Guatemala, continues as the Sierra de Omoa in northeastern Honduras, forms the Bay Islands off Honduras, and proceeds as a submarine ridge to Jamaica. It is separated from the high Sierra de San Cristóbal of northern Chiapas by a tectonic depression, the Valley of Chiapas, which continues eastward through the Motagua Valley of Guatemala and then into the Caribbean as the Cayman Trench.

The highest peaks in the Oaxaca portion of the Sierra Madre de Chiapas are Picacho Prieto (about 7,900 ft), Cerro Baúl (6,750), and Cerro Atravesado (about 6,600). From the continental divide, which passes along the southern escarpment of this range and into Chiapas at Cerro de la Gineta, the southern slopes of the Sierra descend abruptly into the Pacific coastal lowlands. On the northern side of the divide, the hills dip steeply into the upper portion of the valley of the Río Coatzacoalcos, ascend again north of this valley, and finally drop gradually into the Atlantic lowlands of eastern Veracruz.

The Sierra Madre de Chiapas is highly dissected by the many rivers to which it gives rise, but because of a heavy cover of vegetation, erosion has not progressed to the degree found in many of the ranges of the Mesa del Sur. The rivers of the

Atlantic slope are part of the Río Coatzacoalcos basin, whereas those of the Pacific cut transversely across the lowlands and empty into the large coastal lagoons.

#### HYDROGRAPHY

The major river systems and coastal bays and lagoons have already been discussed under their respective physiographic regions and are depicted in Figure 31. The Pacific coastline of Oaxaca extends for about 300 mi between the Chiapas and Guerrero borders. The large, relatively shallow Gulf of Tehuantepec is herein treated as part of the ocean.

West of the Isthmus the Pacific Ocean attains great depths where the Middle American Trench closely approaches the shore. The 500-m line (1,640 ft) passes within 11 mi of shore near the Guerrero border and gradually approaches the coast until it is less than 2 mi distant off Puerto Angel. About 30 mi off this town depths of almost 12,000 ft are known. These great depths produce the necessary environmental conditions to bring pelagic birds close to shore. East of Puerto Angel the 500-m line gradually recedes from the coast, until at the longitude of Salina Cruz it swings south along the outer limits of the Gulf of Tehuantepec. In the Gulf the 200-m line (656 ft) runs parallel to the coast about 33 mi offshore, and the 20-m line (about 66 ft) ranges as far as 8 mi from the coast.

Few natural lakes are found in the state. The largest that I have seen is located 12 mi southeast of Santiago Jamiltepec and is only about 0.5 mi in diameter. Most other natural bodies of fresh water are little more than ponds, and the majority of these are found in bends of streams and are quite marshy. Such ponds are most numerous in the Atlantic lowlands. A few ponds or small shallow lakes are found in the Oaxaca Valley and in the savannas of extreme southwestern Oaxaca. During the rainy season, numerous temporary ponds spring up on the Plains of Tehuantepec. Roadside ditches in the lowlands sometimes retain water throughout the year and support permanent aquatic vegetation.

The two largest bodies of fresh water in the state are both reservoirs. In the Atlantic lowlands is Presa Miguel Alemán, with a capacity of 282,528 ft<sup>3</sup>, formed from the impounded waters of the Río Tonto. At the confluence of the Río Tehuantepec and Río Tequisistlán is Presa Benito Juárez, with a capacity of 33,268 ft<sup>3</sup>. Both reservoirs are surrounded by hills, and Presa Miguel Alemán contains numerous, small steep-sided islands. Several smaller reservoirs that I have not visited are shown on some maps. One is located on the Río Santo Domingo west of San Juan Bautista Tuxtepec, another on the Río Valle Nacional just east of Valle Nacional, and a third slightly farther east on a tributary of the latter river.

#### CLIMATE

The climate of Oaxaca can be classified using broad terms that denote variations in humidity and temperature. The Atlantic lowlands and adjacent lower slopes have a humid tropical climate, which blends into humid subtropical and then humid temperate at higher elevations. The Pacific lowlands are arid tropical, and the higher slopes are, progressively, humid tropical, humid subtropical, and humid temperate. The lowest portions of the Interior Region connect through valleys with the coastal lowlands and are arid (or semiarid) tropical; above this is an extensive belt of arid subtropical, then arid temperate climate, with still higher isolated pockets of humid temperate. Above about 9,800 ft throughout the state,

the climate can be termed boreal, either arid or humid. I find the term "subtropical" useful and meaningful, despite the differing opinions as to its definition. In Oaxaca it embraces arid subtropical scrub, cloud forest, and some pine-oak forests (see Habitats) in regions with mild frosts.

Under the Köppen system of climate classification, as modified by Vivó and Gómez (1946) and Strahler (1960), three fundamental zones of climate are recognized in Oaxaca. Tropical rainy climates (designated by the letter "A" in the Köppen system) of various types are found; in this category the average atmospheric temperature of every month exceeds 64.4°F (18°C), there is no cold winter season, and annual rainfall is great and exceeds annual evaporation. In the dry climates (designated by the letter "B"), of which there are several types, potential evaporation exceeds precipitation throughout the year, and no water surplus occurs (hence, no permanent streams originate here). The third major type of climate ("C"), called warm temperate by Strahler (1960) and humid temperate by Vivó and Gómez (1946), is characterized by the coldest month having an average temperature below 64.4°F but above 26.6°F (−3°C), by at least one month having an average temperature above 50°F (10°C), and by the occurrence of both summer and winter seasons.

Tropical rainy climates ("A") of two types occur. At lower elevations in the Atlantic Region, intense rains occur during the summer and autumn months (mid-May to mid-October), while a partial dry season prevails during the remainder of the year; this is a tropical rain forest climate with a short dry season ("Amw"). In the lower reaches of the Pacific Region, precipitation is restricted almost entirely to the summer and autumn months, the rest of the year being subjected to severe dryness; the climate is known as tropical savanna climate ("Aw").

Of the dry climates ("B"), two major subdivisions can be recognized: the steppe climate ("BS") and the desert climate ("BW"). Steppe climates in Oaxaca are semiarid, with about 15 to 30 in of rainfall per year, and have a definite dry season during the winter. According to Vivó and Gómez (1946), this type occurs in the Oaxaca Valley, the western portion of the Río Tehuantepec basin, the general region of Asunción Nochixtlán, the valley of San Miguel Sola de Vega, and a small area northwest of Huajuapán de León. In the last area, the average annual temperature and the average monthly temperatures of all months exceed 64.4°F ("BSH'w"). In the other regions of steppe climate, the average annual temperature is above 64.4°F, but the average of some months is below 64.4°F ("BSHw"). Temperate or subtropical climates prevail in all of these areas, except in the lower portions of both the valley of San Miguel Sola de Vega and the Río Tehuantepec basin, where tropical conditions exist.

Desert climate, found in Oaxaca only in the valley of San Juan Bautista Cuicatlán, is characterized by extremely arid conditions, usually with less than 10 in of rainfall annually (although the town itself receives 21.8 in). Here the average annual and monthly temperatures for all months is above 64.4°F, there is a definite dry season, and tropical conditions prevail.

Humid temperate climates ("C") of several types are found in Oaxaca. In the Atlantic Region west of the Isthmus is an area in which rains occur throughout the year but are heaviest in the summer, and the average temperature of the warmest month is over 71.6°F (22°C) ("Cfwa"). Above this belt and in the Sierra Aloapaneca and on the Pacific sides of the Sierra de Miahuatlán and Sierra de

Yucuyacua, the temperature is also over 71.6°F, but a definite, although not severe, dry season occurs during the winter months ("Cwag").

According to Vivó and Gómez, parts of the Sierra Madre de Chiapas and those portions of the Mesa del Sur without the dry climates have a humid temperate climate characterized by a dry winter season with the average temperature of the warmest month below 71.6°F ("Cwbg").

The two factors in the climate of Oaxaca that influence to the greatest degree the distribution of the various vegetation types are temperature and rainfall. Climatic data that are representative of each of the extensive terrestrial habitats are shown in Table 1. Frosts, which are a reflection of temperature and humidity and are useful in distinguishing temperate from subtropical and tropical climates, are also presented.

The major factor influencing temperature is elevation, the higher lands having the colder temperatures. Variation in latitude, although important on a worldwide scale, has little effect within Oaxaca. Increased distance from the warming effect of the waters of the Gulf of Mexico and the Pacific Ocean causes somewhat colder temperatures in parts of the interior of the Mesa del Sur. Humidity is effective in minimizing temperature extremes. Cloud forests, for example, often occur where temperatures are low enough to produce frosts, but their effect is minimized by the high humidity. As will be discussed later, cold fronts from the north cause sudden and often severe periodic drops in temperature.

Several factors influence the amount of rainfall in Oaxaca: water temperatures and currents in the Gulf of Mexico and Pacific Ocean, winds, surface configuration, and extent of land mass. The Pacific shores of Oaxaca are bathed by the warm waters of a branch of the Pacific Equatorial Countercurrent. In the Gulf of Mexico, off southern Veracruz, a branch of the Atlantic North Equatorial Current brings warm water to the coast. Over both these warm currents form tropical air masses laden with moisture. As will be seen, these air masses, influenced by other factors, produce most of the rainfall in Oaxaca.

Oaxaca is affected throughout the year by the Northeast Trade Winds, a large flow of easterly air. As the trades sweep across the warm waters of the Caribbean Sea and Gulf of Mexico, they absorb large quantities of water vapor. When they approach the thermal equator, they are forced by the rising air of the equatorial calms (doldrums) to rise, cool, and release their moisture. During the summer, the thermal equator is located near 12°N, and its effect on the moisture-laden easterlies, which at this time are also unstable, extends into southern Mexico, causing (for the most part) the annual rainy season (mid-May to mid-October). The rainy season in Oaxaca has two peaks, usually in June and September. The semipermanent low pressure area that forms over northwestern Mexico in summer probably is too far away to affect Oaxaca.

During winter the thermal equator migrates southward and in the latitude of southern Mexico can no longer cause the trades to rise. In addition, the subtropical calms, or masses of descending air, which are dry and stable and thus incapable of producing much rain, extend their influence southward into Oaxaca. The trades are also quite stable at this time. Hence, a dry season is produced (mid-October to mid-May). An important exception to this general pattern occurs on the steep windward slopes of the Atlantic and Pacific mountains, which even during winter force the trades to rise and release some of their moisture, although far less than

in summer. This source (plus rains from occasional *nortes* on the Atlantic side; see below) assures permanently moist conditions in these mountains.

During the winter, Oaxaca is also affected by the irregular incursions of cold air masses, or *nortes*, which originate over the North Pacific Ocean or in the Great Plains of Canada and the United States and sweep southward into Mexico and Central America. Where these cold air masses encounter warm tropical air, storm lines are produced. The stronger fronts cross the Gulf of Mexico and often hit the Atlantic Region of Oaxaca, including the lowlands, with great fury, bringing high winds, much rainfall, and sudden drops in temperature (as much as 10°F). In the higher mountains of Oaxaca, heavy frosts and snowfall sometimes result. The interior of the Mesa del Sur and the Pacific coast of Oaxaca west of the Isthmus of Tehuantepec are little affected because of the shadow afforded by the high mountains in the northern portion of the Mesa; the *nortes* usually descend into these Pacific lowlands as hot dry winds. In the Isthmus, however, the strong winds accompanying a front sweep unobstructed into the Pacific lowlands, where they are often associated with a decrease in temperature and rarely, some precipitation.

Tropical cyclones, developing in both the Caribbean Sea and the Pacific Ocean, usually from August through October, occasionally bring hurricane winds and heavy rains to Oaxaca. So large are the low pressure systems associated with such hurricanes that precipitation and light winds sometimes affect Oaxaca even when a storm is centered far to the north or south of the state. "Easterly waves"—changes in the air flow of the trades—associated with cyclones in the Gulf of Mexico sometimes bring days of continuous rain to the Atlantic slope and even the Pacific slope of Oaxaca.

Local air circulation also strongly affects the climate of Oaxaca. Local convective rains in association with the humid air brought by the trade winds and cyclones are very important in their effect on the interior of the Mesa del Sur. Although most rainfall occurs there during the summer, when the trades exert most of their influence, some convective rains are produced even during winter.

Surface configuration plays an important role in the precipitation patterns exhibited in Oaxaca. The ranges of high mountains bordering the Mesa del Sur force the prevailing moisture-laden winds to drop their rain on the windward slopes; at the same time, partial rain shadows are caused on the leeward sides. Thus, the slopes facing the Atlantic and Pacific lowlands are humid, whereas the interior valleys are arid. The degree of effect depends on the elevation and geographical extent of the mountains, the largest and highest ranges producing the most pronounced results. In the interior, only the highest peaks can intercept enough moisture to support humid vegetation.

Extent of land mass also affects rainfall. The greater the distance from the sources of moisture-laden air—the Gulf of Mexico and the Pacific Ocean—the less the amount of precipitation. Oaxaca, situated as it is in a narrow portion of the Middle American land mass, exhibits little variation in this respect, although the northwestern portion of the Mesa del Sur, located farther from the large bodies of water, appears to receive slightly less precipitation than areas at the eastern end of the Mesa.

The effects of rainfall on a regional basis can be summarized as follows. The Atlantic coastal lowlands and the adjacent mountain slopes receive moisture throughout the year. In summer, the rains there are heavy; they are caused by the

TABLE 1  
 AVERAGE ANNUAL AND MONTHLY AIR TEMPERATURES (°F; LINE 1), RAINFALL (IN; LINE 2), AND WHITE OR KILLING FROSTS  
 (NUMBER OF DAYS; LINE 3, IF PRESENT) FOR OAXACA STATIONS SELECTED TO REPRESENT ALL EXTENSIVE TERRESTRIAL  
 HABITATS.<sup>a</sup>

Station	Aver. ann.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Habitats
San Juan Bautista Tuxtepec, 105 ft	78.4 96.5	71.4 1.0	73.8 0.9	77.5 1.5	81.3 1.8	83.8 4.5	83.5 16.1	80.6 24.8	82.2 13.4	81.0 16.4	78.6 10.4	74.7 3.5	71.8 2.1	Tropical evergreen forest
Valle Nacional, 213 ft	76.8 149.2	70.2 3.7	72.3 2.3	76.5 3.7	80.6 3.6	82.6 8.2	81.9 23.1	79.5 29.3	80.4 21.0	78.6 22.0	76.6 20.0	72.9 8.5	69.8 3.8	Tropical evergreen forest
Finca Jamaica, 2,400 ft	68.0 106.0	65.5 0.8	66.6 0.8	69.3 0.1	70.0 2.5	70.3 11.0	68.9 20.0	68.0 15.8	68.5 16.1	68.2 21.4	67.8 13.5	66.9 3.6	66.4 0.4	Tropical semideciduous forest (temperatures atypical)
Ingenio Santo Domingo, 295 ft	80.1 48.8	77.2 0	78.4 0	80.8 0	82.9 0	83.8 0	81.5 0	82.8 0	81.3 5.3	80.8 15.2	78.8 4.8	76.3 0.5	75.0 0.1	Tropical deciduous forest
Puerto Angel, 141 ft	82.8 40.9	81.3 0.2	82.0 0.1	82.2 0.1	83.1 0	84.2 3.1	83.5 7.3	83.5 5.4	83.3 6.4	82.6 13.3	82.9 4.4	82.9 0.4	81.9 0.2	Tropical deciduous forest
San Juan Bautista Cuicatán, 1,952 ft	77.9 21.8	71.1 0.2	73.8 0.1	77.9 0.1	82.9 0.2	84.2 1.8	82.4 4.4	79.7 5.9	80.8 2.4	79.5 4.4	77.0 1.9	74.3 0.4	71.4 0	Arid tropical scrub
Juchitán, 46 ft	81.7 36.7	77.4 0.3	79.2 0	81.3 0.3	84.4 1.6	85.3 8.8	83.5 5.9	83.3 8.8	84.2 5.3	82.2 8.6	81.0 4.4	79.7 1.3	78.1 0	Arid tropical scrub, savanna
Matías Romero, 659 ft	76.3 51.2	72.1 0.8	73.6 0.5	76.3 0.9	78.6 0.6	80.8 2.0	79.3 8.0	78.1 10.0	77.7 9.4	76.5 11.2	76.3 5.5	73.9 1.8	73.0 0.6	Transition between tropical ever- green and deciduous forests
Cataluña, 3,280 ft	67.1 217.4	61.9 5.2	62.2 4.2	66.2 3.9	69.4 6.5	70.0 11.4	70.7 34.5	69.4 44.1	71.1 32.5	68.9 29.4	68.2 26.0	64.6 12.7	61.5 6.9	Cloud forest
San Pedro Teutila, 4,265 ft	68.7 96.5	62.1 1.3	65.8 1.3	67.8 0.8	73.2 1.5	74.1 3.7	73.4 15.4	70.3 23.6	71.6 16.1	70.5 15.6	68.4 10.9	65.3 4.4	62.4 1.8	Cloud forest
Alotepec Mixes, 7,875 ft	63.5 90.7	59.5 1.5	60.3 1.3	64.2 1.6	66.9 3.1	67.3 6.0	65.8 17.5	64.8 18.2	65.5 13.8	64.9 15.2	62.6 7.9	60.3 3.0	58.8 1.7	Humid pine-oak forest
San Miguel Suchixtepec, 9,325 ft	64.2 53.1	61.5 1.0	65.3 0.2	64.9 0.5	67.1 0.8	65.1 4.6	64.9 8.5	64.2 9.8	64.6 10.3	65.1 10.1	64.4 5.7	62.6 1.2	60.8 0.4	Humid pine-oak forest

TABLE 1  
(CONTINUED)

Station	Aver. ann.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Habitats
Ixtlán de Juárez, 5,576 ft	61.0	56.8	59.5	63.7	63.9	64.6	63.5	61.3	61.5	60.3	60.6	58.1	57.7	Arid pine-oak forest
	40.8	0.5	0.5	0.3	1.1	3.0	6.7	7.1	5.6	7.8	5.3	2.2	0.6	
Santa María Asunción Tlaxiaco, 6,553 ft	62.1	57.0	59.0	61.9	64.0	65.5	64.9	64.8	64.4	64.2	62.2	59.4	57.4	Arid pine-oak forest
	44.6	0.6	0.5	0.1	1.9	4.4	8.3	7.3	7.3	8.8	3.9	1.2	0.4	
Cuajimoloya, 10,335 ft	96	24	19	11	6	<1	<1	0	0	0	1	15	21	Highland pine forest
	48.7	47.5	49.8	51.1	52.3	50.5	48.2	46.8	47.8	47.1	47.5	48.7	47.7	
Huaquapan de León, 5,238 ft	44.7	1.1	1.1	0.6	1.9	3.4	7.6	7.8	6.7	8.1	4.5	1.3	0.6	Arid subtropical scrub
	69.1	63.7	66.0	70.0	72.7	73.8	72.1	71.1	71.1	70.2	68.4	65.7	63.7	
Oaxaca City, 5,127 ft	28.4	0.2	0.1	0.3	0.8	3.1	5.8	4.0	4.7	6.4	2.2	0.6	0.3	Arid subtropical scrub, steppe
	10	3	3	<1	<1	0	0	0	0	0	<1	2	2	
Asunción Nochixtlán, 7,216 ft	69.1	64.6	67.3	71.1	73.4	73.6	71.2	70.3	70.2	69.3	68.0	66.0	64.4	Steppe
	25.4	0.3	0.1	0.2	1.4	3.9	5.4	3.3	3.1	5.3	2.1	0.2	0.1	
	5	2	1	<1	<1	0	0	0	0	0	0	1	1	
	63.7	58.5	62.4	64.0	67.5	67.3	66.7	64.8	64.4	64.2	62.4	62.2	59.2	
	17.7	0.2	0.1	0.1	1.0	1.8	3.5	2.5	2.0	3.9	1.9	0.3	0.3	
	<1	<1	0	0	0	0	0	0	0	0	0	0	<1	

\*Temperature and rainfall data from García (1973) and based on observations of from 4 to 31 yr; frost data from the *Atlas Climatológico de México* (1939) and based on a period of 15 yr

effect of the doldrums and mountain convection on the trade winds and by occasional cyclones. In winter, the rains are much reduced but still occur because of the convective effect of the mountains on the trades and the periodic occurrences of cold fronts.

In the interior of the Mesa del Sur, most precipitation occurs as a result of convective rains associated with the trades and cyclones; and, except on the highest peaks, which receive some moisture from winter cold fronts, rain is restricted to the summer season. However, even during the rainy season, precipitation is reduced by the shadowing effect of the high ranges surrounding the Mesa and directly bordering the valleys.

The Pacific coastal lowlands have a nearly complete dry season during the winter. Summer rains there are a result of the easterlies and occasional cyclones. The effect of the easterlies is lessened by the intervening mountains of the Mesa del Sur and Sierra Madre de Chiapas, which intercept much of the moisture-laden air originating in the Gulf of Mexico. The Plains of Tehuantepec sometimes receive a small amount of winter rain from the *nortes*. The humid forests on the southern slopes of the mountains bordering the Pacific coastal lowlands are maintained through the winter by convective rains produced by the mountains. A high water table might also aid the maintenance of humid forests in this area.

The general aridity of the Pacific lowlands and interior of the Mesa del Sur is primarily a result of the seasonality of the rains rather than the low total precipitation. Thus, Santiago Jamiltepec, located in the Pacific lowlands, although receiving 80.0 in of rain annually (García 1973), has an arid climate, because of the lack of precipitation in February, March, and April, and only very small amounts from October through January.

## HABITATS

The choice of a system that will allow the proper allocation of animal species to the wide variety of ecological situations existing in a geographical region is a difficult problem for the biogeographer. Many such systems have been devised, some based solely on climatological data and others on plant-animal associations.

The Holdridge (1947) classification, employed by Slud (1964) in his work on the birds of Costa Rica, allows for "the identification and mapping of the relation between climate and the major vegetation divisions of the world by dividing the climate into latitudinal temperature regions and subdividing each region into altitudinal temperature belts. Each belt is then broken down into plant formations on the basis of annual precipitation" (Slud 1964:13). The formations are further divided into plant associations, each with its distinct physiognomy. The associations, which result from climatic, edaphic, atmospheric, hydric, or biotic factors, are too small in Costa Rica to allow mapping.

The Holdridge system might be adapted to Oaxaca if more extensive climatological data were available. However, this classification has one major disadvantage. Because it is based on temperature and rainfall data, it can determine only the *climatic* association (as well as belt and formation) that *potentially* occurs in a given region. Associations resulting from local (or sometimes extensive) edaphic, atmospheric, hydric, or biotic conditions (including the effects of man), might have quite different vegetation complexes. Hence, the Holdridge system, when carried to the association level, a level very important to the distribution

of bird species, cannot stand on climatological data alone, but must be backed up by extensive field study to determine the presence and geographic distribution of these nonclimatic associations.

Numerous authors, including Griscom (1932), Dickey and van Rossem (1938), and Goldman (1951), in their respective works on Guatemala, El Salvador, and Mexico, have used variations of Merriam's life zone concept. This system often works well when applied to a small area, as was the case when originally developed on San Francisco Mountain in Arizona, because the life zones there corresponded to the different animal habitats. When applied to a larger geographic area, however, this system often breaks down, as is the case in Oaxaca. A given life zone can embrace several major animal habitats and, thus, contain such a great diversity of bird species that the regions lose their usefulness. For example, Goldman's (1951) Humid Upper Tropical Subzone includes both broad-leaved cloud forest and humid pine-oak forest. As a result, it is said to support both *Aulacorhynchus prasinus*, which is confined to the former habitat, and *Campylorhynchus megalopterus*, restricted to the latter. Similarly, his Lower Tropical Zone includes such diverse habitats as mangrove swamp, savanna, and arid tropical shrub. Conversely, two or more life zones can contain the same animal habitat, or habitats so similar that their slight variations appear to have little or no effect on the avifauna. Thus, *Melanerpes formicivorus*, a woodpecker confined to oak forest, is found in several life zones. Furthermore, at lower latitudes the zones tend to narrow in their elevational width, especially those at high elevations, and often are indistinguishable from adjacent zones. Finally, life zones are based primarily on major climatological data, and important variations due to edaphic, hydric, atmospheric, or biotic conditions are not taken into account. For a more detailed analysis of the pros and cons of the life zone system, see Stuart (1964).

In my opinion the habitat is the most important factor controlling the present ranges of the birds in Oaxaca. In most terrestrial and a few aquatic environments, the primary feature influencing the avifauna appears to me to be the physiognomy of the vegetation, and, hence, these habitats are named and defined in terms of their vegetation. For many aquatic environments, the degree of salinity, amount of water movement, water temperature and depth, aquatic vegetation, and shore substrate or vegetation are important factors.

Unfortunately, no detailed account of animal habitats is available for Oaxaca. The various vegetation analyses that include the state treat all of Mexico and relative to Oaxaca are either inaccurate or too general to be useful in describing the distributions of the avifauna. It has, therefore, been necessary to develop my own classification of the major animal habitats of Oaxaca, based in part on vegetation types. My purpose is not to present a detailed floristic classification of the vegetation types themselves but to convey to the reader a picture of the major habitats that influence the avifauna. I have drawn my terminology and descriptive material from a variety of sources. Foremost among these are Breedlove's (1973) *The Phytogeography and Vegetation of Chiapas (Mexico)* and Leopold's (1950) *Vegetation Zones of Mexico*. Vegetation classifications by Conzatti (1926), Carr (1950), Miranda and Sharpe (1950), Miranda (1952), Beard (1955), Leopold (1959), Miranda and Hernández (1963), Shelford (1963), Duellman (1965), and Monroe (1968), have also been used. Specific descriptive data concerning Oaxaca have been taken from numerous publications, including several of the above as well

as MacDougal (1908), Bravo (1931), Martínez (1940, 1945, 1946, 1947, 1948a, 1948b), Schultes (1941), Miranda (1948a, 1948b), Mullerried (1948), Rickett (1950), Goldman (1951), Duellman (1960), Rowley (1966, 1984), and MacDougal (1971). Where possible, I have attempted to equate my habitat terms with those of Breedlove (1973) and Leopold (1950). Many of my habitats would be termed "formations" by Beard (1955) and Breedlove (1973) and "associations" by Holdridge (1947).

The present distribution of the more extensive habitats is depicted in Figure 1. Information employed in the preparation of this map was gleaned from the references already mentioned, including maps presented by Conzatti (1926) for Oaxaca, Leopold (1950, 1959) for the country of Mexico, and Miranda (1952) and Breedlove (1973) for Chiapas, and from a variety of other sources. For geographic and elevational limits, as well as much descriptive material, I have relied heavily on personal observations and on locality descriptions in Goldman (1951). Because no descriptions are available for much of the state, extrapolation has been necessary. For the most part, I have drawn habitat lines along contours, using as the basis the series of maps (dated 1958) prepared by the Comision Intersecretarial Coordinadora del Levantamiento de la Carta de la Republica Mexicana.

In preparing the habitat map, I have emphasized the climatic factors of temperature (including frosts) and amount and seasonality of rainfall. Because climatological data are unavailable for some of the state, I have relied in part on data dealing with the factors responsible for climate, including direction of prevailing moisture-laden winds (especially in relation to the geographic position, maximum elevations, and slope direction of major mountain ranges, these factors being important in the formation of rain shadows and convective rainfall), distance from major sources of moisture-laden air (Gulf of Mexico and Pacific Ocean), and proximity to other humid or arid habitats.

Presented below is a list of the major animal habitats of Oaxaca. An asterisk (\*) denotes habitats depicted in their entirety or in part in Figure 1. Following this outline are detailed discussions of the individual habitats.

## I. Terrestrial environments.

### A. Natural terrestrial habitats (see also forested aquatic habitats).

- \*1. Tropical evergreen forest.
- \*2. Cloud forest.
- 3. Pine-oak forest.
  - \*a. Humid pine-oak forest.
    - (1) Typical humid pine-oak, pine, or oak forests.
    - (2) Fir forest.
    - (3) Cypress forest.
    - (4) Bunch grassland.
  - \*b. Arid pine-oak forest.
    - (1) Typical arid pine-oak, pine, or oak forests.
    - (2) Oak scrub.
    - (3) Juniper scrub.
    - (4) Highland pine forest.
- \*4. Tropical semideciduous forest.
- \*5. Tropical deciduous forest.

- \*6. Arid tropical scrub.
- \*7. Arid subtropical scrub.
- \*8. Steppe.
- \*9. Savanna.
- B. Modified terrestrial habitats.
  - 1. Fincas.
  - 2. Cultivated land.
  - 3. Grazed land.
  - 4. Structures.
  - 5. Openings.
    - a. Semi-open portions. . . .
    - b. Margins. . . .
    - c. Brushy clearings. . . .
- II. Aquatic environments.
  - A. Open aquatic habitats.
    - 1. Lakes, ponds, and reservoirs.
    - 2. Rivers and creeks.
    - 3. Coastal bays, harbors, and lagoons.
    - 4. Open ocean.
    - 5. Marshes.
    - 6. Rocky seashores.
    - 7. Sand beaches.
    - 8. Sand dunes.
    - 9. Mud flats.
    - 10. River bars.
  - B. Forested aquatic habitats.
    - \*1. Mangrove swamp.
    - 2. Swamp forest.
    - 3. Palm forest.

#### NATURAL TERRESTRIAL HABITATS

##### TROPICAL EVERGREEN FOREST (Figs. 2, 3)

This habitat stretches through the Atlantic lowlands along the entire length of the state and extends inland (south and west) into the foothills of the adjacent mountain ranges.

It is equivalent to the "tropical evergreen forest" of Leopold (1950) and the "evergreen seasonal forest" plus "lower montane rain forest" of Breedlove (1973). Tropical evergreen forest is a more seasonal, less luxuriant growth than true "tropical rain forest," a term most properly applied to those forests from southern Veracruz eastward that have no dry season, the rainfall exceeding 2.5 in in each month. In Oaxaca, some of the broad-leaved evergreen trees lose a percentage of their leaves during the rather dry winter.

This forest presents an aspect of humid lushness, especially during the summer rainy season, when in the early hours of the day the leaves often drip moisture. On the taller trees, buttresses are common and often large. Moss, lichens, orchids, and bromeliads festoon the branches, and figs (*Ficus*) encircle the trunks in their



FIG. 2. Pond in tropical evergreen forest, Trans-Isthmian Highway north of Matías Romero, Oaxaca, about 250 ft, 29 May 1959. (Photograph by L. C. Binford.)

strangling grasp. Although it contains many of the plants characteristic of true tropical rain forest, it differs in structure, having only two tree strata instead of three. The usual upper stratum is composed of trees 80 to 115 ft tall. Below this is a layer of short trees about 30 ft in height. Both canopies are rather broken, allowing some penetration of direct sunlight. Occasional emergents, jutting 10 or 15 ft above the general level of the forest, seem too scattered to be recognized as a third and uppermost stratum. Below the tree strata is sometimes a growth of shrubs. Where the canopy is dense, the shrubs often are absent or scattered and the terrain easily negotiable. Along edges or below breaks in the canopy, however, a dense tangle of vines and small shrubs often makes passage virtually impossible. The ground is covered with a thick layer of dead leaves and in places supports a dense herbaceous growth. Grass is scarce.

Miranda (1948a) lists the important plants found in various situations in the vicinity of San Juan Bautista Tuxtepec. In relatively undisturbed "primitive" forests, he gives the following plants. On deep soils are *Swietenia macrophylla* G. King (Mahogany), *Cedrela mexicana* M. Roemer (Cigar Box Tree), *Tabebuia donnell-smithii* Rose (Primavera), *Calophyllum brasiliense* Camb. (up to 115 ft tall), *Spondias mombin* L., and *Ficus* (fig) in the upper story, with *Desmoncus chinantlensis* Mart. (a palm) and *Cephaelis tomentosa* (Aubl.) Vahl as subvegetation. On shallow lime soils west of town are the trees *Brosimum terrabanum* Pittier (100 ft), *B. costaricanum* Liebm. (100 ft), *Stemmadenia obovata* (Hook. & Arn.) Schum., *Bursera simaruba* (L.) Sarg. (Gumbo Limbo), *Astronium graveolens* Jacq., *Luehea speciosa* Willd., and *Spondias mombin* L.; the subvegetation here includes *Maranta arundinacea* L. and *Chamaedorea*. In forests along streams are *Ficus segoviae* Miq., *Lonchocarpus hondurensis* Benth., and *Inga spuria* H. &



FIG. 3. Tropical evergreen forest, near Donají, Oaxaca, 300 ft, 4 June 1964. (Photograph by L. C. Binford.)

B., with the grass *Paspalum* on sandy shores, the willow *Salix chilensis* Mol. near the water, and the shrub *Lindenia rivalis* Benth. on rocky or submerged shores.

Of the secondary forests, which often appear much the same as the "primitive" forest in aspect but have been disturbed by man, Miranda lists five types as follows:

Type 1 is dominated by *Vochysia hondurensis* Sprague and the palm *Scheelea liebmannii* Becc. and contains also *Ficus*, *Sweetia panamensis* Benth. (80 ft), *Miconia argentea* (Sw.) DC., *Spondias mombin* L., *Terminalia* (80 ft), *Tabebuia pentaphylla* (L.) Hemsl., *Castilla elastica* Cervantes (Mexican Rubber Tree), *Cochlospermum vitifolium* Willd. ex Spreng. (Yellowsilk Shellseed), and *Erythroxylon tabascense* Britton. The subvegetation includes *Siparuna nicaraguensis* Hemsl., *Desmoncus*, *Entada phaseoloides* Merrill, and various species of Rubiaceae (*Psychotria* and *Palicourea*, *vide* D. E. Breedlove).

Type 2 is characterized by *Didymopanax morototoni* (Aubl.) Dcne. & Planch. (115 ft) and *Scheelea liebmannii* Becc. and also includes *Apeiba tibourbou* Aubl. (50–65 ft), *Andira galeottiana* Standl. (100 ft), *Sweetia panamensis* Benth., *Belotia campbellii* Sprague (40–50 ft), *Trema micrantha* (L.) Blume (50 ft), *Miconia argentea* (Sw.) DC., *Hampea*, *Nectandra salicifolia* (H. B. K.) Nees, *Erythroxylon tabascense* Britton, *Xylopia frutescens* Aubl., and *Luehea speciosa* Willd. The dense subvegetation supports the herb *Costus spicatus* Sessé & Moc. and various species of Rubiaceae, Melastomaceae (meadow-beauties), and Piperaceae (peppers).

Type 3, on shallow lime soils, includes *Schizolobium parahybum* (Vell.) Blake (100 ft), *Ochroma limonensis* Rowlee (100 ft), *Calocarpum mammosum* (L.) Pierre (100 ft), *Brosimum terrabanum* Pittier, *Cupania macrophylla* A. Rich. (40 ft), *Cecropia mexicana* Hemsl., and *Aechmea magdalenae* (Andre) Andre.

Type 4 has the palm *Sabal* (65 ft) and various other species such as *Ficus*, *Terminalia*, *Luehea speciosa* Willd., *Miconia argentea* (Sw.) DC., *Schizolobium parahybum* (Vell.) Blake, *Sweetia panamensis* Benth., *Bursera simaruba* (L.) Sarg., *Stemmadenia obovata* (Hook. & Arn.) Schum., and *Dracaena americana* Donn. Sm.

Type 5, on undulating and relatively dry terrain where fires are frequent, is composed of open stands of *Cordia alliodora* (R. & P.) Cham. (33–50 ft).

First-growth woods arising on cut-over or abandoned cultivated land form dense thickets 20–25 ft tall. Miranda lists the following dominant plants: *Croton gossypifolius* Vahl, *C. draco* Schl., *Bixa orellana* L. (30 ft), *Heliocarpus donnell-smithii* Rose (30 ft), *Conostegia xalapensis* (Bonpl.) D. Don (26 ft), *Tabernaemontana alba* Mill., and *Acacia collinsii* Saff.

For the Atlantic slopes of the Isthmus mountains between Mogoñé and Matías Romero, Duellman (1960:31) records *Ceiba pentandra* (L.) Gaertn., *Cedrela mexicana* M. Roemer, *Swietenia macrophylla* G. King, *Ficus*, *Tabebuia donnell-smithii* Rose, *Zanthoxylum melanostictum* Schlecht. & Cham., *Pithecellobium arboreum* L. (Urban), and a species of *Pterocarpus*.

Tropical evergreen forest ranges (or did range; see below) throughout most of the Atlantic lowlands and in pure form up to about 2,600 ft in the adjacent mountains. From this point up to about 4,100 ft is an ecotone with cloud forest; the vegetation is generally taller and more luxuriant than in the lowlands, probably because of increased precipitation and reduced evaporation and perhaps its relative inaccessibility to the logging interests of man. I have drawn the dividing

line at 3,300 ft, the elevation frequently given as the upper limit of tropical evergreen forest.

In the Isthmus from the latitude of Matías Romero south to the continental divide, tropical evergreen forest interdigitates with tropical deciduous forest, arid tropical scrub, savanna, and arid pine-oak forest and is usually confined, especially in the more southern areas, to stream valleys. It also takes on an increasingly more arid aspect, with shorter trees and more open canopy.

Table 1 contains temperature and rainfall data for two localities in tropical evergreen forest, San Juan Bautista Tuxtepec and Valle Nacional. Temperatures are high and relatively constant throughout the year, with only occasional drops because of the cold fronts. Frosts do not occur. The forest interior is much cooler than are open areas. In general, rainfall is heavy, although not extreme, in the summer (mid-May to mid-October) but is much reduced in the winter, when the Atlantic slope is subjected to a dry spell especially severe in March and April. The forest survives the winter drought for several reasons. The dense foliage, providing protection from the desiccating effects of wind and sun and contributing moisture through transpiration, and the deep alluvial soils mixed with large quantities of decaying organic matter aid in maintaining a fairly even humidity in the forest throughout the year. Convective rains produced by the effect of the adjacent mountains on the trade winds occasionally extend into the lowlands. Perhaps most important are the *nortes*, which arrive with considerable force and regularity and often last two or three days each. Even when they do not bring rain, they produce cloudiness that greatly reduces evaporation.

Most streams contain water all year but are fullest during the rainy summer; even flooding occurs. The deeper ponds contain water throughout the year, but smaller ones are usually empty by April.

Along with all other terrestrial habitats in Oaxaca, tropical evergreen forest has been heavily affected by man. Whether any virgin forest remains is conjectural. Probably some remote mountain areas and the regions just east of the Isthmus still contain remnants of undisturbed timber. Most of the forest today, although perhaps appearing luxuriant to those unfamiliar with the tropics, is in reality only second growth. Virtually all accessible areas have been, and are still being, heavily logged. The slash-and-burn method of agriculture has destroyed most forests within sight of lowland roads.

Other major habitats exist in isolated patches, too small to map, within the general range of tropical evergreen forest. These include savanna, humid stretches of oak or pine-oak, various aquatic habitats, and all types of modified terrestrial habitats.

#### CLOUD FOREST (Fig. 4)

The term cloud forest as used here is confined to those broad-leaved hardwood forests that occur at moderate elevations and owe their existence to a humid subtropical climate and to the presence of clouds or fog. Areas of lush pine-oak growth, either at lower or higher elevations, which are included within Leopold's (1950) "cloud forest," are here placed in the humid division of pine-oak forest. My cloud forest includes all of what Breedlove (1973) calls "montane rain forest." He restricts his "evergreen cloud forest," as used for Chiapas, to certain broad-



FIG. 4. Cloud forest, Cerro Baúl 2 mi east-southeast of Colonia Rodolfo Figueroa, Oaxaca, 5,300 ft, 26 April 1972. (Photograph by L. C. Binford.)

leaved forests above montane rain forest. Oaxaca supports similar high-elevation forests in small, warm, moist, sheltered locations within the general range of humid pine-oak forest in the Sierra Madre de Chiapas and mountains west of the Isthmus.

Cloud forests are found in six large patches located on the top of the Sierra Madre de Chiapas and on the windward (lowland) sides of the mountain ranges bordering the Mesa del Sur. They are isolated from one another by low gaps containing more arid habitats. The cloud forests of the Sierra de Huautla are narrowly separated from those of the Sierra de Juárez by the valley of the Río Santo Domingo, and those of the latter range from the connected forests of the Sierra de Zempoaltepec and Sierra de los Mijes by the valley of the Río Cajones. The forests of the last range are isolated from those of the Sierra Madre de Chiapas by a distance of some 60 mi across the lowland gap of the Isthmus of Tehuantepec. On the Pacific slope west of the Isthmus, far from the cloud forests of the Atlantic drainage, are two extensive areas of this habitat, one in the Sierra de Miahuatlán and the other, isolated by 40 mi of more arid country in the basin of the Río Verde, in the Sierra de Yucuyacua. Whether or not it occurs in the mountains along the Veracruz border east of the Isthmus is unknown; I have mapped only tropical evergreen forest there.

Cloud forest is the most lush and humid habitat in Oaxaca, perpetually dripping the moisture condensed on the leaves. Two tree strata are usually present, the uppermost often presenting a complete canopy and thereby providing deep shade for the plants beneath. The height of the upper story varies greatly according to locality but generally is lower than in tropical evergreen forest. In the Sierra Madre de Chiapas, for example, the upper story is composed of trees mostly 15–40 ft tall with trunks 10–18 in in diameter; a few, however, reach 4 ft in diameter. Where exposed to winds, cloud forest is sometimes under 10 ft in height and might be termed an “elfin forest,” whereas deeper soils and more sheltered sites occasionally support trees 130 ft tall and 6–7 ft in diameter. Cloud forest is characterized by a dense shrub layer, including, as does part of the lower tree stratum, tree ferns (*Cyathea* and others), which sometimes attain heights of 25 ft or more. They are good indicators of cloud forest, although they grow sparingly in the upper reaches of tropical evergreen forest as well. Small palms are frequent. Strangler figs (*Ficus*), important plants in tropical evergreen forest, are absent. The herb stratum is dense and lush, containing a wealth of small ferns, begonias, and *Equisetum*. The ground, continuously saturated, is covered with leaf litter and mossy logs. Completely encasing the trunks and branches of many trees is a profusion of mosses and epiphytic ferns, with some bromeliads, orchids, and lichens.

In the Sierra Madre de Chiapas, from 5,000 to at least 5,700 ft on the ridge just southeast of Cerro Baúl (Fig. 4), the trees include *Weinmannia*, *Nectandra*, *Clethra*, *Coccoloba*, *Liquidambar styraciflua* L., and scattered *Pinus*; the understory includes *Posoqueria*, *Palicourea*, and the palm *Chamaedorea* (D. E. Breedlove, pers. comm.). Strong north winds have produced an elfin forest at about 7,900 ft on the crest of Picacho Prieto, where MacDougall (1971) records flowering *Gaultheria*, *Mahonia*, *Bouvardia*, *Smilacina*, *Crusea*, *Rondeletia*, *Ilex*, and the orchids *Arpophyllum giganteum* Hartw. ex Lindl., *Oncidium*, and *Epidendrum*.

On the Atlantic side of the Sierra de Juárez, from 6,300 to 6,600 ft, is a cloud

forest composed primarily of oaks and associated with a luxuriant growth of Ericaceous plants, including *Gaultheria*, *Leucothoë*, and *Vaccinium* (Miranda and Sharp 1950:319). On steep slopes at 7,000 ft elevation southwest of Valle Nacional are forests of *Weinmannia pinnata* L., sometimes containing *Quercus* and members of the Lauraceae.

The cloud forests of the Pacific slope west of the Isthmus are similar to the Atlantic forests structurally but probably less so floristically. Tree ferns are present, and Rowley (1966:108) lists *Oreopanax peltatum* Linden from this area.

In Oaxaca this habitat develops only where high mountains intercept the clouds blowing in from the Gulf of Mexico or Pacific Ocean. In the Sierras de Huautla, Juárez, and Zempoaltepec, it forms an extensive belt from about 4,100 to 6,600 ft elevation between the tropical evergreen forest or (rarely) patches of humid pine-oak forest below and the extensive humid pine-oak forest above. Patches occur as low as 2,600 ft, however, and the lower limit is here placed at 3,300 ft. Cloud forest in the Sierra de los Mijes covers the tops of the range and descends to 4,900 ft on both slopes, a condition probably resulting from the absence of very high mountains to back up this habitat and produce heavier rainfall or more extensive clouds. In the Sierra Madre de Chiapas, this forest extends from the crests down to about 4,900 ft on the Pacific side and in some places is interspersed with patches of humid pine-oak and tropical semideciduous forests. In the Sierra de Miahuatlán, it ranges from about 4,900 to 7,200 ft (locally perhaps higher) and does not form a solid elevational belt but occurs primarily along streams and is interspersed with patches and interdigitations of humid pine-oak on the intervening ridges; the floristic elements of the two habitats occasionally intermix. Similar conditions exist in the Sierra de Yucuyacua, where, however, patches of arid (or semiarid) pine-oak are interspersed with the cloud and humid pine-oak forests.

Climatic data for Cataluña and San Pedro Teutila, two cloud forest localities in the Atlantic Region west of the Isthmus, are presented in Table 1. Average annual temperatures are usually in the subtropical range, i.e., from 64.4 to 71.6°F, but reach as low as 59°F (half way into the temperate range), in which case their effect is ameliorated by the high humidity. Light frosts sometimes occur but do not affect the forest floor. In Oaxaca, this habitat does not exist under tropical conditions. The total annual rainfall varies considerably and doubtless can be much lower than is the case for either of the cited localities. Regular winter rains probably are a prerequisite, but most important are the clouds, which must appear during a high percentage of days throughout the year. Streams are permanent, clear, and cold, and many originate here.

#### HUMID PINE-OAK FOREST (Figs. 5, 6, 7)

Humid and arid pine-oak forests range throughout the state in a variety of situations from as low as 100 ft to near the crests of the highest peaks. Only the more extensive portions are shown in Figure 1. These forests often border on one another, sometimes forming sharp lines of contact but more often producing ecotones, here termed "semiarid pine-oak forest" (Fig. 9), of intermediate humidity (and hence, lushness) and variable width; designation to type often must be arbitrary.

As its name implies, humid pine-oak forest is a mixture of pine and oak existing



FIG. 5. Humid pine-oak forest, kilometer marker 184.5, about 6 mi north of San Gabriel Mixtepec, Oaxaca, 5,750 ft, 11 March 1968. (Photograph by J. R. Arnold.)

under humid conditions. I include what Breedlove (1973) calls “pine-oak *Liquidambar* forest” and “temperate riparian forest,” as well as part of Leopold’s (1950) “pine-alder-fir forest.” Because clouds sometimes enshroud humid pine-oak forest, it might be termed “cloud forest,” as has been done by Leopold (1950, 1959). However, for discussion of the avifauna, a distinction must be made between broad-leaved hardwood cloud forest and these pine-oak “cloud forests.”

Humid pine-oak occurs near the tops of all the higher mountains west of the Isthmus, in patches below cloud forest on the Atlantic side of the Sierras de Juárez and Zempoaltepec (and perhaps other ranges), and on the lower Pacific versants of the Sierra Madre de Chiapas, Sierra de Miahuatlán, and Sierra de Yucuyacua.

In its best form it is dense and lush. One or two tree strata occur, the upper one of pure oak, pure pine, or a mixture of both. The canopy is moderately complete, although because of the open structure of the pines, shade is not intense except along some streams. The trees, which include numerous species of pines and oaks, often attain large size and are an important source of lumber. Hardy (1971) pictures and describes this habitat at high elevation (ca. 9,000 ft) near La Cumbre on Cerro San Felipe. The primary trees are *Quercus rugosa* Neé and *Q. laurina* Humb. & Bonpl., with lower percentages of *Abies hickeli* Flous & Gaussen, *Arbutus xalapensis* H. B. K. (a madrone), *Litsea glaucescens* Kunth., *Buddleia cordata* H. B. K., *Jatropha*, *Montanoa arborescens* DC., *Pinus tenuifolia* Benth., and other *Pinus*. In the Sierra Madre de Chiapas, pines include *Pinus chiapensis* (Martínez) Andresen, *P. pseudostrobus* Lindl., and *P. tecote* Schlecht. et Cham. (D. E. Breedlove, pers. comm.).

The shrub layer is dense, especially in the wettest sections; this is a major characteristic separating humid from most arid pine-oak forests. The shorter trees



FIG. 6. Humid pine-oak forest, along San Juan Bautista Tuxtepec Road in Sierra de Juárez 43 road mi southwest of Valle Nacional, Oaxaca, 9,000 ft, 10 June 1964. (Photograph by L. C. Binford.)

and shrubs on Cerro San Felipe include *Alnus* (alder), which sometimes also forms tall stands along streams (the “temperate riparian forest” of Breedlove 1973), *Sambucus mexicana* Presl (Mexican Elder), *Ceanothus coeruleus* Lag., *Arctostaphylos pungens* H. B. K. (Manzanita) (Goldman 1951:209), and *Cornus* (dogwood).

Under the trees in some areas the ground is covered with a thick layer of small ferns and frequently tangles of *Ribes*, whereas elsewhere leaf litter predominates. Herbs on Cerro San Felipe include *Solanum*, *Castilleja*, *Pentstemon*, *Lupinus*, *Eryngium*, *Commelina*, *Tradescantia*, *Lamourouxia*, *Dahlia*, and *Salvia* (Goldman 1951:209). Grasses are common, especially in flatter and more open areas, where moist meadows are frequent. Moss, lichens, and bromeliads festoon the trees (Fig. 7), but tree ferns and vines are usually absent.

On the Atlantic sides of the Sierras de Huautla, Juárez (Fig. 6), and Zempoaltepec, humid pine-oak extends from the upper limit of cloud forest at about 6,600 ft up to 9,800 ft, where temperatures become much lower and highland pine forest takes over (see arid pine-oak forest). Although most of the precipitation occurs on the windward (Atlantic, or north and northeast) sides of these mountains, some extends onto the interior slopes before the full effect of the rain shadow is felt. Thus, humid pine-oak overlaps the interior side down to about 7,900 ft. In the Sierra Aloapaneca it stretches from about 7,900–9,800 ft on both windward and leeward sides. Some patches in the interior of the Mesa del Sur do not range below about 8,500 ft, as they are distant from the coasts and are partially shadowed by the mountains to the north and east.

On the interior sides of the Sierras de Miahuatlán and Yucuyacua, humid pine-oak is found from 9,800 down to 7,900 ft. Semiarid pine-oak sometimes extends as low as 6,900 ft, such as on the ridge top just south of San Miguel Sola de Vega.



FIG. 7. Humid pine-oak forest, La Cofradía, Oaxaca, 8,900 ft, 17 April 1968. (Photograph by J. R. Arnold.)

On the windward Pacific sides, however, solid forest occurs down to 7,200 ft. Below this level, down to 2,300 ft, humid pine-oak usually interdigitates with other habitats. In the Sierra de Miahuatlán (Fig. 5), it is found in pure stands adjacent to patches of cloud forest down to 4,900 ft. In the western half of this range, it borders tropical semideciduous forest down to 2,300 or rarely 1,850 ft, whereas toward the eastern end it extends, probably in solid form, to 4,900 ft. On the Pacific side of the Sierra de Yucuyacua, from 7,200 to 4,900 ft, it is interspersed with cloud forest and arid pine-oak forest. In such mixed situations, little if any intermingling of floristic elements takes place, each forest type forming pure stands, with humid pine-oak on moist ridges, arid pine-oak on dry hillsides, and cloud forest along stream valleys where fog settles and the water table is high.

Humid pine-oak also occurs at low elevations on the Atlantic slope west of the Isthmus between the cloud forest belt and tropical evergreen forest. The distribution of these pine-oak forests is poorly known and cannot be indicated in Figure 1. One such forest has been noted at about 3,300 ft at the eastern end of the Sierra de Juárez. An important constituent of these forests is *Liquidambar styraciflua* L., which also occurs in nearly pure stands, or together with *Nyssa sylvatica* Marsh, on deep soils between 4,000 and 5,300 ft. As previously noted, *Liquidambar styraciflua* L. is common also in cloud forests. In the lowlands of the Atlantic Region, humid patches of oaks, some deciduous, occur on drier sites, usually on crests of small hills or ridges, down to 100 ft within tropical evergreen forest. In such situations the ground is grass-covered, and the trees, ranging from small to large, have a fairly heavy cover of epiphytes. One such forest, located southwest of San Juan Bautista Tuxtepec, is composed of *Quercus oleoides* S. & C. and *Q. glaucescens* Humb. & Bonpl. (Miranda and Hernández 1963:71).

In the Sierra Madre de Chiapas, humid pine-oak forests, often associated with

*Liquidambar styraciflua* L., occur locally from the crests down to at least 2,600 ft and are interspersed with patches of cloud forest and tropical semideciduous forest; sometimes pines are scattered within clumps of cloud forest. *Pinus pseudo-strobus* Lindl. is a major component.

The primary factors giving rise to this habitat as it exists in solid form (above cloud forest) are temperate conditions, rather heavy rainfall, and the occasional presence of clouds or fog. Climatic data for two localities, Alotepec Mixes and San Miguel Suchixtepec, are presented in Table 1. Temperatures are colder than those in cloud forest. Frosts are somewhat less frequent and severe than in areas of arid pine-oak forest, because of the unusually high humidity. Frosts are caused by the high elevation and irregular cold fronts, which also bring some snow to the highest areas. The fairly heavy rainfall is a result of the high ridges intercepting the moisture-laden air coming from the Gulf of Mexico or Pacific Ocean and causing it to rise, cool, and drop its moisture. Precipitation occurs throughout the year but is more intense during the summer rainy season. This habitat is more arid than cloud forest, with lighter rainfall and less frequent clouds. Humid pine-oak forest below, or interdigitated with, cloud forest exists under tropical to subtropical conditions and probably is edaphic in nature, growing on drier sites. Most streams in humid pine-oak forest are permanent, although during the winter a few dry up and all diminish in size.

*Fir forest.*—Small patches of fir (*Abies*) forest are found in the high mountains of the Mesa del Sur. These are not mapped but are included within the general range of humid pine-oak forest. Leopold (1950) treats fir forest as a division of his "boreal forest." It has been noted only in the Sierra Aloapaneca and Sierra de Juárez, on the northeastern slope of Cerro Zempoaltepec, and near La Cieneguilla in the Sierra de Miahuatlán, but doubtless occurs elsewhere. The approximate elevational limits are from 8,200 to 9,800 ft (probably above 10,000 ft at La Cieneguilla). It develops in the coldest and most humid portions of the mountain peaks, usually, perhaps always, in canyon heads facing north or northeast. Frosts are severe and precipitation heavy. The forest probably also contains pines and oaks and in general appearance is similar to humid pine-oak forest. Scattered firs also grow within more typical humid pine-oak forest. *Abies religiosa* (H. B. K.) Schlecht. & Cham. is listed by Duellman (1960:32) for Cerro Zempoaltepec, by Goldman (1951:224) for La Cieneguilla, and by Hardy (1971) for Cerro San Felipe. Martínez (1948a), however, in his monograph on Mexican firs, indicates that *religiosa* is not found south of the Sierra Volcanica Transversal and records three species for Oaxaca: *hickeli* Flous & Gaussen, *guatemalensis* Rehder., and *oaxacana* Martínez.

*Cypress forest.*—On the upper slopes of Cerro Baúl is a forest composed of *Cupressus benthamii* Endl. interspersed with scattered pines (MacDougall 1971: 95). This unique vegetation type is ornithologically unexplored. Probably the climate is similar to that in humid pine-oak forest.

*Bunch grassland.*—Within humid pine-oak forest at elevations of 7,500 and 8,000 ft near San Andrés Chicahuaxtla, I encountered small areas covered with tall, rather closely-spaced bunch grass. Following Breedlove (1973) and Leopold (1950), I term this "bunch grassland." It occurs also in the Sierra de Quatro Venados and probably other Interior Region ranges. This is the only habitat in which I have found the Striped Sparrow (*Oriturus superciliosus*).



FIG. 8. Arid pine-oak forest, kilometer marker 178, about 8 mi north of San Gabriel Mixtepec, Oaxaca, 4,500 ft, 5 April 1968. (Photograph by J. R. Arnold.)

#### ARID PINE-OAK FOREST (Figs. 8, 9)

This is the most widespread habitat in Oaxaca, occurring in all three Regions. It ranges from near sea level to the mountain summits and is found under temperate, subtropical, and tropical conditions. Although here termed a "forest," it is really a "woodland," because the canopy is incomplete. To facilitate the delineation of bird ranges, however, I have found it convenient to define the term "forest" loosely and apply it to this habitat, as done by Breedlove (1973) and Leopold (1950), who refer to my typical stands of arid pine-oak "woodland" as simply "pine-oak forest."

One or two strata occur in arid pine-oak forest. The upper one, which is composed mostly of oaks, primarily of pines, or a mixture of both, contains trees that are shorter at lower elevations and taller at higher elevations. In areas where pines dominate (the usual case), oaks and other small trees often form the lower stratum. The canopies are incomplete, allowing sunlight and wind to exert their desiccating effects. Brush is sparse in rocky areas of thin soil but often somewhat more dense in moister situations, where it usually grows in patches. The ground is covered with grass, moderately tall and fairly dense in moist locations, short and sparse elsewhere. *Pteridium aquilinum* (L.) Kuhn (bracken fern) is found in some places. When the grass desiccates during the dry winter, stretches of ground in some localities become partially bare. Epiphytic bromeliads are scarce.

Near San Juan Bautista Cuicatlán, arid pine-oak forest (or arid subtropical scrub) replaces arid tropical scrub at about 4,600 ft, where rainfall increases and temperatures decrease over those in the valley below. Here, according to Miranda (1948b), arid oak woods 16–33 ft tall include *Quercus glaucophylla* Seemen, *Q. glaucoides* Mart. & Gal., *Q. liebmannii* Oerst., and *Q. obscura* Trel. At the lower



FIG. 9. Meadow in semiarid pine-oak forest, La Cofradía, Oaxaca, 8,900 ft, 17 April 1968. (Photograph by J. R. Arnold.)

limits of the oak forest, *Acacia pennatula* (S. & C.) Benth., *Piscidia grandifolia* (Donn. Sm.) I. M. Jtn., and *Xylosma ellipticum* Hemsl. are found. Forests 33–50 ft tall are formed by several species of oaks, one of the most common of which is *Q. conspersa* Benth. The subvegetation in these two types of forest includes *Arctostaphylos lucida* (Small) Standl., *Clinopodium laevigatum* Standl., *Salvia adenophora* Fernald, *Vernonia karvinskiana* DC., *V. oaxacana* Schultz Bip., *Hemichaena fruticosa* Benth., *Lamourouxia exerta* Rob. & Greenm., *Senecio hederaefolius* Hemsl., *Rumfordia floribunda* DC., and *Baccharis elegans* H. B. K. Herbs include *Bletia*, *Calea*, *Castilleja*, *Crotalaria*, *Dalea*, *Lobelia*, and *Lopezia*. Pines, which grow in pure stands on less humid slopes or are mixed with the oaks, include *Pinus montezumae* Lambert and *P. oocarpa* Schiede.

The most extensive areas of arid pine-oak are in the arid temperate interior of the Mesa del Sur below the level of humid pine-oak forest and above arid subtropical scrub and steppe. Elevational limits there vary considerably with local conditions. In the Oaxaca Valley and in the extreme northwestern portion of the state, arid pine-oak replaces arid subtropical scrub on the first foothills approaching mountainous areas, or at about 6,100 ft. In steppe regions in northwestern Oaxaca, however, it does not appear until moister conditions are reached, at about 7,800 ft. Throughout the remainder of the interior of the Mesa, it usually replaces arid tropical scrub and interdigitates with arid subtropical scrub at 4,100 ft and becomes pure at about 6,100 ft. Toward the eastern end of the Mesa, arid pine-oak grows at progressively lower elevations, until in the Isthmus it covers the hills down to about 800 ft, forming a bridge across the Isthmus for birds able to tolerate arid tropical conditions.

On the Pacific side of the Sierra Madre de Chiapas, arid pine-oak patches are

interspersed with stands of tropical semideciduous forest between about 4,000 and 4,900 ft. On the Atlantic side of this range, extending westward from Chiapas, is an extensive area of arid to semiarid pine-oak forest (pers. obs.). This forest almost certainly connects with similar habitat in the Isthmus mountains and probably extends along the full length of the Sierra Madre de Chiapas to the Guatemalan border; it probably does not connect with the pine-oak forests of the remainder of Chiapas (D. E. Breedlove, pers. comm.). It stretches from near the crests of the Sierra down the Atlantic side to at least 2,600 ft, except that along streams it is replaced by tropical semideciduous or tropical evergreen forest. Its existence in this Atlantic slope portion of Oaxaca is probably a result of a rain shadow produced by the crests of the Sierra and the isolated mountains along the Veracruz border, although edaphic factors might also be involved.

Arid pine-oak also clothes isolated hills above 4,100 ft (and sometimes lower) on the Pacific versant of extreme southwestern Oaxaca, where it is surrounded by tropical deciduous forest. Numerous patches too small to map are found down to 900 ft between the tropical deciduous and tropical semideciduous forest belts on the Pacific side of the Sierra de Miahuatlán (Fig. 8). On the Pacific side of the Sierra de Yucuyacua, patches intermingle with stands of tropical semideciduous forest (4,100–4,900 ft) or humid pine-oak and cloud forests (4,900–7,200 ft).

The climate of arid pine-oak forest varies considerably according to locality. The following account applies to regions in the interior of the Mesa del Sur, where temperate conditions exist and the forest covers extensive areas. Rain is seasonal, although some small amounts fall even during the dry winter as a result of *nortes* or of convection caused by the nearby mountain peaks supporting humid pine-oak forest. Ixtlán de Juárez and Santa María Asunción Tlaxiaco, both located in regions of arid pine-oak, each receive about 40 in of rain annually, most coming between mid-May and mid-October (Table 1). Temperatures are cool, with annual and most monthly averages in the temperate range—below 64.4°F. Heavy frosts are frequent in such areas; the former town has an average of 12 days of frost per year, and the latter town, 96 days.

Everywhere else in the state arid pine-oak forest exists under subtropical or tropical conditions, with annual monthly temperatures averaging about 10°F warmer. Rainfall is seasonal, although precipitation falls in traces even during winter. In such areas pine-oak is found on hillsides or ridges, adjacent to arid tropical scrub or tropical deciduous forest at lower elevations along streams and on flat terrain.

Throughout the state in this habitat, all but the largest streams dry up during the winter. Springs are rare. Where the terrain has been denuded of vegetation by man, which includes much of the interior of the Mesa del Sur, precipitation in the rainy season has had a devastating effect on the parched soil.

*Oak scrub* (Fig. 10).—This habitat, for which Leopold (1950) uses the same term, is found in the interior of the Mesa del Sur. It forms an elevational belt usually only a few hundred feet wide between arid pine-oak forest above and steppe, arid subtropical scrub, or arid tropical scrub below, and can be present anywhere between 4,600 and 7,900 ft, depending on factors of temperature, moisture, and perhaps soil. The bushy oaks are 5 to 10 ft tall and form irregular, often impenetrable, patches, between which is bare rock or a sparse cover of short grass. Occasional oak trees, especially along streams, are quite large. J. C. Barlow (in



FIG. 10. Oak scrub, along Pan-American Highway 4 mi east of Santiago Matatlán, Oaxaca, 6,100 ft, 28 May 1959. (Photograph by D. A. Zimmerman.)

litt.), at a point about 2 mi southeast of Santiago Matatlán, recorded a *Cassia*, *Arctostaphylos pungens* H. B. K. (Manzanita), and two species each of *Quercus* (scrub oak), *Rhus*, and *Garrya*.

*Juniper scrub.*—In certain parts of the arid portion of the Interior Region are stands of juniper scrub. Too little-known to map, they are included within the general range of arid pine-oak forest, with which they are allied. Leopold (1950) places this habitat in his “piñon-juniper” division of “pine-oak forest.” Juniper scrub is found between the arid subtropical scrub below and arid pine-oak forest above and, when present, occupies a narrow elevation spread of about 400 ft. It occurs anywhere between 4,700 and 7,000 ft. I have noted it at 5,000 ft elevation 7 mi north of San Pedro Juchatengo, at San Miguel Sola de Vega, and in the region of San Pedro y San Pablo Teposcolula (from a point 3 road mi southwest of the turnoff from the Pan-American Highway southwest for about 23 road mi). The dominant trees, *Juniperus flaccida* Schlecht. and *Quercus*, are short and grow singly or in clumps. Between them are small bushes or a sparse cover of grass. The ground is always extremely rocky, with very thin soil distributed in pockets between bare stretches of rock. Oak scrub might develop in such areas were it not for the thin soil. Although no detailed climatological data are available for juniper scrub areas, doubtless the climate is cool and rather arid. Rainfall is seasonal and probably in amounts intermediate between those received in areas of arid pine-oak forest and arid subtropical scrub. Runoff is rapid as a result of the rocky terrain. Frosts probably are infrequent and not severe.

*Highland pine forest.*—On the highest mountains of the Mesa del Sur, from about 9,800 ft to the summits, are open stands of pine devoid of oaks and dominated by *Pinus hartwegii* Lindl.; this I call highland pine forest. Leopold (1950)



FIG. 11. Tropical semideciduous forest, near Pluma Hidalgo, Oaxaca, about 3,500 ft, 8 January 1970. (Photograph by J. R. Arnold.)

calls this habitat “open pines” and includes it in his “boreal forest.” These large scattered trees form the only tree stratum, and the canopy is open. Little or no shrub layer is found; only a few scattered small *Alnus* (alder) and *Arbutus* (madrone) break the monotony of the thick ground cover of grass. Climatic data from Cuajimoloya (Table 1) demonstrate that rainfall is similar in amount and distribution to that in lower-elevation arid pine-oak forest, but temperatures are much colder, averaging below the temperate range (53.6°F) in all months. Frosts probably are frequent and severe.

#### TROPICAL SEMIDECIDUOUS FOREST (Figs. 11, 12)

This habitat is found only on the Pacific sides of the Sierras de Yucuyacua and Miahuatlán and on both versants of the Sierra Madre de Chiapas. It is similar to tropical evergreen forest of the Atlantic Region and in fact has been called “Pacific coast tropical evergreen forest” by Rowley (1966). Breedlove (1973) uses the term “semi-evergreen seasonal forest” for such vegetation in Pacific Chiapas, but considers it very similar to his “evergreen seasonal forest” of the Atlantic lowlands. Leopold (1950, 1959) does not discuss or map humid tropical forest on the Pacific side of Oaxaca, but in the legend to his Figure 17 (1959) indicates that he would call it tropical evergreen forest. I prefer to treat it separately because it is somewhat dryer and more deciduous than tropical evergreen forest, its plant species diversity probably is lower, and its avifauna is distinct on the subspecific level.

During the rainy season, tropical semideciduous forest is similar in aspect to tropical evergreen forest with poorly differentiated strata. Usually two tree strata are present. The upper canopy is sometimes discontinuous, but often it is complete and then produces deep shade. The trees attain heights of 80 to 115 ft and often



FIG. 12. Tropical semideciduous forest with tree cycads (*Dioon edule* Lindl.), Cycad Camp, 3 mi south-southeast of San Gabriel Mixtepec, Oaxaca, 1,900 ft, 8 January 1965. (Photograph by R. T. Orr.)

have thick trunks and large buttresses. Along with a dense understory of shrubs, epiphytes, figs (*Ficus*), lianas, and small ferns are common. The ground cover is dense with herbs or more open with a thick layer of leaves. Grass is scarce. Rowley (1966:107) lists *Cecropia*, *Phoebe*, and *Rondeletia* from this type of forest.

During the dry season the forest takes on a somewhat more arid aspect than does tropical evergreen forest, because more trees lose all or part of their foliage. Nevertheless, a fairly humid atmosphere is retained. Some streams dry up, but most hold water throughout the year.

In the Sierra de Yucuyacua, tropical semideciduous forest stretches between 4,100 and 4,900 ft and is intermingled with patches of arid to semiarid pine-oak forest. In the eastern half of the Sierra de Miahuatlán (Figs. 11, 12), where it attains its most extensive and luxuriant form, it is found mainly between about 2,400 and 4,900 ft but sometimes as low as 1,250 ft along streams. In the western half it ranges from 2,300 to 4,900 ft and is interspersed with stands of humid pine-oak forest, the latter on ridges and hilltops and the tropical semideciduous in valleys. On the Pacific versant of the Sierra Madre de Chiapas, this habitat forms a narrow belt (the lower reaches of which contain patches of semiarid oak or pine-oak) extending approximately from 4,400 to 4,900 ft; on the Atlantic side, broad riparian fingers project from the cloud forests of the crests down to at least 4,000 ft through country otherwise covered with pine-oak forest.

Areas with this type of vegetation are in an intermediate climatic zone, where there is felt neither the full effect of the winter drought prevalent in the tropical deciduous forest below nor the full force of the permanent rains and clouds of the humid pine-oak and cloud forests above. Table 1 presents climatic data for one locality in this habitat, Finca Jamaica. Rainfall is heavy from mid-May to

mid-October and continues much diminished well into or throughout the remainder of the year. Temperatures are warm and relatively constant; temperatures for Finca Jamaica are atypically cool. Frosts do not occur. Probably a high water table accounts for the presence of much of this forest, especially along its lower elevational limits.

The boundary between this and other habitats is sharp in some areas and evenly blended in others. At its lower limits, fingerlike projections extend downward along streams between arid strips of tropical deciduous forest on the ridges. At its upper edge, tropical semideciduous growth merges almost imperceptibly with cloud forest along streams or on flat areas, and pine-oak forest projects downward along ridges from the peaks above.

#### TROPICAL DECIDUOUS FOREST (Figs. 13, 14)

The vegetation of the arid lowland tropics of Oaxaca shows great variation from open stands of bushes to dense, closed-canopied forests of very tall trees. In general, however, this vegetation can be divided into arid tropical scrub (discussed beyond) and tropical deciduous forest. Breedlove (1973) and Leopold (1950) also use the name "tropical deciduous forest." Shelford (1963) distinguishes a "short-tree" form, which is extensive in Oaxaca, and a "tall-tree" type, which is local.

Tropical deciduous forest, interspersed with savanna and arid tropical scrub, stretches along the entire length of the Pacific Region between the Guerrero and Chiapas borders, northwest into the Río Tehuantepec basin, and north across the Isthmus as far as the latitude of Matías Romero and Guichicovi. An isolated patch is said to exist in the upper Río Grande (Río Santo Domingo) valley (D. E. Breedlove, pers. comm.). This habitat does not extend eastward through the Río Coatzacoalcos basin to connect with the arid forests of interior Chiapas, as indicated by Leopold (1950, 1959). Instead, this region supports tropical evergreen forest to the west (T. MacDougall, pers. comm.) and arid pine-oak forest to the east (pers. obs.).

In its most luxuriant form, short-tree tropical deciduous forest has two tree strata, the upper composed of trees 40 to 60 ft tall with a closed canopy. These trees are often smooth-barked, with large, simple or compound, glabrous, entire leaves. The boles usually are not heavily buttressed. The lower tree stratum is formed by scattered trees averaging about 20 ft in height. The shrub layer is usually fairly dense, often thorny, and varies in height, frequently reaching 7 ft. The ground is bare or covered with leaf litter or grass. Epiphytic plants, including bromeliads and orchids, are numerous. Figs (*Ficus*) are fairly common. Rowley (1966:107) lists the following plants from the Sierra de Miahuatlán: *Ceiba*, *Lysiloma*, *Lonchocarpus*, *Bursera*, *Bucida*, and *Gliricidium*. In its less luxuriant form (Fig. 14), especially where approaching arid tropical scrub, short-tree tropical deciduous forest attains a height of only about 25 ft and has only one tree stratum.

Tall-tree tropical deciduous forest occurs only in local, protected semiriparian situations with deeper soil. One patch is found just west of Puerto Angel (Fig. 13). Here, two tree strata are found, and the tallest trees are over 60 ft in height, with some reaching 130 ft. D. E. Breedlove (pers. comm.) recorded the following trees below San Gabriel Mixtepec: *Cochlospermum vitifolium* Willd. ex Spreng., *Cordia alliodora* (R. & P.) Cham., *Croton draco* Schl., *Enterolobium cyclocarpum*



FIG. 13. Tall-tree tropical deciduous forest in end of dry season, just west of Puerto Angel, Oaxaca, about 200 ft, 28 April 1964. (Photograph by L. C. Binford.)

(Jacq.) Griseb., *Guazuma ulmifolia* Lam., *Heliocarpus donnell-smithii* Rose, *Ipomoea wolcottiana* Rose, *Licania arborea* Seem., *Plumeria rubra* L., *Pseudobombax ellipticum* (H. B. K.) Dugand, *Tabebuia rosea* (Bertol.) DC., and *Vitex mollis* Kunth.

Forests along streams and in locally humid situations adjacent to coastal bays or lagoons are sometimes considered to be tropical deciduous forest. However, because they are mostly or completely evergreen and depend on a high water table, which tropical deciduous forest cannot tolerate, they are here treated as swamp forest, a habitat discussed later.

During the dry season the dominant trees in tropical deciduous forest lose most or all of their leaves (Fig. 13). Only a few scattered trees and some shrubs and vines retain all or a portion of their foliage. The forest becomes very open, and one can see long distances through the leafless branches. The general aspect is one of considerable aridity. Exposed to the desiccating effects of sun and wind, ponds and ground dry up, and dust and dry leaves abound. During the rainy season, however, the forest springs to life, first with flowers, then with foliage. The aspect now becomes one of dense lush verdancy, with tall-tree forest similar in appearance to tropical evergreen forest. Streams and ponds fill again, and the moist ground gives rise to numerous herbs and fresh grass.

Climatic data for two localities in tropical deciduous forest, Ingenio Santo Domingo and Puerto Angel, are presented in Table 1. Temperatures are high and constant. At Puerto Angel, for example, average monthly temperatures vary from 81.3°F (January) to 84.2°F (May), with an average annual temperature of 82.8°F. There are, of course, no frosts. Rainfall is highly seasonal. Puerto Angel receives an annual average of 40.9 in, with all but 1.0 in falling from May through October.



FIG. 14. Short-tree tropical deciduous forest in middle of dry season, just north of La Ventosa, Oaxaca, 100 ft, 8 January 1962. (Photograph by L. C. Binford.)

Prevailing winds are off the Pacific and bring the summer rains. *Nortes* have little effect in the region of tropical deciduous forest, descending into the Pacific lowlands as hot dry winds. Well-drained soil is a requirement of this habitat, which develops only on sloped terrain and is replaced by savanna or arid tropical scrub on flat areas.

The upper elevational limits of tropical deciduous forest vary considerably with local conditions of temperature and precipitation. In the southwestern corner of the state and in the San Pedro Juchatengo valley, such forest usually extends up to the lower limit of arid pine-oak forest at 4,100 ft. South of the central and western portions of the Sierra de Miahuatlán, however, conditions are wetter, and tropical deciduous forest gives way to other habitats at lower elevations. In the region of San Gabriel Mixtepec, for example, patches of humid oak appear at about 1,350 ft and stands of humid pine-oak forest and tropical semideciduous forest at 1,850 ft. The deciduous forest becomes progressively scarcer and disappears entirely at about 2,350 ft. In the lower half of the Río Tehuantepec basin and on the Pacific side of the Sierra Madre de Chiapas, the 4,100-ft level again represents the border with arid pine-oak. In the upper portions of the Río Tehuantepec basin, colder and drier conditions produce arid subtropical scrub, which meets tropical deciduous forest (or arid tropical scrub) at about 3,300 ft. Approaching the Isthmus from the west, arid pine-oak reaches lower and lower elevations in response to more humid conditions, crowding out the tropical deciduous forest, and in the Isthmus north of the continental divide it replaces the latter habitat at an elevation of about 800 ft. In the Pacific lowlands of the Tehuantepec region, tropical deciduous forest occurs only on isolated rises with well-drained soils.



FIG. 15. Arid tropical scrub, 5 mi east of Tapanatepec, Oaxaca, 1,400 ft, 1 June 1959. (Photograph by D. A. Zimmerman.)

#### ARID TROPICAL SCRUB (Fig. 15)

Arid tropical scrub can be described as a tree-cactus desert with an arid tropical climate. Usually it is quite open. In some areas, however, such as along the Pacific coast of extreme southwestern Oaxaca near Minitán and in the southeastern corner of the Isthmus (Fig. 15), it is very dense and could be called "thorn forest" (Leopold 1950) or "thorn woodland" (Breedlove 1973), terms that I have not employed.

Arid tropical scrub covers extensive areas only in the broad flat valleys of the Mesa del Sur and on the Pacific side of the Tehuantepec region. However, small patches (unmapped) are scattered throughout the arid tropical section of the state within the general range of tropical deciduous forest. It also stretches (in patches) north across the Isthmus to the region of Guichicovi and far up river valleys into marginally subtropical portions of the Interior Region.

Arid tropical scrub, a deciduous habitat, merges almost imperceptibly with short-tree tropical deciduous forest, but usually has only one tree stratum, which varies in different localities from about 6 to 26 ft in height and presents a partially broken to very open canopy. In many areas, trees are scarce or absent, leaving only the shrub layer. Giant cacti are a conspicuous feature in some localities. Shrubs, typically quite thorny, form almost impenetrable tangles ("thorn forest") or (especially on rocky soils) are quite widely spaced. The sparse herb stratum is composed of grasses and small cacti, with the intervening ground usually bare. The shrubs and trees produce no leaf litter except in the densest clumps.

Miranda (1948b) discusses this vegetation in the lower portions (up to 4,600 ft) of the San Juan Bautista Cuicatlán valley. He divides the wooded land into

three extensive vegetational types. Below 3,000 ft is found (1) a low spiny woods with trees no more than 26 ft tall with small deciduous leaves and characterized by *Cercidium praecox* Harms (Paloverde). Also found there are *Prosopis chilensis* Stuntz. (Honey Mesquite), *Bursera odorata* T. S. Brandeg., *B. submoniliformis* Engl., *B. morelensis* Ramirez, *B. aloexylon* Engl., and *Capparis incana* H. B. K. Less frequent are *Chlorophora mollis* Fernald, *Ceiba parvifolia* Rose, *Cyrtocarpa procera* H. B. K., and *Amphipterygium adstringens* Scheide ex Schlecht. The subvegetation is composed of spiny thicket characterized below. The sparse herbaceous layer contains species of *Ayenia*, *Cracca*, *Indigofera*, *Stachytarpheta*, *Commicarpus*, *Tragia*, *Zinnia*, *Euphorbia*, and *Oxalis*. In some open areas is the grass *Pentarrhaphis polymorpha* Griffiths. A creeper, *Antigonon leptopus* Hook. & Arn., and *Cissus sicyoides* L. are also present. Scattered large cacti include *Lemaireocereus weberi* (Coulter) Britt. & Rose (Candelabra), *L. pruinosus* (Otto) Britt. & Rose (Pitayo), *L. stellatus* (Pfeiff.) Britt. & Rose, *Escontria chiotilla* (Weber) Rose (Jiotilla), and *Cephalocereus chrysacanthus* (Weber) Britt. & Rose. Smaller cacti include species of *Ferocactus*, *Coryphantha*, and *Mammillaria*. In ravines are *Chlorophora mollis* Fernald, *Podopterus mexicanus* Humb. & Bonpl., *Zizyphus sonorensis* S. Wats., and *Agonandra conzattii* Standl.

A second type of forest (2) is a low woods with medium-sized deciduous leaves and dominated by *Cyrtocarpa procera* H. B. K. This type ranges from about 3,000 to about 4,600 ft in areas with higher rainfall or lower temperatures or both. Also found, in order of abundance, are *Bursera submoniliformis* Engl., *B. morelensis* Ramirez, *Amphipterygium adstringens* Scheide ex Schlecht., *Bursera bipinnata* (DC.) Engl., *Ceiba parvifolia* Rose, *Bursera aloexylon* Engl., *B. odorata* T. S. Brandeg., *B. fagaroides* (H. B. K.) Engl., *Cassia emarginata* L., *Euphorbia schlechtendalii* Boiss., *Pseudosmodingium multifolium* Rose, *Gyrocarpus americanus* Jacq., and *Leucaena pueblana* Britt. & Rose. Cacti include *Lemaireocereus weberi* (Coulter) Britt. & Rose and *Cephalocereus chrysacanthus* (Weber) Britt. & Rose. In the subvegetation are *Acacia cymbispina* Sprague & Riley, *Mimosa*, and two species of *Randia*. The sparse herb cover includes *Pentarrhaphis polymorpha* Griffiths, *Gomphrena dispersa* Standl., *Melampodium*, *Tragia*, and *Talinum*. As a result of increased availability of water and abundance of shade, different plants occur along streams. These include *Euphorbia fulva* Stapf, *Thevetia ovata* (Cav.) A. DC., *Ficus*, *Plumeria rubra* L., *Tabebuia pentaphylla* (L.) Hemsl., *Ruprechtia pringlei* Greenm., *Sideroxylon capiri* (A. DC.) Pittier, *Caesalpinia velutina* Standl., and *Pileus mexicanus* I. M. Johnston.

Miranda's third type (3) of extensive vegetation is called spiny thicket. This occurs alone and as the understory of low spiny woods. Spiny thicket ranges from about 1 to 6 ft tall and is composed of spiny plants with very small leaves. Legumes are numerous: *Mimosa polyantha* Benth., *M. lactiflua* Delile, *M. luisana* T. S. Brandeg., *Pithecellobium acatlense* Benth., and *Acacia cymbispina* Sprague & Riley. Other spiny bushes are *Zizyphus pedunculata* (T. S. Brandeg.) Standl., *Randia nelsonii* Greenm., *Celtis pallida* Torr., and *Castela tortuosa* Liebm. Non-spiny dense bushes are *Calliandra eriophylla* Benth., *C. unijuga* Rose, *Karwinskia humboldtiana* (Roem. & Schult.) Zucc., *Cordia cylindrostachya* (Ruiz & Pav.) Roem. & Schult., *C. stellata* Greenm., *Cassia pringlei* Rose, *Plocosperma microphyllum* Baill., *Lippia graveolens* H. B. K., *Pedilanthus pringlei* Robinson, *Turnera diffusa* Willd., *Brongniartia mollicula* T. S. Brandeg., *Aeschynomene compacta*

Rose, *Malpighia galeottiana* Juss., *Adelia oaxacana* (Muell. Arg.) Hemsl., *Sebastiania*, and *Hintonia standleyana* Bullock. Succulents include *Echinocereus*, *Coryphantha*, *Opuntia*, *Hechtia*, and *Agave*. The ground is mostly bare with a very sparse cover of grass (*Pentarrhaphis polymorpha* Griffiths).

Five local types of vegetation are recognized by Miranda. Cardoneras (1) are large stands of *Lemaireocereus weberi* (Coulter) Britt. & Rose. These are associated with spiny thicket. Tetecheras (2) are dense groups of the columnar cactus (*Neobuxbaumia tetetzo* (Web. ex K. Sch.) Backeb. and are usually intermixed with spiny woods. *Cephalocereus hoppenstedtii* (Weber) Schum. also is found. Quiotillales (3), associations of *Escontria chiotilla* (Weber) Rose, are found near towns. Cucharales (4), stands of *Acacia cymbispina* Sprague & Riley, are of secondary origin on abandoned cultivated land. Quebrachales (5) are associations of *Acacia unijuga* Rose, which are found along streams and can reach 50 ft in height and be rather dense. Trees associated with *Acacia unijuga* Rose are *Diospyros oaxacana* Standl., *Agonandra racemosa* (DC.) Standl., *Sapium appendiculatum* (Muell. Arg.) Pax & Hoffm., *Elaeodendron xylocarpum* (Vent.) DC., *Zizyphus sonorensis* S. Wats., *Thevetia peruviana* (Pers.) Schum., *Vallesia glabra* (Cav.) Link, and sometimes *Ficus* and *Taxodium mucronatum* Ten. The subvegetation includes *Capricum baccatum* L.

Duellman (1960:32) lists the following trees found in arid tropical scrub on the Plains of Tehuantepec: *Acacia cymbispina* Sprague & Riley, *Prosopis chilensis* Stuntz., *Caesalpinia coriaria* (Jacq.) Willd., *C. eriostachys* Benth., *Celtis iguanaea* (Jacq.) Sarg., *Cordia brevispicata* Mart. & Gal., *Jatropha aconitifolia* Mill., and *Crescentia alata* H. B. K. Goldman (1951) mentions some of the same plants plus *Guazuma ulmifolia* Lam., *Ficus*, *Ipomoea*, *Pithecellobium*, *Acacia farnesiana* (L.) Willd., and *Cassia*.

Elevational limits of arid tropical scrub vary somewhat with local conditions of rainfall and temperature, but generally range from sea level to 4,600 ft, above which this habitat merges with arid pine-oak forest or arid subtropical scrub. Probably, many of the small patches of tropical scrub that occur in the Pacific Region within the general range of tropical deciduous forest are a result of man's clearing and are not climax.

The climate in areas of arid tropical scrub is characterized by rather high constant temperatures, no frosts, and little rainfall. Precipitation is highly seasonal. San Juan Bautista Cuicatlán (Table 1) receives an annual average of only 21.8 in, all but 1.0 in from May through October. Thus, the dry season here is much more severe than in areas supporting tropical deciduous forest. However, outside the Interior Region, such as at Juchitán in the Isthmus (Table 1), rainfall approaches that of the forest. Which habitat occupies a given area probably depends on soil drainage, with scrub on rocky soils or very slight rises in otherwise flat terrain that are too well-drained for savanna and insufficiently drained for forest. Average monthly temperatures at San Juan Bautista Cuicatlán range from 71.1°F (January) to 84.2°F (May), with an average annual temperature of 77.9°F. These temperatures are only slightly lower than those found at Puerto Angel, a town in tropical deciduous forest.

During the dry season, ponds and all but the largest rivers in arid tropical scrub become dry. With the onset of summer rains, some small depressions become temporary ponds. Because the scrub is essentially leafless in winter, the ground



FIG. 16. Arid subtropical scrub, along Pan-American Highway 5 mi northwest of Huajuapán de León, Oaxaca, 5,900 ft, 13 June 1964. (Photograph by L. C. Binford.)

is exposed to the desiccating effects of wind and sun and becomes quite parched. The lack of leaves to provide moisture through transpiration and the absence of ground matter to hold water add to the general aridity of this habitat.

#### ARID SUBTROPICAL SCRUB (Figs. 16, 17)

Arid subtropical scrub is similar to arid tropical scrub in structure but differs floristically and occurs under subtropical rather than tropical conditions. It is restricted to the Interior Region. Included in my term are the "mesquite scrub" and at least part of the "cactus desert" of Leopold (1950).

Recognizing arid subtropical scrub is often difficult in the absence of local climatological data, especially along its border with arid tropical scrub. The former usually can be identified, however, by the presence of tree species of *Yucca* (Fig. 16) and the much greater abundance of small cacti and other primarily subtropical plants such as *Opuntia* and *Agave*. The first two are often the dominant features of the landscape, attaining heights of 15 or more ft; they are usually well scattered, but occasionally form dense patches. Agaves are cultivated and often used as fence rows. The lower vegetation consists of short, small-leaved, thorny, deciduous bushes, growing in dense groups or scattered singly throughout the landscape, and reaching heights of 4 to about 7 ft. *Prosopis chilensis* Stuntz. (Honey Mesquite), *Acacia*, small yuccas and agaves, and numerous species of cacti make up much of this low stratum. The ground is rocky and barren, with short stretches often devoid of the larger plants. Scattered clumps of grass are the commonest element in the herb stratum.

Miranda and Hernández (1963:66) describe a thorn thicket of *Acacia bilimekii* Macbr. to the southeast of Huajuapán de León at about 5,400 ft. For the Oaxaca

Valley, Goldman (1951) lists *Acacia farnesiana* (L.) Willd., *Cassia*, a tree *Ipomoea*, *Fouquieria formosa* H. B. K., *Jatropha*, and *Prosopis chilensis* Stuntz., with *Baccharis* and *Taxodium mucronatum* Ten. along streams. The large Bald Cypress at Santa María del Tule is said to have a trunk circumference of about 170 ft (Goldman 1951:438). MacDougal (1908:27–28) lists *Cereus eburneus* Salm-Dyck, *Agave karwinskii* Zucc., *Yucca*, and *Dasyliirion* in the Oaxaca Valley. The presence of tropical figs (*Ficus*) and some of the forms listed above reflects the subtropical climate of this valley.

Bravo (1931) records the following cacti in the Oaxaca Valley: *Pereskiaopsis chapistle* (Weber) Britt. & Rose, *Nopalea auberi* (Pfeiff.) Salm-Dyck, *Opuntia pumila* Rose, *O. pilifera* Weber, *O. affinis* Griff., *O. hytiacantha* A. Web., *Pachycereus marginatus* (DC.) Britt. & Rose, *Lemaireocereus pruinosus* (Otto) Britt. & Rose, *L. treleasei* (Vaupel) Britt. & Rose, *L. stellatus* (Pfeiff.) Britt. & Rose, *Nyctocereus serpentinus* (Lag. & Rodr.) Britt. & Rose, *Heliocereus speciosus* (Cav.) Britt. & Rose, *Selenicereus hamatus* (Scheidw.) Britt. & Rose, *Aporocactus conzattii* Britt. & Rose, *Ferocactus macrodiscus* (Mart.) Britt. & Rose, *F. latispinus* (Haw.) Britt. & Rose, *Coryphantha pycnantha* (Mart.) Lem., *C. retusa* (Pfeiff.) Britt. & Rose, *Neomammillaria karwinskiana* (Mart.) Britt. & Rose, *N. conzattii* Britt. & Rose, and *N. schmollii* H. Bravo.

Arid subtropical scrub is found only in the dry interior of the Mesa del Sur, where it occupies an elevational and climatological band between the warmer (frostless) areas of arid tropical scrub below and the colder (in Oaxaca) and wetter arid pine-oak forest or drier steppe above. The most extensive portion is located in northwestern Oaxaca, where it occupies the relatively level land away from rivers between 4,600 ft on the one hand (upper limit of the arid tropical scrub that invades the interior valleys) and 6,100 to 7,900 on the other (lower limit of arid pine-oak or steppe). The variation in the upper boundary is perhaps due in part to edaphic factors.

Although much of the Oaxaca Valley today is covered with steppe, probably caused by man, scattered pockets of arid scrub also occur. The moderate elevations and level terrain of this valley combine to produce some sections in which annual temperatures are between tropical and subtropical, resulting in vegetation ecotonal between arid tropical and arid subtropical scrubs. Such an area surrounds Ejutla de Crespo, a town averaging less than one day of frost per year. Most of the valley, however, supports remnants of what I believe was the preponderant “natural” vegetation—arid subtropical scrub. The occurrence of at least light frosts throughout most of the valley lends credence to this belief. Also, the avifauna contains few tropical elements. Thus, I have mapped no arid tropical scrub there.

In the San Juan Bautista Cuicatlán valley the elevational limits are approximately 4,600–6,100 ft, but partial invasion by arid pine-oak elements makes the scrub difficult to discern. In the San Miguel Sola de Vega valley, it extends from the floor to 5,000 ft on the north side and 4,750 on the south side before arid pine-oak takes over. Arid subtropical scrub appears to be absent from the warm San Pedro Juchatengo valley, tropical deciduous forest merging directly into arid pine-oak forest. I have mapped arid subtropical scrub in the upper Río Sordo valley on theoretical grounds; it might be absent. In the upper Río Tehuantepec basin, the boundaries appear to be 3,300 and 4,600 ft.

Climatic data typical of arid subtropical scrub are presented in Table 1 for



FIG. 17. Arid subtropical scrub, along Pan-American Highway in northwestern Oaxaca, 26 February 1968. (Photograph by J. R. Arnold.)

Huajuapán de León and Oaxaca City. The former receives an average of 28.4 in of rainfall per year. The latter town has only 25.4 in, and some localities in the Oaxaca Valley get even less (22.1 in at Tlacolula de Matamoros; García 1973). Rainfall is highly seasonal, with all but 2.3 in at Huajuapán de León falling from May through October. Ejutla de Crespo in the Oaxaca Valley, with an annual average of 24.2 in, receives none in December through February (García 1973). Most of the rain in arid subtropical scrub regions comes as scattered showers rather than in sustained storms. During the dry season, streams and most ponds become dry. Few streams originate here; most simply pass through on their way from the higher and more humid mountains to the lowlands. In the Oaxaca Valley, despite its fertile soil, irrigation is necessary for good crop production.

This habitat, as its name implies, occurs mostly under subtropical temperatures. At both Oaxaca City and Huajuapán de León, the average annual temperature is 69.1°F, with December and January being the coldest months and May the warmest. Frosts occur from October through April and vary in average number of days per year from less than 1 (Ejutla de Crespo) to 15 (Tlacolula de Matamoros); Huajuapán de León averages 10 and Oaxaca City, 5.

#### STEPPE (Fig. 18)

Steppe is here used to denote arid regions virtually devoid of woody vegetation. It is found in two large areas in Oaxaca, one in the north central portion from Asunción Nochixtlán and San Juan Bautista Coixtlahuaca west to the regions of Tamazulapán del Progreso and San Felipe Ixtapa and the other occupying much of the Oaxaca Valley.

In the former area, the geological formation is a soft limestone, which on



FIG. 18. Steppe, 2 mi east of Asunción Nochixtlán, Oaxaca, 6,800 ft, 16 May 1964. (Photograph by L. C. Binford.)

disintegration forms a lime subsoil known locally as *tepetate* (Goldman 1951: 211). This soil is very thin, and every trail is visible for miles as a winding white line across the bleak countryside. Vegetation is scanty, and the ground for the most part is bare rock or earth. Some thin patches of short grass and a few small cacti are found. Occasionally, a bush or even a low tree breaks the monotony of the landscape. On the lower ridges and hilltops are other habitats—oak scrub, juniper scrub, or arid oak forest. Arid pine-oak clothes the higher ridges. In this area the development of steppe probably is a result of both the poor soil, which fails to hold moisture, and the low rainfall (Table 1). Asunción Nochixtlán receives an annual average of only 17.7 in, falling primarily from May through October, with only 2.0 in during the rest of the year. Because this area has been inhabited and portions cultivated for centuries, it has been suggested that originally the soil was deeper and supported a “natural” vegetation of arid pine-oak forest. I seriously doubt this to have been the case, because the very low amount and extreme seasonality of the rainfall would seem inadequate for pine-oak. If steppe were not present, the vegetation more likely was oak scrub, juniper scrub, or arid subtropical scrub.

The Oaxaca Valley contains some areas of steppe and others of arid subtropical scrub (see discussion of that habitat), arranged in no apparent pattern and impossible to map separately. Here the soil is fertile, and the rainfall is adequate to support arid scrub throughout. The presence of steppe is probably a result of man’s disturbance, because the valley has been under cultivation for more than 2,000 yrs (West 1964:63). Continual grazing by goats probably aids in keeping arid subtropical scrub from reclaiming the area.

All areas of steppe in Oaxaca receive some frost. Temperatures are similar to

those in regions of arid subtropical scrub. Asunción Nochixtlán has an average annual temperature of 63.7°F and monthly averages ranging from 58.5°F (January) to 67.5°F (April). Rainfall and temperatures in the Oaxaca Valley are discussed under the section on arid subtropical scrub. Few streams and no ponds occur in the north central steppe. During the infrequent rains, runoff is swift, leaving little soil moisture to support woody plants. The Oaxaca Valley contains a few ponds, marshes, and streams, most of which are dry in winter.

That steppe seems to be confined to relatively level regions probably is due to the restriction of prolonged cultivation to flatter areas, the lack of physiographic relief to produce convective rainfall, and the general flatness of the underlying geologic formation producing *tepetate*; in Oaxaca, pine-oak forest seems to require sloped terrain. In the Oaxaca Valley, steppe gives way to arid pine-oak in the first foothills of the mountains ringing the valley, usually at about 6,100 ft. In the north central region, steppe occurs up to about 7,900 ft, and its lower dividing line from arid subtropical scrub, usually about 6,500 ft, is determined by the distribution of the lime subsoil.

#### SAVANNA (Figs. 19, 20)

As used here, “savanna” refers to a combination of grassland and scattered trees or shrubs growing most commonly on deep, poorly drained soils on flat or gently rolling terrain. In Oaxaca, the climate is tropical or subtropical. I include what Breedlove (1973) calls “short-tree savanna.”

Isolated patches of savanna are scattered over the state below 6,000 ft within the general range of several other major habitats. Only the most extensive savannas have been mapped as solid patches. These are found west of San José Estancia Grande (Fig. 19), northwest of Huajuapán de León, south of Chahuítes, east of La Ventosa (Fig. 20) and at two points east of Chivela. Savannas too small to be mapped occur in all three Regions: in the Atlantic Region near Temascal, between San Juan Bautista Tuxtepec and Loma Bonita, north of Sarabia, near Mogoñé, and probably near Tutla; in the Interior at numerous points in the Oaxaca Valley (e.g., near Santa María Coyotepec, along the Pan-American Highway between Oaxaca City and San Pablo Villa de Mitla, and near San Pedro y San Pablo Etla) and on the Pacific-facing ridges of parts of the Sierra de Los Mijes; and in the Pacific Region near Minitán, Putla de Guerrero, Llano Grande, Rancho Las Animas, the mouth of the Río Tonameca, and on the lower slopes of the Sierra Madre de Chiapas. In the Tehuantepec region (Fig. 1), savanna intermingles with other habitats from Tehuantepec City east to the Chiapas border and north across the Isthmus as far as the latitude of Guichicovi; it is more extensive to the east of La Ventosa than to the west.

The trees or shrubs in Oaxaca savannas are often related to the surrounding habitat, including pine-oak, palm, tropical evergreen, or tropical deciduous forests and arid tropical or arid subtropical scrubs. In most of the tropical lowland savannas, however, the dominants are species in the genera *Byrsonima*, *Crescentia*, and *Curatella* and can be considered “true” endemics (Fig. 19). Strips or patches of riparian forest, often quite humid and luxuriant, occupy the river beds and other low places, with savanna on the drier ridges. The height of the savanna trees varies considerably. West of San José Estancia Grande, trees range from 10–15 ft tall. In areas of tropical evergreen forest, isolated dicotyledonous trees can



FIG. 19. Typical savanna, 9 mi west-northwest of San José Estancia Grande, Oaxaca, 300 ft, 21 February 1964. (Photograph by L. C. Binford.)

surpass 100 ft, and palms are known to reach 115 ft in height. Shrubs grow singly or, more often, in irregular clumps, which in places are virtually impenetrable.

The grass layer varies from sparse in the driest areas to very dense in moist situations (as around edges of marshes). Because of the frequent use of savannas as grazing land for horses, cattle, and goats, the natural height of the grass is often difficult to ascertain. Apparently, however, undisturbed savannas in Oaxaca usually support grass less than one foot tall. But in isolated patches in the valley of Putla de Guerrero and in the palm savannas of the Isthmus (Fig. 20), grass is often dense and several feet in height.

Miranda (1948a) believes that natural primitive savannas once existed in Oaxaca near San Juan Bautista Tuxtepec but now have been destroyed by man and replaced with secondary savannas. Between Tierra Blanca and Los Naranjos, both in Veracruz, just north of San Juan Bautista Tuxtepec, Oaxaca, are primitive grasslands with scattered short trees, including *Curatella americana* L. and *Crescentia cujete* L. In Oaxaca, near San Juan Bautista Tuxtepec, are secondary savannas on flat or undulating areas of deep soil where man has eliminated the forests. There the dominant tree is the palm *Scheelea liebmannii* Becc. (up to 115 ft tall), and other large trees are *Ceiba pentandra* (L.) Gaertn. (Kapok Tree) and *Enterolobium cyclocarpum* (Jacq.) Griseb. (Guanacaste).

On the Pacific coast near Chicapa de Castro, the small trees are mostly *Byrsonima crassifolia* (L.) DC. (Nanche) and *Curatella americana* L. (Goldman 1951). The Plains of Chivela are covered with a savanna containing widely scattered palms and clumps of small trees and shrubs including *Croton niveus* Jacq., *Cordia cana* Mart. & Gal., *Jacquinia aurantiaca* Ait., *Calycophyllum candidissimum* (Vahl) DC., and *Cassia emarginata* L. (Duellman 1960:32).



FIG. 20. Palm savanna, 4 mi east of La Ventosa, Oaxaca, 100 ft, 1 June 1964. (Photograph by L. C. Binford.)

The very different savanna on shallow lime soils northwest of Huajuapán de León, dominated by a palm, *Brahea dulcis* (H. B. K.) Mart., and a close relative of the yuccas, *Dasylyrion lucidum* Rose (Miranda and Hernández 1963:63), has been termed “yucca grassland” by Shelford (1963).

Savannas in Oaxaca are not a climatic climax type of vegetation. Their origin is unknown, but most likely they result from a variety of factors. Some probably are a natural edaphic habitat in regions having permeable soil horizons on top of an impermeable layer that causes poor drainage. In such cases, the grasslands become waterlogged or even partly flooded during the rainy season and desiccated during the dry season (Duellman 1960:30). Because such flooded areas do not have a permanently high water table, and hence cannot support aquatic vegetation, they are not considered marshes here. Savannas on the Plains of Tehuantepec probably fit this category. Many savannas, especially those in regions of tropical evergreen and tropical deciduous forests, are probably man-made, being an aftermath of very early clearing and cultivation; maintenance requires fire (natural or man-caused), grazing, or repeated cutting, to avoid long-time reforestation by the natural climatic vegetation.

Savannas are most common in regions with seasonal rainfall, where the soils desiccate during the dry season. Most are tropical in temperature, but those of the Oaxaca Valley and northwest of Huajuapán de León, which occur between 5,000 and 6,000 ft, are subtropical, as they occasionally receive mild frosts. Climatic data for Juchitán, in an area that supports both arid tropical scrub and savanna, are presented in Table 1. Streams are scarce in savannas, but temporary ponds frequently form during the rainy season, and permanent ponds supporting marsh often occur in association.

## MODIFIED TERRESTRIAL HABITATS

Man has had such a profound effect on the terrestrial habitats of Oaxaca that it is often impossible to determine whether or not a given vegetation is virgin or even if the habitat present is natural. Some areas covered by savanna, arid tropical scrub, arid subtropical scrub, and steppe might well be a result of the inroads of civilization, although each habitat also exists naturally.

Man-modified habitats are often difficult to recognize because no unmodified areas are available for comparison, as with arid pine-oak forest, probably all of which (certainly near roads) has been logged in the past. Whether or not such cut-over forests have since achieved full maturity can only be surmised, but probably they have not. The same is true of most other terrestrial habitats in Oaxaca. Even arid tropical scrub can be severely disturbed by cutting for firewood, grazing of animals, or man-caused fires. Continuous use of this nature can prevent a habitat from attaining full maturity, as it does near towns.

Improper forestry techniques can destroy such a large percentage of the tall trees that the understory, thus exposed to the full impact of the climate, can no longer exist. On sloping terrain, which includes most of Oaxaca, the inevitable aftermath is extreme erosion. With the soil washed away, centuries can pass before another forest can develop. Much of the interior of the Mesa del Sur, once completely covered by pine-oak forest, is now a "badlands" of red gullies, with only occasional patches of pines or oaks to indicate which habitat once existed.

Perhaps the most destructive activity of man is clearing for agriculture. In forested regions the usual procedure is first to remove the large economically important trees and then cut and burn the rest, leaving only charred ground. So poor is the soil in tropical evergreen forest and so harmful the effect of burning, that crops can be grown for only a few years. The land is then abandoned, allowed to grow up for several years, and cut and burned again. Although such practices are most common in the relatively level lowlands in areas of tropical evergreen and tropical deciduous forests, regions at higher elevations and on steep terrain are not immune. In the arid pine-oak belt, forests are cut for the planting of corn, beans, apples, peaches, and quinces. In the humid lowlands, corn, rice, beans, peppers, sugarcane, coffee, bananas, pineapples, mangos, papayas, and avocados are grown.

Although we usually think of destruction of habitat in reference to man's activities, we should not overlook his simultaneous creation of new habitats, which allows some bird species (particularly common ones associated with open habitats) to invade otherwise unsuitable areas.

I have dealt previously only with those habitats believed to exist at least in part as "climax" formations. Some bird species, however, are not adapted to such formations but rather to variously modified habitats, either natural or man-made. Naturally modified habitats, such as those resulting from floods, wind-falls, and lightning fires, often cannot be distinguished, at least by the non-botanist, from those caused by man or his domestic animals; although the floristic composition might differ, the structure, to which most birds respond, is similar. I have attempted to distinguish man-made habitats only when they are actively maintained by man, such situations being easily recognizable. I divide modified terrestrial habitats into two types: those that are purposely produced and actively maintained



FIG. 21. Coffee finca in tropical evergreen forest, 1 mi southwest of Valle Nacional, Oaxaca, 300 ft, 20 April 1961. (Photograph by L. C. Binford.)

by man (or his animals); and those that represent successional stages and related situations (e.g., “edge”) resulting from either natural or man-made causes. The former category includes fincas, cultivated land, grazed land, and man-made structures. The latter I term “openings.” These two types are too small in extent or their distributions too poorly known to indicate on the habitat map.

#### FINCAS (Fig. 21)

Coffee fincas are found throughout much of the humid tropical and lower subtropical forests of Oaxaca within the general range of tropical evergreen forest, tropical semideciduous forest, and the lower portions of cloud forest. Usually, most of the larger trees are left intact to provide shade for the coffee plants and hence can harbor at least some arboreal birds. In some localities, however, the native trees are replaced by exotics. Most of the undergrowth is removed to make space for the coffee plants. Thus, some brush-inhabiting birds are extirpated, but as coffee fincas are seldom kept clean, returning herbs and patches of brush can support at least part of the natural avifauna.

#### CULTIVATED LAND (Figs. 22, 23)

This category embraces areas under active cultivation, with their food plants, weeds, and vegetation along fence rows. In the Oaxaca Valley and parts of the Pacific lowlands of the Isthmus, some cultivated fields are large and irrigated. Elsewhere, most are used for subsistence agriculture and are quite small, poorly tilled, and contain weeds or perhaps a few small shrubs; hence, the differences from guamil (see Openings) often are not marked.



FIG. 22. Cultivated land in tropical evergreen forest, Trans-Isthmian Highway north of Matías Romero, Oaxaca, about 250 ft, 29 May 1959. (Photograph by L. C. Binford.)

#### GRAZED LAND

Most grazing animals (horses, cattle, sheep, and goats) are allowed to forage for themselves wherever grass is found, usually in savannas. In places, however, notably in the Oaxaca Valley and near San Juan Bautista Tuxtepec, small grassy fields are cleared and actively maintained by man or by overgrazing. If left alone, such pastures would grow up to scrub within a few years. The only distinction between such grazed land and man-made savannas is that the latter would require a much longer time for reforestation. Because grazing animals are relatively scarce in Oaxaca, being numerous only locally, permanent maintenance of savannas by the animals alone probably does not happen.

#### STRUCTURES

Included here are all man-made structures, including piers, bridges, roads, and all types of buildings, urban and rural.

#### OPENINGS (Fig. 24)

Many bird species that occur within the general geographic limits of one or another of the natural terrestrial habitats, rather than being inhabitants of the interior of the optimal vegetation, are associated with *openings*, such as clearings, edge situations, and successional stages. I have found this terminology most useful in reference to forest habitats; scrub habitats, steppe, and savanna are already so open that for the most part I have been unable to distinguish between birds preferring the openings and those simply visiting from adjacent optimal habitats.



FIG. 23. Cultivated land in Oaxaca Valley, about 14 mi southeast of Oaxaca City, about 4 June 1956. (Photograph by Dale and Marian Zimmerman.)

When data have been available, I have applied the following more specific phrases to describe habitat preferences in forested regions.

*Semiopen portions.*—This embraces the later successional stages or early second growth in which trees (at least saplings) are present but provide an incomplete canopy. Many such areas in Oaxaca are a result of human activity, especially logging of the larger trees. Patches of extremely dense undergrowth associated with tropical evergreen forest have been termed “jungle” by Carr (1950).

*Margins.*—Included here are those portions of the forest proper that border on all types of clearings, including streams.

*Brushy clearings.*—This category includes all types of brush-covered clearings adjacent to forest. One such habitat in tropical evergreen forest, termed “breña” by Carr (1950), consists of impenetrable tangles of shrubby and herbaceous growth overgrown and roped together into a mass of vines and creepers. I also include here the man-made habitat called by Carr (1950) “guamil” (Fig. 24), which is abandoned farmland allowed to grow up to thickets of brush, vines, and saplings.

#### OPEN AQUATIC HABITATS

This category embraces all aquatic habitats that are unforested. For lakes, ponds, reservoirs, bays, harbors, lagoons, and ocean, only the open water (and the submerged bottom) is considered part of the habitat; edges are not. In the Species Accounts, open waters edged by terrestrial or swamp forests are termed *forest-edged aquatic habitats*, and the phrase *shallow aquatic habitats* implies fresh,



FIG. 24. Brushy clearing (guamil) in tropical evergreen forest, 1 mi southwest of Valle Nacional, Oaxaca, 300 ft, 20 April 1961. (Photograph by L. C. Binford.)

brackish, or saline waters. For additional discussion of open aquatic habitats, see General Physiography.

#### LAKES, PONDS, AND RESERVOIRS (Fig. 2)

These are freshwater habitats. In Oaxaca, few are permanent, most arising as temporary ponds that fill depressions during the rainy season. Other wet areas are marshy throughout and are not here treated as ponds. The two largest bodies of fresh water in the state are man-made reservoirs: Presa Miguel Alemán and Presa Benito Juárez. Both contain dead trees at their edges, where the natural forest has been inundated. Because of their rather recent construction, these reservoirs, unlike lakes, lack extensive aquatic vegetation and some aquatic animals. Lake conditions should develop in the future.

#### RIVERS AND CREEKS

As used here, the terms rivers and creeks refer, respectively, to streams more than 10 and less than 10 ft wide. In the Interior Region, such waters usually are shallow, cold, and swift-flowing. In the lowlands, especially in the wider portions of the Atlantic lowlands, waters are warm, muddy, sluggish, and fairly deep. Because of the seasonality of rainfall, all rivers, even those in the humid Atlantic lowlands, are fullest during the rainy season. Many creeks and smaller rivers dry up completely during the dry season, especially in the Interior and Pacific Regions.

#### COASTAL BAYS, HARBORS, AND LAGOONS (Figs. 25, 26)

Coastal bays are bodies of saline water, usually rather deep, directly connected with the ocean by way of broad open mouths and hence having shores subject to



FIG. 25. Saline lagoon edged by mud flats and Black Mangrove (*Avicennia nitida* Jacq.) swamp, Minitán, Oaxaca, sea level, 29 February 1964. (Photograph by L. C. Binford.)

direct ocean wave action. Oaxaca bays are bordered by sand beaches or by rocky hills supporting arid tropical scrub or tropical deciduous forest.

Man-made coastal harbors are similar to natural bays but differ in that they are more completely lined with artificial structures, might have their bottoms dredged occasionally, and have narrow man-made mouths to exclude ocean waves. The only large harbor in Oaxaca is at Salina Cruz.

Oaxaca coastal lagoons (Figs. 25, 26) have waters that are saline or, in the case of true estuaries, brackish or rarely partly fresh. Their mouths are narrow or closed, the waters protected from direct ocean wave action. Most are rather shallow, but the larger ones in the Isthmus are fairly deep in the middle. The shores are lined with mud flats, mangrove swamp, or both. The waters of Laguna Superior are being used for salt production. Large basins have been constructed in the shallower portions; water is pumped in, allowed to evaporate, and the salt crystals collected. The shallow open waters of the basins, which are often lined with mud flats, are here treated as part of the natural lagoons.

#### OPEN OCEAN

Here I include both the ocean proper and the large Gulf of Tehuantepec but not wide-mouthed bays communicating with the ocean. The ocean off Oaxaca teems with aquatic life. Porpoises, sea turtles, sailfish, tuna, flying fish, and many other fish are numerous and an occasional sea snake can be seen. Off Puerto Angel and Puerto Escondido the water is often quite calm, permitting small outboard motorboats to venture far offshore. The shallower waters of the Gulf of Tehuantepec, however, are usually rather rough as the result of incessant winds blowing across the Isthmus from north or south. West of the Gulf the great depth of the



FIG. 26. Saline lagoon edged by Red Mangrove (*Rhizophora mangle* L.) swamp, Minitán, Oaxaca, sea level, 29 February 1964. (Photograph by L. C. Binford.)

ocean near shore (see General Physiography) probably accounts for the great abundance of oceanic birds within three miles of the coast.

#### MARSHES (Fig. 27)

Marshes are nonforested areas flooded throughout most or all of the year and hence supporting permanent hydrophytic or aquatic vegetation. This habitat is called "herbaceous marsh" by Breedlove (1973). I know of no saline or brackish marshes in the state. Savannas often flood during the rainy season but do not have permanently high water tables and hence cannot develop aquatic vegetation. Marsh in Oaxaca is scarce and is found usually at the edge of drainage ditches, ponds, and lakes. The most extensive marshes are on open flatlands between San Juan Bautista Tuxtepec and Loma Bonita and at a point about 4 mi west of Río Grande (southwestern Oaxaca). The area around Tehuantepec City once supported many large marshes, but most have been drained for cultivation, and the marsh vegetation is now confined largely to drainage ditches. I have also noted marsh at the mouth of the Río Tonameca, at a point 15 road mi west of San Pedro Pochutla, around two ponds near San José Estancia Grande, along a river just east of Putla de Guerrero (Fig. 27), and at pond near Santa María Coyotepec.

Vegetation includes grasses, sedges, and various types of floating plants. Short shrubs, such as willows (*Salix*), usually border marshy areas or are scattered among the grass; this habitat could be termed "shrub swamp," but is here treated as part of marsh. Miranda (1948a) gives some of the plants found in what he calls marshy prairies in the Atlantic lowlands near San Juan Bautista Tuxtepec: *Andropogon bicornis* L. (grass over 3 ft tall), *Solanum diversifolium* Schlecht. (spiny bush 3–6 ft), *Mimosa pigra* L. (leguminous bush 3–6 ft), and *Cassia reticulata* Willd. (leguminous plant 6–20 ft).



FIG. 27. Freshwater marsh inhabited by the Spotted Rail (*Pardirallus maculatus*), 1 mi east of Putla de Guerrero, Oaxaca, 2,400 ft, 22 May 1964. (Photograph by L. C. Binford.)

#### ROCKY SEASHORES

Along much of the coastline, especially from Salina Cruz west to Puerto Escondido, the high mountains of the Mesa del Sur drop abruptly into the ocean, often forming rocky promontories with little or no beach. At the foot of the cliffs are jumbled rocks exposed to ocean waves and supporting abundant invertebrate life.

#### SAND BEACHES

Scattered between the rocky promontories, lining coastal bays, and forming long stretches of the coast between the ocean and coastal lagoons are beaches composed of fine sand. I have noted extensive sand beaches in the following places: on the islands south of Chahuities; at and near Puerto Angel, Salina Cruz, and Puerto Escondido; at the mouth of the Río Tonameca; and near Minitán. I include shell beach here.

#### SAND DUNES

Some of the sand beaches backed by large lagoons merge into low sand dunes, which separate ocean from lagoon and are covered with grass or a low cover of scrubby trees and bushes. This habitat has been termed "coastal strand" by Breedlove (1973) and "dune grassland" by Leopold (1950). One such area forms the narrow strip of land, 1–2 mi wide, on which San Mateo del Mar is located; Goldman (1951:222) states that these dunes support salt grass (*Distichlis*). A similar habitat is found between the ocean and Laguna de Alotengo. This habitat could be considered terrestrial, but is included here because of its close association with the ocean and lagoons and because of its potential use by aquatic birds.

### MUD FLATS (Fig. 25)

Open areas of bare mud border many aquatic habitats in the state but are extensive only in association with shallow coastal lagoons. The largest mud flats are at Laguna de Alotengo (Fig. 25) and at the edges of the large lagoons on the Pacific coast of the Tehuantepec region. At Laguna Superior such flats are several square miles in extent. The tidal waters periodically inundating coastal mud flats are strongly saline. Away from the water's edge the mud becomes dry and cracked, whereas beneath the shallow waters it is soft and can be a foot deep. Invertebrate life is abundant in the wet portions. I include here mud flats associated with man-made salt basins.

### RIVER BARS

In most of the larger rivers are ridges of rock or sand, which are exposed permanently or only during the dry season. These afford feeding and/or breeding sites for a number of resident birds.

### FORESTED AQUATIC HABITATS

#### MANGROVE SWAMP (Figs. 25, 26)

Mangrove swamps are forests consisting primarily of mangroves on coastal sites permanently or periodically inundated by saline or brackish waters. They are scattered along the length of the Pacific coast wherever there are lagoons. In Figure 1, I have shown mangrove swamp at the edges of all coastal lagoons, although in many cases this distribution is based on theoretical grounds rather than direct observation. The trees usually are 15–25 ft tall but locally reach 60 ft.

Two types occur in Oaxaca. One is composed of dark-leaved Red Mangrove (*Rhizophora mangle* L.; Fig. 26) growing in permanent, rather deep water. These trees are frequently quite large and dense, and their numerous stilt roots form so thick a tangle that penetration is possible only by walking on the roots themselves. Shade is complete. The deepest waters lack shrubs or other trees.

The second type, composed of Black Mangrove (*Avicennia nitida* Jacq.), occurs in shallow waters that often disappear completely during parts of the dry season (Fig. 25). These plants send up short vertical pneumatophores in a circular array around the trunk. The swamp can be negotiated by carefully stepping between the rootlets. The pale-leaved trees are small and seldom produce a complete canopy. The substrate usually is bare mud, but on higher ground in the vicinity of the trees a sparse cover of grass or low succulents sometimes develops.

#### SWAMP FOREST (Figs. 28, 29)

The term swamp forest here refers to patches or strips of lush, close-canopied, mostly evergreen forest on land that has an extremely high water table and/or is periodically or permanently inundated by fresh water. In Oaxaca, swamp forests are too small in extent to map; they are confined to areas of tropical evergreen and tropical deciduous forest, occurring at the edges of most Pacific coastal lagoons immediately behind the mangrove swamps and along Pacific and Atlantic lowland rivers, especially those having slow-moving water and adjacent flat areas. The coastal patches are here called *Pacific swamp forest*. Shelford (1963:432) uses the term "semideciduous gallery forest" for a similar type of habitat in Guatemala.



FIG. 28. Typical Pacific swamp forest, Minitán, Oaxaca, sea level, 29 February 1964. (Photograph by L. C. Binford.)

Breedlove (1973) uses “swamp” and “lowland riparian forest” for Chiapas and discusses them together. Strips of tall trees following rivers far into the Interior are not here considered swamp forests because they are invariably too limited in extent (often only one tree wide), have too open a canopy to produce a humid atmosphere, and are completely or mostly deciduous.

A typical Pacific swamp forest (Fig. 28) is found near Minitán at the edge of Laguna de Alotengo in extreme southwestern Oaxaca. This rather extensive forest is evergreen, although during the dry season leaves are shed at a greater rate than in the rainy season. Two tree strata are found, the upper containing trees 40–80 ft tall and the lower 15–40 ft; the two merge to a certain extent. Some trees have trunks 6 ft in diameter and buttresses 15 ft in diameter at ground level. The shrub layer consists of scattered clumps of shrubs up to 15 ft tall. For the most part, however, the forest floor is rather open, and the ground, which is dry most of the year, is covered with a thick litter of leaves and occasional clumps of grass. Scattered through the upper strata are tall palms. In the lower tree and shrub layers, especially below openings in the upper canopy, are dense clumps of a spiny palm (*Bactris*). Strangler figs (*Ficus*) and epiphytes are fairly numerous.

The usual juxtaposition of habitats in such coastal areas is one in which mangrove swamp occupies the flooded (saline) land immediately adjacent to open water and is flanked by a very narrow strip of palm savanna. Next is a strip of palm forest mixed with dicotyledonous trees, which blends into a strip of Pacific swamp forest containing scattered palms. The border between Pacific swamp forest and the adjacent tropical deciduous forest or arid tropical scrub is abrupt, following along the first rise in terrain, with the swamp forest restricted to low ground. From this point, swamp forest sometimes continues inland along the flood plains of

major rivers and connects with arms descending from the tropical semideciduous forests of the adjacent mountainsides, thus forming important mesic avenues for avian dispersal.

Along creeks in the low foothills between Tapanatepec and the Chiapas border are rather extensive semihumid forests (Fig. 29). These are poorly known floristically and geographically and might be transitional between the lowland tropical deciduous and highland tropical semideciduous forests. However, for convenience in describing bird ranges and because they appear to be riparian, I call them Pacific swamp forests.

At the mouth of the Río Tonameca is a small, permanently inundated, freshwater swamp forest. It consists of short, closely-spaced trees and might better be termed a "shrub swamp."

Little is known about the swamp forests of the Atlantic Region of Oaxaca. Probably they merge to such an extent with adjacent tropical evergreen forest that they are not readily discernible. Few species of trees occur in these swamps. Miranda (1948a:111) lists the following plants in a swamp forest near San Juan Bautista Tuxtepec: *Pachira aquatica* Aubl. (Shaving-Brush Tree), *Coccoloba schiedeana* Lindau, and *Chlorophora tinctoria* (L.) Gaud.

The climate is the same as that in adjacent tropical deciduous or tropical evergreen forests. The dense shade and abundance of foliage throughout the year aid in keeping the forest interior cool and humid even during the dry season.

#### PALM FOREST

Forests composed primarily of tall palms are scattered along the Pacific coast, but their extent is too small or too poorly known to permit mapping. The most extensive palm forest I have seen is along the main road between Santiago Jamiltepec and Puerto Escondido and stretches from north of the Río Grande southward for a distance of some 20 mi. The palms here reach 50 ft in height and are so dense that shading is complete. Except for young palms, there is no herb or shrub layer, the ground being covered only by dry leaves. A few large dicotyledonous trees are scattered among the palms. A similar but much smaller forest is found a little farther southeast at a point two miles northwest of San José Manialtepec.

Strips or small patches of palm forest occur also at the edges of some coastal lagoons, between the narrow strip of savanna bordering the mangroves and the swamp forest on the inland side. Apparently, palm forest in Oaxaca is an edaphic habitat, developing where the water table is high and periodic flooding occurs during the rainy season.

#### PLAN OF THE SPECIES ACCOUNTS

In the Species Accounts I summarize for each species its relative abundance; mode, seasonality, annual frequency, and dates of occurrence; habitat preferences; geographic and elevational ranges; and breeding status. I also present all data for most of the rare or previously unreported species, list the subspecies reliably recorded and delimit the ranges of those that breed, correct errors in the literature, and indicate gaps in our knowledge for the benefit of future workers.



FIG. 29. Atypical Pacific swamp forest, 8.9 mi east of Tapanatepec, Oaxaca, 1,800 ft, 3 June 1959. (Photograph by D. A. Zimmerman.)

The main Oaxaca list includes the 680 species that in my opinion have been reliably recorded. Of these, 659 are supported by specimens I have examined personally, 8 by published and 2 by unpublished records of specimens examined by other ornithologists, 1 by a published banding record, and 10 by sight records only; each of the last 10 has its name enclosed in brackets ([ ]). An additional 39 species and 1 hybrid, said to have occurred in the state but not, in my opinion, on the basis of acceptable records, are discussed in the Hypothetical List.

#### SPECIMENS EXAMINED; COLLECTORS

In the course of preparing this report, I examined about 17,400 Oaxaca specimens in museums in the United States and Mexico. For all specimens listed in detail in the Species Accounts, I give either a museum catalogue number (if available; some specimens were uncatalogued when I examined them) or a literature reference. Museum abbreviations are as follows: American Museum of Natural History (AMNH); A. R. Phillips Collection (ARPC; numbers are original field numbers of Phillips), formerly in Mexico City, most now in the Delaware Museum of Natural History (DEL); Berlin Museum (BM); British Museum (Natural History) (BMNH); California Academy of Sciences (CAS); Laboratory of Ornithology, Cornell University (CU); Field Museum of Natural History (FMNH); G. M. Sutton Collection (GMSC), formerly in the Stovall Museum, University of Oklahoma, now in the Delaware Museum of Natural History (DEL); Western Foundation of Vertebrate Zoology (WFVZ; for WFVZ birds formerly in the Ed N. Harrison Collection and now [1 February 1980] possessing only his catalogue number, I use the abbreviation WFVZ-HC, followed by the Harrison number); Los Angeles Museum of Natural History (LAMNH); Museum of Zoology, Louisiana State University (LSUMZ); Museum of Comparative Zoology, Harvard University (MCZ); Robert T. Moore Laboratory of Zoology, Occidental College (MLZ); Museum of Vertebrate Zoology, University of California, Berkeley (MVZ); National Museum of Natural History (USNM); Department of Zoology, University of Arizona (UA); Museum of Natural History, University of Kansas (UK); Museum of Zoology, University of Michigan (UMMZ).

I use only last names for those people who are well known or are mentioned frequently in the text: John R. Arnold, Mario del Toro Avilés, Delwyn G. Berrett, Franklin M. Berrett (last two referred to as "the Berretts"), Adolphe Boucard, Mark Delwiche, Ferdinand Deppe, Don A. Fenochio, Ronald J. Galley, Edward A. Goldman, Chester C. Lamb, John J. Morony, Edward W. Nelson, Allan R. Phillips, Eugène Rébouch, Warren Rook, J. Stuart Rowley, Auguste Sallé, William J. Schaldach, P. W. Shufeldt, A. L. François Sumichrast, and Larry L. Wolf.

#### MARIO DEL TORO AVILÉS SPECIMENS

After careful consideration, I conclude that the data on all specimens collected by the late Mario del Toro Avilés are questionable. My independent appraisal disclosed numerous instances in which his data do not fit patterns established by valid records. Only selected examples will be mentioned here; additional evidence is presented in the Species Accounts.

Most localities on his labels *probably* are correct, but because some are not, all must be questioned. According to the collector himself (in litt. to Marshall [1964: 353]), the 24 specimens of *Pipilo fuscus* he labeled "Mitla" [= San Pablo Villa de

Mitla], Oaxaca, actually came from Puebla; the species is otherwise unknown from the Oaxaca Valley. His specimens of *Strix fulvescens* and *Campylopterus rufus* represent the only Mexican records west of the Isthmus of Tehuantepec, whereas his specimen of *Atthis heloisa* is the only one from east of the Isthmus. Specimens of some sedentary birds are of the wrong race for the stated locality, e.g., *Myioborus pictus*, *M. miniatus*, and *Agelaius phoeniceus*.

The dates on his specimens are even less trustworthy. Little can be deduced from the dates of permanent residents. Hence, most of the improbable dates concern either transient migrants (e.g., the only winter records of *Coccyzus americanus* for Oaxaca; only winter records of *Dendroica fusca* and probably *Wilsonia canadensis* for Mexico; earliest spring dates for *Coccyzus erythrophthalmus*), winter residents (e.g., the only summer records of *Seiurus aurocapillus* and *Wilsonia citrina* for Oaxaca), or summer residents (e.g., earliest spring date for *Legatus leucophaius*). The dates on his specimens of prejuvenile *Cyanolyca nana* seem much too early.

Some of the elevations on his labels or attributed to his localities by various authors are questionable (see Gazetteer under Amatepec, San Miguel Soyaltepec, and Tutla).

My conclusions agree with those of Crossin and Ely (1973), Dickerman (1974: 9), Marshall (1964:353), K. C. Parkes (pers. comm.), and A. R. Phillips (in litt.). M. del Toro Avilés was a professional collector poorly versed in proper labeling techniques. During a visit to the collector's home, A. R. Phillips (pers. comm.) was shown *thousands* of unlabeled bird skins. Phillips believes that the data were added to these specimens *from memory* long after the collections were made and only after the collector received an order from a buyer. Although in most cases the localities likely are correct, being fairly easy to remember, at least for rare species, the dates probably are largely fictitious.

The principal Oaxaca collections amassed by del Toro Avilés were supposedly taken at Amatepec, Escuilapa, Moctum, Palomares, Río Tonto, San Miguel Soyaltepec, San Pablo Villa de Mitla, Totontepec, and Tutla. Unfortunately, his specimens have been distributed to many of the major museums in the United States and Europe and have been the subject of a number of important publications, notably by Blake (1949, 1950), Friedmann et al. (1950), Miller et al. (1957), and Pardiñas (1946). Some of his specimens have been used as the types of new subspecies, those from Oaxaca (see Type Localities) being *Glaucidium minutissimum occultum* Moore (1947:144), *Aegolius acadicus brodkorbi* Briggs (1954:180), *Aphelocoma unicolor oaxacae* Pitelka (1946:44), *Geothlypis nelsoni karlenae* Moore (1946:99), *Pipilo fuscus toroi* Moore (1942:46), *Pipilo albicollis parvirostris* Davis (1951:84), and *Sporophila schistacea subconcolor* Berlioz (1959: 41). The type of *P. f. toroi* has been shown to have come from Puebla (Marshall 1964:353).

Rather than disregard del Toro Avilés specimens altogether, however, I have established the following policy. I totally ignore all records that add nothing to the Oaxaca status of a form (relative abundance, annual frequency, mode and season of occurrence, range, habitat, dates, elevation, breeding evidence, and subspecies). On the other hand, I do mention all records (whether previously published or not) that *significantly* affect status; however, I do not accept these records and in all cases append the collector's name and a negative or cautionary

word or statement. The *only* del Toro Avilés records I accept are his specimens used as types of Oaxaca races (see above) of *Glaucidium*, *Aphelocoma*, *Geothlypis*, *Pipilo albicollis*, and *Sporophila*, but not *Aegolius* or *Pipilo fuscus*, and my acceptance of even these is tentative and carefully qualified in text. Further, I have not used his data in formulating any general statement; thus, my Species Accounts contain no "hidden" data based on del Toro Avilés specimens. I have avoided mentioning every individual published record, because to have done so would have greatly increased the length of this survey; also, many published records probably based on his specimens do not mention his name and hence cannot be distinguished from legitimate records.

#### GENERAL FORMAT

For typical accounts, the first paragraph is a summary of data concerning relative abundance; mode, seasonality, and annual frequency of occurrence; habitat preference; range; dates of occurrence; and elevations. The second paragraph contains breeding evidence. Complete information is presented in the first paragraph only for those species known from very few records; if the presence of a species is based on many records, but the bird has not previously been reported from the state or its status is poorly documented, the third and subsequent paragraphs detail the information on which the summary is based. Miscellaneous information is presented next. The final paragraph treats subspecies and other systematic matters. In a few accounts, well-marked subspecies are accorded separate summaries. For species not supported by specimens examined by me, the summary paragraph begins with the number and type of acceptable records.

Throughout the accounts, the term "record" refers either to a specimen or a sighting. Records are considered different if they involve significant differences in date or locality. Errors in the literature or on specimen labels are mentioned only when deemed important. Statements as to "probable" (more likely) or "possible" (less likely) status are given for many species and serve as guides for future workers. Such information is based on the limited positive data available for Oaxaca, negative Oaxaca data (i.e., scarcity or absence of a species in well-studied localities, habitats, or seasons), and the known status outside the state (based on my field experience and the literature and including information similar to that discussed under Breeding Evidence: Range, Habitat, and Dates).

#### RELATIVE ABUNDANCE AND ANNUAL FREQUENCY

The abundance of each species and its frequency from year to year are presented according to the following scale. *REGULAR* (believed to occur every year): *abundant*, *very common*, *common*, *fairly common*, *uncommon*, *very uncommon*, *rare*; *IRREGULAR* (believed to be absent some years): *occasional*, *casual*, *accidental*. Conspicuousness of each species has been considered, as has the amount of time workers have spent in the range and habitat of a species. Relative abundance during migration seasons is based on the *total* population, although some individuals (perhaps fewer) might be transient migrants and others (perhaps more) residents. This system is necessarily vague; application of thoroughly defined abundance ratings must await the acquisition of sufficient data.

## OCCURRENCE

In addition to annual frequency, occurrence is given in terms of mode and season, according to the following outline.

*Mode.*—Modal terms describe the manner in which a species occurs (or fails to occur) in the state.

*Resident.*—A species that is present continuously during the entire year or most of at least one given season; when combined with “permanent” or “summer,” implies presumed breeding unless otherwise stated; a species such as a gull or shorebird that over-summers without breeding is termed a “nonbreeding summer resident.”

*Transient migrant.*—A species that passes through on migration, usually from south (wintering grounds) to north (breeding grounds) in spring and/or the reverse in fall, but spends neither the summer nor winter; thus, the species is present more or less continuously during one or both migratory seasons, at least during some years. Summer and winter residents are also “migrants” in the broad sense but are not herein given separate treatment as “migrants.”

*Visitant.*—A species that is within its normal overall range but present in all or a stated part of Oaxaca only intermittently, as a sporadic wanderer, either at any time of the year or during a stated season; if seasonal, not present as a regular transient migrant between winter and summer homes nor as a continuous resident during an entire season; always irregular (but might be more numerous than “occasional,” in which case the term “irregular” is appended).

*Vagrant.*—Same definition as for visitant, but species is outside its normal overall range and always occasional to accidental.

*Extirpated.*—A species that formerly was a permanent resident (known or presumed to breed) but now does not occur at any time of year in all or part of its former Oaxaca range.

*Hypothetical.*—A species said (usually published) to have occurred in the state but not, in my opinion, on the basis of wholly acceptable evidence; includes species whose presence is known or suspected of being based on escapees or misidentifications. These species are listed in the separate Hypothetical List.

*Season.*—Seasonal terms are those relating to temperature in the Northern Hemisphere. Because the limits of each of the four seasons vary according to species, extreme dates usually are presented (see Dates).

*Permanent.*—Denotes a species that is present continuously throughout the year in all or a given part of the state; used only in conjunction with “resident” (see Resident).

*Spring.*—Approximately, March through May.

*Summer.*—Approximately, June through August; breeding summer residents usually arrive in Oaxaca during spring and leave during late summer.

*Fall.*—Approximately, September through November.

*Winter.*—Approximately, December through February; winter residents usually arrive during fall and leave during spring.

## HABITAT PREFERENCE; RANGE; ECOPHYSIOGRAPHIC REGIONS

One of the major theses of this report is that the present distribution of bird species is in great measure a result of habitat selection. On this hypothesis, and with due allowance for barriers to the distribution of habitats, one can usually describe the distribution of a species simply by mapping the known ranges of the habitats and then listing the habitats or geographical portions thereof in which the species occurs. In the Species Accounts I list those habitats which each species is known to frequent in Oaxaca. By referring to the map of major habitats (Fig. 1), by understanding the information presented in the section on habitats, and by allowing for variations explained in each species account, the reader can determine the range of a given species.

The range of each species is also given with reference to three major ecophysiographic Regions: Pacific Region, Atlantic Region, and Interior Region. These Regions are shown in Figure 1 and are always capitalized in the text to distinguish them from the five physiographic regions of Oaxaca (see General Physiography) and from such geographic terms as "Tehuantepec region" and "Isthmus region."

Describing ranges of birds in terms of ecophysiographic Regions serves to give the casual reader a quick broad picture of distribution and to facilitate the description of range in terms of habitat. The boundaries between the three ecophysiographic Regions, as this term implies, are based on both physiography and the limits of certain habitats. In most of the area west of the Isthmus of Tehuantepec, the line delimiting the Interior Region follows the upper edge of cloud forest and hence is located on the coast-facing versant of, and somewhat below the crests of, the mountains at the perimeter of the Mesa del Sur. Where the distribution of cloud forest is interrupted by river valleys, the line follows the upper limits of tropical evergreen or tropical deciduous forest. Thus, the Interior encompasses all solid areas of high-elevation, humid pine-oak forest west of the Isthmus and all arid subtropical scrub and steppe in the state. The Interior ends at the western edge of the Isthmus. The line separating the Atlantic and Pacific Regions in the Isthmus follows the continental divide. That in the Sierra Madre de Chiapas follows the northern border of arid pine-oak forest, and hence is on the Atlantic drainage slope well north of the continental divide. The ecophysiographic Regions should not be confused with drainage slopes. Although both the Atlantic and Pacific Regions are almost completely within their respective slopes, neither embraces an entire slope. The Interior includes parts of both.

Also used in describing range is the Isthmus of Tehuantepec, defined as that area whose Oaxaca portion is delimited by west longitudes  $95^{\circ}10'$  and  $94^{\circ}40'$ , or as a north-south strip of land extending between the gulfs of Mexico and Tehuantepec and bordered on the east by the foothills of the Sierra Madre de Chiapas and on the west by the foothills of the Sierra de Choapan. Reference is also made to the Atlantic and Pacific sides of the Isthmus, the dividing line being the continental divide, which here coincides with the ecophysiographic boundary between Atlantic and Pacific Regions.

Localities of record are also used to delimit ranges. Quotation marks are used around locality names when I wish to quote a locality directly from a specimen label or literature reference, in which case the quoted material is followed by the accepted name in brackets. In all other cases I have used the accepted name,

whether or not so given on the label or in the literature. The term "lowlands" refers to those parts of the Atlantic and Pacific Regions below 300 ft elevation. The reader should interpret ranges within the framework of the stated elevations. For example, a statement might say "common in tropical evergreen forest," but if the range of elevations is given as "sea level to 2,000 ft," the species, according to available data, is restricted to that portion of tropical evergreen forest below 2,000 ft.

To be considered an acceptable Oaxaca record, a bird must have been recorded within the political borders of the state or, on the Pacific Ocean, within 30 mi of the nearest land and between straight lines drawn due south from the state's borders with Guerrero and Chiapas. Thus, the interesting birds seen over 90 mi offshore by Murphy (1958:101-111) are not included. Limits of a species' world range, or major portions thereof, that fall within Oaxaca are indicated usually by the phrase "entire range."

#### DATES

This subdivision is used primarily to indicate extreme dates for summer residents, winter residents, visitants, and vagrants, or extreme dates for the migration periods of transient migrants. The dates given depend on the status of the species. For birds with only one status in regard to seasonal occurrence, the heading "dates" means "extreme dates." If a species has more than one mode (e.g., is both a transient migrant and a winter resident) and the dates are known for both periods, phrases such as "extremes," "migration periods," or "winter" are used. Miscellaneous dates falling outside a normal continuous period are also listed, with supporting data. Miscellaneous notes, such as a known arrival date at a given locality, are also presented in this section. The date subdivision is omitted if all known dates or those normally placed in the date section have already been mentioned.

#### ELEVATIONS

The range of elevations for each species usually is given in a separate subdivision at the end of the first paragraph. Elevations are the extremes actually recorded or (in very rare noted instances) have been deduced from a locality of record if that locality is in very flat country. Correct but apparently abnormal elevations are separated from the normal range by semicolons and might be followed by supporting data if not given elsewhere. The elevation section is omitted for oceanic species or when all known elevations have been mentioned previously in the account.

Unless otherwise noted, all elevations, as well as distances, have been taken from original specimen labels, publications, or my field notes and are those of the specimens or observations themselves (for records that lack elevations, gross approximations can be obtained by referring to the appropriate localities in the *Gazetteer*). Because almost all such data for Oaxaca are in the English rather than metric system, for consistency and readability I use the former throughout this survey (except for specimen measurements, which are in millimeters and grams). Metric measurements are given when so recorded originally, in which cases I append their English equivalents. I have not used the metric system exclusively

because I believe that conversions are inaccurate if rounded off and imply unintentional accuracy if not. To save space I have not routinely given both.

Many records, especially older ones, lack elevations. When a locality significantly exceeds the known range of elevations, I add a minus sign (–) before the lowest known elevation or a plus sign (+) after the highest. For example, “–550 to 1,500+ ft” means that the species has been recorded at definite elevations of 550 and 1,500 ft and also at uncertain elevations that *probably* are well below or well above these extremes. Such cases arise under three conditions: when the exact point of record is known but the elevation there is not, or is suspected of being erroneous; when the elevation at a town of record is known but I suspect that the record was not obtained actually within the town limits but instead at some nearby point that in mountainous terrain could be much higher or lower than the town; or when neither the exact location of the point of record nor its elevation is known. Most old records fall into the second category.

#### BREEDING EVIDENCE

The usual method employed in check-lists for presentation of breeding evidence is simply to present a symbol, usually an asterisk, if the species is known to breed within the region considered. Such a system is, in my opinion, unsatisfactory. Opinions among various workers vary considerably as to what type of information constitutes a valid breeding record. One person might consider an egg found in the oviduct of a specimen as definite evidence of breeding; another person might regard as conclusive only a record of a nest; few people accept “enlarged testes” as valid evidence. In addition, such a scheme does not reveal the type of information on which the author bases his conclusions. A system of symbols that takes into account all grades of evidence is too cumbersome. On the other hand, the presentation of all breeding data is beyond the scope of a survey of the present nature.

I have devised a system based on a scale, whereby breeding evidence is given in the standardized word phrases listed below (Binford 1973). This scale contains all the *major* types of breeding evidence that can be obtained for a species. The sequence employed is a minimal modification of that occurring in nature. At the top of the scale is the category that I consider the best evidence for successful breeding. At the bottom are the categories that represent the weakest evidence. Use of a scale entry in the Species Accounts implies that the conditions or activities involved in most or all of the lower categories have also occurred, even though they may not actually have been observed. The scale employed for breeding evidence is presented below.

*Prejuvenile.*—The term “prejuvenile,” coined here and synonymous with my previous term “prejuvinal” (Binford 1973), denotes an individual that has left the nest but has not yet attained full growth of its first set of adult-sized remiges or rectrices. Since such an individual is unable to fly or is capable of only short flights, it must be in the neighborhood of its nest. Unlike the term “fledgling,” which has several nebulous definitions and is usually applied only to nidicolous birds, the term “prejuvenile” can be applied to both nidicolous and nidifugous species. Some species (e.g., hummingbirds and swifts) probably lack the prejuvenile stage, remaining in the nest or nest cavity

(nestlings) until the flight feathers are fully grown. Unless otherwise stated, reference in the species accounts to a prejuvenile means that a study skin has been examined.

*Nest with . . . young.*—An examined specimen of a nestling is considered equivalent evidence. The number of young is given if known.

*Brood patch.*—Must be described as edematous, thickened, or vascularized.

*Nest with . . . egg(s).*—The number of eggs is given, if known.

*Active nest completed, contents unknown.*—This and the next four categories imply nests known to be used for breeding.

*Active nest completed but empty.*

*Nest under construction.*

*Active nest, condition unknown.*—This category is useful for inaccessible nests, especially those in holes, for which neither stage of construction nor contents are known.

*Adult(s) carrying nest material.*

*Hard-shelled egg in oviduct.*

*Soft-shelled egg in oviduct.*

*Egg without shell in oviduct.*

*Ruptured follicle(s).*

*Enlarged oviduct.*—An indication of length and/or width must be given to invoke this category.

*Enlarged follicle (. . . mm).*—Usually, measurements are given only for the largest follicle. See enlarged testes category.

*Copulation observed.*

*Courtship display observed.*

*Enlarged cloacal protuberance.*

*Enlarged testes (. . . mm).*—Two sets of dimensions are given if the testes are different in size and one set if the testes are equal or the size of only one is known; in the last case, notation to that effect is given in the Species Account.

*Range.*—This and the following two categories are considered to be on an equal level at the bottom of the scale and are always given together. The breeding section is omitted if any one of these three terms is negative and no other valid evidence exists. Considered in evaluating range as breeding evidence are: (a) the distance from Oaxaca to the nearest area of known breeding, (b) whether a species breeds on only one or on two or more sides of Oaxaca, (c) whether continuity in habitat exists between Oaxaca and the known breeding range, (d) and the degree of localness exhibited by a species. In the last case, a species known to be local in its breeding distribution is considered a less likely breeding prospect than a wide-ranging species.

*Habitat.*—Habitat is used as breeding evidence if a species has been recorded in Oaxaca in the same habitat in which it breeds elsewhere.

*Dates.*—A species is considered a more likely breeding prospect if it is sedentary rather than migratory or wandering in its habits, if breeding season dates have been recorded, or if the distribution of dates indicates that the species is a permanent resident. For sedentary species, a single Oaxaca record, whether or not it is during the breeding season, is regarded as excellent evidence, in most cases conclusive, for inclusion of the date category. For a nonsedentary species, lack of a breeding season date negates the date category.

In the Species Accounts, each species believed to breed in Oaxaca is afforded a separate paragraph for breeding evidence, although in some instances the reader might be directed elsewhere for the actual data. In a few cases, well-marked subspecies receive separate treatment. If a species is mentioned as only "probably" or "possibly" a breeder, summer resident, or permanent resident, it is not considered a breeding bird, and the breeding evidence section is omitted.

I have taken two different approaches to the presentation of breeding evidence. For many species, especially those that are colonial, rare in Oaxaca, supported by few breeding data, or have unusual breeding seasons, I list all reliable and useful evidence known to me, heading the section "Breeding (all data)." Usually, these data are listed in chronological order (by month and day), with the date of each record given first followed by the evidence in the word phrases of the scale and then, in parentheses, by supporting data.

For most other species, especially those supported by extensive breeding data, I entitle the section simply "Breeding" and divide it into two parts. The first part consists of the two dates that best define the known limits of the breeding season (not enough nests with eggs have been found in Oaxaca to use the classical "egg dates" method). The two dates are separated by the word "to," and each is followed immediately by the appropriate scale phrase (or similar terms if not exactly matching the scale) and, in parentheses, by the supporting data. The second part, separated from the first by a semicolon, consists of the highest-ranking datum, according to the scale, known for Oaxaca; the date is listed first, followed by the word phrase from the scale and then, in parentheses, the supporting data. The second part is omitted if the maximum datum has already been presented in the first part. This two-part format ensures that the highest-ranking datum known is always listed.

Enlarged testes are generally regarded as poor evidence of breeding (e.g., Wolf 1977). In some species, the testes begin to enlarge long before actual nesting begins. Also, the size that testes must attain before successful copulation is unknown for most birds. Nevertheless, for many Oaxaca species, this is the best datum available, and I have, therefore, used it sparingly. In the Species Accounts, I use this category only when measurements are available and even then only when "all data" are given or, for extreme dates, when no higher data are available. "Slightly" or "moderately" enlarged testes or follicles are used only under the latter conditions; evaluation of the degree of development is necessarily subjective and is based on my personal experience and on my knowledge of the opinions of other collectors.

The three categories "range," "habitat," and "dates" (always presented together) are used only when "all data" are given and only when other data are unavailable or in some way inadequate. They are omitted if any other information is presented.

For the most part, I have ignored the following specimen label notations, even when published, unless supported by additional descriptive information (e.g., measurements of testes or follicles): breeding; nesting; testes enlarged, greatly enlarged, or full size; ova, eggs, ovary, or oviduct enlarged; brood patch. I have found many such notations to be unreliable; in some cases, collectors have indicated enlarged gonads but then have given measurements clearly indicating nonbreeding condition; in other instances, birds in juvenal plumage have been noted as "breeding" or possessing "large ova." Some collectors consider a simple

abdominal bare patch as a "brood patch," and a visible oviduct as "enlarged." "Large eggs" might indicate nothing more than an adult granular ovary.

In selecting the second extreme date, I have chosen the datum that would result in the latest date if the breeding cycle were carried to completion. For example, a nest with eggs on 10 June would be chosen over a prejuvenile on 15 June because the nestlings could not become prejuveniles until after 15 June. I have applied the opposite policy in selecting the early extreme date.

For additional Oaxaca breeding records and for further detailed information on those presented here, see Rowley (1966, 1984).

#### SUBSPECIES; OTHER SYSTEMATICS

The last paragraph of a typical Species Account is entitled "Subspecies." Included here is information concerning subspecies, specific relationships, endemic status, hybridization, and reference to the Type Localities chapter. The first sentence consists of a list of the subspecies I accept as having been recorded reliably in Oaxaca, each followed by its range and mode and season of occurrence, when these are known to differ from those of the species as a whole; for most transient migrant and winter resident races, data are too incomplete to determine range or abundance. A race listed on the basis of my own determination receives no annotation to that effect, whereas one included on the word of another scientist (published or not) is followed immediately by the phrase "according to" and the appropriate citation; if the occurrence of all listed subspecies is based on another authority, the phrase "according to" and citation are positioned immediately after the heading "Subspecies."

In subsequent sentences I discuss the subspecies, emphasizing taxonomic validity and regions of intergradation. I have made no attempt to identify racially every specimen taken in the state. I have, however, determined the general Oaxaca distribution of most of the breeding races. I have also identified many specimens of nonbreeders, but quite possibly additional races might be found among the specimens already in collections. Neither have I attempted to judge the taxonomic validity of every subspecies that occurs in Oaxaca. To have done so would have required in many cases a thorough analysis of geographic variation within the entire species, a task well beyond the scope of this survey, the thrust of which is ecological and distributional. Nevertheless, I frequently express my opinions.

For subspecific taxonomy and nomenclature, I follow the *Distributional Checklist of the Birds of Mexico* (Friedmann et al. 1950; Miller et al. 1957) unless otherwise noted. I use that work as the *starting point* for all my subspecific taxonomy and attempt to treat all taxonomic proposals (e.g., revisions, new races) published since. The reader can refer to that publication for most citations to original descriptions; for each race not listed or not recognized by that work, I either cite the original description in parentheses immediately following the author's name or later refer to a publication where it is found.

For the taxonomy and both scientific and English nomenclature of families, genera, and most species (exception noted), I follow the *Check-list of North American Birds* (A.O.U. 1983) and its supplements (A.O.U. 1985, 1987), where original citations are found. Information on Oaxaca type localities, as well as a list of Oaxaca endemics, is presented in the chapter entitled Type Localities, and the reader is so directed in the appropriate Subspecies section. The few hybrids known

from Oaxaca are mentioned. The Subspecies section is omitted when and only when both the Mexican check-list and I consider the species monotypic and no other comments (e.g., discussion of subsequent taxonomic proposals, reference to type localities) are necessary.

## SPECIES ACCOUNTS

### Family TINAMIDAE

#### *Tinamus major* (Gmelin). Great Tinamou.

Uncommon permanent resident in Atlantic Region in heavy tropical evergreen forest, recorded northwest to a point 15 road mi southwest of Valle Nacional and south in Isthmus to a point 24 road mi north of Matías Romero. *Elevations*: 200 to 4,100 ft.

*Breeding*: range, habitat, and dates.

*Subspecies*: *robustus* Sclater and Salvin.

#### *Crypturellus soui* (Hermann). Little Tinamou.

Fairly common permanent resident in Atlantic Region in margins and semi-open portions of tropical evergreen forest, recorded northwest to a point 5 mi west of Temascal and south in Isthmus to Sarabia. *Elevations*: 250 to 1,500 ft.

*Breeding* (all data): 22 March 1962, enlarged testes (21 × 8 mm, Montebello, Schaldach, AMNH 778212); 15 June 1961, enlarged follicle (15 mm, Sarabia, Schaldach, AMNH 776242).

*Subspecies*: *meserythrus* (Sclater); see Type Localities.

#### *Crypturellus cinnamomeus* (Lesson). Thicket Tinamou.

Permanent resident, common in Pacific Region from 1,600 to at least 4,900 ft in tropical semideciduous forest and adjacent Pacific swamp forest of Sierra Madre de Chiapas and very uncommon in Atlantic Region below 250 ft in openings within semiarid tropical evergreen forest at San Juan Bautista Tuxtepec and perhaps (del Toro Avilés) San Miguel Soyaltepec. To be expected elsewhere in semiarid portions of Atlantic Region and perhaps in Pacific Region west of Isthmus. *Elevations*: 100 to 4,900+ ft.

*Breeding*: 26 March, hard-shelled egg in oviduct (no year, Río Mono Blanco west of Cerro Baúl, MacDougall [1971:99]), to 28 April 1964, hard-shelled egg in oviduct (20 kilometers [12.4 mi] northwest of Tapanatepec, Rowley [1984:82], egg WFVZ 24347).

*Subspecies*: *sallaei* (Bonaparte), Atlantic Region; *soconuscensis* Brodkorb, Pacific side of the Sierra Madre de Chiapas. Specimens (WFVZ) from the latter area, although close to typical *soconuscensis*, approach *vicinior* Conover of interior Chiapas in their general paleness and wider pale barring. They do not approach the allopatric blackish *sallaei*, contra Blake (1979:31), who lists both *soconuscensis* and *sallaei* from this region.

#### *Crypturellus boucardi* (Sclater). Slaty-breasted Tinamou.

Common permanent resident along entire length of Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas. The Temascal record listed below is northwesternmost in entire range of species. *Elevations*: 200 to 4,900 ft.

*Breeding*: 5 March 1961, enlarged follicle (5 × 3 mm, Montebello, Schaldach,

AMNH 775862), to 8 June 1964, nest with four eggs (island 5 mi west of Temascal, 250 ft, Binford photograph); 19 May 1963, prejuvenile (La Cumbre near Rancho Sol y Luna, Rook, female, WFVZ-HC 10919).

*Subspecies: boucardi* (Sclater); see Type Localities.

#### Family PODICIPEDIDAE

*Tachybaptus dominicus* (Linnaeus). Least Grebe.

Common permanent resident in Atlantic and Pacific Regions on shallow fresh-water lakes and ponds and in roadside ditches. Only two records for Interior, both sight records by Binford: 1 bird at 5,050 ft in the Oaxaca Valley 1 mi west of Santa María del Tule on 27 May 1964; and 2 at 8,100 ft 2 mi west of San Andrés Chicahuaxtla on 23 May 1964; apparent rarity here probably because of temperate conditions and scarcity of suitable habitat. *Elevations:* sea level to 8,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: brachypterus* (Chapman).

*Podilymbus podiceps* (Linnaeus). Pied-billed Grebe.

Uncommon winter resident in Atlantic and Pacific Regions on ponds, lakes, reservoirs, and freshwater lagoons. Rare late fall breeder in Atlantic Region on a slough near San Juan Bautista Tuxtepec and probably in Pacific Region at mouth of Río Tonameca; breeding individuals presumed to be permanent residents, although there are no records for the species between 28 April and 20 November. Unrecorded in the Interior. *Elevations:* sea level to 300 ft.

*Breeding* (all data): see below.

In 1961 on Presa Miguel Alemán near Temascal, the Berretts and I recorded 7 Pied-billed Grebes on 11 February, 30 on 1 December (including a male taken by Binford, LSUMZ 27346, 444.7 g, moderately fat, testes slightly enlarged), and 10 on 2 December. At the same town, O. Epping collected a male (Museum of Natural History, Leiden, 34001, testes 8 × 4 mm) on 9 November 1962 (Mees 1970:238). At a small pond 9 road mi west-northwest of San José Estancia Grande, I saw 1 bird on 14 and 15 February 1964. At a pond at 50 ft elevation 2 mi northwest of San José Manialtepec, I saw 5 birds on 8 February and 8 on 9 February 1974. On a freshwater lagoon at the mouth of the Río Tonameca, Morony and I observed 8 on 19 April and 27 on 28 April 1964 (including a female taken by Binford, LSUMZ 32934, 344.1 g, very fat, largest follicle 3 mm).

On 20 November 1961 at 100 ft elevation on a small slough 1 mi southwest of San Juan Bautista Tuxtepec, I observed two groups of young Pied-billed Grebes. One group consisted of 5, full-sized, stripe-headed juveniles, attended by 2 adults. Nearby was a group of 5, small unattended prejuveniles, one of which I preserved as a specimen (sex?, LSUMZ 27347, 60.3 g). A lone adult on the opposite side of the slough might have been one of the parents of this latter group; however, no fourth adult was noted, and the possibility exists that both broods were raised by the pair accompanying the older juveniles.

*Subspecies: antillarum* Bangs, permanent resident; *podiceps* (Linnaeus), winter resident. The race *antillarum* is weakly-marked, but seems valid on the basis of Oaxaca specimens. The Río Tonameca female fits *antillarum* in wing length and is very dark in coloration; its date is too late for a winter resident. Both Temascal specimens fit *podiceps* in size (wing chords 131 and 130 mm, respectively), and

my male is not in full breeding plumage, exhibiting some white on the throat and brown on the neck and breast. Probably, both races occur throughout the lowlands, with the breeding race, *antillarum*, being more local. Storer (1979:147) considers as nominate *podiceps* all mainland populations south to Panama, a treatment not supported by Oaxaca specimens.

*Podiceps nigricollis* Brehm. Eared Grebe.

Uncommon winter resident on lakes, ponds, and lagoons, probably occurring throughout state but recorded only as follows: 27 birds seen on 1 December 1961 (including a female taken by Binford, LSUMZ 27345, 254.5 g, very fat, ovary small) and 12 on 2 December 1961 by the Berretts and Binford in Atlantic Region at 200 ft on Presa Miguel Alemán near Temascal; a male (Museum of Natural History, Leiden, 34429, testes 5 × 3 mm) taken by O. Epping at the same town on 19 December 1962 (Mees 1970:237); 2 seen by Binford on 9 January 1962 in Pacific Region at sea level at southwestern edge of Laguna Superior 19 road mi southwest of Juchitán.

*Subspecies: californicus* Heermann.

Family PROCELLARIIDAE

*Puffinus creatopus* Coues. Pink-footed Shearwater.

Status uncertain; occurs on open ocean to within at least 4 mi of shore; so far recorded only in spring. I recorded this species on only one of my 15 ocean trips taken off Oaxaca: 1 bird taken (Binford, male, CAS 68854, 590 g, moderately fat, testes 3 × 1 mm, heavy body molt) and 3 others seen 4 mi off Puerto Escondido on 18 February 1974. On 8 April 1973, during an ocean transect between points located approximately 24 mi southwest of the mouth of the Río Verde and 9 mi southwest of the mouth of the Río Tonameca, Jehl (1974b:684; in litt.) saw 46 birds, including a flock of 30.

*Puffinus pacificus* (Gmelin). Wedge-tailed Shearwater.

Common winter resident on open ocean, sometimes to within 100 yd of shore. Nonbreeding birds should be sought in summer. *Dates*: 20 January to 26 April.

I observed this species on seven of the 15 total trips and seven of 10 winter trips taken off Oaxaca; all specimens were collected about 3 mi offshore; observations extend to about 10 mi offshore. Out of Puerto Angel on 20 January 1962, the Berretts and I saw 15 Wedge-tailed Shearwaters, of which three were collected (Binford, male, LSUMZ 27357, 318.2 g, little fat; D. G. Berrett, male, LSUMZ 27359, 320.4 g, little fat; D. G. Berrett, female, LSUMZ 27358, 334.4 g, moderately fat; all possessed small gonads). In 1964 off the same town Morony and I saw 25 birds on 20 April (including a male secured by Morony, LSUMZ 32936, 358.0 g, moderately fat, testes small), 34 on 21 April (including a female taken by Morony, LSUMZ 32935, 384.2 g, moderately fat, ovary small), and 21 on 22 April. Off Puerto Escondido in 1974, Delwiche and I saw 35 birds on 6 February, and Arnold and I saw 450 on 7 February and 100 on 18 February. Dark (black or gray-breasted) phase birds accounted for about 15 and 5 percent, respectively, on the last two dates and far outnumbered white-breasted birds on all other dates. One of the five specimens (21 April) was in dark phase. The high percentage of white-breasted birds suggests that at least some come from the Hawaiian Islands (see King 1974:54).

Jehl (1974b:684; in litt.) saw 2 birds on 8 April 1973 (same locality as *Puffinus*

*creatopus*). P. R. Lenna and L. F. Kibler saw a bird flying west about 100 yd off the breakwall at Salina Cruz on 26 April 1963 (Lenna 1963:5).

*Subspecies: chlororhynchus* Lesson. I follow Murphy (1951:17) in considering *cuneatus* Salvin a synonym of *chlororhynchus*. This species might be monotypic; see Jouanin and Mougín (1979:91).

*Puffinus auricularis* Townsend. Townsend's Shearwater.

Fairly common winter resident on open ocean to within at least 1 mi of shore. Nonbreeding birds should be sought in summer. *Dates:* 30 September to 22 April.

This shearwater was seen between 1 and 10 mi from shore on seven of my 15 oceanic trips off Oaxaca; it was found only off Puerto Angel. In 1961 the Berretts and I made the following observations: 30 September, 45 seen, of which four were collected (respectively, male and female, LSUMZ 27349 and 27350, 315.4 and 344.4 g, both moderately fat, with small gonads, and collected by Binford; two males, LSUMZ 27351 and AMNH 776558, 352.8 and 351.5 g, respectively, both very fat, with small testes, and collected by D. G. Berrett); 9 October, 250 seen, of which one was taken by Binford (male, LSUMZ 27348, 358.3 g, very fat, testes small); 11 October, 50 seen. On 20 January 1962 we observed 5 birds, of which one was secured by D. G. Berrett (male, LSUMZ 27353, 255.6 g, little fat, testes small). In 1964 Morony and I saw 5 birds on 20 April (including a female taken by Morony, LSUMZ 32937, 321.0 g, moderately fat, ovary small), 1 on 21 April, and 2 on 22 April.

Because Townsend's Shearwater is rather poorly known, the following data are of interest. Exposed culmens measured as follows (in millimeters): two females, 31.2 and 33.4; four males, 31.9 to 34.3 (average, 33.2). All five birds taken in the fall had nearly completed molt of the primaries and rectrices but exhibited no body molt. The individual taken on 20 January had worn wings and tail and was molting the body feathers; the short wing chord (213 mm) and tail (73 mm), as well as the light weight, perhaps indicate immaturity. The bird taken on 20 April was not molting.

*Puffinus lherminieri* Lesson. Audubon's Shearwater.

Rare winter resident on open ocean from 3 to at least 27 mi offshore. The race *subalaris* nests only in the Galapagos Islands, and because its breeding cycle there is non-annual (Snow 1965:592), birds can be expected in Oaxaca throughout the year. *Dates:* 29 September to 10 April.

My companions and I recorded this species on four of 15 oceanic trips off Oaxaca. About 3 mi offshore from Puerto Angel in 1961 we took a male (Binford, LSUMZ 27354, 133.9 g, moderately fat, testes very small) on 29 September and two males (Binford, LSUMZ 27355, 133.1 g; D. G. Berrett, LSUMZ 27356, 147.3 g; both with moderate fat and very small testes) on 9 October; a third bird was seen on the latter date. Off Puerto Escondido I took a male (CAS 68857, very fat, testes 5 × 4 mm) on 6 February 1974 and with Arnold saw 4 birds the next day. On 10 April 1976 Jehl (in litt.) saw 3 birds southwest of Puerto Escondido.

*Subspecies: subalaris* Ridgway, according to Binford (1970:366).

#### Family HYDROBATIDAE

[*Oceanites oceanicus* (Kuhl). Wilson's Storm-Petrel.]

No specimens; sight records on one date. Status uncertain; occurs on open ocean, apparently only well offshore. Recorded only on 8 April, 1973, when Jehl

(1974b:684; in litt.) saw 3 birds (same locality as *Puffinus creatopus*). I failed to record it on 15 ocean trips out of Puerto Angel and Puerto Escondido, perhaps because I did not venture far enough offshore.

*Subspecies*: unknown.

*Oceanodroma melania* (Bonaparte). Black Storm-Petrel.

Common transient migrant and uncommon winter resident on open ocean to within at least 1 mi of shore. *Dates*: 6 February; 5 March to 4 May; 28 September to 11 October.

Black Storm-Petrels were seen between 1 and 10 mi offshore on 12 of my 15 days spent on the open ocean off Oaxaca; specimens were collected 3 mi offshore. Off Puerto Angel Wolf and I saw 2 birds on 3 May and 1 on 4 May 1961. In the fall of 1961 the Berretts and I recorded the following data off Puerto Angel: 28 September, 15 seen, of which two were collected by D. G. Berrett (male, LSUMZ 27362, 46.0 g; sex?, LSUMZ 27361, 46.9 g); 29 September, 20 seen, of which three were collected (D. G. Berrett, male, LSUMZ 27364, 45.7 g and sex?, LSUMZ 27363, 46.8 g; F. M. Berrett, sex?, LSUMZ 27365, 49.4 g); 30 September, 20 seen; 9 October, 8 seen, of which one was taken (D. G. Berrett, female, LSUMZ 27360, 50.6 g); 11 October, 16 seen. All specimens were moderately fat. The gonads were very small. In 1964 out of the same town Morony and I observed 18 on 20 April, 11 on 21 April, and 12 on 22 April. Offshore from Puerto Escondido, Morony and I saw 3 on 5 March 1964, and Delwiche and I saw 3 on 6 February 1974.

Jehl (1974b:684; in litt.) saw 7 birds on 8 April 1973 (same locality as *Puffinus creatopus*). A map presented by Crossin (1974:185) shows two sightings in the Gulf of Tehuantepec; no specific data are given.

All birds that I saw, except those in February, were flying parallel to the coast, heading east in the fall and west in the spring. They flew rapidly and directly as if migrating, pausing only briefly to feed.

*Oceanodroma microsoma* (Coues). Least Storm-Petrel.

Common transient migrant and uncommon winter resident on open ocean to within at least 1 mi of shore. *Dates*: 6 and 7 February; 5 March to 4 May; 28 September to 11 October.

Least Storm-Petrels were seen on 13 of my 15 days spent on the ocean off the coast of Oaxaca. On 3 and 4 May 1961 Wolf and I saw several of these birds within 3 mi of shore off Puerto Angel. In the fall of 1961 the Berretts and I made the following observations within 10 mi of shore off Puerto Angel: 28 September, 3 seen, of which one was taken by D. G. Berrett (female, LSUMZ 27370, 16.1 g, moderately fat); 29 September, 8 seen, of which one was secured by Binford (male, LSUMZ 27369, 16.8 g, moderately fat); 30 September, 25 seen, of which three were collected (F. M. Berrett, male, LSUMZ 27366, 14.5 g, little fat; D. G. Berrett, male, LSUMZ 27367, 16.5 g, moderately fat; Binford, female, LSUMZ 27368, 16.2 g, moderately fat); 9 October, 3 seen; 11 October, 3 seen. All five of these specimens had very small gonads. On 5 March 1964 Morony and I saw 9 Least between 1 and 9 mi off Puerto Escondido. Between 1 and 10 mi out of Puerto Angel we recorded the following data: 20 April, 27 seen; 21 April, 12 seen, of which one was taken by Morony (male, LSUMZ, 16.0 g, testes very small); 22

April, 4 seen. Off Puerto Escondido in 1974, Delwiche and I saw 55 on 6 February, and Arnold and I saw 10 the next day. Although Jehl (1974b:691) supposedly "found it common as far south as Oaxaca," he does not list it in his table (p. 684) as having been seen in Oaxaca waters.

As was the case with *Oceanodroma melania*, all the Least Storm-Petrels I saw, except those in February, which were flying in all directions, were moving rapidly west in the spring and east in the fall, pausing only briefly to feed.

#### Family SULIDAE

*Sula dactylatra* Lesson. Masked Booby.

Uncommon winter resident on open ocean to within about 3 miles of shore. *Dates*: 28 September to 22 April.

I recorded this species 3 and 10 mi offshore on 10 of the 15 oceanic trips made off Oaxaca. In 1961 the Berretts and I obtained the following records off Puerto Angel: 28 September, 4 seen, of which one was taken by Binford (immature female, LSUMZ 27371, 1,658 g, little fat); 29 September, 3 seen, of which one was secured by D. G. Berrett (adult male, LSUMZ 27372, 1,759.4 g, moderately fat, testes small); 30 September, 2 seen; 11 October, 2 seen. On 20 January 1962 we observed 1 bird. In 1964 Morony and I saw 2 birds on each of 20, 21, and 22 April. Off Puerto Escondido in 1974, Delwiche and I saw 2 birds on 6 February, and Arnold and I saw 5 the next day. Jehl (1974b:684; in litt.) saw 10 birds on 8 April 1973 (same locality as *Puffinus creatopus*).

*Subspecies*: *granti* Rothschild. I follow Dorst and Mougín (1979:185) in treating *californica* Rothschild as a synonym of *granti*; if "soft part" colors are of taxonomic value, the two might yet prove to be separable, in which case the Oaxaca birds would be *californica*.

*Sula leucogaster* (Boddaert). Brown Booby.

Very common winter resident on Pacific Ocean from shoreline to at least 10 miles out. *Dates*: 28 September to 13 May.

About 1 mi west of Puerto Angel and a few hundred yards off the beach is a large, dome-shaped "bird rock" that serves as a roost for hundreds of wintering Brown Boobies. My field companions and I recorded this species on all of our 11 oceanic trips out of Puerto Angel. In 1961 Wolf and I observed 5 on 3 May (including an immature female taken by Binford, LSUMZ 24216, 1,147 g, little fat, follicles not enlarged) and 45 on 4 May. In the fall of 1961 the Berretts and I made the following observations: 28 September, 220; 29 September, 20; 30 September, 950; 9 October, 1,200; 11 October, 1,000. Early in the morning of 20 January 1962, we counted 2,400 birds roosting on the bird rock; this was the most I recorded on a single date. In 1964 Morony and I saw 250 on 20 April, 30 on 21 April, and 15 on 22 April. The great variation in the numbers of birds observed near Puerto Angel is a reflection of two facts. On some days we did not visit the rock until late morning, when many of the birds had gone to sea. Also, fewer birds were present on the rock in spring and fall than in mid-winter.

I observed this species at several localities other than Puerto Angel. Three were seen from the shore at Salina Cruz by Wolf and me on 13 May 1961. At the mouth of the Río Tonameca on 19 April 1964, I saw 1 bird flying close to shore. My companions and I saw it on all four of our ocean trips out of Puerto Escondido,

as follows: with Morony, 6 birds on 5 March 1964; with Delwiche, 20 on 6 February 1974; and with Arnold, 30 on 7 February and 70 (including at least 10 adults) on 18 February 1974. Jehl (1974b:684; in litt.) saw 66 birds on 8 April 1973 (same locality as *Puffinus creatopus*).

*Sula sula* (Linnaeus). Red-footed Booby.

Very uncommon winter resident on open ocean to within 3 mi of shore. *Dates*: 29 September to 20 April.

My companions and I recorded this species on three of 15 ocean trips taken off Oaxaca, as follows: about 3 miles off Puerto Angel, an immature male (LSUMZ 27373, 1,003 g, little fat, testes very small) taken by Binford on 29 September 1961, and 2 adults seen by Morony and Binford on 20 April 1964; off Puerto Escondido, 1 bird seen by Arnold and Binford on 7 February 1974. Jehl (1974b: 684; in litt.) saw 15 birds on 8 April 1973 (same locality as *Puffinus creatopus*).

*Subspecies*: unknown.

#### Family PELECANIDAE

*Pelecanus erythrorhynchos* Gmelin. American White Pelican.

No specimen examined; one published specimen record; numerous sight records and band recoveries. Uncommon winter resident on coastal bays and lagoons, occasionally wandering out along ocean shore. One record for Atlantic Region, 400 seen by Wolf and Binford on Presa Miguel Alemán on 11 February 1961. The only Oaxaca specimen, a bird taken by Sumichrast at San Mateo del Mar (Lawrence 1876:50), cannot be located. Five birds banded as nestlings at Chase Lake National Wildlife Refuge, North Dakota, have been recovered at unknown localities in Oaxaca. Their dates of banding and recovery, respectively, are as follows: 28 June 1955, 1959; 25 June 1959, 30 October 1966; 1 July 1961, 3 September 1961; 6 July 1962, December 1962; and 11 July 1964, 17 December 1964 (Strait and Sloan 1975: 58; Sloan in litt.). *Dates*: 3 September to 5 March; 2 May 1961 (flock of 6 seen, Puerto Angel, Binford). *Elevations*: sea level to 200 ft.

*Pelecanus occidentalis* Linnaeus. Brown Pelican.

No specimen examined; one published specimen record; numerous sight records. Fairly common winter resident along ocean shore and on deep coastal bays. The only Oaxaca specimen, a bird taken by Sumichrast at Bahía Ventosa (Lawrence 1876:50), cannot be found. *Dates*: 28 September to 13 May.

*Subspecies*: unknown.

#### Family PHALACROCORACIDAE

*Phalacrocorax olivaceus* (Humboldt). Olivaceous Cormorant.

Very common permanent resident in Atlantic and Pacific Regions on lakes, ponds, reservoirs, coastal lagoons, and large rivers. One record for Interior, 1 bird seen by Binford and Morony on 28 May 1964 on a small lake at 5,000 ft elevation 1 mi west of Santa María Coyotepec. *Elevations*: sea level to 800 ft; 5,000 ft.

*Breeding* (all data): 19 April 1964, one active nest completed, contents unknown (on island in lagoon at mouth of Río Tonameca, Binford); 27 May 1969 and 27 and 28 May 1970, three nests, each with four eggs (Isla de los Pajaros in Mar Muerto, Galley, WFVZ 52088-52090, respectively).

*Subspecies*: *mexicanus* (Brandt).

## Family ANHINGIDAE

*Anhinga anhinga* (Linnaeus). Anhinga.

Uncommon permanent resident along entire length of Pacific Region and in Atlantic Region southeast at least to region of San Juan Bautista Tuxtepec, frequenting lakes, ponds, reservoirs, and coastal lagoons and, occasionally, rivers. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 28 April 1964, one nest under construction and two others completed but with contents unknown (at mouth of Río Tonameca, Binford observation); 28 and 27 May 1969, two nests, each with three eggs (Isla de los Pajaros in Mar Muerto, Galley, WFWZ 52091-52092, respectively).

*Subspecies*: *leucogaster* (Vieillot). I follow Wetmore (1965:72) in merging *minima* van Rossem (1939a:439) of western Mexico with *leucogaster*.

## Family FREGATIDAE

*Fregata magnificens* Mathews. Magnificent Frigatebird.

Common permanent resident along Pacific coast on ocean, large saline lagoons, and coastal bays. Seldom seen far from ocean shore. Occasionally soars a few miles inland and might regularly cross Isthmus of Tehuantepec. *Elevations*: sea level to 350 ft.

*Breeding* (all data): 9 March 1948, active nests completed, contents unknown (in arid tropical scrub on Isla Natartiac in Laguna Superior, T. MacDougall [in litt.]); 20 March 1964, 3,000 adults and hundreds of nests containing small to large young (south of Punta Paloma on a mangrove-covered island on southern edge of Mar Muerto, Morony and Binford observations).

On 25 January 1951 Dalquest (1951:256) observed a Magnificent Frigatebird flying almost due south at a point in the state of Veracruz about 17 mi east-southeast of the town of Jesús Carranza. He postulated that this species might regularly fly overland from one ocean to the other, a supposition with which I concur. Only once have I noted this species inland: 1 bird on 10 October 1961 at an elevation of 350 ft about 3 road mi north of Puerto Angel.

*Subspecies*: monotypic, following Wetmore (1965:77).

## Family ARDEIDAE

*Botaurus lentiginosus* (Rackett). American Bittern.

Rare winter resident in marshes probably throughout state but so far recorded only on Pacific coastal plain. Only two records: female (UMMZ 136791) taken by Shufeldt at Tehuantepec City (city at 115 ft but elevation at exact point of collection unknown) on 29 September 1914; 1 bird seen by Binford on 14 and 15 February 1964 at a small marsh-edged pond at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande.

*Ixobrychus exilis* (Gmelin). Least Bittern.

Status uncertain. Only one record, a male (USNM 59783) taken by Sumichrast on 29 October 1869 at Tehuantepec City (city at 115 ft but elevation at exact point of collection unknown).

*Subspecies*: *exilis* (Gmelin). I follow Dickerman (1973a) in considering *hesperis* Dickey and van Rossem a synonym of nominate *exilis*.

*Tigrisoma mexicanum* Swainson. Bare-throated Tiger-Heron.

Uncommon permanent resident along entire length of Pacific Region and in Atlantic Region in vicinity of Isthmus (La Ranchería and Río Sarabia), occurring in swamps and in freshwater and brackish habitats bordered by tropical evergreen and tropical deciduous forests. Probably a very uncommon permanent resident elsewhere in Atlantic region. *Elevations*: sea level to 1,500 ft.

*Breeding* (all data): 6 March 1964, somewhat enlarged testes (right  $14 \times 5$ , left  $25 \times 11$  mm, 16 mi northwest of Puerto Escondido, Morony, LSUMZ 32940, 1,262 g, moderately fat).

*Subspecies*: monotypic, following Blake (1977:164) and Payne (1979:234).

*Ardea herodias* Linnaeus. Great Blue Heron.

Uncommon winter resident in shallow aquatic habitats of Pacific coastal plain and adjoining lower foothills. Recorded in Atlantic Region only at Presa Miguel Alemán (11 February 1961, 1 seen, Wolf and Binford; 1 and 2 December 1961, 15 seen each day, the Berretts and Binford) but probably occurs elsewhere. Possibly a rare permanent resident. Immature banded on 5 June 1925 at Waseca, Minnesota, found wounded on 21 February 1926 at "El Hule, Oaxaca," a locality that I cannot find (Cooke 1946). Only two Oaxaca specimens: a specimen that I cannot locate taken by Sumichrast at Tehuantepec City (Lawrence 1876:48); and an unsexed bird (WFVZ-HC 16663) secured by Galley at Lagunas Sol y Luna on 2 December 1965. *Dates*: 19 October to 28 May. *Elevations*: sea level to 300+ ft.

*Subspecies*: *herodias* Linnaeus (based on Minnesota origin of banded bird).

*Casmerodius albus* (Linnaeus). Great Egret.

Common permanent resident in shallow aquatic habitats throughout lowlands of Atlantic and Pacific Regions and occasionally in upper Río Tehuantepec basin (1 seen, San Pedro Totolapan, 2,785 ft, 10 April 1961, Wolf and Binford). One record for Interior, 2 birds seen by Morony and Binford on 28 May 1964 at 5,200 ft elevation 1 mi west of Santa María Coyotepec. Only three certain Oaxaca specimens: a male (LSUMZ 27375, 974.5 g, little fat, testes  $10 \times 3$  mm) taken by Binford on 18 October 1961 at Laguna Superior 19 road mi southwest of Juchitán; male (Museum of Natural History, Leiden, 34434, testes  $10 \times 4$  mm) secured by O. Epping on 27 January 1963 at Temascal; eggs noted below; male (USNM 73067) taken by Sumichrast might be from Oaxaca, but label data are not readable. *Elevations*: sea level to 300 ft; 2,785 and 5,200 ft.

*Breeding* (all data): 29 February 1964, 10 adults and five active nests completed with contents unknown (in tall trees at Minitán, Morony and Binford); 19 and 28 April 1964, 34 adults and at least three active nests completed with contents unknown (mouth of Río Tonameca, Morony and Binford); 27 May 1969, nest with three eggs (Isla de los Pajaros in Mar Muerto, Galley, WFVZ 52086).

*Subspecies*: *egretta* (Gmelin).

*Egretta thula* (Molina). Snowy Egret.

Very common permanent resident in shallow aquatic habitats in lower portions of Atlantic and Pacific Regions. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 19 and 28 April 1964, 54 adults and at least 12 nests each with one to four eggs (mixed rookery at mouth of Río Tonameca, Morony and

Binford observations); 28 April 1964, enlarged testes (18 × 13 mm, same locality, Morony, LSUMZ 32939, 461 g).

*Subspecies: thula* (Molina).

*Egretta caerulea* (Linnaeus). Little Blue Heron.

Fairly common winter resident in shallow aquatic habitats of Atlantic and Pacific Regions. Possibly an uncommon and local permanent resident; 2 adults seen by me on 19 April 1964 near a mixed rookery at mouth of Río Tonameca might have been breeding, although no nest was located. *Dates:* 20 November to 28 April. *Elevations:* sea level to 800 ft.

*Subspecies: monotypic*, following Wetmore (1965:91).

*Egretta tricolor* (Müller). Tricolored Heron.

Fairly common permanent resident in shallow aquatic, primarily saline and brackish, habitats of Pacific coastal plain. No records for Atlantic or Interior Regions. *Elevations:* sea level to 100 ft.

*Breeding* (all data): 28 April 1964, 6 adults and at least two active nests completed with contents unknown (mixed rookery at mouth of Río Tonameca, Morony and Binford); 28 May 1969, three nests, each with two eggs (Isla de los Pajaros in Mar Muerto, Galley, WFFVZ 52093-52095).

*Subspecies: ruficollis* Gosse.

*Egretta rufescens* (Gmelin). Reddish Egret.

Common permanent resident on immediate Pacific coast along shores of saline and brackish lagoons in vicinity of Minitán and from Ventosa east to Chiapas border. Probably more abundant and widespread along remainder of coast than indicated by the one record, 2 birds seen by Morony and Binford 4 road mi southeast of Puerto Escondido on 4 March 1964. Occasionally wanders a short distance inland along major rivers (Tehuantepec City, 28 October 1869, Sumichrast, sex?, USNM 59775, light phase). Casual winter visitant in Atlantic and Interior Regions (one record each; see below). Oaxaca breeding locality is south-easternmost for species on Pacific coast of North America (A.O.U. 1983:50). *Elevations:* sea level to 100 ft; about 200 ft and about 1,952 ft (see below).

*Breeding* (all data): 20 March 1964, three active nests completed, contents unknown (on a mangrove-covered island south of Punta Paloma near southern shore of Mar Muerto, Morony and Binford).

Two of the nests in the rookery were attended by light-phase parents and the third by dark-phase birds. During the few hours spent at this locality, I counted 62 Reddish Egrets, 44 of which were in light phase, giving a ratio of about 2.4 light-phase to 1 dark-phase birds.

Bent (1926:167) records a young bird banded at Green Island, Cameron Co., Texas on 15 May 1923 that was killed about 20 October 1923 at "Cuicatlan, Oaxaca" [= San Juan Bautista Cuicatlán, elevation of town 1,952 ft, but elevation at exact point of recovery unknown]. Another Reddish Egret was banded at Aransas Pass, Texas, on 25 May 1976 and recovered in October 1976 at about 200 ft elevation at Presa Miguel Alemán, Oaxaca (R. T. Paul in litt.).

*Subspecies: rufescens* (Gmelin). I base this identification on an adult male in dark phase (WFFVZ-HC 12592, Mar Muerto near Chahuities, April 1964, Rook),

which is much paler throughout than *dickeyi* (van Rossem) of northwestern Mexico; Blake (1977:179) errs in saying that *dickeyi* is "paler" than nominate *rufescens*; it is darker throughout, as noted in the original description. The only other specimens I have seen (USNM 59774 and 59775) are so badly worn that I cannot allocate them to race.

*Bubulcus ibis* (Linnaeus). Cattle Egret.

Common winter resident in grazed land along entire length of Pacific Region lowlands and in the Interior near Oaxaca City. Only one definite record for Atlantic Region lowlands (8 January 1962), where, however, apparent scarcity is probably a result of inadequate coverage; A. R. Phillips (in litt.) was told that the species occurs at San Juan Bautista Tuxtepec. Probably a permanent resident in suitable habitat in lowlands. *Dates*: 8 January to 21 March. *Elevations*: sea level to 920 ft; 5,100 ft. (Summary based on data through 21 February 1974.)

The first record (and only specimen) for the state was 2 birds that the Berretts and I saw along the Trans-Isthmian Highway 11 road mi north of Matías Romero on 8 January 1962 (one taken by Binford, male, LSUMZ 27374, 312.0 g, little fat, small testes). The fact that I failed to record this species during the spring and fall of 1961 in areas where I later found it suggests that the Cattle Egret first entered Oaxaca in the winter of 1961–1962.

In the early spring of 1964, Morony and I found this species to be common along the entire length of the Pacific lowlands from Minitán (4 in flock, 24 February, first record since the Matías Romero specimen) to Tapanatepec (16 in flock, 19 March, 900 ft elevation). The latest spring record for Oaxaca was a group of 4 birds seen by Dr. and Mrs. George H. Lowery, Jr. (pers. comm.) on 21 March 1965 at kilometer marker 757 along the Pan-American Highway about 20 mi northwest of Tehuantepec City. The only Interior records are for Oaxaca City, at 5,100 ft, where I first noted the species on 1 February 1974 and counted 601 birds leaving a roost in city trees on the morning of 14 February 1974.

*Subspecies: ibis* (Linnaeus).

*Butorides striatus* (Linnaeus). Green-backed Heron.

Common winter resident and uncommon permanent resident in most aquatic habitats throughout lower portions of Atlantic and Pacific Regions. *Elevations*: sea level to 1,050 ft.

*Breeding* (all data): 19 and 28 April 1964, at least 25 pairs and numerous nests with eggs (in mixed rookery in lagoon at mouth of Río Tonameca, Morony and Binford observation); 14 August 1961, nest with three eggs ("small seasonal lake" 10 mi north of Matías Romero, Rook and L. Petite, WFVZ 24295).

*Subspecies: virescens* (Linnaeus), permanent resident and possibly (on distributional grounds; Friedmann et al. 1950:29) winter resident from north of Oaxaca; *anthonyi* (Mearns), winter resident.

*Nycticorax nycticorax* (Linnaeus). Black-crowned Night-Heron.

Very uncommon winter resident in swamp forest, mangrove swamp, and forest-edged aquatic habitats, recorded in Atlantic Region only at Presa Miguel Alemán and in Pacific Region from Isthmus of Tehauntepec west at least to vicinity of

Puerto Escondido. Possibly a rare and local permanent resident in lowlands. *Dates*: 20 October to 19 February. *Elevations*: sea level to 200 ft.

I can find only six records for Oaxaca. The only specimen is an adult male (USNM 59780) taken by Sumichrast at Tehuantepec City on 10 November 1869. On 11 February 1961 Wolf and I saw 1 adult at Presa Miguel Alemán. In the same year the Berretts and I saw 3 on 20 October and 2 on 21 October at the southwestern edge of Laguna Superior 19 road mi southwest of Juchitán and 6 on 1 December at Presa Miguel Alemán. Delwiche, Arnold, and I saw 2 on 19 February 1974 at a lagoon 6 mi east-southeast of Puerto Escondido.

*Subspecies*: *hoactli* (Gmelin).

*Nycticorax violaceus* (Linnaeus). Yellow-crowned Night-Heron.

Uncommon winter resident in shallow aquatic habitats (especially swamp forest and mangrove swamp) in lower portions of Atlantic and Pacific Regions; probably a permanent resident but recorded only from 20 October to 20 May. *Elevations*: sea level to 2,400 ft.

I have examined four Oaxaca specimens: Valle Nacional, 18 March 1960, Rook, sex?, WFVZ 75; 25 mi south of San Juan Bautista Tuxtepec, 23 March 1960, T. Sims, male, LSUMZ 39074; Laguna Superior 19 road mi southwest of Juchitán, 20 October 1961, Binford, male, LSUMZ 27376, 637.0 g, little fat, testes small; and San Gabriel Mixtepec, 1 December 1963, male, ARPC 7200. In addition, Sumichrast (1881:233) recorded it at Tehuantepec City (date unknown), and my companions and I have seen it as follows: Laguna Superior, 19 mi southwest Juchitán, 4 birds seen (in addition to specimen noted above) on 20 October and 2 on 21 October 1961; 1 mi southwest of San Juan Bautista Tuxtepec, 100 ft, 1 on 20 November 1961; Minitán, 1 each on 23 and 29 February 1964; Punta Paloma, 2 on 20 March 1964; 1 mi east of Putla de Guerrero, 2 on 19 May and 1 on 20 May 1964.

*Subspecies*: *violaceus* (Linnaeus). Specimens LSUMZ 27376 and 39074 appear to be nominate *violaceus* and might represent either wintering birds or, if breeding, the permanent resident race of the Atlantic Region. If it breeds in the Pacific Region, the race might prove to be *bancrofti* (Huey); Blake (1977:168) extends the range of this race south into Central America.

*Cochlearius cochlearius* (Linnaeus). Boat-billed Heron.

Uncommon and local permanent resident in lower portions of Atlantic and Pacific Regions in swamps and on shores of forest-edged, freshwater and brackish, aquatic habitats. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 5 April 1962, enlarged follicle (11 mm, with yolk, El Guamol, Schaldach, AMNH 778214).

The statement by Dickerman (1973b:113) that the Pacific coast range of this species is interrupted by a gap between Guerrero and Chiapas is not correct. The species has been recorded in Pacific Oaxaca as follows: mouth of the Río Tonameca, 19 April 1964, 3 birds seen by Morony and Binford; El Guamol (see above); and Santa Efigenia, male (USNM 57888) on 16 December 1868, and female (USNM 57889) on 12 January 1869, both collected by Sumichrast. In the Atlantic Region, this species has been recorded as follows: 12 mi north of Matías Romero,

10 May 1960, Rook, male, LSUMZ 39078; Piedra Blanca, immature male (WFVZ 88) on 3 August 1961 and two immature females (LSUMZ 43000 and WFVZ 89) on 14 August 1961, Rook and L. Petite; 25 mi south of San Juan Bautista Tuxtepec, 24 March 1960, Rook, immature male, WFVZ 87.

*Subspecies*: unknown.

#### Family THRESKIORNITHIDAE

*Eudocimus albus* (Linnaeus). White Ibis.

Common permanent resident in shallow aquatic, primarily saline and brackish, habitats of Pacific coastal plain. Unrecorded in Atlantic and Interior Regions. *Elevations*: sea level to 100 ft.

*Breeding* (all data): 28 April 1964, 240 adults and numerous active nests, three of which contained one, two, and three eggs, respectively (in mangroves and cane at mouth of Río Tonameca, Binford observations).

*Plegadis chihi* (Vieillot). White-faced Ibis.

Casual winter resident in lowland marshes of Pacific Region; to be expected in Atlantic Region. Only one definite record, a female (CAS 68854, 424 g, no fat) taken by me on 9 February 1974 at a marshy pond at 50 ft elevation 12 mi southeast of Santiago Jamiltepec. Friedmann et al. (1950:35) and Edwards (1972: 20) list this species for Oaxaca, but I can find no specific record prior to mine.

*Ajaia ajaja* (Linnaeus). Roseate Spoonbill.

Fairly common winter and spring resident in shallow aquatic, primarily saline and brackish, habitats in lower portions of Pacific Region, breeding during this period. Probably a permanent resident, although recorded only from 9 January to 1 June. Only one record for Atlantic Region, 2 birds seen by Wolf and Binford 3 road mi southwest of San Juan Bautista Tuxtepec on 19 April 1961. Lawrence (1876:48) published first record for state, a male (USNM 57890) taken by Sumichrast at Santa Efigenia on 1 February 1869. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 29 February 1964, 16 adults with five old nests under reconstruction (in mangroves on island near Minitán, Morony and Binford observations).

#### Family CICONIIDAE

*Mycteria americana* Linnaeus. Wood Stork.

Common permanent resident in shallow aquatic, primarily saline and brackish, habitats along entire Pacific coastal plain. Only one record for Atlantic Region, a flying flock of 80 observed by Morony and Binford at 1,000 ft elevation near El Barrio on 3 June 1964. Only three specimens: female (LSUMZ 27377, little fat, largest follicle 3 mm) taken by Binford on 19 October 1961 at Laguna Superior 19 road mi southwest of Juchitán; sex? (WFVZ-HC 16662) taken by Galley on 1 December 1966 at Lagunas Sol y Luna; one bird that cannot be found secured by Sumichrast in December 1868 at Santa Efigenia (Lawrence 1876:48). *Elevations*: sea level to 1,000+ ft.

*Breeding* (all data): 24 and 29 February 1964, 136 adults and numerous nests, some containing small young (nests on large cacti in arid tropical scrub on island near Minitán, Morony and Binford observations).

## Family ANATIDAE

[*Dendrocygna bicolor* (Vieillot). Fulvous Whistling-Duck.]

No specimen; three acceptable sight records. Rare winter resident in fresh or slightly brackish, shallow aquatic habitats of Pacific coastal plain southeast at least to mouth of Río Tonameca. To be expected in Atlantic Region. *Dates*: January to 28 April. *Elevations*: sea level to 50 ft.

I have seen this species twice in the state: 4 birds on 28 April 1964 at the mouth of the Río Tonameca, and 1 on 8 February 1974 at a lake at 50 ft elevation 2 mi northwest of San José Manialtepec; in each instance, the Fulvous associated with a large flock of Black-bellied Whistling-Ducks. Leopold (1959:Table 5, p. 141) saw 30 Fulvous Whistling-Ducks at Laguna Lagartero during an aerial waterfowl census in January 1952. His map (Fig. 61, p. 159) shows an additional locality in the area between the towns of Potrero and Río Grande, but specific data are unaccountably missing from Table 5. Rojas (1955:Map 14, p. 159) shows the range of this species as including almost the entire Pacific Region of Oaxaca; because no details, however, are mentioned either on the map or in the text, I do not consider this a definite Oaxaca record.

*Subspecies*: monotypic, following Monroe (1968:60).

*Dendrocygna autumnalis* (Linnaeus). Black-bellied Whistling-Duck.

Permanent resident in fresh or brackish, forested and some open aquatic habitats at low elevations, fairly common in Pacific Region and uncommon in Atlantic Region. Largest recorded flock, 575 birds, seen by Arnold and Binford on 8 February 1974 at a lake 2 mi northwest of San José Manialtepec. Johnsgard (1979:430), probably following Friedmann et al. (1950:39) and overlooking five published references (e.g., Lawrence 1876:50), states that Oaxaca represents a gap in range of species. *Elevations*: sea level to 2,400 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *fulgens* Friedmann. I follow Banks (1978:348) and others in considering *lucida* Friedmann a synonym of *fulgens*.

*Cairina moschata* (Linnaeus). Muscovy Duck.

Very uncommon and local permanent resident in fresh or brackish swamps and forest-edged aquatic habitats, recorded in Pacific Region only at Tapanatepec, Santa Efigenia, Laguna Lagartero, and a lake 2 mi northwest of San José Manialtepec and in Atlantic Region only at Presa Miguel Alemán. *Elevations*: sea level to 800 ft.

*Breeding* (all data): range, habitat, and dates.

*Anas crecca* Linnaeus. Green-winged Teal.

Very uncommon winter resident in shallow aquatic habitats of Pacific Region. Unrecorded elsewhere, but probably a rare winter resident. *Dates*: January to 21 February. *Elevations*: sea level to 300 ft.

Leopold (1959:Table 4, p. 137), on an aerial waterfowl census of the Pacific coast in January 1952, saw 50 at Laguna de Alotengo and 310 at Laguna Inferior, the latter listed erroneously as in Chiapas. On a small pond at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande, I saw a male and female on 18 February and 1 female on 19 February 1964. On 21 February 1964 Morony and I saw 14 birds on a pond 2.5 road mi west-northwest of the same town. The

only specimen for Oaxaca is a female (CAS 68856, 314.6 g, very fat, ovary small) I saw on 8 February and took on 9 February 1974 at a lake at 50 ft elevation 2 mi northwest of San José Manialtepec.

*Subspecies: carolinensis* Gmelin.

*Anas acuta* Linnaeus. Northern Pintail.

Uncommon winter resident in shallow aquatic habitats of Pacific Region, with largest concentration on Laguna Inferior. Unrecorded in Atlantic and Interior Regions, but probably a very uncommon winter resident in suitable habitat. Only one Oaxaca specimen, a female (LSUMZ 32941, very fat, ovary small) taken by Morony at 300 ft elevation 9 mi west-northwest of San José Estancia Grande on 19 February 1964. *Dates:* 9 January to 21 February. *Elevations:* sea level to 300 ft.

*Subspecies:* monotypic, following the A. O. U. (1957:74). Johnsgard (1979:474) treats *A. eatoni* (Sharpe) and *A. drygalskii* Reichenow as races of *A. acuta*, an opinion with which I disagree, and *tzitzihoa* Vieillot as a synonym of nominate *acuta*.

*Anas discors* Linnaeus. Blue-winged Teal.

Fairly common winter resident in shallow aquatic habitats of Pacific Region, with largest concentration on Laguna Inferior. Unrecorded elsewhere, but probably an uncommon winter resident. Probably an occasional, nonbreeding summer resident on Pacific side of Isthmus, where seen near Tehuantepec City on 17 May 1957 (2 males; Coffey 1960:290) and 22 May 1952 (Amadon and Eckelberry 1955:68). *Dates:* 19 October to 28 April; 17 and 22 May. *Elevations:* sea level to 300 ft.

*Subspecies: discors* Linnaeus. This species might be monotypic, as advocated by Johnsgard (1979:477).

*Anas clypeata* Linnaeus. Northern Shoveler.

Fairly common winter resident in shallow aquatic habitats of Pacific Region, with largest concentration on Laguna Inferior. Unrecorded in Atlantic Region, but probably an uncommon winter resident. Apparently, an occasional, nonbreeding summer resident on Pacific side of Isthmus, where lingering birds observed as follows: 15 May 1961, 1 bird, Laguna Superior, 19 mi southwest of Juchitán, Binford; 22 May 1952, species seen, marshes near Tehuantepec City, Amadon and Eckelberry (1955:67). No record for Interior. Only one Oaxaca specimen, a female (LSUMZ 27380, 443.9 g, little fat, small ovary) taken by Binford at southwestern shore of Laguna Superior 19 road mi southwest of Juchitán on 9 January 1962. *Dates:* 2 December to 1 March; 15 and 22 May. *Elevations:* sea level to 300 ft.

[*Anas strepera* Linnaeus. Gadwall.]

No specimen; four sight records. Uncommon winter resident in shallow aquatic habitats of Pacific coast, found in greater numbers in some years than in others; probably occurs irregularly throughout state, but unrecorded in Atlantic and Interior Regions. *Dates:* January; 19 April. *Elevation:* sea level.

Leopold (1959:Table 4, p. 137), on a aerial waterfowl survey of the Pacific coast in January 1952, recorded 65 Gadwalls between the towns of Potrero and Río Grande, 40 at Laguna Lagartero, and 7,050 at Laguna Inferior. The last area is listed erroneously as in Chiapas. On 19 April 1964 Morony and I saw a female at the mouth of the Río Tonameca.

*Subspecies*: monotypic, following the A.O.U. (1957:73). Johnsgard (1979:464) treats the extinct *A. couesi* (Streets) as a race of *A. strepera*, an action that seems to me unwarranted.

*Anas americana* Gmelin. American Wigeon.

Uncommon winter resident in shallow aquatic habitats of Pacific Region, with largest concentration on Laguna Inferior. Probably an uncommon winter resident in Atlantic Region (only one record, 4 birds seen on Presa Miguel Alemán near Temascal, 2 December 1961, the Berretts and Binford). Apparently, an occasional, nonbreeding summer resident on Pacific side of Isthmus, where seen on 22 May 1952 in marshes near Tehuantepec City (Amadon and Eckelberry 1955:67). No record for Interior. Only one Oaxaca specimen, a female (LSUMZ 32942, 726 g, moderately fat, ovary small) taken by Binford at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande on 14 February 1964. *Dates*: 2 December to 21 February; 22 May. *Elevations*: sea level to 300 ft.

*Aythya collaris* (Donovan). Ring-necked Duck.

Very uncommon winter resident in freshwater, open aquatic habitats; probably occurs in all Regions of state, but the only records with specific data are for southwestern corner of Pacific Region from 17 to 20 February. *Elevation*: 300 ft.

Sclater (1862:20) records Boucard specimens from "Oaxaca" [= state of Oaxaca]; Salvin and Godman (1897–1904 [1902]:224) cite Sclater; and Friedmann et al. (1950:43) list the state of Oaxaca without details. The range map presented by Rojas (1955:Map 1, p. 121), showing the zone of abundance embracing the southwestern corner of Oaxaca and the zone of general distribution including the entire southern half of the state, is not supported by specific published data; Rojas states (1955:124), apparently erroneously, that this species occurs south to "northern Oaxaca." In 1964 at a small pond at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande, Morony and I recorded the following birds: one specimen (female, LSUMZ 32943, extremely fat, follicles not enlarged) taken by Morony on 17 February; 4 birds seen on 19 February; and 1 seen on 20 February.

*Aythya affinis* (Eyton). Lesser Scaup.

Winter resident in open aquatic habitats in lowlands, abundant in coastal lagoons of Isthmus of Tehuantepec, fairly common elsewhere in Pacific Region, and uncommon in Atlantic Region. Concentration of 36,950 birds on Laguna Superior in January 1952 was at that time fourth largest in Mexico (Leopold 1959: Table 4, p. 137, where Laguna Superior erroneously listed as in Chiapas). Apparently, a rare, nonbreeding summer resident on Pacific coast of Isthmus, where lingering birds observed as follows: 15 May 1961, 1 bird, Laguna Superior, 19 mi southwest of Juchitán, Wolf and Binford; 31 May 1964, 8 birds, same area, Morony and Binford; 1 June 1964, 39 birds, 15 mi south of Reforma, Binford. No record for Interior. Only one Oaxaca specimen, a male (LSUMZ 27381, 532.4 g, little fat, small testes) taken by Binford at 100 ft elevation 1 mi southwest of San Juan Bautista Tuxtepec on 20 November 1961. *Dates*: 20 November to 19 April; 15 and 31 May, 1 June. *Elevations*: sea level to 200 ft.

*Oxyura jamaicensis* (Gmelin). Ruddy Duck.

No specimen examined; one published specimen record; four definite sight records. Very uncommon winter resident in open aquatic habitats in lowlands of

Atlantic and Pacific Regions. No record for Interior. *Dates*: 20 November to 2 March. *Elevations*: sea level to 100 ft.

Slater (1859b:393) records a Boucard specimen from "Oaxaca" [= state of Oaxaca]. Numerous subsequent authors have listed Oaxaca within the range of the Ruddy Duck but have merely cited Slater or given no reference at all. A range map presented by Rojas (1955:Map 13, p. 157) shows a zone of abundance on the Pacific side of the Isthmus of Tehuantepec and a region of general distribution covering the remainder of the state. Leopold (1959:Table 4, p. 137), in an aerial census of the entire Pacific coast in January 1952, recorded this species only at Laguna de Alotengo (35 birds). On 20 November 1961 I saw 2 birds on a small pond at 100 ft elevation 1 mi southwest of San Juan Bautista Tuxtepec. At a pond 12 road mi southeast of Santiago Jamiltepec, I observed flocks of 36 birds on 2 March 1964 and 5 on 9 February 1974.

*Subspecies: rubida* (Wilson), according to Friedmann et al. (1950:45). This race might not be separable from *O. j. jamaicensis* (Gmelin); see Blake (1977:256).

#### Family CATHARTIDAE

*Coragyps atratus* (Bechstein). Black Vulture.

Permanent resident throughout state in most terrestrial habitats but preferring open areas in vicinity of habitation; very common and at times abundant in lowlands, uncommon in highlands, and rare in large areas of unbroken forest. *Elevations*: sea level to 9,000 ft. See *Cathartes aura*.

*Breeding* (all data): 2 May 1966, adult repeatedly entering probable nest cave (15 mi south of Oaxaca City, 5,000 ft, Rowley [1984:82]).

*Subspecies: brasiliensis* (Bonaparte). This species is considered monotypic by most recent authors, including Stresemann and Amadon (1979:275), but I find the arguments of Wetmore (1962:3) convincing.

*Cathartes aura* (Linnaeus). Turkey Vulture.

Permanent resident throughout state in virtually every terrestrial habitat but preferring open areas and the vicinity of habitation; very common in lowlands and fairly common in highlands and in large areas of forest. Numbers augmented by birds from north, both winter residents and transient migrants (see Migration, Transient Migrants). *Elevations*: sea level to 9,700 ft.

*Breeding* (all data): range, habitat, and dates.

Compared with the Black Vulture, Turkey Vultures are seen more often, occur in a greater variety of situations, and are more common at higher elevations and in heavily forested areas. In the lowlands, however, Black invariably outnumber Turkey vultures.

*Subspecies: meridionalis* Swann, winter resident and transient migrant; permanent residents presumably are *aura* (Linnaeus). I follow the treatment by Wetmore (1964:6), who considers *teter* Friedmann a synonym of *meridionalis*. The only two specimens I have examined (near and at Matias Romero, both 8 February 1961 and with heavy fat, LSUMZ 39143 and WFVZ 120, respectively) are *meridionalis*.

*Cathartes burrovianus* Cassin. Lesser Yellow-headed Vulture.

Status uncertain; breeds along Pacific coastal plain and presumably in extreme lowlands of Atlantic Region, where probably a very uncommon permanent resident; hunts over savannas and other grassy areas, especially in vicinity of open,

shallow aquatic habitats. No fall records; recorded only from 15 January to 6 June. Minitán record is northwesternmost in entire Pacific slope range of species. *Elevations*: sea level to 100 ft.

*Breeding* (all data): see below.

In 1964 Morony and I obtained these data: near Minitán we saw 2 on 24 February and 1 on 25 February; at the mouth of the Río Tonameca we saw 1 on 19 April and 3 on 28 April, collecting two of the latter (Binford, adult male, LSUMZ 32944, 935 g, little fat, testes 15 × 11 mm; Morony, adult female, LSUMZ 51289, fully-formed egg in oviduct [egg, LSUMZ 51254, preserved by Binford]); on 6 June we saw 2 at 100 ft elevation 7 road mi west of Loma Bonita and another along the road between that town and San Juan Bautista Tuxtepec. A. R. Phillips (in litt.) saw 1 bird 6 mi south of Niltepec on 15 January 1966.

*Subspecies*: *burrovianus* Cassin. I follow the taxonomic treatment by Wetmore (1964:11).

*Sarcoramphus papa* (Linnaeus). King Vulture.

Uncommon permanent resident in tropical semideciduous and Pacific swamp forests on both sides of Sierra Madre de Chiapas and in tropical evergreen forest of Atlantic Region northwest at least to Valle Nacional. Should be sought in Pacific Region west of Isthmus. Much less common than formerly, as Sumichrast considered it "partout universel" (Lawrence 1876:43). *Elevations*: 300 to 4,900 ft.

*Breeding* (all data): range, habitat, and dates.

#### Family ACCIPITRIDAE

*Pandion haliaetus* (Linnaeus). Osprey.

Winter resident, fairly common along ocean shore and on Pacific coastal plain on lagoons and large rivers and uncommon in lowlands of Atlantic Region on lakes, reservoirs, and large rivers at least from Temascal southeast to a point 1 mi southwest of Valle Nacional. The one summer record, 3 birds seen by Morony and Binford on 8 June 1964 over the Río Tonto in the Atlantic Region near San Juan Bautista Tuxtepec, could represent breeders or nonbreeding summer residents. Should be sought along Pacific coast in summer. *Dates*: 11 October to 19 April; 8 June. *Elevations*: sea level to 300+ ft.

*Subspecies*: *carolinensis* (Gmelin).

*Leptodon cayanensis* (Latham). Gray-headed Kite.

Uncommon breeder in Atlantic Region in swamp forest and around other aquatic habitats bordered by tropical evergreen forest and in Pacific Region in Pacific swamp forest in vicinity of Santa Efigenia, Tapanatepec, and Chahuities; unrecorded in mangrove swamp. Presumably a permanent resident, although recorded only from 12 November to 20 April. *Elevations*: near sea level to 800 ft.

*Breeding* (all data): 23 February 1961, slightly enlarged follicle (4 mm, Río Sarabia, Schaldach, AMNH 775867); middle of May 1871, greatly enlarged follicles (extreme southeastern Oaxaca, Sumichrast [Lawrence 1876:43]).

*Subspecies*: *cayanensis* (Latham). I follow the subspecific treatment by Wetmore (1965:188).

*Chondrohierax uncinatus* (Temminck). Hook-billed Kite.

Uncommon permanent resident in Pacific Region in palm forest, Pacific swamp forest, mangrove swamp, and near water in tropical deciduous forest. One record

for Interior, a brown-phase bird seen well by Morony and Binford 9 road mi north of San Andrés Chicahuaxtla in sparse, arid pine-oak forest at 6,600 ft elevation on 25 May 1964. Recorded in Atlantic Region only in Isthmus of Tehuantepec (18 road mi north of Matías Romero, 8 April 1960, Rook, female, WFVZ 142). *Elevations*: sea level to 2,600 ft; 6,600 ft.

*Breeding* (all data): 27 May 1966, nest with two eggs (2 mi west of Rancho Sol y Luna, 800 ft, Rowley [1984:82–83], WFVZ 21331).

*Subspecies*: *uncinatus* (Temminck). On the basis of specimens I have examined, I agree with Smith and Temple (1982) that *aquilonis* Friedmann is untenable. Specimens of both types have been taken in Oaxaca.

*Elanoides forficatus* (Linnaeus). American Swallow-tailed Kite.

One record, a specimen (female?, USNM 76987) taken by Sumichrast in October 1875 in Pacific Region at "Cacoprieto" [= Rancho de Cacoprieto] (elevation of ranch and exact point of collection unknown). Status uncertain; possibly a casual transient migrant, as stated by the A.O.U. (1983:102), but Pacific location of the only record suggests vagrant status.

*Subspecies*: *forficatus* (Linnaeus), according to W. B. Robertson (in litt.), based on identification of above specimen.

*Elanus caeruleus* (Desfontaines). Black-shouldered Kite.

Uncommon winter resident in lowlands of Atlantic Region and south across Isthmus onto Plains of Tehuantepec, occurring in savanna, cultivated land, and grazed land; possibly a permanent resident as stated by the A.O.U. (1983:103), but recorded only from 1 August to 20 April, and there is no breeding evidence other than range and habitat. *Elevations*: 100 to 300 ft.

Eleven specimens have been collected, as follows: male (LSUMZ 43128), 25 mi south of San Juan Bautista Tuxtepec, 28 March 1960, Rook; female (WFVZ 136), same locality and date, Rook and T. Sims; female (LSUMZ 39147), 10 mi north of Matías Romero, 18 November 1960, Rook; female (WFVZ 135, 10 mi north of Matías Romero, 19 November 1960, K. Wolfe; male (LSUMZ 61025), 15 mi north of Niltepec, 20 November 1960, Rook; immature male (LSUMZ 24219, 381.3 g, moderate fat, testes small), 11 road mi northeast of Valle Nacional, 12 February 1961, Binford; female (AMNH 775866, not very fat, largest ovum 3 mm), 15 mi north of Matías Romero, 18 February 1961, Schaldach; male (WFVZ 134, testes not enlarged, no fat), 10 mi north of Matías Romero, 23 February 1961, K. Wolfe; female (LSUMZ 43129, no fat, ovary not enlarged), La Ventosa, 1 August 1961, Rook and L. Petite; male (LSUMZ 39146, testes not enlarged, slightly fat), 11 mi north of Matías Romero, 2 August 1961, Rook and L. Petite; male (Museum of Natural History, Leiden, 34933, testes 6 × 3 mm, molting), Rancho Las Vegas near Loma Bonita, 21 August 1963, O. Epping (Mees 1970:239).

The Berretts and I observed this species as follows: 1 adult feeding over a grassy field 4 mi east of Tehuantepec City on 19 October 1961; 1 seen at a point 1 mi east of Tehuantepec City on 21 October 1961; 1 chasing a Red-tailed Hawk 5 mi east of Tehuantepec City on 23 October 1961; 1 observed near San Juan Bautista Tuxtepec on 30 November 1961; 1 adult seen 12 road mi north of Matías Romero on 8 January 1962. The latest spring bird was 1 seen by B. B. and L. C. Coffey (in litt.) on 20 April 1964 near Matías Romero.

The fact that this species was not collected prior to 1960 by such earlier workers as Sumichrast, Shufeldt, and Lamb, suggests that it has only recently invaded the state.

*Subspecies: majusculus* Bangs and Penard.

*Rostrhamus sociabilis* (Vieillot). Snail Kite.

Rare spring and summer visitant in shallow, freshwater aquatic habitats, including roadside ditches, on both sides of Isthmus of Tehuantepec. Possibly a rare permanent resident, but prematurely assigned this status by the A.O.U. (1983: 104). *Dates:* 29 April to 18 July. *Elevations:* 100 to 300 ft.

The only Oaxaca specimen (male, WFVZ 169, 367 g, testes small) was taken by J. T. Marshall, Jr., at a small roadside pool 42 km (26.1 mi) west of Tapanatepec on 18 July 1957. On 28 and 29 May 1959 D. A. Zimmerman, J. P. Hubbard, G. L. Brody, and I watched an immature bird catch a snail in a shallow roadside ditch along the Pan-American Highway 13.6 road mi west of Niltepec. At the town of Uvero on 3 June 1964, Morony and I saw an immature bird perched in a tree near a roadside ditch. Lenna (1963:5) and L. F. Kibler saw 4 birds flying across the Pan-American Highway at Tehuantepec City on 29 April 1963. Edwards (1968:186) notes the possibility of a visitor seeing this species 28 miles east of Tehuantepec City, but gives no specific record.

*Subspecies: major* Nelson and Goldman.

*Harpagus bidentatus* (Latham). Double-toothed Kite.

Permanent resident, very uncommon in Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and uncommon in Pacific Region in Pacific swamp forest and tropical semideciduous forest of Sierra Madre de Chiapas. Should be sought in Pacific Region west of Isthmus, because it has been collected in Guerrero (Dixon and Davis 1958). *Elevations:* 300 to 4,300 ft.

*Breeding* (all data): 15 March 1964, nest observed (Colonia Rodolfo Figueroa, Rook notation on male specimen, WFVZ-HC 12391); 7 April 1961, nest under construction (Binford observation), enlarged follicle (5 mm, Wolf, LSUMZ 24222, 228.8 g, little fat, shot at nest), and enlarged testes (11 × 5 mm, Binford, LSUMZ 24221, 197.7 g, slightly fat, shot at nest; all data 1 mi southwest of Valle Nacional, 300 ft elevation).

*Subspecies: fasciatus* Lawrence.

*Ictinia plumbea* (Gmelin). Plumbeous Kite.

Summer resident in lowlands, fairly common throughout Atlantic Region in openings within tropical evergreen forest and, disjunctly, uncommon in Pacific Region west of Isthmus in vicinity of Pacific swamp forest adjacent to the Sierra de Miahuatlán. *Dates:* extremes, 22 February to 24 May; definite arrival date in 1961 for my locality 1 mi southwest of Valle Nacional, 4 March. *Elevations:* sea level to 300+ ft.

*Breeding* (all data): 13 March 1961, enlarged follicle (6 mm, LSUMZ 24223, 374.1 g, very fat), and 25 March 1961, copulation observed (both records 1 mi southwest of Valle Nacional, 300 ft, Binford).

The only records for the Pacific side of Mexico west of the Isthmus were obtained by Morony and me in 1964 as follows: 2 seen on 9 March and 1 on 11 March at

a point 16 road mi northwest of Puerto Escondido; 1 seen on 12 March at a point 8 road mi northwest of Puerto Escondido; one taken (female, LSUMZ 32945, 436.5 g, moderately fat, largest follicle 3 mm) by Binford on 19 April near the mouth of the Río Tonameca.

*Circus cyaneus* (Linnaeus). Northern Harrier.

Fairly common transient migrant and uncommon winter resident, occurring in savanna, marsh, and other open grassy areas throughout state. *Dates*: 23 September to 12 April. *Elevations*: sea level to 7,650 ft.

*Subspecies*: *hudsonius* (Linnaeus).

*Accipiter striatus* Vieillot. Sharp-shinned Hawk.

Fairly common transient migrant (see Migration, Transient Migrants) and uncommon winter resident, frequenting forest habitats throughout state. Rare permanent resident in high-elevation pine-oak forests of Interior (one male, USNM 155658, taken by Nelson and Goldman on 19 August 1894 at La Parada and one adult male, WFVZ-HC 19148, taken by Galley on 5 June 1967 at 10,000 ft on Cerro San Felipe; both *A. s. madrensis*); and uncommon permanent resident in pine-oak forests of Pacific Region in Sierra Madre de Chiapas (six specimens, WFVZ, 18 September to 6 April, Colonia Rodolfo Figueroa and at 4.5 km [2.8 mi] north of Rancho Cerro Baúl; all *A. s. chionogaster*). *Dates*: extremes for migrants, 6 October to 19 April; major migration periods, March and October; date of 22 April 1942, based on a del Toro Avilés specimen (Totontepec, male, MLZ 34097), is questionable. *Elevations*: sea level to 10,000 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *madrensis* Storer (1952:288), permanent resident west of Isthmus; *chionogaster* (Kaup), permanent resident east of Isthmus; *velox* (Wilson), winter resident and transient migrant. I agree with Storer (1952:288) that *chionogaster* should be treated as a race of *A. striatus*; the sequence from *perobscurus* Snyder to *velox* to *suttoni* van Rossem to *madrensis* to *chionogaster* presents an almost perfect north-south cline in most characters.

*Accipiter bicolor* (Vieillot). Bicolored Hawk.

Rare breeder in Atlantic Region in tropical evergreen forest, where presumably a permanent resident but recorded only as follows: male taken (AMNH 775869, testes small) by Schaldach on 4 March 1961 at Río Sarabia; 1 seen by Binford on 5 March 1961 and one female secured (LSUMZ 24224, 584.8 g, moderately fat, enlarged follicles 20, 15, and 8 mm) plus another seen by Wolf on 6 March 1961, all at 300 ft elevation 1 mi southwest of Valle Nacional; immature female taken (LSUMZ 27386, 446.1 g, moderately fat, paired ovaries small) by Binford on 28 November 1961 at 4,100 ft elevation 15 road mi southwest of Valle Nacional. Only one record for Pacific Region, where apparently only a casual winter visitant: immature male (USNM 76973) taken by Sumichrast near Tapanatepec in December 1877.

*Breeding* (all data): see above.

*Subspecies*: *fidens* Bangs and Noble.

*Accipiter cooperii* (Bonaparte). Cooper's Hawk.

Winter resident, uncommon in Pacific Region in tropical deciduous forest and rare in forest habitats elsewhere in state. *Dates*: 18 October to 19 February. *Elevations*: sea level to 4,750+ ft.

*Geranospiza caerulescens* (Vieillot). Crane Hawk.

Uncommon permanent resident in Pacific swamp forest and mangrove swamp of Pacific Region and north across Isthmus into swamp forest of Atlantic Region to Donají. Only other record for Atlantic Region (San Miguel Soyaltepec, 26 November 1943, del Toro Avilés, male, MLZ 31335) is questionable. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 23 February 1964, slightly enlarged follicle (5 mm, Minitán, sea level, Morony, LSUMZ 32950, 519.5 g).

*Subspecies*: *nigra* (Du Bus de Gisignies).

*Leucopternis albicollis* (Latham). White Hawk.

Uncommon permanent resident in tropical evergreen forest of Atlantic Region northwest at least to Temascal and south in Isthmus to a point 6 mi north of Matías Romero and to "Chimalapa" [probably Santa María Chimalapa; W. B. Richardson; see Gazetteer]. *Elevations*: sea level to 4,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *ghiesbreghti* (Du Bus de Gisignies).

*Buteogallus anthracinus* (Deppe). Common Black-Hawk.

Fairly common permanent resident up to 3,800 ft locally throughout Pacific Region and north across Isthmus into Atlantic Region at least to Montebello, occurring in openings within tropical evergreen, tropical semideciduous, tropical deciduous, and Pacific swamp forests, usually in vicinity of freshwater aquatic habitats. Recorded in Atlantic Region outside Isthmus only at a point 1 mi southwest of Valle Nacional, 300 ft, where Wolf and I regularly saw 1 to 2 birds from 15 February to 20 April 1961 in large trees along Río Valle Nacional. The only two records for Interior might represent wandering birds: immature male taken by Boucard in October 1857 at an unknown elevation at La Parada (Sclater 1858:295); 1 adult seen by Arnold, Delwiche, and Binford on 12 February 1974 at 6,500 ft elevation 4.4 mi south of Santa María Asunción Tlaxiaco.

*Breeding*: 12 March 1964, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley, WFWZ 24378), to 15 April 1966, nest with one egg (Novillero, Rowley [1984:85] observation); "toward the 15th of April" (no year), prejuvenile observed (Isthmus region, probably Tapanatepec or Santa Efigenia, Sumichrast [Lawrence 1876:42]).

*Subspecies*: *anthracinus* (Deppe). Blake (1977:312) suggests that mangrove-inhabiting birds as far north as Guerrero might be *B. a. rhizophorae* Monroe, treated by Monroe as a race of a separate species, *B. subtilis* (Thayer and Bangs); although I have seen no birds in mangroves in Oaxaca, and all specimens are *B. a. anthracinus*, this possibility should be investigated.

*Buteogallus urubitinga* (Gmelin). Great Black-Hawk.

Uncommon permanent resident along entire length of Pacific Region and north across Isthmus into Atlantic at least to Montebello, occurring in openings within tropical evergreen, tropical semideciduous, and Pacific swamp forests and humid portions of tropical deciduous forest. To be expected elsewhere in Atlantic Region. *Elevations*: sea level to 5,000 ft.

*Breeding* (all data): 22 March 1961, enlarged testes (22 × 15 mm, town of Río Grande, 8 mi south of Matías Romero, Schaldach, AMNH 775884); 4 April 1960,

enlarged follicle (25 mm, 19 mi south of Matías Romero, Schaldach, LSUMZ 39217).

*Subspecies: ridgwayi* (Gurney).

*Parabuteo unicinctus* (Temminck). Harris' Hawk.

Uncommon permanent resident in the Interior in lower reaches of arid subtropical scrub of Oaxaca Valley and near Santiago Chazumba and in Pacific Region in arid tropical scrub from Tequisistlán east to Tapanatepec. *Elevations*: sea level to 6,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: harrisi* (Audubon).

*Busarellus nigricollis* (Latham). Black-collared Hawk.

Status uncertain; frequents marshes, swamp forest, and forest-edged aquatic habitats in lowlands of Atlantic and Pacific Regions. Only two records; a female (Museum of Natural History, Leiden, 34930) taken by O. Epping on 10 August 1963 at Rancho Las Vegas, near Loma Bonita (Mees 1970:240); 1 seen by Binford and Arnold on 8 February 1974 at 50 ft elevation 2 mi northwest of San José Manialtepec. The record of a female (MLZ 31343) taken by del Toro Avilés purportedly on 15 October 1943 at San Miguel Soyaltepec is questionable.

*Subspecies: nigricollis* (Latham).

*Harpyhaliaetus solitarius* (Tschudi). Solitary Eagle.

No specimen examined; one published specimen record; two records supported by color photographs (examined); one sight record. Rare and apparently irregular permanent resident in tropical deciduous forest (or Pacific swamp forest?) on Pacific side of Sierra Madre de Chiapas. Four records, as follows: a bird in immature plumage taken by Sumichrast in "Tehuantepec" [= Tehuantepec region] (Salvin and Godman 1897-1904 [1900]:88); an immature seen by Morony and Binford on 24 March and 2 April 1964 as it circled over dense cloud forest at 4,900 ft elevation 12 mi north-northeast of Zanatepec; two nests, one with one young on 14 May 1980 at about 500 ft elevation 2 mi northwest of Rancho Sol y Luna, and the other with one young on 17 May 1980 at about 500 ft elevation 0.6 mi northwest of Chiapas border on Route 200 thence 1.2 mi northeast (supported by photographs in Smith [1982:79] and in litt.). The fact that Rowley and others failed to find this species near Rancho Sol y Luna in the 1960s indicates that this species is not regular there.

*Breeding* (all data): see above.

*Subspecies: solitarius* (Tschudi).

*Buteo nitidus* (Latham). Gray Hawk.

Common permanent resident throughout lowlands and adjacent foothills of Atlantic and Pacific Regions; most abundant in openings within tropical evergreen and tropical deciduous forests but ranging into arid tropical scrub and savanna; recorded northwest in Río Tehuantepec basin to Rancho Las Animas. Only report for Interior (Sclater 1859b:389) is for San Miguel Talea de Castro. Numbers augmented by winter residents from north. *Elevations*: sea level to 3,000+ ft.

*Breeding*: 29 March 1961, enlarged follicle (16 × 15 mm, at the Río Ostuta 4 mi west of Zanatepec, Schaldach, AMNH 775880), to 19 July 1957, enlarged

follicle (5mm, Tapanatepec, P. Marshall, LSUMZ 43202); 13 May 1963, nest with at least one half-grown young (near Puerto Escondido, Rowley [1984:86] observation).

*Subspecies: plagiatus* (Schlegel). I follow Brown and Amadon (1968:272) and Blake (1977:322) in treating *maximus* (van Rossem), recorded for Oaxaca by Friedmann et al. (1950:363), as a synonym of *plagiatus*.

*Buteo magnirostris* (Gmelin). Roadside Hawk.

Common permanent resident throughout lowlands and adjacent foothills of Atlantic and Pacific Regions in arid tropical scrub and in openings within tropical evergreen and tropical deciduous forests. *Elevations*: sea level to 2,400+ ft.

*Breeding*: 17 February 1961, enlarged follicles (14 and 6 mm, 1 mi southwest of Valle Nacional, 300 ft, Wolf, LSUMZ 24225, 404.2 g, moderately fat), to 31 May 1966, nest with two eggs (2 mi south of Presa Benito Juárez, 1,200 ft, Rowley, WFVZ 20747); 15 June 1961, prejuvenile (Sarabia, Schaldach, AMNH 776252, male).

*Subspecies: griseocauda* Ridgway, Atlantic Region, south in Isthmus at least to Almoloya (see Type Localities); *xantusi* van Rossem, Pacific Region, east at least to Puerto Angel; *petersi* Brodkorb, Plains of Tehuantepec and adjacent foothills, north at least to El Barrio and Santa Efigenia and west at least to Tehuantepec City. Stresemann and Amadon (1979:362) treat *xantusi* and *petersi* as synonyms of *griseocauda*; I prefer to recognize three races, pending a thorough revision.

*Buteo platypterus* (Vieillot). Broad-winged Hawk.

Fairly common transient migrant in lowlands and adjacent foothills throughout Atlantic and Pacific Regions; uncommon winter resident on both slopes of Isthmus and on Pacific slopes of Sierra Madre de Chiapas and Sierra de Miahuatlán. Found at edges of tropical evergreen, tropical semideciduous, tropical deciduous, and cloud forests and in arid tropical scrub. No record for arid portions of Interior. *Dates*: migration periods (possibly including some extreme dates for winter residents), 16 March to 10 April, 10 October to 6 December; all "winter" dates (12 specimens, mostly immature), 21 and 22 December, 25, 27, 28 and 31 January, 9, 13, 18, and 20 February. *Elevations*: sea level to 8,600 ft.

*Subspecies: platypterus* (Vieillot).

*Buteo brachyurus* Vieillot. Short-tailed Hawk.

Uncommon breeding bird in savanna and openings within tropical deciduous forest, occurring in Pacific lowlands and adjacent foothills from a point 6 road mi south of Chahuities west to a point 4 road mi northwest of the town of Río Grande and probably to Guerrero border; possibly a permanent resident but recorded only on 13 October (1869, Tehuantepec City, Sumichrast, USNM 59514) and from 20 January to 20 March. The 20 adults of known color phase included seven in dark phase and 13 in light phase. *Elevations*: sea level to 500 ft; 4,650 ft (2 seen, 2 mi south of Soledad, 3 February 1974, Binford).

*Breeding* (all data): 4 March 1964, dark-phase female containing enlarged follicle (22 mm, 4 miles southeast of Puerto Escondido, Morony, LSUMZ 32948, 560.3 g).

*Subspecies: fuliginosus* Sclater. This species is often regarded as monotypic, but I follow Rand (1960) and Stresemann and Amadon (1979:366) in recognizing three races.

*Buteo swainsoni* Bonaparte. Swainson's Hawk.

Fairly common (but irregular?) winter resident in Pacific lowlands from San Pedro Pochutla westward, occurring in savanna and in openings within tropical deciduous forest and arid tropical scrub. Transient migrant on Pacific coastal plain near Juchitán. *Dates*: 5 to 21 February; 19 April. *Elevations*: near sea level to 300 ft.

In February 1964 at a small savanna surrounded by tropical deciduous forest at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande, Morony and I recorded this species almost daily for more than a week. On 13 February I saw 13 birds perched in low trees and circling overhead in the vicinity of a small grass fire. Although the fire had been extinguished by the next day, 35 birds were noted perched and flying low in the area; one was taken by Binford (male, LSUMZ 32947, 623 g, little fat, small testes). On 16 and 17 February none was seen perched, but on each day 7 were noted flying very high over the savanna. On 18 February we recorded 11 birds, and on 19 February, 2 birds. Then, on 20 February a loosely strung-out flock of 108 birds gliding northwest at a very high altitude gave me the impression that they were migrating. Finally, on 21 February, our last day in the area, we saw 38 birds perched in low trees at the edge of the savanna 5 road mi west-northwest of San José Estancia Grande.

In February 1974, Arnold, Delwiche, and I encountered this species at six localities on the Pacific coastal plain, as follows: 5 February, 3 birds seen 12 mi and 2 seen 15 mi west-northwest of San Pedro Pochutla; 9 February, 3 birds 1 mi southeast, 2 birds 1 mi northwest, and 2 about 20 mi west-northwest of the town of Río Grande; 19 February, 1 at 250 ft elevation 16 mi east-southeast of Puerto Escondido. All the birds on 9 February were circling low as if feeding.

The facts that Swainson's Hawks were seen in two different years, over extended periods of time, and showed little obvious migratory behavior but instead often occurred in feeding groups of only 2 or 3 birds make me believe that they were wintering. Spring migration does not commence until late February or March in Panama and Costa Rica.

I found only two published references pertaining to Swainson's Hawk in Oaxaca. The report by Edwards (1955:16) near Oaxaca City lacks specific data and must be supported by additional observations before the known range of this species can be extended to the Interior. Phillips (1962a:310) states that the Swainson's Hawk migrates "in great numbers" across the Isthmus of Tehuantepec but gives no details; upon inquiry, he (in litt.) tells me that he saw this species near Juchitán on 19 April 1960 (see Migration, Transient Migrants).

*Buteo albicaudatus* Vieillot. White-tailed Hawk.

Fairly common permanent resident in the Interior (near Tamazulapan del Progreso and in valleys of Oaxaca and Hidalgo Yalalag) in arid tropical scrub and lower reaches of arid subtropical scrub and oak scrub and in the Isthmus from Tehuantepec City east to Tapanatepec and north (into Atlantic Region) to a point 5 mi north of Matías Romero in arid tropical scrub and openings within arid pine-oak forest and tropical deciduous forest. *Elevations*: sea level to 6,500 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *hypospodius* Gurney.

*Buteo albonotatus* Kaup. Zone-tailed Hawk.

Very uncommon winter resident in tropical deciduous forest along entire length of Pacific Region and north across Isthmus into Atlantic Region to a point near

Matías Romero, recorded northwest in Río Tehuantepec basin to a point near Tequisistlán. One record for Interior. Possibly a permanent resident but recorded only from 22 October to 26 March. *Elevations*: sea level to 650+ ft.

I know of only nine Oaxaca records for the Zone-tailed Hawk. On 26 March 1960 Schaldach took a female (WVZ-HC 4675) near Matías Romero. At Tehuantepec City on 22 October 1961, I saw 2 birds. On 14 January 1962 the Berretts and I observed a bird circling over the Pan-American Highway near Tequisistlán. The following data were obtained by Morony and me in 1964: Minitán, 24, 25, and 28 February, 1, 2, and 1 seen, respectively; Puerto Escondido, 7 March, one taken (male, LSUMZ 32946, 682.5 g, very fat, small testes) by Binford; Zanatepec, 19 March, 1 seen. In 1974 I saw single birds on 6 February at Puerto Escondido and on 8 February 2 mi northwest of San José Manialtepec. The only Interior record is 1 adult seen by Phillips (pers. comm.) on 11 December 1977 at a point 3 km (1.9 mi) south of San Juan Bautista Cuicatlán.

*Subspecies*: monotypic, following Wetmore (1965:198) and Blake (1977:336).

*Buteo jamaicensis* (Gmelin). Red-tailed Hawk.

Uncommon permanent resident and fairly common winter resident throughout Interior, above 4,350 ft in Pacific Region west of Isthmus, and in Sierra Madre de Chiapas, occurring primarily in arid subtropical scrub and openings within pine-oak forests. Transient migrant, apparently rare, in a variety of habitats down to 4,100 ft in Atlantic Region west of Isthmus and to 100 ft in Plains of Tehuantepec east of Tehuantepec City; possibly a casual winter resident in latter area, where recorded by Sumichrast in January 1872 (Lawrence 1876:41). *Elevations*: 100 to 10,000 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *hadropus* Storer (1962:78), permanent resident west of Isthmus; *kemsiesi* Oberholser (see Storer 1962), permanent resident east of Isthmus (adult female, WVZ-HC 16592, Cerro Baúl, 4,300 ft, 25 April 1966, Rowley); *calurus* Cassin, winter resident and transient migrant. Sclater (1859b:389) records as *B. j. harlani* (Audubon) a Boucard specimen taken in "Oaxaca" [= Oaxaca City?]. Salvin and Godman (1897-1904 [1900]:65-66) cite Sclater and include Oaxaca in the range of *harlani*. However, this form has not otherwise been reliably recorded in Mexico (Miller et al. 1957:405), and although I have not seen the specimen that formed the basis for Sclater's statement, it is probably a dark-phase example of *B. j. calurus*.

*Harpia harpyja* (Linnaeus). Harpy Eagle.

One record, a male (USNM 54224) taken by Sumichrast on 8 October 1868 in Isthmus of Tehuantepec at Almoloya (town at 754 ft but elevation at exact point of collection unknown). Status uncertain; probably an accidental vagrant (see below) and not, as stated by the A.O.U. (1983:120), a resident.

Much confusion has surrounded the Oaxaca record of the Harpy Eagle. Friedmann (1950:434) misspells Sumichrast's locality as "Almaloya" and incorrectly lists it as in Veracruz. In addition, Friedmann records a second Oaxaca locality for this species: "Tehuantepec, Guichiloma, Oaxaca." These two localities, however, pertain to the same specimen. Lawrence (1876:39) records it from "Tehuantepec (Almoloya)," the same information that is on the original specimen label. Sumichrast (1881:236) states that his only Oaxaca record was a bird taken "en el cerro de Guichilona," the local name for the range of hills just south of

Almoloya and in which the town of Guichilona is located. Hence, Sumichrast must have secured the bird in this range of hills at a point near Almoloya.

Statements by Oswald (1878) that he found the Harpy Eagle to be a very common breeding bird in the mountains of Oaxaca are, in my opinion, untrustworthy. Sumichrast (*in* Lawrence 1876:39) believed this species to be "exceedingly rare in Mexico" and suggested: "The isolated birds which have been found there up to this time have probably been brought by some atmospheric disturbance, which has driven them beyond the natural limits of the zone in which they live."

*Spizastur melanoleucus* (Vieillot). Black-and-white Hawk-Eagle.

Status uncertain; recorded only in Pacific Region in humid forests of Sierra Madre de Chiapas, where possibly a rare permanent resident, as prematurely stated by the A.O.U. (1983:121). Should be sought in tropical evergreen forest of Atlantic Region. Only three records: male (USNM 76988), Santa Efigenia, March 1877, Sumichrast; adult male (WFVZ-HC 19250) testes inactive, moderately fat), above Rancho Carlos Minne near La Cumbre, 5,000 ft, 14 April 1967, Rowley; sex? (WFVZ-HC 16584, very fat), Rancho Sol y Luna, about 15 January 1966, collector uncertain. The record from Uvero listed by Salvin and Godman (1897-1904 [1901]:94) and referred to Oaxaca by Friedmann (1950:441) pertains to Veracruz.

*Spizaetus ornatus* (Daudin). Ornate Hawk-Eagle.

Very uncommon permanent resident in Atlantic Region in heavy tropical evergreen forest and in Pacific Region in humid forests of Sierra Madre de Chiapas. *Elevations*: -800 to 4,200 ft.

*Breeding* (all data): 14 June 1968, nest with one young (in pine-oak canyon 20 km [12.4 mi] north of Colonia Rodolfo Figueroa, 4,200 ft, Galley note on adult female specimen, WFVZ-HC 19694); 24 November 1961, apparent courtship flight observed (15 mi southwest of Valle Nacional, 4,100 ft, Binford).

*Subspecies*: *vicarius* Friedmann.

#### Family FALCONIDAE

*Polyborus plancus* (Miller). Crested Caracara.

Common permanent resident in arid tropical scrub, steppe, savanna, cultivated land, grazed land, brushy clearings, and lower reaches of arid subtropical scrub, ranging along entire length of Pacific Region, northwest through Río Tehuantepec basin into Oaxaca Valley in the Interior, and north in Isthmus to a point 11.7 road mi south of Matías Romero. One record for Atlantic Region, 2 seen by the Berretts and me at Temascal on 2 December 1961. *Elevations*: sea level to 5,400+ ft.

*Breeding* (all data): 8 April 1966, active nest completed, contents unknown (near Rancho Sol y Luna, Rowley [1984:90] observation); 13 April 1912, nest with two eggs (San Pedro y San Pablo Etna, J. C. F. van Balen, eggs FMNH egg collection 6968); 29 April 1964, nest with young (Colonia Rodolfo Figueroa, Galley, female nestling WFVZ-HC 12411).

*Subspecies*: *audubonii* Cassin. I use the taxonomy of Stresemann and Amadon (1979:393), except that I follow Wetmore (1965:273-274) in the recognition of *audubonii* as a race distinct from *P. p. cheriway* (Jacquin).

*Herpetotheres cachinnans* (Linnaeus). Laughing Falcon.

Fairly common permanent resident in Atlantic and Pacific Regions in savanna and openings within tropical evergreen and tropical deciduous forests, recorded northwest in Río Tehuantepec basin to Las Tejas. *Elevations*: sea level to 800+ ft.

*Breeding* (all data): 20 February 1961, enlarged follicle (6 mm, 15 mi north of Matías Romero, Schaldach, AMNH 775887).

*Subspecies*: *chapmani* Bangs and Penard. I follow Wetmore (1944:35–38; 1965: 263–264) in treating all populations south to Honduras as this race, which is only weakly differentiated from *H. c. cachinnans* (Linnaeus).

*Micrastur ruficollis* (Vieillot). Barred Forest-Falcon.

Very uncommon permanent resident in Atlantic Region from 300 to 4,100+ ft in tropical evergreen forest and lower reaches of cloud forest and in Pacific Region in tropical semideciduous and at least some cloud forests of Sierra Madre de Chiapas (3,000 to 5,300 ft) and (disjunctly) Sierra de Miahuatlán (2,400 to 8,600 ft), in the last range recorded west to kilometer marker 183, Jamaica Junction, and a point 1 mi west of San Gabriel Mixtepec, the northwesternmost localities in Pacific range of species (occurrence in Guerrero [A.O.U. 1983:124] needs substantiation).

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *oaxacae* Phillips (1966:91), endemic to Sierra de Miahuatlán (see Type Localities); *guerilla* Cassin, remainder of state, including Pacific side of Sierra Madre de Chiapas (CAS, WFVZ). The race *oaxacae*, which seems to me well-marked, is known only from the two syntypes (ARPC) and four additional specimens (CAS), all taken in the area above San Gabriel Mixtepec.

*Micrastur semitorquatus* (Vieillot). Collared Forest-Falcon.

Uncommon permanent resident in Pacific swamp forest of Pacific Region, recorded from a point 16 road mi northwest of Puerto Escondido east to Puerto Angel, and (more or less disjunctly) adjacent to the Sierra Madre de Chiapas. Should be sought in the Sierra de Yucuyacua, because it occurs in Guerrero. Probably a very rare permanent resident in Atlantic Region, where there is only one record, a male (MLZ 59137) taken by Lamb at 500 ft elevation 4 mi south of Loma Bonita on 19 April 1955. One intervening record, a male (AMNH 44955) taken by Sumichrast at Tehuantepec City on 23 November 1869. *Elevations*: sea level to 1,600 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *naso* (Lesson).

*Falco sparverius* Linnaeus. American Kestrel.

Common winter resident and transient migrant (see Migration, Transient Migrants) throughout state in savanna, arid tropical scrub, arid subtropical scrub, and openings within all forest habitats. Very uncommon and apparently local permanent resident in openings within arid pine-oak forest of Interior in vicinities of San Pedro Juchatengo (3,500 to 4,000 feet) and Tamazulapan del Progreso (about 6,500 feet) and of Pacific Region in Sierra Madre de Chiapas near Pericos (about 3,200 feet, 1 seen, 10 May 1972, Binford) and 7 road mi north-northwest of Ciénega, Chiapas (but in Oaxaca; 4,350 ft, 1 seen, 11 May 1972, Binford).

*Dates:* winter residents (racially determined specimens and sight records in non-breeding habitats or localities), 26 September to 19 April. *Elevations:* sea level to 8,750 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies:* *sparverius* Linnaeus, winter resident; *tropicalis* (Griscom), permanent resident and only records for Mexico west of Isthmus. I assign to *tropicalis* four specimens taken near San Pedro Juchatengo, as follows: 8 mi south, 9 July 1963, Rowley, male, AMNH; 5 mi north, 4,000 ft, 4 October 1964, Rook, male WFVZ 20742, 85.5 g, not fat; 7 mi south, 3 October 1964, Rook, female, CAS, 83.7 g; about 8.5 mi north (at kilometer marker 136), 3,500 ft, 26 July 1965, Rowley and F. Flores, immature male, CAS, 80.8 g. Compared to *sparverius*, these males are smaller, paler below, and lack the reddish crown patch.

*Falco columbarius* Linnaeus. Merlin.

Uncommon transient migrant and very uncommon winter resident in open areas of Pacific and Interior Regions. To be expected in Atlantic Region. *Dates:* 20 October to 10 April. *Elevations:* sea level to 5,100 ft.

*Subspecies:* *bendirei* Swann, according to A. R. Phillips (in litt.), based on identification of specimen (Santa María del Tule, 6 January 1965, ARPC). This race perhaps is not distinguishable from nominate *columbarius*; see Stresemann and Amadon (1979:414). I cannot allocate to race the only other specimen I have seen (Tehuantepec City, 15 March 1917, Shufeldt, female, UMMZ 136913).

*Falco femoralis* Temminck. Aplomado Falcon.

Uncommon inhabitant of savanna in extreme southwestern corner of Pacific Region in vicinity of San José Estancia Grande. One old record for Tehuantepec City. Possibly a permanent resident, but only known dates (14 to 19 February) indicate status as winter resident only. *Elevations:* 100 to 300 ft.

Lawrence (1876:39) records a specimen taken by Sumichrast on an unknown date at Tehuantepec City. In 1964 on a small savanna at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande, Morony and I recorded the following birds: 1 seen on 14 February, 1 seen and another taken on 18 February (Binford, female, LSUMZ 32953, 367 g, little fat, largest follicle 2 mm), and 4 seen on 19 February.

*Subspecies:* *septentrionalis* Todd.

*Falco ruficularis* Daudin. Bat Falcon.

Permanent resident from sea level to 3,000 ft, fairly common in Atlantic Region and in Pacific Region in Sierra Madre de Chiapas and vicinity of Puerto Escondido; frequents openings within tropical evergreen, tropical semideciduous, tropical deciduous, and Pacific swamp forests. Unrecorded elsewhere in Pacific Region. Occasional visitant in the Interior, for which there are two records: La Parada (Friedmann 1950:676), elevation unknown but perhaps near the 7,900 ft of town; near Oaxaca City, elevation unknown but probably close to the 5,127 ft of town, 13 August 1868, Sumichrast, female, USNM 54217.

*Breeding* (all data): 27 March 1967, nest with three eggs (Rancho Carlos Minne, 4,000 ft, Galley, WFVZ 21229); 17 April 1967, nest with three eggs (3 mi south of Rancho Carlos Minne, 4,000 ft, Galley, WFVZ 21228).

*Subspecies:* *petoensis* Chubb. For validity of *petoensis*, see Wetmore (1965:286).

*Falco peregrinus* Tunstall. Peregrine Falcon.

Uncommon winter resident on Pacific coast, frequenting ocean shore and coastal lagoons. To be expected elsewhere in state at least on migration. Should be sought as a rare permanent resident. *Dates*: 9 October to 21 April. *Elevation*: sea level.

The only specimen for Oaxaca is an adult female (MLZ 47664) taken by Lamb at Punta Paloma on 9 February 1948. In 1939 at a beach near Salina Cruz, F. W. Loetscher (in litt.) saw 1 bird on 21 March and 2 adults on 22 March. In the fall of 1961 and winter of 1962, the Berretts and I made the following observations: 1 each on 9 and 11 October and 20 January at Puerto Angel; 1 each on 19, 20, and 21 October, and 2 each on 9 and 12 January, at southwestern corner of Laguna Superior 19 road mi southwest of Juchitán. In 1964 Morony and I observed this species as follows: 1 on 23 February, 2 on 25 February, and 2 on 1 March at Minitán; 1 on 21 April at Puerto Angel. Arnold, Delwiche, and I saw 1 on 5, 6, and 19 February 1974 over the town of Puerto Escondido; during the evening of the last date, Arnold watched it catch a bat.

*Subspecies*: *anatum* Bonaparte. The specimen seems to me intermediate in size and coloration between *anatum* and *tundrius* White (1968:183) but somewhat closer to the former. Its measurements are: wing (chord) 343 mm, tail 175, tarsus 51.6, and culmen (from cere) 21.9.

#### Family CRACIDAE

*Ortalis vetula* (Wagler). Plain Chachalaca.

Common permanent resident in openings within tropical evergreen forest of Atlantic Region south in Isthmus at least to La Ranchería (16 June 1895, Nelson and Goldman, two unsexed juveniles, USNM 155604–155605), Guichicovi (25 September 1869, Sumichrast, male, USNM 59786), and Santa María Chimalapa (12 March 1869, Sumichrast, male USNM 58969; and MacDougall 1971: 100). *Elevations*: 100 to 1,900 ft.

*Breeding*: 18 March 1961, enlarged follicle (35 mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24229, 546.9 g), to 13 June 1961, "large egg in oviduct" (Sarabia, Schaldach, skin AMNH 776254); see also above.

*Subspecies*: *vetula* (Wagler). I follow Vaurie (1965:32) in considering specimens named *fulvicauda* by Miller and Griscom (see Type Localities) as individual variants of *O. v. vetula*. See *O. poliocephala*.

*Ortalis poliocephala* (Wagler). Wagler's Chachalaca.

Common permanent resident in tropical deciduous forest, tropical semideciduous forest, and arid tropical scrub, occurring along entire length of Pacific Region, northwest in Río Tehuantepec basin to a point at 3,200 ft elevation 18 mi southeast at Santiago Matatlán, and north across Isthmus into Atlantic Region to El Barrio (Sumichrast; Lawrence 1876:45), Río Grande (6 mi south of Matías Romero, 7 April 1962, Schaldach, male, AMNH 778224, fat, testis 12 × 9 mm), and perhaps Santa María Chimalapa (the female, AMNH 50435, taken by A. C. Buller on 8 March 1890 at "Chimalapa" might, however, pertain to San Miguel Chimalapa). No reliable record for Interior; occurrence on Cerro San Felipe (Wagner, *in De-lacour and Amadon 1973:102*) seems to me very unlikely. *Elevations*: sea level to 6,000 ft.

*Breeding*: 13 April 1965, nest with three eggs (near La Cima, 5,800 ft, F. Flores

for Rook, WFVZ 24359), to 25 June 1966, nest with three pipped eggs (Rancho Sol y Luna, Rowley [1984:96–97] observation); 13 May 1965, prejuvenile (kilometer marker 195 on Puerto Escondido Road, 4,300 ft, Galley, male, CAS, 290.4 g, no fat).

*Subspecies: poliocephala* (Wagler). I agree with Moore and Medina (1957), Vaurie (1965), and the A.O.U. (1983:130–131) that *Ortalis poliocephala* should be considered specifically distinct from *O. vetula*. They occur within about eight mi of each other (*vetula* at Guichicovi and La Ranchería and *poliocephala* at Río Grande and El Barrio), and their ranges might overlap at Santa María Chimalpa and perhaps elsewhere. No hybrids are known.

*Penelopina nigra* (Fraser). Highland Guan.

Permanent resident in Pacific Region in Sierra Madre de Chiapas, common from 4,000 to 5,600 ft in cloud forest and uncommon down to 800 ft in tropical semideciduous and Pacific swamp forests. Oaxaca represents northwestern limit of entire range of species.

*Breeding*: 19 March 1964, nest with two eggs (La Golfá, northwest of Tapanatepec, Rook, WFVZ 24355), to 26 May 1967, nest with one egg (Cerro Baúl, Rowley [1984:103] observation); 30 April 1964, prejuvenile (Colonia Rodolfo Figueroa, Rook, male, WFVZ 12469).

*Subspecies: nigra* (Fraser). This species is probably monotypic; see Delacour and Amadon (1973:166).

*Penelope purpurascens* Wagler. Crested Guan.

Uncommon permanent resident in Atlantic Region (300 to 7,200 ft) in tropical evergreen and cloud forests and in Pacific Region in Pacific swamp, tropical semideciduous, and cloud forests of Sierra Madre de Chiapas (800 to 4,500 ft) and Sierra de Miahuatlán (4,500 to 10,000 ft).

*Breeding* (all data): 4 April 1967, nest with three eggs (above Rancho Carlos Minne, 4,500 ft, Rowley and Galley, WFVZ 21312); 8 May 1965, 2 prejuveniles seen (ridges above kilometer marker 195 on Puerto Escondido Road, Rowley [1966:120]); 21 October 1964, active nest, condition unknown (Cerro Verde, 10,000 ft, Rowley [1966:120]).

*Subspecies: purpurascens* Wagler.

*Crax rubra* Linnaeus. Great Curassow.

Very uncommon permanent resident in Atlantic Region in heavy tropical evergreen forest and in Pacific Region in Pacific swamp and tropical semideciduous forests of Sierra Madre de Chiapas. *Elevations*: 100 to 1,800 ft; 5,000 ft (above Rancho Carlos Minne, Cerro Baúl, 5 April 1967, Rowley and Juan Nava S., male, WFVZ-HC 19227).

*Breeding* (all data): no date, nest under construction (Monte Rico, MacDougall [1971:89] observation); 30 March 1967, soft-shelled egg in oviduct (few miles north of Rancho Carlos Minne, Galley [Rowley 1984:106]).

*Subspecies: rubra* Linnaeus.

#### Family PHASIANIDAE

*Dendrortyx macroura* (Jardine and Selby). Long-tailed Wood-Partridge.

Uncommon permanent resident in all Regions in humid pine-oak forest and adjacent cloud forest, recorded east to Cerro Zempoaltepec and Río San Marcial,

the southeasternmost localities in entire range of species. Unrecorded from Sierra de Yucuyacua. *Elevations*: about 3,000 ft; 4,200 to 10,000 ft.

*Breeding*: 14 April 1965, two nests each with four eggs (near La Cima, 5,800 ft, Rowley [1966:121], one egg set WFFVZ 24316), to 10 June 1967, 2 prejuveniles seen with parent (Cerro San Felipe, 10,000 feet, Rowley [1984:106]).

*Subspecies*: *inesperatus* Phillips (1966:91), endemic to Sierra de Miahuatlán; *oaxacae* Nelson, endemic to remainder of state; see Type Localities. I have examined 16 specimens (CAS) of *inesperatus*; although the characters given by Phillips are of a rather minor nature, they seem consistent, and the race thus seems worthy of recognition.

*Odontophorus guttatus* (Gould). Spotted Wood-Quail.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to Teotalcingo and in Pacific Region in tropical semideciduous forest and lower reaches of cloud forest of Sierra Madre de Chiapas. *Elevations*: 250 to about 5,500 ft.

*Breeding* (all data): 28 March 1962, enlarged testes (19 × 9 mm, Montebello, Schaldach, AMNH 778225).

*Subspecies*: monotypic, following Edwards and Lea (1955:39).

*Dactylortyx thoracicus* (Gambel). Singing Quail.

Fairly common permanent resident of Pacific Region in Sierra Madre de Chiapas, occurring in cloud forest and adjacent Pacific swamp and tropical semideciduous forests. Should be sought west of Isthmus. *Elevations*: 800 to 5,000 ft.

*Breeding* (all data): 7 April 1964, hard-shelled egg in oviduct (12 mi north-northeast of Zanatepec, 4,900 ft, Binford, adult LSUMZ 32985, 234.4 g, little fat); 19 May 1967, prejuvenile (above Colonia Rodolfo Figueroa, 5,000 ft, Rowley and Galley, unsexable, WFFVZ-HC 19230).

I have examined 36 Oaxaca specimens (LSUMZ, WFFVZ) from the following localities: Santa Efigenia, 800 ft; La Cumbre near Rancho Sol y Luna; at, above (5,000 ft elevation), and 5 km (3.1 mi) from Colonia Rodolfo Figueroa; La Golfa, near Colonia Rodolfo Figueroa; and 12 mi north-northeast of Zanatepec, 4,900 ft.

*Subspecies*: *chiapensis* Nelson; I follow the taxonomy of Banks (1987). See Type Localities.

*Cyrtonyx montezumae* (Vigors). Montezuma Quail.

Fairly common permanent resident in the Interior in the Sierra Aloapaneca, Sierra de Miahuatlán, Sierra de Yucuyacua, and Sierra de Cuatro Venados, occurring in arid and semiarid pine-oak forests (including highland pine) and upland oak scrub. To be expected in suitable habitats throughout Interior. Southeasternmost point in entire range of species is La Cieneguilla, Oaxaca (specimen [February 1895, Nelson and Goldman, male, USNM 155552] labeled "Mts. near Ozolotepec"). *Elevations*: 3,500 to 10,000 ft.

*Breeding* (all data): 9 July 1967, hard-shelled egg and egg without shell (22 × 16 mm) in oviduct and two enlarged follicles (5 mi northeast of San Juan del Estado, 7,000 ft, Rowley [1984:107], adult female, WFFVZ-HC 19138); 24 July 1965, soft-shelled egg in oviduct and three enlarged follicles (near kilometer marker 136 on Puerto Escondido Road, 3,500 ft, Rowley [1966:21], WFFVZ 22250, 209.7 g).

*Subspecies*: *rowleyi* Phillips (1966:92), endemic to at least eastern part of Sierra

de Miahuatlán; a well-marked race; see Type Localities. Birds elsewhere need to be reexamined, as they might be, at least in part, *sallei* Verreaux; see Phillips (1966:93). Nominate *montezumae* (Vigors), often listed for Oaxaca, does not occur in the state (Leopold and McCabe 1957).

*Cyrtonyx ocellatus* (Gould). Ocellated Quail.

Uncommon permanent resident in Pacific Region in pine-oak forests of Sierra Madre de Chiapas at several stations above Tapanatepec, including La Cumbre near Rancho Sol y Luna, the northwesternmost locality in entire range of species. *Elevations*: 1,200 to 5,000 ft.

*Breeding* (all data): 26 April 1966, enlarged testes (11 × 6 mm, about 20 km [12.4 mi] northwest of Rizo de Oro, Chiapas, Galley, WFVZ-HC 16952).

*Subspecies*: monotypic, following Monroe (1968:102) and Hellmayr and Conover (1942:287); see *C. Sumichrasti* in Type Localities.

*Colinus virginianus* (Linnaeus). Northern Bobwhite.

Common permanent resident along entire length of Pacific Region and north through Isthmus portion of Atlantic region into Veracruz, occurring in savanna, arid tropical scrub, cultivated land, grazed land, and brushy clearings within tropical deciduous and tropical evergreen forests. Reliably recorded in Atlantic Region outside Isthmus only at a point 3 road mi east of Temascal (8 June 1964, 2 seen, Morony and Binford); record for Tutla, based on a del Toro Avilés specimen (30 April 1941, male, FMNH Conover Collection 15029), is questionable. Unrecorded in the Interior. *Elevations*: sea level to 3,050 ft.

*Breeding*: 19 May 1964, hard-shelled egg in oviduct (1 mi east of Putla de Guerrero, 2,400 ft, Binford, adult LSUMZ 32981, 179.8 g, little fat; egg LSUMZ 51255), to 25 June 1966, nest with eight eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 20696).

*Subspecies*: *atriceps* (Ogilvie-Grant), endemic to extreme western Pacific Region; *harrisoni* Orr and Webster (1968:37), endemic to central Pacific Region; *coyolcos* (Müller), eastern Pacific Region; *thayeri* Bangs and Peters, endemic to eastern Atlantic Region, south in Isthmus to Chivela. The races *pectoralis* (Gould) (contra Goldman 1951:323), *insignis* Nelson (contra Aldrich and Duvall 1955: 18), and *nigrippectus* Nelson have not, in my opinion, been collected in Oaxaca. Sight records from Temascal could pertain to *thayeri* or *pectoralis*. See Type Localities.

#### Family RALLIDAE

*Laterallus ruber* (Sclater and Salvin). Ruddy Crane.

Uncommon and very local permanent resident in freshwater marshes probably throughout lowlands but recorded at only two definite localities, in Atlantic Region at a point about 1 mi east of Sarabia and in Pacific Region near Putla de Guerrero. Data on del Toro Avilés specimens from Tutla (MLZ, FMNH) are questionable. *Elevations*: 300 to 2,400 ft.

*Breeding* (all data): 18 July 1962, two juveniles (3 km [1.9 mi] east of Sarabia, Schaldach, male AMNH 768796, female AMNH 768795); 21 October 1965, two juveniles ("3 km E (?)" of Putla de Guerrero, Juan Nava S., males, R. W. Dickerman collection).

*Subspecies*: monotypic, following Dickerman (1968:98).

*Rallus limicola* Vieillot. Virginia Rail.

Status uncertain. Only one record, a male (little fat, testes  $6 \times 3$  mm; specimen in possession of R. W. Dickerman) taken by Juan Nava S. on 25 October 1965 in Pacific Region in rice fields "2½ km. E?" of Putla de Guerrero. *Elevation*: about 2,400 ft.

*Subspecies*: unknown; according to R. W. Dickerman (in litt.), his specimen is either *limicola* Vieillot or *friedmanni* Dickerman (1966:215).

*Aramides cajanea* (Müller). Gray-necked Wood-Rail.

Fairly common permanent resident, widespread in Atlantic Region in swamps and near shallow aquatic habitats within tropical evergreen forest, and local in Pacific Region in mangrove swamp and Pacific swamp forest from Santa Efigenia west at least to a point 8 road mi northwest of Puerto Escondido. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 10 June 1961, two prejuveniles (Sarabia, Schaldach, male AMNH 776257, female AMNH 776258).

*Subspecies*: *mexicana* Bangs.

*Amaurolimnas concolor* (Gosse). Uniform Crake.

Rare and local in swampy tropical evergreen forest of Atlantic Region in vicinity of Isthmus, recorded only near Sarabia and possibly (del Toro Avilés) at Tutla; probably a permanent resident, but recorded with certainty only from 15 July to 15 August. *Elevation*: about 300 ft.

*Breeding* (all data): see below.

I know of seven reliable specimens from Oaxaca. Dickerman (1971:55) mentions three adult males collected by Schaldach near Sarabia on 15 July 1962 (AMNH 768793) and 2 and 12 August 1964. Two were taken by Schaldach in 1964 (D. M. Niles in litt.): prejuvenile male (DEL 27531, no fat, testes small), 5 km (3.1 mi) east of Sarabia, 4 August; and adult male (DEL 23838, not fat, testes  $9 \times 6$  mm), Arroyo Tonto near Sarabia, 15 August. I examined two specimens collected by Schaldach in 1964: adult male (WFVZ 22324, little fat, testes  $11 \times 6$  mm), 2 km (1.2 mi) west of Sarabia, 1 August; and adult female (WFVZ 22323, not fat, many developing follicles, largest 4 and 3 mm), 0.5 km (0.3 mi) east of Sarabia, 4 August. M. del Toro Avilés took this species purportedly at Tutla in 1941, as follows: single males on 26 February and 29 April and a female on 27 April (FMNH Conover Collection 15034, 15036, 15035, respectively); these records are questionable.

*Subspecies*: *guatemalensis* (Lawrence). This race might not be separable from *castaneus* (Pucheran) of South America (Hellmayr and Conover 1942:342), but see Monroe (1968:103–104).

*Porzana carolina* (Linnaeus). Sora.

Very uncommon winter resident in marshes of Pacific Region, recorded only at Rancho de Cacoprieto (Sumichrast 1881:229), Putla de Guerrero (20 December 1965, male in possession of R. W. Dickerman, very fat, testes  $7 \times 3$  mm; Dickerman in litt.), at 50 ft elevation 18 mi west-northwest of San Pedro Pochutla (5 February 1974, 1 seen by Binford), and at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande (16 February 1964, Binford, male, LSUMZ 33000, 82.5 g, very fat, testes  $2 \times 1$  mm). The only Interior record, purportedly

from San Pablo Villa de Mitla (7 January 1942, probably del Toro Avilés, male, MLZ) is questionable. Should be sought in Atlantic Region.

*Pardirallus maculatus* (Boddaert). Spotted Rail.

Common permanent resident in Pacific Region at 2,400 ft elevation in the river valley just east of Putla de Guerrero, where found in marshes (Fig. 24), weedy ponds, flooded pastures, rice fields, and long-grass savanna. Should be sought in Atlantic Region and elsewhere in Pacific Region.

*Breeding* (all data): see below.

In 1964 Morony and I recorded the following data 1 mi east of Putla de Guerrero: 18 May, 1 bird seen; 19 May, 7 seen, of which two were collected by Morony (male, LSUMZ 32987, 190.2 g; female, LSUMZ 32988, 140.1 g, moderately fat); 20 May, 7 seen, of which four were collected (Morony, female, LSUMZ 32990, 162.9 g, moderately fat; Binford, male, LSUMZ 32991, 159.6 g, little fat; Binford, male, LSUMZ 32992, 175.6 g, moderately fat; Binford, male, LSUMZ 32993, 189.1 g, moderately fat); 22 May, 2 seen, of which one was taken by Morony (female, LSUMZ 32989, 139.8 g, little fat). All specimens had the gonads moderately enlarged, each male with the largest testis measuring about 10 × 5 mm, and each female with the largest follicle 3 or 4 mm in diameter. One female had earthworms in the stomach. At least three of the specimens, all males, were undergoing body molt.

The only other specimens for Oaxaca were collected 3 km northeast of Putla de Guerrero on 24 October 1965 (Juan Nava S., prejuvenile, Carnegie Museum of Natural History) and 19 December 1965 (Santos Farfán B., female, CU, moderately fat) and published by Dickerman and Haverschmidt (1971:444) and Parkes et al. (1978:298).

I am informed by the inhabitants of Putla de Guerrero that during the dry season the Spotted Rails frequent marshes and small weed-choked ponds in the vicinity of the river and then disperse over the valley to breed during the rainy season, when water is said to cover the valley floor to a depth of two feet. So common is this species that the natives consider it a nuisance in the rice fields.

*Subspecies: insolitus* (Bangs and Peck).

*Porphyryla martinica* (Linnaeus). Purple Gallinule.

Locally a fairly common permanent resident in marsh at edges of weed-choked freshwater ponds in Atlantic and Pacific Regions, recorded in only four areas: several ponds between San Juan Bautista Tuxtepec and Loma Bonita, Lagunas Sol y Luna, mouth of the Río Tonameca, and 1 mi east of Putla de Guerrero. *Elevations*: sea level to 2,400 ft.

*Breeding* (all data): range, habitat, and dates.

*Gallinula chloropus* (Linnaeus). Common Moorhen.

Winter resident in shallow freshwater habitats, usually uncommon but at times locally common; probably occurs in suitable habitat throughout state but so far recorded only in lowest portions of Atlantic and Pacific Regions. Meager data suggest numbers are augmented by transient migrants. Possibly a rare and local permanent resident. *Dates*: 3 November to 28 April. *Elevations*: sea level to 100 ft.

*Subspecies: cachinnans* Bangs.

*Fulica americana* Gmelin. American Coot.

Fairly common winter resident in Pacific lowlands in shallows of ponds, lakes, and lagoons. To be expected in Atlantic Region. No fall record. Possibly a local permanent resident. *Dates*: January to 28 April. *Elevations*: sea level to 300 ft.

*Subspecies*: *americana* Gmelin.

#### Family HELIORNITHIDAE

*Heliornis fulica* (Boddaert). Sungrebe.

Rare permanent resident in lowlands of Atlantic Region in swamp forest and forest-edged ponds and creeks within tropical evergreen forest, recorded northwest at least to a point 1 mi southwest of San Juan Bautista Tuxtepec and south in Isthmus to a point 10 mi north of Matías Romero. *Elevations*: 100 to 300 ft.

*Breeding* (all data): range, habitat, and dates.

The only reliable specimens for the state are a male (WFVZ-HC 4874) taken by Rook 10 mi north of Matías Romero on 20 February 1961 and two females collected by Lamb 3 mi north of Loma Bonita on 1 February 1951 (MLZ 51362) and 18 mi north of Matías Romero on 8 June 1955 (MVZ 133473), both at 300 ft elevation. In addition, the Berretts and I saw 1 bird at 100 ft elevation 1 mi southwest of San Juan Bautista Tuxtepec on 20 November 1961. The specimen (female, FMNH 119415) supposedly from Tutla on 19 April 1941, published by Blake (1950:399), was taken by del Toro Avilés and hence is of questionable origin and date. The only other published account is the bare mention of the state of Oaxaca by Beristain and Laurencio (1894:214), whose records often are unreliable.

#### Family ARAMIDAE

*Aramus guarauna* (Linnaeus). Limpkin.

Very uncommon permanent resident in brushy freshwater swamps (not swamp forest) and adjacent, tall brushy marsh in Pacific Region from Chiapas border west to Tehuantepec City. Unrecorded on Pacific slope of Mexico northwest of Isthmus. *Elevations*: 50 to 800+ ft.

*Breeding* (all data): 17 July 1957, enlarged follicle (9 mm, Juchitán, J. T. Marshall, Jr., LSUMZ 39433).

*Subspecies*: *dolosus* Peters.

#### Family BURHINIDAE

*Burhinus bistriatus* (Wagler). Double-striped Thick-knee.

Fairly common permanent resident in savanna on Pacific side of Tehuantepec region from Tapanatepec and Punta Paloma west to Tehuantepec City and Huilo-tepec and north to Chivela and Niltepec; also at Rancho Las Animas. To be expected between Tehuantepec City and Rancho Las Animas. Unrecorded on Pacific slope of Mexico northwest of Oaxaca. Should be sought in savanna on Atlantic side of Isthmus. *Elevations*: sea level to 3,000 ft.

*Breeding* (all data): 28 February 1960, "large eggs ready for laying" (6 mi east of Niltepec, Schaldach, LSUMZ 39534, data from field catalogue in WFVZ); 28 March 1961, enlarged testes (11 × 5 mm, near Ixhuatán, Schaldach, AMNH 775894).

*Subspecies*: *bistriatus* (Wagler); see Type Localities.

## Family CHARADRIIDAE

*Pluvialis squatarola* (Linnaeus). Black-bellied Plover.

Common winter resident along Pacific coast on mud flats and sand beaches. To be expected occasionally in open areas throughout remainder of state. *Dates*: 18 October to 31 May. *Elevation*: sea level.

*Pluvialis dominica* (Müller). Lesser Golden-Plover.

Very uncommon spring transient migrant and casual winter resident in Pacific Region on mud flats, savannas, river bars, and sand beaches. One winter record, a bird seen by Binford on 16 February 1964 on savanna at 300 ft elevation 9 mi west-northwest of San José Estancia Grande. One record for Interior, a bird seen by Morony at 5,000 ft elevation 1 mi west of Santa María Coyotepec on 28 May 1964. To be expected in Atlantic Region in the few areas of suitable habitat. Unrecorded in fall. *Dates*: 16 February; 27 March to 28 May. *Elevations*: sea level to 300+ feet; 5,000 ft.

*Subspecies*: *dominica* (Müller); sight records above do not exclude *P. d. fulva* (Gmelin).

*Charadrius collaris* Vieillot. Collared Plover.

Uncommon permanent resident in Pacific Region on mud flats and sand beaches and on bars in larger rivers. To be expected on river bars of Atlantic Region. Sympatric with *C. alexandrinus* at Laguna Superior, at least in October; at this locality and date, however, *collaris* may be only a winter resident. *Elevations*: sea level to 100+ ft.

*Breeding* (all data): 19 April 1964, three prejuveniles attended by adult (mouth of Río Tonameca, Binford observation).

*Charadrius alexandrinus* Linnaeus. Snowy Plover.

Uncommon permanent resident on mud flats at Laguna Superior, the southeasternmost breeding locality on Pacific coast of the Americas. To be expected elsewhere on Pacific coast of Oaxaca. The only records for Guatemala (Dickerman 1975:413), Chiapas (Hunn 1973), and Oaxaca suggest recent colonization of this part of Pacific coast. *Elevation*: sea level. See *Charadrius collaris*.

*Breeding* (all data): see below.

I recorded the Snowy Plover on nine of 12 days spent at a point 19 road mi southwest of Juchitán at the southwestern corner of Laguna Superior. In 1961 Wolf and I recorded the following data: 16 May, 5 seen, of which two were collected (Wolf, male, LSUMZ 24236, 34.4 g, moderately fat, testes  $5 \times 2$  and  $3 \times 2$  mm; Binford, male, LSUMZ 24237, 33.7 g, slight fat, testes  $8 \times 4$  and  $6 \times 4$  mm); 17 May, 2 seen, of which one, a prejuvenile a few days old, was taken (Binford, male, LSUMZ 24238, 9.7 g, little fat, testes minute); 18 May, 2 seen. In the fall of 1961 and winter of 1962 the Berretts and I saw 14 on 19 October (including a male taken by D. G. Berrett, LSUMZ 27391, 35.9 g, moderately fat, testes small), 27 on 20 October, 2 on 21 October, and 2 each on 9 and 11 January. Finally, on 31 May 1964 Morony and I saw 12 birds.

*Subspecies*: *nivosus* (Cassin). I follow Blake (1977:551) in merging the race *tenuirostris* (Lawrence) with *nivosus*.

*Charadrius wilsonia* Ord. Wilson's Plover.

Uncommon winter resident, and possibly a rare permanent resident, along Pacific coast on mud flats at Laguna Superior and on sand beach at mouth of Río Tonameca. To be expected elsewhere on Pacific coast. *Dates*: 18 October to 28 April. *Elevation*: sea level.

In the fall of 1961 and winter of 1962, at the southwestern corner of Laguna Superior 19 road mi southwest of Juchitán, the Berretts and I recorded the following data: 18 October, 10 birds seen, of which one was taken (Binford, female, LSUMZ 27394, 52.7 g, moderately fat, fol. small); 19 October, 5 seen; 20 October, 5 seen; 21 October, 7 seen; 9 January, 3 seen; 11 January, 2 seen. In 1964 at the mouth of the Río Tonameca, Morony and I saw 2 birds on 19 April and again on 28 April.

*Subspecies*: *beldingi* (Ridgway).

*Charadrius semipalmatus* Bonaparte. Semipalmated Plover.

Fairly common winter resident in Pacific lowlands on mud flats, river bars, and sand beaches. To be expected occasionally throughout remainder of state. *Dates*: 5 August to 1 June. *Elevations*: sea level to 100 ft.

*Charadrius vociferus* Linnaeus. Killdeer.

Winter resident at edges of rivers, ponds, and lakes, and on some savannas, fairly common in Pacific Region except on coast and uncommon in Atlantic region. Not definitely recorded from Interior; specimen for "Oaxaca" taken by Boucard (Sclater 1859b:393) might pertain to state instead of city. Apparently avoids saline habitats. *Dates*: 21 October to 29 March. *Elevations*: 50 to 800 ft.

*Subspecies*: *vociferus* Linnaeus.

## Family HAEMATOPODIDAE

*Haematopus palliatus* Temminck. American Oystercatcher.

Very uncommon winter resident at edges of saline lagoons, especially on sand and shell beaches, along Pacific coast of Tehuantepec region from Punta Paloma west to San Mateo del Mar; possibly a permanent resident but recorded only from 21 February to 1 April. Record by Sumichrast (1881:232) from the inland locality of "Tehuantepec (villa de)" [= Tehuantepec City] needs confirmation. *Elevation*: sea level.

*Subspecies*: *frazari* Brewster. Oaxaca specimens are variously intermediate between *frazari* of northwestern Mexico and *palliatus* Temminck of Pacific southern Central America and the Atlantic coast; for convenience, and in consideration of geographic distribution, I follow Jehl (1985:489) in treating Oaxaca birds as *frazari*.

## Family RECURVIROSTRIDAE

*Himantopus mexicanus* (Müller). Black-necked Stilt.

Common permanent resident in Pacific Region at edges of ponds, lakes, and coastal lagoons. *Elevations*: sea level to 300 ft.

*Breeding* (all data): 27 May 1969, nest with four eggs (Isla de los Pajaros in Mar Muerto, Galley, WFVZ 52087).

*Subspecies*: *mexicanus* (Müller).

*Recurvirostra americana* Gmelin. American Avocet.

Fairly common winter resident locally in lowlands of Pacific Region near edges of ponds, lakes, and brackish lagoons; recorded only from 21 February to 1 June. *Elevations*: sea level to 50 ft.

Although Friedmann et al. (1950:101) list Oaxaca in the range of the American Avocet, I find no definite published or specimen records prior to my own in 1964. During that year Morony and I recorded the following data: 1 to 10 birds noted daily from 21 February to 1 March at sea level at Minitán (including one female taken by Binford on 22 February, LSUMZ 33011, 296.3 g, very fat, follicles not enlarged); 15 seen at 50 ft elevation on a small pond 12 road mi southeast of Santiago Jamiltepec on 2 March; 3 seen at sea level at mouth of Río Tonameca on 28 April; 178 noted at sea level on a mud flat 15 road mi south of Reforma on 1 June.

## Family JACANIDAE

*Jacana spinosa* (Linnaeus). Northern Jacana.

Common permanent resident in marshy edges of shallow, weed-choked freshwater habitats in lower portions of Atlantic and Pacific Regions. *Elevations*: sea level to 800+ ft.

*Breeding* (all data): 4 December 1965, prejuvenile (4 km [2.5 mi] west of Tapanatepec, female, WFVZ-HC 16783, 57.5 g).

*Subspecies*: monotypic, following Blake (1977:532).

## Family SCOLOPACIDAE

*Tringa melanoleuca* (Gmelin). Greater Yellowlegs.

Common winter resident in shallow portions of aquatic habitats, especially freshwater, in lowlands of Pacific Region. To be expected elsewhere at least as a transient migrant. *Dates*: 18 October to 1 June. *Elevations*: sea level to 300 ft.

*Tringa flavipes* (Gmelin). Lesser Yellowlegs.

Fairly common winter resident in shallow portions of open aquatic habitats, primarily freshwater, in lowlands of Pacific Region. To be expected elsewhere at least as a transient migrant. *Dates*: 20 October to 22 May. *Elevations*: sea level to 300 ft.

*Tringa solitaria* Wilson. Solitary Sandpiper.

Uncommon transient migrant in shallow portions of freshwater habitats of Pacific Region. Occasional winter resident at least in lowlands of Pacific Region (one record, 2 mi east of Tehuantepec City, 9 January 1962, 1 seen by the Berretts and Binford). One record for Atlantic Region (1 mi southwest of Valle Nacional, 300 ft, 20 April 1961, 2 seen by Wolf and Binford). One record for Interior (Río Molino, 8,500 ft, 5 May 1962, Rowley, female, AMNH 766542). *Dates*: 9 January; 11 March to 8 May; 15 August to 21 October. *Elevations*: 50 to 800+ ft; 8,500 ft.

*Subspecies*: *solitaria* Wilson, according to Bangs and Peters (1928: 387); *cinnamomea* (Brewster).

*Catoptrophorus semipalmatus* (Gmelin). Willet.

Very common winter resident, restricted to shallows and mud flats of saline lagoons. Should be sought as a nonbreeding summer resident. *Dates*: 6 August to 1 June. *Elevation*: sea level.

*Subspecies*: *inornatus* (Brewster).

*Heteroscelus incanus* (Gmelin). Wandering Tattler.

Uncommon winter resident on rocks exposed to ocean waves. *Dates*: 28 September to 27 April. *Elevation*: sea level.

In the fall of 1961 and winter of 1962 the Berretts and I recorded the following data: 1 seen and another taken on 28 September (D. G. Berrett, male, LSUMZ 27398, 71.8 g, little fat, testes small), and 1 seen on 9 October on an offshore "bird rock" just west of Puerto Angel; 1 seen on 17 October and another on 10 January on the breakwall at Salina Cruz. In 1964 Morony saw a bird at the harbor of Puerto Escondido on 3 March, and Morony and I saw 1 along the coast 6 road mi west of Puerto Angel on 27 April. Arnold, Delwiche, and I observed 1 bird on 5, 6, and 7 February 1974 at Puerto Escondido. The only other record for Oaxaca is a sighting of 2 birds by F. W. Loetscher (in litt.) at Salina Cruz on 21 March 1939.

*Actitis macularia* (Linnaeus). Spotted Sandpiper.

Common winter resident at edges of aquatic habitats throughout state. *Dates*: 14 August to 28 May. *Elevations*: sea level to 6,300 ft.

*Subspecies*: monotypic. In specimens I have examined, I am unable to see the characters that supposedly distinguish *A. m. rava* Burleigh (1960:212); if any geographic variation exists, it is too slight to warrant taxonomic recognition.

*Numenius phaeopus* (Linnaeus). Whimbrel.

Uncommon winter resident on mud flats of coastal lagoons. To be expected as an occasional transient migrant in Atlantic Region and elsewhere in Pacific Region. *Dates*: 21 December to 15 May. *Elevation*: sea level.

*Subspecies*: *hudsonicus* Latham.

*Numenius americanus* Bechstein. Long-billed Curlew.

Uncommon winter resident on mud flats of coastal lagoons. One record apparently away from immediate coast, a specimen taken by Sumichrast at Juchitán on 11 December 1868 (Oberholser 1918:191). To be expected as an occasional transient migrant in Atlantic Region and elsewhere in Pacific Region. *Dates*: 20 October to 18 May. *Elevations*: sea level +.

*Subspecies*: *americanus* Bechstein, according to Oberholser (1918:191); *parvus* Bishop (Laguna Superior, 19 road mi southwest of Juchitán, 15 May 1961, Wolf, male, LSUMZ 24239, 508.3 g, moderately fat, testes 4 × 1 mm; wing chord 265 mm, tail 97, tarsus 79, exposed culmen 131), the southeasternmost record for the race.

*Limosa haemastica* (Linnaeus). Hudsonian Godwit.

Rare transient migrant on mud flats around saline lagoons on Pacific coast of Isthmus of Tehuantepec. *Dates*: 15 to 18 May; 13 July. *Elevation*: sea level.

Only three Oaxaca records for the Hudsonian Godwit are known. Blake (1953: 140) mentions a sight record by L. I. Davis and R. Herbert "at Salina Cruz" in July 1952; Davis (in litt.) informs me that this bird was photographed by Herbert on 13 July just west of La Ventosa. My only records (Binford 1970) are from the southwestern corner of Laguna Superior 19 road mi southwest of Juchitán, where single males were collected on 15 May 1961 (Wolf, LSUMZ 24240, 241.0 g, very fat, testes 10 × 5 mm) and 18 May 1961 (Binford, LSUMZ 24241, 181.9 g, slightly fat, right testis 4 × 2 mm, left testis 7 × 3 mm). These are the only specimens for Mexico.

*Limosa fedoa* (Linnaeus). Marbled Godwit.

Uncommon winter resident on mud flats of coastal lagoons. *Dates*: 5 August 1869 (Ridgway 1883:151) to 1 June. *Elevation*: sea level.

*Arenaria interpres* (Linnaeus). Ruddy Turnstone.

Very uncommon transient migrant along Pacific coast on mud flats, sand beaches, and sand bars. To be expected occasionally on migration throughout state and as a rare winter resident on Pacific coast. *Dates*: 19 April to 31 May; 9 August. *Elevation*: sea level.

*Subspecies: interpres* (Linnaeus), according to Friedmann et al. (1950:97). Cooke (1910:98) lists *morinella* (Linnaeus) from Oaxaca on the basis of a specimen taken by Sumichrast at "San Mateo" [= San Mateo del Mar] on 9 August 1869; I cannot find this specimen, and because Ridgway (1919:47–49) lists all Sumichrast records as the nominate form, I must question Cooke's identification.

*Calidris canutus* (Linnaeus). Red Knot.

Uncommon spring transient migrant on Pacific coast on mud flats and sand beaches. Possibly also a fall transient migrant and a winter resident. *Dates*: 19 April to 18 May. *Elevation*: sea level.

In 1961 at the southwestern corner of Laguna Superior 19 road mi southwest of Juchitán, Wolf and I saw 13 Red Knots on 15 May (including one male taken by Binford, LSUMZ 24247, 115.3 g, slightly fat, testes small), 4 on 16 May, 9 on 17 May, and 8 on 18 May. The only other record for Oaxaca is from the mouth of the Río Tonameca, where Morony and I saw 2 birds on 19 April 1964.

*Subspecies: rufa* (Wilson).

*Calidris alba* (Pallas). Sanderling.

Occurs at sea level along Pacific coast on sand beaches and less commonly on mud flats. Very common spring transient migrant (19 April–1 June) and presumably fall transient migrant (one record, San Mateo del Mar, 5 August 1869, Sumichrast, sex?, USNM 59714). Only one winter record (San Mateo del Mar, 24 February 1869, Sumichrast, female, USNM 58904), but presumably an uncommon winter resident.

*Calidris pusilla* (Linnaeus). Semipalmated Sandpiper.

Transient migrant at edges of aquatic habitats; probably very uncommon throughout state but so far recorded only in spring and only on Pacific side of Isthmus as follows: 3 birds seen by Coffey (1960:292) at about 100 ft elevation just east of Tehuantepec City on 19 May 1954; and two collected at sea level 19 road mi southwest of Juchitán at southwestern edge of Laguna Superior on 17 May 1961 (Wolf, female skeleton, UMMZ 156458, 28.3 g, heavy fat, ovary small; and Binford, male, LSUMZ 24248, 22.5 g, moderately fat, testes small). Should be sought in winter, but statement by the A.O.U. (1983:193) that it winters in Oaxaca is not supported by current evidence. Confusion in field with much commoner Western Sandpiper probably accounts in part for scarcity of records.

*Calidris mauri* (Cabanis). Western Sandpiper.

Fairly common winter resident on Pacific side of Isthmus of Tehuantepec on mud flats, sand beaches, and river bars, and in shallows of open aquatic habitats. Probably more common in remainder of Pacific Region than indicated by the one

record (mouth of Río Tonameca, 28 April 1964, 1 seen by Binford). To be expected at least as a transient migrant in Atlantic and Interior Regions. *Dates*: 7 August to 1 June. *Elevations*: sea level to 100 ft.

*Calidris minutilla* (Vieillot). Least Sandpiper.

Common winter resident on muddy shores of open aquatic habitats throughout lowlands of Atlantic and Pacific Regions. Unrecorded in the Interior, where it should occur at least on migration. *Dates*: 13 October to 16 May. *Elevations*: sea level to 300 ft.

[*Calidris fuscicollis* (Vieillot). White-rumped Sandpiper.]

No specimen or published record; one sight record, a bird that I observed carefully as it fed on a large mud flat at sea level in the Pacific Region 19 road mi southwest of Juchitán at the extreme southwestern edge of Laguna Superior on 18 May 1961. Rare spring transient migrant on mud flats of Pacific side of Isthmus; to be expected as a casual spring transient migrant elsewhere; should be sought in late May.

*Calidris bairdii* (Coues). Baird's Sandpiper.

Rare spring transient migrant, recorded only on the mud flats of Pacific side of Tehuantepec region but to be expected in similar habitats, as well as at edges of open freshwater habitats, throughout state. No record for fall, when species probably has same status as in spring. *Dates*: 17 May to 1 June. *Elevation*: sea level.

In 1961 on mud flats at the southwestern edge of Laguna Superior 19 road mi southwest of Juchitán, Wolf and I obtained the following records: 17 May, 3 seen, of which two were collected (Wolf, male, LSUMZ 24255, 27.6 g; Binford, female, LSUMZ 24254, 36.8 g; both moderately fat and with small gonads; 18 May, 2 seen. In 1964 I saw 1 at the same locality on 31 May and 8 on a mud flat near the eastern end of Laguna Inferior 15 road mi south of Reforma on 1 June. As indicated by Coffey (1960:292), the record for this species by Amadon and Eckelberry (1955:67) in May 1942 at junction of Trans-Isthmian Highway and the Río Jaltepec pertains to Veracruz.

*Calidris melanotos* (Vieillot). Pectoral Sandpiper.

Spring transient migrant in lower portions of Atlantic and Pacific Regions, very uncommon at edges of freshwater habitats and rare in brackish aquatic habitats. One fall record (Tehuantepec City, 13 October 1869, Sumichrast, sex?, USNM 59700). Should be sought in the Interior during migration. *Dates*: 24 March to 3 June; 13 October. *Elevations*: sea level to 2,400 ft.

*Calidris alpina* (Linnaeus). Dunlin.

Status uncertain. Only one record, 1 bird seen and another taken (D. G. Berrett, male, LSUMZ 27402, 43.0 g, little fat, testes very small) on 20 October 1961 on mud flats at sea level in Pacific Region 19 road mi southwest of Juchitán at extreme southwestern corner of Laguna Superior.

*Subspecies*: *pacifica* (Coues). I follow the taxonomic treatment by Browning (1977).

*Calidris himantopus* (Bonaparte). Stilt Sandpiper.

Recorded only in the shallow aquatic habitats on Pacific coast of Isthmus of Tehuantepec, where apparently a rare spring transient migrant and casual winter

resident. Possibly a transient migrant elsewhere in state. To be expected in fall. *Dates*: 15 and 18 May; 24 February. *Elevation*: sea level.

The only winter specimen that I have examined is a male (USNM 58925) taken by Sumichrast at "San Mateo" [= San Mateo del Mar] on 24 February 1869 (all data from original level). Sumichrast also took a female (formerly USNM 58909, exchanged) at the same place and on the same date (Ridgway 1883:148). I have not seen the third specimen which was recorded without data in the USNM catalogue but then sent to another museum. It was probably taken by Sumichrast in the same month and at the same locality, because Lawrence (1876:47) lists only "Tehuantepec (San Mateo); February, 1869." Ridgway (1919:207) misquotes Lawrence by giving August instead of February as the month of collection. In 1961 at the southwestern edge of Laguna Superior 19 road mi southwest of Juchitán, Wolf and I recorded the following data: 15 May, 7 birds seen, of which two were collected by Wolf (male, LSUMZ 24259, 52.8 g, heavy fat, testes small; female, LSUMZ 24258, 54.7 g, moderately fat, follicles small); 18 May, 8 seen.

*Limnodromus griseus* (Gmelin). Short-billed Dowitcher.

Status of *L. griseus* and *L. scolopaceus* uncertain because of difficulty in field identification. Both species apparently uncommon winter residents in Pacific Region in shallows of aquatic habitats and on mud flats. No *Limnodromus* recorded from Atlantic or Interior Regions, but both species to be expected in these areas at least as transient migrants. *Dates and elevations* for all *Limnodromus*, identified to species or not: 12 August to 31 May; sea level to 300 ft.

All definite Oaxaca records for *L. griseus* have been obtained by my field companions and me at sea level 19 road mi southwest of Juchitán at the southwestern edge of Laguna Superior. On 16 May 1961 I took a male (LSUMZ 24246, 79.9 g, slightly fat, testes small). In the fall of 1961 and winter of 1962 the Berretts and I recorded the following data: 18 October, 1 bird taken (D. G. Berrett, female, LSUMZ 27399, 86.4 g, little fat, ovary small); 20 October, 12 seen; 21 October, 5 seen; 11 January, 1 seen.

*Subspecies*: unknown.

*Limnodromus scolopaceus* (Say). Long-billed Dowitcher.

See *Limnodromus griseus*.

Four specimens of *L. scolopaceus* were collected by Sumichrast on the Pacific coast at San Mateo del Mar in 1869 as follows: 23 February, one female (USNM 58927); 12 August, two males and one female (USNM 59716, 59718, and 59717, respectively). On 9 February 1974 at a lake at 50 ft elevation 2 mi northwest of San José Manialtepec, I saw and heard a flock of 25 birds, from which I took a female (CAS 68855, 100.4 g, very fat).

*Gallinago gallinago* (Linnaeus). Common Snipe.

Very uncommon winter resident in shallow freshwater habitats of Pacific Region. To be expected at least on migration in Atlantic and Interior Regions. *Dates*: 5 October to 20 February. *Elevations*: 50 to 6,200 ft.

On 5 October 1961 at 700 ft elevation 9 road mi north of San Pedro Pochutla, I took the first specimen for the state (male, LSUMZ 27400, 107.3 g, moderately fat, testes small). In 1964 Morony and I saw this species almost daily at a small

savanna pond at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande, as follows: 1 bird each on 12, 14, 17, 18, and 20 February, and 2 each on 15, 16, and 19 February. Rowley took a male (WFVZ 22557, 89.5 g) on 26 October 1964 at 6,200 ft elevation at kilometer marker 117 on the Putla de Guerrero Road. On 10 February 1974 I saw 2 birds at a pond at 50 ft elevation 12 mi southeast of Santiago Jamiltepec.

*Subspecies: delicata* (Ord).

*Phalaropus tricolor* (Vieillot). Wilson's Phalarope.

Transient migrant in shallow aquatic habitats; probably fairly common throughout state but so far recorded only at sea level on Pacific coast of Tehuantepec region and only in spring, as follows: female (LSUMZ 24260, 53.2 g, slightly fat, follicles poorly developed) taken by Binford on 16 May 1961 at southwestern shore of Laguna Superior 19 road mi southwest of Juchitán; 1 male seen on 31 May 1964 on a small pond 8 road mi southwest of Juchitán and a flock of 44 seen on 1 June 1964 on a mud flat 15 road mi south of Reforma, both records by Morony and Binford. Scarcity of records probably a result of scant field work during very late spring and very early fall.

*Phalaropus lobatus* (Linnaeus). Red-necked Phalarope.

Fairly common transient migrant on ocean from surf line to at least 3 mi offshore. *Dates:* 8 April to 4 May; 11 to 24 October.

*Phalaropus fulicaria* (Linnaeus). Red Phalarope.

Status uncertain; occurs to within 3 mi of shore on open ocean. *Dates:* February to 22 April.

L. Miller and F. Richardson, during two trips across the Gulf of Tehuantepec off Oaxaca in 1936, noted rafts of "uncountable numbers" in February and "a scant dozen birds" in April (Miller 1937:19). I recorded this species from 3 to 6 mi offshore on three of 11 oceanic trips made off Puerto Angel but on none of my four trips off Puerto Escondido. In 1964 Morony and I recorded the following data: 20 April, 1 bird seen and another taken (Binford, female, LSUMZ 33012, 52.2 g, very fat, follicles not enlarged); 21 April, 7 seen; 22 April, 1 seen. Jehl (1974b:684; in litt.) saw 19 birds on 8 April 1973 (same locality as *Puffinus creatopus*). Finally, Jehl (in litt.) saw 7 birds on 10 April 1976 off southwestern Oaxaca.

#### Family LARIDAE

[*Stercorarius pomarinus* (Temminck). Pomarine Jaeger.]

No specimen; sight records as below. Uncommon winter resident on open ocean to within 3 mi of shore. *Dates:* 6 February to 22 April.

I observed this species on five of my 15 ocean trips off Oaxaca. In 1964 about 3 mi off Puerto Angel, Morony and I saw 1 bird on 21 April and a flock of 4 on 22 April; all were light-phase adults. In 1974 off Puerto Escondido, Delwiche and I saw 1 bird on 6 February, and Arnold and I saw 16 on 7 February and 4 on 18 February; about half of the birds on 7 February were adults, some in black phase. Jehl (1974b:684; in litt.) saw 16 birds on 8 April 1973 (same locality as *Puffinus creatopus*).

*Stercorarius parasiticus* (Linnaeus). Parasitic Jaeger.

Status uncertain; occurs on open ocean. Recorded only on two of my 15 pelagic trips: a male (LSUMZ 33014, 345.9 g, fat between moderate and little, testes small) taken by Morony on 21 April 1964 about 3 mi offshore from Puerto Angel, and an adult seen by the Berretts and me on 30 September 1961 at the same locality. My companions and I saw jaegers that were either *parasiticus* or *longicaudus* on two other trips off Puerto Angel, 20 April 1964 (2 birds) and 3 May 1961 (1 bird).

*Stercorarius longicaudus* Vieillot. Long-tailed Jaeger.

Transient migrant on open ocean, where apparently rare. The only record, an immature female (LSUMZ 33015, 298.0 g, very fat, follicles not enlarged) that I took on 21 April 1964 on open ocean 3 mi offshore from Puerto Angel, is the first acceptable specimen for Mexico (Binford 1970:366). See *S. parasiticus*.

*Subspecies*: monotypic, following Blake (1977:614). If polytypic (see Manning 1964), the Oaxaca specimen presumably would be the Nearctic race, *pallescens* Løppenthin.

*Larus atricilla* Linnaeus. Laughing Gull.

Winter resident, common along ocean shore and on coastal lagoons, uncommon inland in Pacific lowlands, where found on lakes, ponds, and cultivated fields, and rare in lowlands of Atlantic region (one record, an immature female [LSUMZ 27404, 317.6 g, little fat, follicles small] taken by Binford from flock of seven birds on Presa Miguel Alemán on 1 December 1961). Probably a nonbreeding permanent resident. *Dates*: 7 August to 1 June. *Elevations*: sea level to 200 ft.

*Larus pipixcan* Wagler. Franklin's Gull.

Transient migrant, very common during flights on a north-south axis across Isthmus of Tehuantepec (see Migration, Transient Migrants) and uncommon on remainder of Pacific coast. Possibly a winter resident on Pacific coast; the only winter record, 2 birds seen on 2 December 1948 at Salina Cruz by Coffey (1960: 293), might, however, represent late transient migrants. Usually noted in flight but occasionally seen feeding or resting on cultivated fields, coastal lagoons, or open ocean. Only two Oaxaca specimens, one adult male (UMMZ 137157) taken by Shufeldt at Tehuantepec City on 29 April 1917, and one adult female (LSUMZ 24263, 211.9 g, slightly fat, follicles small) secured by Binford 2 road mi east of Tehuantepec City on 14 May 1961. Unrecorded in the Interior or in Atlantic Region outside of Isthmus. *Dates*: 10 April to 3 June; 19 to 23 October; 2 December. *Elevations*: sea level to 350 ft.

*Larus delawarensis* Ord. Ring-billed Gull.

Occasional winter resident (or visitant?) on Pacific coast, where recorded only at "San Mateo" [= San Mateo del Mar] (21 February 1869, Sumichrast, sex?, USNM 58953) and at an unknown locality, probably also San Mateo del Mar in my opinion, on Pacific side of Isthmus (March, Sumichrast; record published by Lawrence 1876:51) but to be expected elsewhere. *Elevation*: sea level. See *L. californicus* in Hypothetical List.

*Xema sabini* (Sabine). Sabine's Gull.

Fairly common transient migrant and casual winter resident or visitor on open ocean to within 3 mi of shore. *Dates*: 7 February; 5 March; 8 April to 4 May; 29 September to 11 October.

L. Miller and F. Richardson noted Sabine's Gulls flying up the coast west of Tehuantepec City on 11 and 12 April 1936 (Miller 1937:19). I observed this species from 3 to 10 mi offshore on eight of 10 migration-period trips and two of five winter trips taken off the coast of Oaxaca. Off Puerto Angel my companions and I observed this species as follows: 2 birds on 3 May and 20 on 4 May 1961, Wolf and Binford; 3 on 29 September, 2 on 30 September, and 2 on 11 October 1961, the Berretts and Binford; 3 on 20 April, 13 on 21 April (including one adult male taken by Binford, LSUMZ 33016, 210.9 g, testes small and black, only Oaxaca specimen), and 13 on 22 April 1964, Morony and Binford. Offshore from Puerto Escondido, Morony and I noted 3 on 5 March 1964, and Arnold and I saw 1 immature on 7 February 1974, these being the only "winter" records for Oaxaca; the March birds might have been early migrants. On 8 April 1973 Jehl (1974b:684; in litt.) saw one bird approximately 25 mi southwest (offshore) of the mouth of the Río Verde.

*Subspecies*: *sabini* (Sabine). This species might be monotypic; see Blake (1977: 622).

*Sterna nilotica* Gmelin. Gull-billed Tern.

Very uncommon winter resident and possibly a local permanent resident (see 28 April record below), occurring on bays and lagoons of Pacific coast from San Mateo del Mar west to mouth of Río Tonameca. *Dates*: 6 August to 28 April. *Elevation*: sea level.

The only Oaxaca records that I can find for the Gull-billed Tern are as follows: a male (USNM 59758) and a female (USNM 58945) collected by Sumichrast at "San Mateo" [= San Mateo del Mar] on 6 August 1869 and 22 February 1869, respectively; 2 seen on 16 and 1 on 17 May 1961 by Wolf and Binford on Laguna Superior, 19 road mi southwest of Juchitán; 4 seen on 19 and 3 on 28 April 1964 by Morony and Binford at the mouth of the Río Tonameca, with one of the former taken by Morony (adult female, LSUMZ 33017, 205 g, very fat, largest follicle 6 mm [suggests breeding]). Another specimen, listed in the USNM catalogue (59757), could not be located; very likely it was taken by Sumichrast in August 1869 at San Mateo del Mar, because it bears the number immediately preceding the 6 August specimen, and Lawrence (1876:51), in listing Sumichrast's specimens, mentions only the months of August and February.

*Subspecies*: *vanrossemei* (Bancroft).

*Sterna caspia* Pallas. Caspian Tern.

Uncommon winter resident on Pacific coast on bays, harbors, and lagoons, and in Atlantic Region at Presa Miguel Alemán. Should be sought on lakes and large rivers elsewhere in lowlands. First published record: 4 birds seen by Coffey (1960: 293) on 2 December 1948 at Salina Cruz. Only Oaxaca specimens: one male (Binford, LSUMZ 27407, 648.4 g, moderately fat, testes small) and one female (D. G. Berrett, LSUMZ 27406, 583.0 g, moderately fat, follicles not enlarged)

collected at southwestern corner of Laguna Superior 19 road mi southwest of Juchitán on 9 January 1962. *Dates*: 20 October to 18 May. *Elevations*: sea level to 200 ft.

*Sterna maxima* Boddaert. Royal Tern.

Fairly common winter resident on Pacific coast on lagoons, bays, and harbors from Punta Paloma west at least to Puerto Escondido. Possibly a permanent resident, at least nonbreeding. *Dates*: 6 August to 31 May. *Elevation*: sea level.

*Subspecies*: *maxima* Boddaert.

*Sterna elegans* Gambel. Elegant Tern.

Uncommon transient migrant on open ocean and on bays and harbors of Pacific coast. Should be sought in mid-winter and as a breeding bird in spring and summer. *Dates*: 19 February to 13 May; 17 October. *Elevation*: sea level. See *S. sandvicensis*.

*Sterna sandvicensis* Latham. Sandwich Tern.

Very uncommon winter resident on coastal lagoons from southwestern edge of Laguna Superior east to Punta Paloma; possibly a permanent resident, at least nonbreeding. Oaxaca localities are northwesternmost on Pacific coast of Mexico. *Dates*: August to 18 May. *Elevation*: sea level.

Lawrence (1876:51) records an unstated number of Sumichrast specimens taken at San Mateo del Mar in August and February. Most subsequent authors have correctly followed Lawrence. Friedmann et al. (1950:111), however, state that the "very old record from the Pacific coast of Oaxaca was originally a misidentification of *T. comatus* [=*S. elegans*] by Sumichrast, corrected by Sclater and Salvin in 1871, but perpetuated by all subsequent authors!" This statement is incorrect; Sclater and Salvin (1871:568) do not mention the Sandwich Tern with reference to the Elegant Tern and the original identification by Lawrence was correct, as corroborated by my examination of the specimens concerned.

Two unsexed specimens collected by Sumichrast on 24 February 1869 at San Mateo del Mar are in the National Museum of Natural History (USNM 58935 and 58938). Four additional specimens supposed to be of this species are entered in the catalogue of that museum, but three have been exchanged, and the fourth cannot be found. In 1961 at the southwestern corner of Laguna Superior 19 road mi southwest of Juchitán, Wolf and I recorded the following data: 16 May, one bird taken (Wolf, female, LSUMZ 24269, 210.5 g, follicles minute); 17 May, one of two taken (Wolf, female, LSUMZ 24270, 160.5 g, slightly fat, follicles minute); 18 May, 9 seen. On 20 March 1964 near Punta Paloma, Morony and I saw 19.

*Subspecies*: *aculavida* Cabot.

*Sterna hirundo* Linnaeus. Common Tern.

Fairly common winter resident on open ocean within several miles of shore and along Pacific coast on lagoons, bays, and harbors. One specimen (22 December 1869, Sumichrast, USNM 59750), and perhaps others, from Bahía Ventosa originally misidentified by Lawrence (1876:51) as *S. forsteri*. *Dates*: 29 September to 18 May. *Elevation*: sea level.

*Subspecies*: *hirundo* Linnaeus.

*Sterna forsteri* Nuttall. Forster's Tern.

Very uncommon winter resident on bays and lagoons of Pacific coast. *Dates*: 20 February to 17 May. *Elevation*: sea level. See *S. hirundo*.

*Subspecies*: monotypic. I follow the A.O.U. (1957:234) in considering *litoricola* Oberholser invalid; Oberholser (on labels) identified two specimens (USNM 58939 and 58942) from San Mateo del Mar as this race.

*Sterna antillarum* (Lesson). Least Tern.

Fairly common summer resident, feeding on lagoons, bays, and harbors of Pacific coast, along the Río Tehuantepec inland in Pacific Region as far as Tehuantepec City, and on open ocean within several miles of shore. Should be sought in winter. *Dates*: 19 April to 19 October. *Elevations*: sea level to 100 ft.

*Breeding* (all data summarized): 12 April 1915, enlarged follicle ("size of large pea"), enlarged testes, and 25 birds seen (Tehuantepec City, Shufeldt field notes in UMMZ); 28 April 1964, 6 adult pairs courting (mouth of Río Tonameca, Binford and Morony observation); 16 and 17 May 1961, enlarged testes (respectively, 15 × 7 mm [LSUMZ 24267, 41.2 g] and 13 × 6 mm [LSUMZ 24266, 39.9 g]; both Laguna Superior, 19 mi southwest of Juchitán, Wolf, moderately fat); 8 May 1915 and 20, 24, and 26 May 1917, 8 to 10 adult pairs seen and six egg sets collected (on river bars about 1 mi northwest of Tehuantepec City, Shufeldt field notes in UMMZ).

*Subspecies*: *staebleri* Brodkorb. Breeding birds (UMMZ; see above) show some slight intergradation with *mexicana* van Rossem and Hachisuka; other Oaxaca specimens cannot be identified to race.

[*Sterna fuscata* Linnaeus. Sooty Tern.]

No specimen; sight records as below. Status uncertain; occurs on open ocean, probably mostly far offshore. Jehl (1974b:684; in litt.) saw 5+ birds on 8 April 1973 (same locality as *Puffinus creatopus*). I failed to see this species on 15 ocean trips that extended only as far as 10 mi offshore.

*Subspecies*: unknown.

*Chlidonias niger* (Linnaeus). Black Tern.

Transient migrant on open ocean and in Pacific lowlands, common on ocean from shoreline to several miles out, uncommon on coastal lagoons, and rare along large rivers on Pacific side of Isthmus. Unrecorded elsewhere but to be expected in lowlands of Atlantic Region and remainder of Pacific Region. Uncommon (and irregular?) winter resident on ocean at least off Puerto Escondido, where seen as follows: 4 birds on 6 February 1974, Delwiche and Binford; 14 on 18 February 1974, Arnold and Binford; and 30 on 5 March 1964, Morony and Binford. These appear to be the only winter records for Mexico (Williams 1983). Boucard record (immature male specimen, October) from "Putla, Vera Cruz" (Saunders and Salvin 1896:22) might pertain to Putla de Guerrero, Oaxaca. *Dates*: migration periods, 10 April to 18 May, 9 August to 21 October. *Elevations*: sea level to 100 ft.

*Subspecies*: *surinamensis* (Gmelin).

*Rynchops niger* Linnaeus. Black Skimmer.

Very uncommon permanent resident on bays and lagoons of Pacific coast. One record inland from coast, 1 bird seen by Morony and Binford on a small lake at

50 ft elevation 12 road mi southeast of Santiago Jamiltepec on 2 March 1964. Only three specimens for Oaxaca: female (LSUMZ 33018, 217.5 g, ovary not enlarged) taken by Morony on 23 February 1964 at Minitán; unsexed adult (USNM 59766) secured by Sumichrast on 9 August 1869 at San Mateo del Mar; set of three eggs (WVZ 52085) taken from nest by Galley on 27 May 1969 at Isla de los Pajaros in Mar Muerto. *Elevations*: sea level to 50 ft.

*Breeding* (all data): see above.

*Subspecies*: *niger* Linnaeus. I follow Wetmore (1965:465) in treating *oblita* Griscom as a synonym of nominate *niger*.

#### Family COLUMBIDAE

[*Columba livia* Gmelin. Rock Dove.]

No specimen or published record; numerous sight records. Introduced. Fairly common permanent resident in many towns in Pacific and Interior Regions; presumed to be largely "wild." Unrecorded but probably occurs in Atlantic Region. *Elevations*: sea level to 7,000 ft.

*Breeding* (all data): range, habitat, and dates.

I observed this species in numerous towns, including Oaxaca City, Puerto Angel, San Pedro Pochutla, Puerto Escondido, and San Pedro y San Pablo Teposcolula.

*Columba speciosa* Gmelin. Scaled Pigeon.

Rare bird in Atlantic Region in semi-open portions of tropical evergreen forest, recorded northwest to San Juan Bautista Tuxtepec and a point 6 road mi southwest of Valle Nacional and south in Isthmus to a point 2 mi north and 2 mi east of Matías Romero; presumably a permanent resident but recorded only from 21 February to 22 April. *Elevations*: 100 to 1,900 ft.

*Breeding* (all data): 21 February 1961, two males with enlarged testes (a point 2 mi north and 2 mi east of Matías Romero, Schaldach; AMNH 775896, testes 19 × 8 mm; AMNH 775897, testes 12 × 6 mm); 26 March 1961, enlarged testes (17 × 8 mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24272, 286.5 g, little fat).

*Columba flavirostris* Wagler. Red-billed Pigeon.

Permanent resident, common in Pacific Region in tropical deciduous, tropical semideciduous, and Pacific swamp forests and fairly common to uncommon in Atlantic Region in tropical evergreen forest. *Elevations*: sea level to 5,600 ft.

*Breeding*: 22 March 1967, nest with one egg (Rancho Sol y Luna, 800 ft, Rowley, WVZ 21422), to 13 July 1961, nest with one egg (Donají, Rook, WVZ 35248); 30 June 1961, nest with one young (Rancho Sol y Luna, Schaldach, female nestling AMNH 776264).

*Subspecies*: *flavirostris* Wagler.

*Columba fasciata* Say. Band-tailed Pigeon.

Fairly common breeding bird in pine-oak forests (especially humid portions) in Sierra Madre de Chiapas, in upper reaches of Pacific Region west of Isthmus, and in the Interior; presumably a permanent resident but recorded only from 2 March to 10 September. *Elevations*: 4,350 to 10,000 ft.

*Breeding*: 8 June 1965, nest with one young (near La Cima, Rowley [1966:

124]), to 10 September 1945, enlarged follicle (9 mm, Cerro San Felipe, 7,000 ft, A. S. Leopold, MVZ 98199, 283 g).

*Subspecies: fasciata* Say.

*Columba nigrirostris* Sclater. Short-billed Pigeon.

Very uncommon permanent resident in tropical evergreen forest of Atlantic Region northwest to Lalana and south in Isthmus to a point 2 mi south of Tolosa and perhaps (del Toro Avilés) Palomares. *Elevations:* 250 to 300+ ft.

*Breeding:* 17 March 1962, enlarged follicle (11 mm, AMNH 778239), to 21 March 1962, enlarged follicle (8 mm, AMNH 778237; both records from Montebello, Schaldach).

*Subspecies:* monotypic; see Type Localities.

*Zenaida asiatica* (Linnaeus). White-winged Dove.

Permanent resident, common in Pacific Region in arid tropical scrub, openings within tropical deciduous forest, and edges of mangrove swamp, recorded north in Isthmus to Chivela, and uncommon in the Interior in arid tropical scrub and lower reaches of arid subtropical scrub near Tamazulapan del Progreso and Santiago Chazumba and in valleys of Oaxaca, San Miguel Sola de Vega, and San Juan Bautista Cuicatlán. No record for Atlantic Region. Numbers augmented by transient migrants and winter residents; five birds banded as transient migrants in Tamaulipas recovered in Oaxaca in March, April (two), October, and December (Zacarias 1973:51–53); Isthmus population largest in October. *Elevations:* sea level to 6,300 ft; elevation for La Parada record uncertain but probably below the 10,000 ft reported by Salvin and Godman (1897–1904 [1902]:247).

*Breeding:* 2 May 1966, nest with two eggs (WVZ 20701), to 28 June 1965, nest with two young (both nests 15 mi southeast of Oaxaca City, 5,000 feet, Rowley [1984:110]).

*Subspecies* (mostly according to Saunders 1968): *monticola* Saunders (1968:10), permanent resident, Interior Region; *collina* Saunders (1968:17), permanent resident, Pacific Region east of Isthmus; *asiatica* (Linnaeus), commonest winter resident and transient migrant; *mearnsi* (Ridgway), winter resident (5.1 mi southwest of San Gabriel Mixtepec, 1,800 ft elevation, 5 November 1964, Rook no. 3970, CAS, male, heavy fat). On distributional grounds, breeding birds from the Pacific Region west of the Isthmus are probably *palustris* Saunders (1968:14).

*Zenaida macroura* (Linnaeus). Mourning Dove.

Mainly a winter resident, common in Pacific and Interior Regions in arid tropical scrub, arid subtropical scrub, tropical deciduous forest, and rarely arid pine-oak forest, and uncommon in Atlantic Region in clearings within tropical evergreen forest. Uncommon permanent resident in the Interior in arid subtropical scrub (see below). Bird banded on 21 August 1927 at Tiffin, Ohio, shot in December 1934 at Tamazola (Cooke 1938:187). *Dates:* extremes for almost certain nonbreeders, 1 October to 21 April. *Elevations:* breeding, 5,000 to 6,600 ft; winter, sea level to 7,650 ft; elevation for La Parada record uncertain but probably below the 10,000 ft reported by Salvin and Godman (1897–1904 [1902]:243).

*Breeding* (all data): 3 May 1966, nest with two eggs (2 mi south of San Bartolo Coyotepec, 5,000 ft, Rowley, WVZ 21305); 6 May 1964, enlarged testis (right

15 × 8 mm, 13 mi east of Santa María del Tule, Binford, LSUMZ 33019, 127.5 g, little fat); 8 May 1961, nest with two eggs (9 road mi east of Santa María del Tule, Binford observation); 4 July 1961, nest with one egg (near Santa María del Tule, Rowley [1984:109] observation); 19 July 1967, nest with two eggs (2 mi south of San Bartolo Coyotepec, Rowley [1984:109] observation); 5 August 1965, nest with two eggs (10 mi southeast of Oaxaca City, 5,000 ft, Rowley, WFVZ 35250); 5 September 1945, enlarged testes (14 mm, 6 km [3.7 mi] east of Tamazulapan del Progreso, 6,600 ft, A. S. Leopold, MVZ 98220, 108 g); 7 September 1945, enlarged follicle (4.5 mm, Tlacolula de Matamoros, 5,000 ft, A. S. Leopold, MVZ 98222, 102 g).

*Subspecies: marginella* (Woodhouse), permanent resident and winter resident; *carolinensis* (Linnaeus), winter resident.

*Columbina inca* (Lesson). Inca Dove.

Permanent resident in Pacific and Interior Regions (valleys of Oaxaca, Huajuapán de León, and San Juan Bautista Cuicatlán), very common in arid tropical scrub, openings within tropical deciduous forest, and lower reaches of arid subtropical scrub, and rare near habitation in openings within arid pine-oak forest and cloud forest, recorded north in Isthmus to Chivela. Probably a rare permanent resident in Atlantic Region (one record, 1 seen in scrubby savanna at Amapan, 3 December 1961, the Berretts and Binford). *Elevations*: sea level to 6,400 ft.

*Breeding* (all data): 24 February 1964, two nests, each with two eggs (Minitán, Binford observations); 21 August 1954, enlarged follicle (11 mm, 2 mi east of Santa María Asunción Tlaxiaco, 5,800 ft, F. C. Sibley, CU 25105, 48.4 g); 7 September 1965, nest with two eggs (San Felipe del Agua, 5,400 ft, Rowley, WFVZ 35251); no date, egg (Oaxaca [City?], Boucard [Sclater 1859b:391]).

*Columbina passerina* (Linnaeus). Common Ground-Dove.

Common permanent resident in Pacific and Interior Regions (Santiago Chazumba and valleys of Oaxaca and San Juan Bautista Cuicatlán) in arid tropical scrub, clearings within tropical deciduous forest, and lower reaches of arid subtropical scrub. The only record for Atlantic Region (Moctum, 3 September 1941, del Toro Avilés, female, MLZ 33779) is questionable. *Elevations*: sea level to 6,100 ft.

*Breeding*: 20 February 1964, nest with two eggs (9 mi west-northwest of San José Estancia Grande, 300 ft, Binford observation), to 16 July 1963, nest with two eggs (4 mi south of San Bartolo Coyotepec, Rowley, WFVZ 26601); see also *C. talpacoti*.

*Subspecies: pallescens* (Baird).

*Columbina minuta* (Linnaeus). Plain-breasted Ground-Dove.

Inhabitant of savanna and grazed land, common in Pacific Region near Putla de Guerrero and uncommon in Atlantic Region along Trans-Isthmian Highway from a point 12 mi north of Matías Romero north to Donají. Probably a permanent resident but recorded only from 5 March to 7 August. Should be sought elsewhere at low elevations. Also collected in Guerrero (DEL) and Jalisco (WFVZ). *Elevations*: 300 to 2,400 ft.

*Breeding* (all data): see below.

In savanna and pastures 1 mi east of Putla de Guerrero, Morony and I observed from 1 to 16 individuals daily from 18 to 22 May 1964. Eight male specimens

(LSUMZ 33021–33028), all with greatly enlarged testes and little fat, were collected as follows: 18 May, one (Morony, 34.2 g); 19 May, one (Morony, 39.9 g); 20 May, one (Binford); 22 May, five (Morony, 33.8 g; Binford, 36.4, 38.3, 39.5, and 42.2 g). In the same area I noted two nests as follows: 19 May, nest under construction by both adults; 22 May, nest with two pinfeathered young.

I examined five specimens from the Atlantic side of the Isthmus of Tehuantepec, as follows: one male (ARPC, testes not enlarged) secured by Rook and L. Petite at a point 12 mi north of Matías Romero on 7 August 1961; one female (AMNH 775906, follicles not enlarged) taken by Schaldach at Montebello on 5 March 1961; one female (ARPC, some fat, largest follicle 2 mm) taken by Schaldach at Rancho Las Cruces near Donají on 3 July 1962; and one male (ARPC, moderately fat, testes not enlarged) and one female (AMNH 787502, moderately fat, follicles not enlarged), both collected by Schaldach at Donají on 15 July 1962.

*Subspecies: interrupta* (Griscom).

*Columbina talpacoti* (Temminck). Ruddy Ground-Dove.

Permanent resident in brushy clearings, cultivated land, grazed land, and savanna; common in lower portions of Atlantic Region within general range of tropical evergreen forest and at low elevations in Pacific Region within general range of tropical deciduous forest from Guerrero border to vicinity of San Pedro Pochutla; no record farther east in Pacific Region. *Elevations*: sea level to 2,400+ ft.

*Breeding*: 25 March 1961, two ruptured follicles (1 mi southwest of Valle Nacional, 300 ft, Wolf, LSUMZ 24282, 42.3 g, slightly fat), to 18 June 1895, nest with two young ("Mts. near Santo Domingo" [= La Ranchería], Nelson and Goldman); these two nestlings, which were collected (females, USNM 155433–155434), were erroneously listed by Todd (1913:538) and Ridgway (1916:403) as *C. passerina*.

*Subspecies: rufipennis* (Bonaparte), Atlantic Region; *eluta* (Bangs), Pacific Region.

*Claravis pretiosa* (Ferrari-Perez). Blue Ground-Dove.

Uncommon permanent resident in Atlantic Region in dense brushy clearings and margins of tropical evergreen forest, recorded northwest to San Juan Bautista Tuxtepec and south in Isthmus to La Ranchería and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 100 to 2,600 ft.

*Breeding* (all data): 17 March 1961, enlarged follicle (5 mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24287, 80.8 g, moderately fat); 17 March 1962, enlarged testes (13 × 7 mm, Montebello, Schaldach, AMNH 778240).

*Leptotila verreauxi* Bonaparte. White-tipped Dove.

Permanent resident; widespread in Atlantic and Pacific Regions, where very common in tropical evergreen, tropical deciduous, tropical semideciduous, and Pacific swamp forests and uncommon in arid tropical scrub and extreme lower reaches of cloud forest, penetrating Río Tehuantepec basin to a point 4 mi east of Santiago Matatlán (6,100 ft); extends into Interior through basins of Río Verde (to a point 11 mi south of San Pedro Juchatengo), Río Balsas (to a point 2 mi west of Tamazulapan del Progreso, 6,000 ft), and Río Santo Domingo (near Ixtlán de Juárez, 7,200 ft), where rare in densely forested canyons within general range of arid subtropical scrub and arid pine-oak forest. *Elevations*: sea level to 7,200 ft.

*Breeding*: 15 February 1964, egg without shell in oviduct (9 mi west-northwest

of San José Estancia Grande, 300 ft, Binford, LSUMZ 33032, 132.9 g, little fat), to 14 June 1895, nest with two male young (La Ranchería, Nelson and Goldman, nestlings USNM 155184–155185).

*Subspecies*: taken as a whole, variously intermediate between *angelica* Bangs and Penard and *fulviventris* Lawrence. Specimens from near Valle Nacional are close to the former, and those purportedly from Tutla (del Toro Avilés) are close to the latter.

*Leptotila rufaxilla* (Richard and Bernard). Gray-fronted Dove.

Very uncommon permanent resident in tropical evergreen forest of Atlantic lowlands, recorded south in Isthmus to Sarabia. *Elevations*: 250 to 300 ft.

*Breeding* (all data): see below.

Previously published accounts (e.g., Friedmann et al. 1950:122) are based either on the two males (FMNH Conover Collection 15047–15048) supposedly from Tutla on 3 and 24 February 1941 (Blake 1950:400), which were collected by del Toro Avilés and hence are of questionable origin and date, or on a record from Playa Vicente (Deignan 1961:120), which is in Veracruz. I have examined eight reliable specimens, as follows: 1 mi southwest of Valle Nacional, 300 ft (22 March 1961, Wolf, male, LSUMZ 24293, 168.3 g, little fat, left testis 15 × 7 mm, right 13 × 6); 18 mi north (13 November 1960, Rook, female, LSUMZ 39612; 26 February 1961, Rook, female, WFVZ-HC 5046) and 24 mi north (14 March 1960, WFVZ-HC 5237; 23 March 1960, formerly Sheffler Collection 6845; 23 March 1962, AMNH 778253, “testes greatly enlarged”; 25 March 1962, AMNH 778254, testes 12 × 8 mm; all four males, Schaldach) of Matías Romero; and Sarabia (11 June 1961, Schaldach, male, AMNH 776263). In addition I saw 1 bird at Temascal on 1 December 1961 and 2 on an island 5 mi west of Temascal on 8 June 1964.

*Subspecies*: *plumbeiceps* Sclater and Salvin.

*Geotrygon albifacies* Sclater. White-faced Quail-Dove.

Permanent resident in cloud forest of Atlantic Region and in cloud forest and upper reaches of tropical semideciduous forest of Pacific Region, very common in Sierra Madre de Chiapas, common in Sierra de Miahuatlán, and uncommon in Atlantic Region. Unrecorded in Sierra de Yucuyacua. *Elevations*: 4,000 to 8,600 ft.

*Breeding*: 27 March 1964, nest with two eggs (near Cerro Baúl, 4,000 ft, Rook, WFVZ 35268), to about 23 May 1965, nest with one egg (near Cerro Baúl, 4,500 ft, Rook and P. Flores, WFVZ 35266); 2 June 1965, nest with one well-feathered young (near La Cima, J. D. Webster observation [Rowley 1966:124]).

*Subspecies*: *rubida* Nelson, Sierra de Miahuatlán; *albifacies* Sclater, elsewhere.

*Geotrygon montana* (Linnaeus). Ruddy Quail-Dove.

Permanent resident; fairly common in Pacific Region west of Isthmus in tropical semideciduous forest; uncommon in Atlantic Region in tropical evergreen forest, recorded south in Isthmus proper to a point 16 road mi north of Matías Romero, and in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas; last two populations disjunct from first but probably continuous with one another. *Elevations*: 300 to 4,900 ft.

*Breeding*: 8 May 1964, enlarged follicle (6 mm, 18 road mi north of San Gabriel Mixtepec, 4,900 ft, Binford, LSUMZ 33034, 131.1 g, little fat), to 3 July 1965,

nest with two eggs (kilometer marker 135 on Putla de Guerrero Road, 3,200 ft, Rowley, WFVZ 21421).

*Subspecies: montana* (Linnaeus).

#### Family PSITTACIDAE

*Aratinga holochlora* (Sclater). Green Parakeet.

Fairly common permanent resident on Pacific side of Tehuantepec region from Chiapas border west to a few miles northwest of Tehuantepec City and north to La Ventosa and Pericos, occurring in tropical deciduous forest, tropical semideciduous forest, Pacific swamp forest, and arid tropical scrub. *Elevations:* 50 to 4,900 ft.

*Breeding* (all data): 30 March 1961, enlarged testes (11 × 5 mm, Oaxaca-Chiapas line, 10 mi east of Tapanatepec, Schaldach, AMNH 775907); 3 June 1964, egg without shell in oviduct (1 mi west of La Ventosa, Morony, LSUMZ 33041, 232.0 g).

*Subspecies: A. h. strenua* (Ridgway). Birds from southeastern Oaxaca and south along the Pacific slope of Central America are larger than *A. h. holochlora* (Sclater) from the Atlantic slope of Mexico and are considered a distinct species, *A. strenua*, by the A.O.U. (1983:269). Bangs and Peters (1928:388) found both size types among a collection taken by W. W. Brown at Tapanatepec and, therefore, treated the two as separate species. I have not examined Brown's birds. Most of the Oaxaca specimens I have seen are close to *strenua*, although one female (AMNH 775908) from the Oaxaca-Chiapas border 10 mi east of Tapanatepec is close to *holochlora*. A male (AMNH 775907) from the same locality and two males (LSUMZ 39655 and 43731) from Tonalá, Chiapas, appear to me to be intermediate in dimensions, and for this reason I prefer to consider the two forms as conspecific pending a thorough study; the first bird has about 14 orange feathers on the throat, cheeks, neck, and nape, indicating an approach to *A. h. rubritorquis* (Sclater). Contrary to the implication by the A.O.U. (1983:269), *A. h. holochlora* has not been recorded in the Atlantic Region of Oaxaca. Instead, the Pacific Oaxaca population and that of the Atlantic slope of Mexico apparently are separated by a wide gap in northern Oaxaca and southern Veracruz. Thus, if *strenua* is indeed sympatric with a population of smaller birds in southeastern Oaxaca and western Chiapas, the latter must be a different population from the one inhabiting northeastern Mexico, even though the two appear to be morphologically very similar.

*Aratinga nana* (Vigors). Olive-throated Parakeet.

Common permanent resident in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to El Barrio. *Elevations:* 100 to 1,050 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: astec* (Souancé).

*Aratinga canicularis* (Linnaeus). Orange-fronted Parakeet.

Very common permanent resident in tropical semideciduous forest, Pacific swamp forest, tropical deciduous forest, and arid tropical scrub, ranging along entire length of Pacific Region, northwest in Río Tehuantepec basin to Rancho Las Animas, and north across Isthmus into Atlantic Region to a point 10 mi south of Matías Romero. *Elevations:* sea level to 4,350 ft.

*Breeding*: 13 February 1964, enlarged follicle (4 mm, 9 mi west-northwest of San José Estancia Grande, 300 ft, Binford, LSUMZ 33045, 81.0 g, little fat), to 15 May 1965, nest with two young nearly ready to leave (Cycad Camp, Rowley [1966:124] observation).

*Subspecies*: intermediate between *canicularis* (Linnaeus) and *eburnirostrum* (Lesson). From Tehuantepec City eastward, most individuals are close to the former subspecies; from there westward, most individuals are intermediate, although some are close to the latter race.

*Ara militaris* (Linnaeus). Military Macaw.

Rare and local permanent resident in mountains, probably throughout state. I know of only three records. Galley took an adult male (WVZ-HC 19229) at 3,000 ft elevation 20 mi "north" [= west] of Tequisistlán on 22 March 1967. Rowley (1984:114–115) saw a pair repeatedly entering a fairly large cavity (probably a nest, as "raucous squawking" was heard at each visit) in a cliff at apparently the same locality on 30 May 1966. The only other record, which is the basis for all published references to the state, including that by Lawrence (1876:35) from "Mountains north [=west] of Tehuantepec," is a listing by Sumichrast (1881:238) of the locality "Reg. alp. de . . . Zapotitlan, cerca de Huamelula" (Zapotitlán at 5,739 ft but elevation at exact point of record is unknown). I do not know whether or not Sumichrast's record is based on a specimen. In the catalogue of the USNM, immediately following a long series of Sumichrast specimens from Oaxaca, is the name *Ara militaris* (USNM 58975). No locality or other data, however, are given in the catalogue, and I can find no specimen with this number in the collection.

*Breeding* (all data): range, habitat, and dates; see also above.

*Subspecies*: *mexicana* Ridgway. I doubt that *sheffleri* van Rossem and Hachisuka of northwestern Mexico should be maintained. It is based solely on tail length, which is only an average difference at best, despite the published figures (*sheffleri*, 345–370 mm; *mexicana*, 405–430 mm). The Oaxaca specimen measures only 382 mm, and a female (WVZ-HC 1098) from Sonora, the type state of *sheffleri*, measures 401 mm, each measurement being intermediate and closest to the other race.

*Ara macao* (Linnaeus). Scarlet Macaw.

Winter resident, presumably from tropical evergreen forest of Atlantic lowlands, in lower portions of Pacific Region in Pacific swamp forest and heavy tropical deciduous forest, recorded from Punta Paloma and Tapanatepec west to Puerto de Huatulco and north in Isthmus to a point 16 road mi south of Matías Romero and to "Chimalapa" (adult male taken in February by W. B. Richardson at either Santa María Chimalapa or San Miguel Chimalapa; record published by Salvadori 1891:155); formerly "excessively common" between Niltepec and Tapanatepec (Sumichrast, *in* Lawrence 1876:35) and "abundant" near Tehuantepec City (Nelson 1898a:118), but neither author gives dates; now rare or extirpated over all of former range; the most recent record is 19 January 1961 (16 mi south of Matías Romero, Rook, male, WVZ-HC 5056). Whether or not this species was resident in Pacific or even Atlantic Oaxaca might never be known. *Dates*: 21 December to 9 March. *Elevations*: sea level to 800 ft.

*Brotogeris jugularis* (Müller). Orange-chinned Parakeet.

Uncommon permanent resident in Pacific swamp forest and tropical deciduous forest of Pacific lowlands and adjoining foothills from Chiapas border west to the Río Ostuta. Should be sought elsewhere in Pacific region. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 24 March 1966, nest with seven eggs (Tapanatepec, Galley, WFVZ 20766).

*Subspecies*: *jugularis* (Müller).

*Pionopsitta haematotis* (Sclater and Salvin). Brown-hooded Parrot.

Fairly common permanent resident in Atlantic Region in heavy tropical evergreen forest and low-elevation cloud forest, recorded northwest to Vista Hermosa (Thompson 1962:174) and a point 6 road mi southwest of Valle Nacional and south in Isthmus to a point 18 road mi north of Matías Romero. *Elevations*: 200 to 5,200 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *haematotis* (Sclater and Salvin).

*Pionus senilis* (Spix). White-crowned Parrot.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to a point 18 road mi north of Matías Romero. The only record outside this area, an adult male (WFVZ-HC 19151) taken by Rowley on 14 April 1967 at 3,900 ft elevation at Rancho Carlos Minne near Cerro Baúl in the Sierra Madre de Chiapas, apparently represents a casual winter visitant. Local migration indicated by records from a point at 300 ft elevation 1 mi southwest of Valle Nacional, where species unrecorded on daily surveys from 14 February through 25 March 1961 but fairly common thereafter. *Elevations*: 300 to 3,900 ft.

*Breeding* (all data): 26 March 1961, enlarged testes (12 × 6 mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24301, 191.2 g, little fat).

*Subspecies*: monotypic, following Monroe (1968:143).

*Amazona albifrons* (Sparrman). White-fronted Parrot.

Common permanent resident in tropical deciduous forest and arid tropical scrub, occurring along entire length of Pacific Region, north across Isthmus into Atlantic Region as far as Matías Romero, and northwest in Río Tehuantepec basin to Rancho Las Animas. Record for La Parada (Ridgway 1916:256) probably erroneous. *Elevations*: sea level to 3,000 ft.

*Breeding* (all data): 29 January 1869, nest with one egg (Santa Efigenia, Sumichrast, egg USNM egg collection 15524); 22 February 1964, enlarged testes (11 × 4 mm, Minitán, Binford, LSUMZ 33049, 227.6 g, little fat); 23 March 1961, enlarged testes (11 × 3 mm, El Guamol, Schaldach, AMNH 775912).

*Subspecies*: *albifrons* (Sparrman). Some specimens from the Isthmus tend toward *nana* Miller in their slightly smaller size.

*Amazona finschi* (Sclater). Lilac-crowned Parrot.

Very uncommon permanent resident from 2,900 to 4,900 ft in humid and semiarid pine-oak forests of Pacific Region west of Isthmus, occasionally wan-

dering into lowlands of Pacific Region (including Isthmus) in fall (August–November); recorded from Putla de Guerrero east to Zanatepec, the southeasternmost point in entire range of species. *Elevations*: sea level to 4,900 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *finschi* (Sclater); see Type Localities.

*Amazona autumnalis* (Linnaeus). Red-lore Parrot.

Common permanent resident in tropical evergreen forest of Atlantic Region south in Isthmus to El Barrio. *Elevations*: 100 to 1,050 ft.

*Breeding* (all data): 4 April 1961, enlarged testes ( $12 \times 5$  mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24303, 377.2 g, slightly fat).

*Subspecies*: *autumnalis* (Linnaeus).

*Amazona farinosa* (Boddaert). Mealy Parrot.

Fairly common permanent resident in heavy tropical evergreen forest of Atlantic Region west to Uvero and a point 16 road mi north of Matías Romero. *Elevations*: 100 to 950 ft. See *A. auropalliata*.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *guatemalae* (Sclater).

*Amazona oratrix* Ridgway. Yellow-headed Parrot.

Uncommon and local permanent resident in savanna and in openings within tropical deciduous and Pacific swamp forests, recorded in two disjunct areas: western portion of Pacific Region at Llano Grande, Minitán, Río Grande (near Puerto Escondido, Boucard), and a point 9 mi west-northwest of San José Estancia Grande; and Isthmus portion of Atlantic Region at “Petapa” (see Type Localities) and El Barrio. *Elevations*: sea level to 1,050 ft.

*Breeding* (all data): 16 February 1964, enlarged testes ( $19 \times 8$  mm, 9 mi west-northwest of San José Estancia Grande, 300 ft, Binford, LSUMZ 33050, 517.3 g, little fat).

*Subspecies*: *oratrix* Ridgway; see Type Localities. The subspecies *magna* Monroe and Howell (1966:5) should be sought in the northern Atlantic Region. Current evidence indicates that *A. oratrix* and *A. auropalliata* are narrowly allopatric, approaching closest at El Barrio (*oratrix*) and Río Ostuta (*auropalliata*), a distance of about 50 mi, and, thus, their specific separation here and by the A.O.U. (1983: 280–281) is necessarily tentative.

*Amazona auropalliata* (Lesson). Yellow-naped Parrot.

Uncommon and local permanent resident in savanna and in openings within tropical deciduous and Pacific swamp forests, recorded in extreme eastern portion of Pacific Region at Rancho de Cacoprieto, Santa Efigenia, Tapanatepec, a point 6 mi south of Chahuities, Río Ostuta (5 mi west of Zanatepec), Niltepec, and near Ixhuatán. Alleged occurrence at Santa María Chimalapa (Ridgway 1916:232) based on a misidentification of *A. farinosa*. Oaxaca localities are northwesternmost in entire range of species. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 10 February 1961, nest with two eggs (Niltepec, Rook, WFVZ 64770).

*Subspecies*: *auropalliata* (Lesson). See *A. oratrix*.

## Family CUCULIDAE

*Coccyzus erythrophthalmus* (Wilson). Black-billed Cuckoo.

Very uncommon transient migrant in all regions, recorded in only six definite localities, as follows: in Atlantic Region in tropical evergreen forest, one female (LSUMZ 44011) taken by Rook on 13 April 1960 at a point 24 [not 18 as miscopied label now says] mi north of Matías Romero; in Pacific Region west of Isthmus in cloud forest, one male (WFVZ 23129, 49.5 g, very fat) taken by Galley on 10 May 1965 at kilometer marker 187 near La Cima, 5,800 ft, and one male (WFVZ 23130, 37.8 g) secured by Rowley on 9 May 1965 at La Cima, 5,800 ft; in Pacific Region east of Isthmus, one female (WFVZ-HC 13756) taken by Rook on 13 May 1964 at Rancho Sol y Luna; in the Interior, probably in arid subtropical scrub or adjacent riparian vegetation, one female (CAS, 57.4 g, reasonably fat) taken by Rowley on 17 September 1964 at 6,000 ft elevation 8 mi northeast of Oaxaca City, and one male and one female collected by Martin del Campo (1942: 353) and/or P. Roveglia sometime between 11 and 27 September 1937 at La Hacienda near Huajuapán de León. Data, especially dates, on four specimens from Tutla (FMNH; 8 and 16 March, 21 and 23 April, 1941) and two from Escuilapa (MLZ; 9 and 16 April 1939), all collected by del Toro Avilés, are questionable. *Elevations*: 300 to 6,000 ft.

*Coccyzus americanus* (Linnaeus). Yellow-billed Cuckoo.

Fairly common transient migrant throughout state in tropical evergreen forest, tropical deciduous forest, tropical semideciduous forest, arid tropical scrub, arid subtropical scrub, and Pacific swamp forest. The only winter records, three specimens (FMNH) taken by del Toro Avilés purportedly at Tutla on 11 February and 11 March 1941, are questionable, especially the dates. *Dates*: 12 April to 31 May; 16 September to 1 October. *Elevations*: 50 to 5,250 ft.

*Subspecies*: *americanus* (Linnaeus); *occidentalis* Ridgway.

*Coccyzus minor* (Gmelin). Mangrove Cuckoo.

Uncommon permanent resident in Pacific Region in mangrove swamp, Pacific swamp forest, and tropical deciduous forest, recorded from Punta Paloma and a point 9 road mi east of Tapanatepec west along foothills of Sierra Madre de Chiapas to a point 5.2 mi west of Niltepec and also (disjunctly?) in Río Tehuantepec basin at Rancho Las Animas, Río Coyul, and points 5 mi north of Nejapa and 16 mi south of Santiago Matatlán. Should be sought in Atlantic Region and elsewhere in Pacific Region. *Elevations*: sea level to 4,000 ft.

*Breeding* (all data): 21 May 1961, enlarged testes (10 × 5 mm, 5 mi east of Tapanatepec, Binford, LSUMZ 24305, 70.6 g, slightly fat); 13 July 1963, nest with one egg (5 mi north of Nejapa, 4,000 ft, Rowley, WFVZ 26620).

*Subspecies*: *palloris* Ridgway.

*Piaya cayana* (Linnaeus). Squirrel Cuckoo.

Common permanent resident throughout Atlantic and Pacific Regions in tropical evergreen, tropical semideciduous, tropical deciduous, and Pacific swamp forests and in the Interior in gallery forest within arid tropical scrub of the Río Verde basin (San Pedro Juchatengo) and within arid subtropical scrub near Huajuapán de León. Unrecorded in arid valleys of San Juan Bautista Cuicatlán and

Hidalgo Yalalag. *Elevations*: sea level to 5,250 ft. See Santa Catarina Juquila in Gazetteer.

*Breeding* (all data): 15 May 1966, nest with one egg (WFVZ 21325) and 21 May 1966, nest with two eggs (WFVZ 21326; both nests from Rancho Sol y Luna, 800 ft, Rowley); 17 July 1955, nest with young (9 mi northwest of Tehuantepec City, R. W. Dickerman, nestling UK 35790).

*Subspecies*: *thermophila* Sclater, entire Atlantic Region plus Pacific Region from Chiapas border west to a point 5 mi east of Tehuantepec City; *mexicana* (Swainson), Interior Region plus Pacific Region in Río Tehuantepec basin and from Guerrero border east to Tehuantepec City. I have seen definite intermediates from Río Ostuta (MLZ 45402), Las Tejas (MLZ 54387), and Tehuantepec City (UMMZ 137345 and 137350), but some specimens from the last two localities are *mexicana*. Birds from Tapanatepec, Santa Efigenia, and a point 18 mi south of Matías Romero are close to *thermophila* but very slightly paler, a condition that might represent response to the drier environment rather than intergradation. The abruptness and apparent rarity of intergradation suggest that these two forms might be separate species; a detailed study is needed.

*Tapera naevia* (Linnaeus). Striped Cuckoo.

Very uncommon permanent resident in Atlantic Region northwest at least to a point 25 mi south of San Juan Bautista Tuxtepec and perhaps (del Toro Avilés) San Miguel Soyaltepec and in Pacific Region in Sierra Madre de Chiapas (Santa Efigenia), occurring in brush at margins of tropical evergreen and tropical semi-deciduous forests. *Elevations*: 250 to 800 ft.

*Breeding* (all data): a brood parasite; 20 June 1961, egg without shell in oviduct (Montebello, Schaldach, AMNH 776279).

*Subspecies*: *excellens* (Sclater).

*Dromococcyx phasianellus* (Spix). Pheasant Cuckoo.

Uncommon permanent resident in tropical semideciduous forest, tropical evergreen forest, lower reaches of cloud forest, and in Pacific swamp forest adjacent to first habitat; recorded in Atlantic Region northwest at least to a point 5 mi west of Temascal and in Pacific Region northwest to a point 1 mi east of Putla de Guerrero, the northwesternmost locality in entire range of species. *Elevations*: 300 to 5,300 ft.

*Breeding*: a brood parasite; 23 April 1961, enlarged follicle (8 mm, 15 road mi southwest of Valle Nacional, 4,100 ft, Binford, LSUMZ 24312, 87.7 g, little fat), to 8 June 1965, hard-shelled egg in oviduct (kilometer marker 134 on Putla de Guerrero Road, 3,600 ft, Rook, female skin CAS, 98.1 g, no fat).

*Subspecies*: *rufigularis* Lawrence.

*Morococcyx erythropygus* (Lesson). Lesser Ground-Cuckoo.

Common permanent resident in Pacific Region in tropical deciduous forest and arid tropical scrub, recorded north in Isthmus to Chivela and northwest in Río Tehuantepec basin to vicinities of San Pedro Totolapan and San Juan del Río. *Elevations*: sea level to 3,200+ ft.

*Breeding*: breeds during rainy season; 15 May 1966, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley [1984:119], WFVZ 21324), to 21 November 1958, prejuvenile (1 mi east of Salina Cruz, Phillips, female, ARPC 4822).

*Subspecies: mexicanus* Ridgway, endemic to Pacific Region from Guerrero border eastward to include most or all of Plains of Tehuantepec (see Type Localities); *erythropygus* (Lesson), hills bordering east side of Plains of Tehuantepec eastward into Chiapas.

*Geococcyx velox* (Wagner). Lesser Roadrunner.

Permanent resident; common in arid tropical scrub, related savanna, and openings in tropical deciduous forest in Río Tehuantepec basin and lowlands of Isthmus, ranging north to points 2 mi south and 6 mi north of Matías Romero, and uncommon in pine-oak forests of upper Pacific and Interior Regions and in arid subtropical scrub and arid tropical scrub of Interior; absent in Atlantic Region outside Isthmus and below 3,000 ft in Pacific Region west of Tehuantepec City and Santa Lucía; record for Moctum questionable (see below). *Elevations*: sea level to 9,000 ft.

*Breeding*: 3 May 1966, active nest completed but empty (2 mi south of San Bartolo Coyotepec, 5,000 ft, Rowley [1984:120] observation), to 15 July 1943, nest with young (Tamazulapan del Progreso, 6,000 ft, Lamb, nestling MLZ 38094).

*Subspecies: melanchima* Moore. All data on the only Oaxaca specimen of *G. v. velox* (Wagner), a female taken by del Toro Avilés supposedly at Moctum on 20 October 1941 (MLZ 23812; Friedmann et al. 1950:137), are questionable.

*Crotophaga sulcirostris* Swainson. Groove-billed Ani.

Common permanent resident in all Regions in cultivated land, grazed land, and brushy clearings, in each case within general range of tropical evergreen forest, tropical deciduous forest, tropical semideciduous forest, arid tropical scrub, and lower reaches of arid subtropical scrub (in Oaxaca Valley and at Huajuapán de León). *Elevations*: sea level to 5,250 ft.

*Breeding*: 27 May 1966, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley [1984:119] observation), to 19 July 1961, nest with 11 eggs (Sarabia, Rook, WFVZ 24301); 24 June 1955, prejuvenile (3 mi east-southeast of Oaxaca City, J. R. Alcorn, female, UK 37211).

*Subspecies: sulcirostris* Swainson.

#### Family TYTONIDAE

*Tyto alba* (Scopoli). Common Barn-Owl

No specimen examined; two published specimen records; one other record. Status uncertain. Recorded as follows: "Oaxaca" [= Oaxaca City?], Boucard specimen (Sclater 1859b:390); Tehuantepec City (town at 115 ft but elevation at exact point of collection unknown), Sumichrast specimen (Lawrence 1876:38); and "Cacoprieto" [= Rancho de Cacoprieto] (elevations of ranch and exact point of collection unknown), Sumichrast record (Sumichrast 1881:238).

*Subspecies: pratincola* (Bonaparte), according to Friedmann et al. (1950: 138).

#### Family STRIGIDAE

*Otus cooperi* (Ridgway). Pacific Screech-Owl.

Fairly common permanent resident in Pacific Region from Puerto Angel and Rancho Las Animas east through Ixtepec and Rancho de Cacoprieto (Ridgway 1914:711) into Chiapas, recorded in arid tropical scrub, tropical deciduous forest,

Pacific swamp forest, and mangrove swamp. Oaxaca localities are northwesternmost in entire range of species. *Elevations*: sea level to 3,000 ft. See *O. trichopsis*.

*Breeding*: 30 March 1966, nest with two young about one-half grown and one addled egg (near Rancho Sol y Luna, 600 ft, Rowley [1984:120–122]; adult female WFVZ-HC 16617), to 26 May 1966, prejuvenile (Rancho Sol y Luna, 800 ft, Rowley, WFVZ-HC 16620).

*Subspecies: cooperi* (Ridgway 1878:116), from Rancho Sol y Luna, Chahuities, and Punta Paloma eastward; *lambi* Moore and Marshall (1959:224), endemic to remainder of Oaxaca range (see Type Localities). Intergradation occurs between Laguna Inferior and Mar Muerto (Marshall 1967:17). I follow Marshall (1967) in merging the race *chiapensis* Moore with nominate *cooperi*.

*Otus trichopsis* (Wagler). Whiskered Screech-Owl.

Fairly common permanent resident in dense clumps of oaks within humid and arid pine-oak forests in highlands of Interior Region in Sierra Aloapaneca, Sierra de Yucuyacua, and Sierra de Miahuatlán, extending to somewhat lower elevations in Pacific Region of last range. Records from Cacoprieto (Sumichrast 1881:237) and “Tehuantepec” [= Tehuantepec region] (Beristain and Laurencio 1894:228) pertain to *O. cooperi cooperi*. Should be sought in Sierra Madre de Chiapas. *Elevations*: 4,000 to 9,500 ft.

*Breeding* (all data): 7 June 1966, two full-sized juvenile males (WFVZ-HC 16621–16622) attended by adult female (WFVZ-HC 16623, Cerro San Felipe, 9,500 feet, Rowley [1984:123]).

*Subspecies: trichopsis* (Wagler).

*Otus guatemalae* (Sharpe). Vermiculated Screech-Owl.

Uncommon permanent resident in tropical evergreen forest of Atlantic Region at “Chimalapa” [= Santa María Chimalapa?] (one female and one bird not sexed, W. B. Richardson; records published by Moore and Peters 1939:50), Montebello, and possibly (del Toro Avilés) Tutla and in tropical semideciduous forest and adjacent tall-tree tropical deciduous forest of Pacific Region from a point 7 mi north of Putla de Guerrero east to a point 13 road mi north of Puerto Angel. Should be sought in similar habitats elsewhere in Atlantic and Pacific Regions. *Elevations*: 300 to 3,500 ft.

*Breeding* (all data): 20 June 1961, three sibling prejuveniles (Montebello, Schal-dach, males AMNH 776284 and 776286, female AMNH 776287).

*Subspecies: guatemalae* (Sharpe), Atlantic Region; *hastatus* (Ridgway), Pacific Region. Birds from the Pacific Region show slight intergradation with *guatemalae*, according to Marshall (1967:26).

*Lophotrix cristata* (Daudin). Crested Owl.

Rare permanent resident in Atlantic Region in tropical evergreen forest (recorded only for San Ildefonso Villa Alta and at a point 24 road mi north of Matías Romero) and in Pacific Region in Pacific swamp and tropical semideciduous forests of Sierra Madre de Chiapas (known only from Rancho de Cacoprieto, Rancho Sol y Luna, and Colonia Rodolfo Figueroa). Should be sought throughout lower portions of Atlantic Region. *Elevations*: 300 to 800+ ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: stricklandi* Sclater and Salvin.

*Pulsatrix perspicillata* (Latham). Spectacled Owl.

Uncommon permanent resident in Pacific Region in Pacific swamp forest of Sierra Madre de Chiapas and in Atlantic Region in tropical evergreen forest northwest at least to a point 5 mi west of Temascal. Record for Tehuantepec City (Ridgway 1914:758) is erroneous, actually pertaining to Tehuantepec region. *Elevations*: 250 to 1,500 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *saturata* Ridgway; see Type Localities.

*Bubo virginianus* (Gmelin). Great Horned Owl.

Rare permanent resident in arid habitats probably throughout Pacific and Interior Regions but so far recorded definitely only at four localities, as follows: on Pacific side of Tehuantepec region at Rancho de Cacoprieto (Sumichrast, four specimens, BMNH; records published by Griscom 1935:546) and Tehuantepec City (16 October 1869, Sumichrast, female, USNM 59497; city at 115 ft but elevation at exact point of collection unknown); and in the Interior at points 6 road mi south of San Miguel Suchixtepec (pine-oak forest at 7,500 ft, 2 February 1974, 1 heard by Binford) and 7 km (4.3 mi) northeast of San Andrés Chicahuaxtla (pine-oak forest at 8,000 ft, 28 October 1964, 1 heard by Rowley, field notes in CAS). Old published record (Sclater 1859b:390) of Boucard specimen from "Oaxaca" might pertain to Oaxaca City.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *mesembrinus* (Oberholser). I follow Webster and Orr (1958) in considering *melancercus* (Oberholser) a synonym of *mesembrinus* and the latter distinct from *mayensis* Nelson of Yucatán state; see Type Localities. Birds west of the Isthmus might be *pallescens* Stone.

*Glaucidium gnoma* Wagler. Northern Pygmy-Owl.

Uncommon permanent resident in the Interior and in upper Pacific Region west of Isthmus, recorded only in humid pine-oak forest but to be expected also in arid pine-oak forest. *Elevations*: -6,600 to 10,000 ft.

*Breeding* (all data): see below.

The Northern Pygmy-Owl has been recorded from eight localities in Oaxaca. In 1961 Wolf took a male (LSUMZ 24315, 52.5 g, moderately fat, testes small) at 9,300 ft elevation 38 road mi southwest of Valle Nacional on 28 April and one of two birds (male, LSUMZ 24316, 50.3 g, slightly fat, testes small) seen at 6,600 ft 10 road mi south of San Miguel Suchixtepec on 1 May. A. R. Phillips (in litt.) informs me that his collection contains two specimens, a male (ARPC 7814, fat, testes not enlarged) secured by Juan Nava S. above Río Guajolote on 15 November 1964 and a female (ARPC 7654, moderate fat, ovary not enlarged) taken by Hermilo Garcia F. at 7,300 ft at Río Molino on 8 November 1964. At 10,000 ft on Cerro San Felipe, Galley took a male (WFVZ-HC 19163) and Rowley a male (WFVZ-HC 19164, testes inactive) on 21 June 1967, and Rowley secured a female (WFVZ-HC 19165, ovaries inactive) on 23 June 1967. Three specimens were collected in 1965 from 7,300 to 7,400 ft at Río Molino: a male (CAS, Rook, 52.6 g, slightly fat) on 25 May, a male (WFVZ 23378, Rowley, 57.5 g, heavy fat, testes inactive) on 26 May, and a female (WFVZ 23377, Galley, 60.0 g, no fat) on 29 May. Rowley took a male (CAS, 51.6 g, "attending two young") on 7 July 1965

at 8,000 ft 4 mi north of San Andrés Chicahuaxtla. L. Baptista took a male (CAS 67080) on 8 August 1966 at 7,200 ft at Ixtlán de Juárez. I heard a bird on 20 February 1974 at 6,600 ft 2 airline mi west of San Juan Lachao Pueblo Viejo. Specimens taken by Sumichrast at Tapanatepec (USNM 58930) and Tehuantepec City (USNM 59500), reported by Lawrence (1876:37) and Sumichrast (1881:237) as *gnoma*, represent *G. brasilianum*, as might the record from "Tehuantepec" [= Tehuantepec region; specimen not seen by me] listed by Beristain and Laurencio (1894:228).

*Subspecies: gnoma* Wagler.

*Glaucidium minutissimum* (Wied). Least Pygmy-Owl.

Permanent resident, very common in Pacific Region in tropical deciduous and Pacific swamp forests up to 1,050 ft elevation north and northwest of Puerto Escondido (seven males, LSUMZ) and rare in Atlantic Region up to at least 4,100 ft in tropical evergreen forest and lower reaches of cloud forest. The Atlantic race *occultum* was previously known in Oaxaca only from the type (Buchanan 1964: 106), a female (MLZ 33803) taken by del Toro Avilés purportedly on 10 September 1941 at Moctum; in addition I took a male (LSUMZ 27418, 51.4 g, very fat, testes  $3 \times 1.5$  mm) on 24 November 1961 at 4,100 ft elevation 15 road mi southwest of Valle Nacional, and Schaldach secured a male (AMNH 768800, testes  $5 \times 3$  mm) on 3 June 1962 at 150 m (492 ft) elevation 12 km (7.5 mi) east-northeast of Piedra Blanca. The Moctum locality could be questioned; see discussion of del Toro Avilés specimens in Plan of the Species Accounts. *Elevations*: 500 to 4,100+ ft.

Near Puerto Escondido, where *minutissimum* is very common, *G. brasilianum* is absent, whereas in the Atlantic Region, where *minutissimum* is rare, *brasilianum* is common.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: occultum* Moore, Atlantic Region; see Type Localities. Birds from the Pacific Region match *palmarum* Nelson in size (seven males: wing chord 79.0–85.1 mm [ $\bar{X} = 82.5$ ]; tail 51.0–55.1 ( $\bar{X} = 53.5$ )) but are slightly paler throughout, especially on the pileum, which is also more finely spotted; they are larger than *griscomi* Moore, and probably represent an undescribed subspecies.

*Glaucidium brasilianum* (Gmelin). Ferruginous Pygmy-Owl.

Permanent resident below 5,000 ft throughout major portion of Atlantic and Pacific Regions, occurring in openings within the various vegetation types, as follows: common in tropical evergreen forest, tropical deciduous forest, and Pacific swamp forest; fairly common in arid tropical scrub and tropical semideciduous forest; and uncommon in cloud forest of the Sierra de Miahuatlán. One record for Interior, a female (WFVZ-HC 19166) taken by Rowley on 17 August 1967 at 2,100 ft elevation 2 mi south of San Juan Bautista Cuicatlán, where presumably a fairly common permanent resident. *Elevations*: sea level to 5,000 ft. See *G. gnoma* and *G. minutissimum*.

*Breeding*: 4 April 1967, nest with one egg (WFVZ 21429), to 15 May 1966, nest with two eggs (WFVZ 21295; both nests Rancho Sol y Luna, 800 ft, Rowley [1984:123–125]).

*Subspecies: intermedium* Phillips, according to Phillips (1966:93–94), Pacific

Region; *ridgwayi* Sharpe, Atlantic Region. Without a thorough revision of this species, I cannot assess the validity of *intermedium*.

*Athene cunicularia* (Molina). Burrowing Owl.

Very uncommon winter resident in savanna of Pacific Region. Should be sought as a rare and local permanent resident. The del Toro Avilés records for Interior at San Pablo Villa de Mitla (17 January 1942, female, MLZ 38804) and the Atlantic Region at Tutla (26 March 1941, male, FMNH 119431) are questionable, particularly the dates. *Dates*: 17 November to 19 February. *Elevations*: 50 to 300+ ft.

*Subspecies*: *hypugaea* (Bonaparte).

*Ciccaba virgata* (Cassin). Mottled Owl.

Fairly common permanent resident in Atlantic and Pacific Regions in tropical evergreen, tropical semideciduous, tropical deciduous, Pacific swamp, and palm forests and in Pacific Region in lower reaches of cloud forest; one record for Interior in San Miguel Sola de Vega valley (11 mi south of San Pedro Juchatengo, 5,600 ft, 20 April 1965, Rook, male, CAS). *Elevations*: sea level to 6,000 ft.

*Breeding*: 6 May 1963, two juveniles (Rancho Sol y Luna, Rook, WFVZ-HC, female 10895, male 10896), to 25 June 1966, nest with one egg (Rancho Sol y Luna, 800 feet Rowley [1984:125], WFVZ 20731; embryo dead, so perhaps abandoned for some length of time).

*Subspecies*: *centralis* Griscom, according to Friedmann et al. (1950: 147); see Type Localities.

*Ciccaba nigrolineata* Sclater. Black-and-white Owl.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in Pacific swamp forest of Sierra Madre de Chiapas. Record for Tehuantepec City (Lawrence 1876:37) highly doubtful because of locality. *Elevations*: 250 to 800 ft.

*Breeding* (all data): 3 May 1963, juvenile (Rancho Sol y Luna, Rook, female, WFVZ-HC 10893); 13 May 1960, juvenile (Río Sarabia, Rook, male, WFVZ-HC 4709).

*Subspecies*: monotypic; see Type Localities.

*Strix varia* Barton. Barred Owl.

Rare permanent resident in high elevation humid pine-oak forest of Interior, recorded only at "Parada" [= La Parada] (December 1857, Boucard; record published by Sclater 1858:295) and on Cerro San Felipe (23 and 29 August 1894, Nelson and Goldman, females, USNM 155665 and 155666, respectively). Oaxaca localities are southeasternmost in entire range of species. *Elevations*: exact elevations at which specimens obtained unknown; La Parada located at 7,900 ft; Nelson and Goldman collected between 10,000 and 10,300 ft on Cerro San Felipe.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *sartorii* (Ridgway).

*Asio otus* (Linnaeus). Long-eared Owl.

No specimen; one published banding record. Status uncertain. Only record, the southeasternmost for North America, is a bird banded by Houston (1966:64) on 15 June 1960 on a farm 7 mi east and 5 mi north of Saltcoats, Saskatchewan,

and found hanging dead in a tree by native boy in the Oaxaca Valley near Ejutla de Crespo (town at 4,723 ft, but elevation at exact point of record unknown); leg and band shown to G. Peterson on 26 January 1965 but found on an unknown date "nearly five years previously."

*Subspecies: tuftsi* Godfrey. I follow the taxonomic treatment of the A.O.U. (1957:286–287) and base this subspecific identification solely on the locality of banding.

*Asio clamator* (Vieillot). Striped Owl.

Rare permanent resident in Atlantic Region in unknown habitat (grassy openings?) in general range of tropical evergreen forest. Known only from three specimens collected in 1960 at 250 ft elevation "18 [road] miles north of Matías Romero" [= Río Sarabia]: two full-sized but partially downy juveniles, one a male (LSUMZ 61377) and one a female (WFVZ-HC 4680), taken by Schaldach on 7 February and one adult female (WFVZ-HC 4707) secured by Rook on 12 April. Should be sought elsewhere in lowlands of Atlantic Region.

*Breeding* (all data): range, habitat, and dates; see also above.

*Subspecies: forbesi* (Lowery and Dalquest 1951:576).

*Asio flammeus* (Pontoppidan). Short-eared Owl.

No specimen examined; one published record, a specimen taken by Boucard in "Oaxaca" [= Oaxaca City?] (Sclater 1859b:390), has formed the basis for all subsequent references. Status uncertain. A. R. Phillips (pers. comm.) informs me that his search of the British Museum collections in 1966 failed to disclose any Oaxaca specimen of the Short-eared Owl.

*Subspecies: flammeus* (Pontoppidan), according to Friedmann et al. (1950:150).

*Aegolius acadicus* (Gmelin). Northern Saw-whet Owl.

Rare inhabitant of humid pine-oak forest of Interior highlands, where presumably a permanent resident. Only two records, the southeasternmost in total range of species. On 21 June 1967 Galley took an adult male (WFVZ-HC 19167, heavy fat; not neotenic) at 10,000 ft on Cerro San Felipe. Sclater (1858:295) published a record of a male taken by Boucard in October 1857 at an unknown elevation at Cinco Señores in the Sierra Aloapaneca. Subsequent authors have referred this record, I presume correctly, to *A. a. acadicus*. In August 1966 A. R. Phillips (pers. comm.) searched the collections of the British Museum and found only one Oaxaca specimen, an example of *A. a. acadicus* taken by Boucard "near Oaxaca." Probably, this and the Cinco Señores bird are one and the same specimen.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: acadicus* (Gmelin). See *Aegolius ridgwayi* in Hypothetical List and Type Localities.

#### Family CAPRIMULGIDAE

*Chordeiles acutipennis* (Hermann). Lesser Nighthawk.

Occurs in and near savannas and other openings within forested regions of lowlands and adjacent foothills, common in winter in Pacific Region near tropical deciduous forest, palm forest, and Pacific swamp forest, and very uncommon on migration in Atlantic Region near tropical evergreen forest and in the Interior

over arid habitats of Oaxaca Valley. Exact status uncertain; as a species, it is a permanent resident, having been recorded in all months, but breeding birds might leave in winter and be replaced by winter residents from north; apparently only a transient migrant in Atlantic Region, where recorded only on 5, 6, and 7 April and 4 December; possibly only a transient migrant in the Interior, where collected only on 2 March, 20 April, and 2 May, although two specimens (WFVZ) from Oaxaca Valley on last two dates have been reported as the breeding race *littoralis* (Dickerman 1985:358); recorded in summer only on Plains of Tehuantepec, from which come the only breeding data and where breeding race (*littoralis*) collected (UMMZ 137448–137456) from 15 April to 20 November but species occurs all year; elsewhere in Pacific Region perhaps only a winter resident, recorded from 28 September to 2 May. *Elevations*: sea level to 5,800 ft.

*Breeding*: 5 May 1915, three nests each with two eggs, to 2 June 1917, two nests each with two eggs (all records on river bars near Tehuantepec City, Shufeldt field notes in UMMZ).

*Subspecies*: *littoralis* Brodkorb (1940b:543), summer or permanent resident, Plains of Tehuantepec and perhaps (Dickerman 1985:358) Oaxaca Valley; *texensis* Lawrence, winter resident.

*Chordeiles minor* (Forster). Common Nighthawk.

Rare and local summer resident in the Interior and in lowland savanna on Atlantic side of Isthmus. Should be sought as a transient migrant throughout state. Only four definite records. At a point 4 mi north and 2 mi east of Matías Romero [elevation about 300 ft], Schaldach collected two females (AMNH 787511, moderately fat, largest follicle 3 mm; WFVZ 23508, moderately fat, largest follicle 5 mm) on 16 May 1962 and a male (WFVZ 23502, some fat, testes 13 × 9 mm) on 15 June 1962. In the Interior, Rowley took a female (WFVZ 23501, 58.9 g) on 16 July 1965 at 3,500 ft at kilometer marker 136 on the Puerto Escondido Road [= about 4 mi north of San Pedro Juchatengo]. The only other specimens, which form the basis for all previously published records (e.g., Friedmann et al. 1950: 153), are a female (MLZ 26373) from Tutla on 7 June 1939 and a male (MLZ 26382) from Palomares on 6 May 1939, both of which were collected by del Toro Avilés and hence are of questionable origin and date.

*Breeding* (all data): see above.

*Subspecies*: *neotropicalis* Selander and Alvarez del Toro (1955:144). The occurrence of *henryi* Cassin, listed for Oaxaca by Friedmann et al. (1950:153) and others, is based on the above Tutla specimen and, thus, is questionable.

*Nyctidromus albicollis* (Gmelin). Common Pauraque.

Very common permanent resident in Atlantic Region in openings within tropical evergreen forest, in Pacific Region in arid tropical scrub and openings within tropical deciduous forest, tropical semideciduous forest, and Pacific swamp forest, and in the Interior in arid tropical scrub of valley of San Juan Bautista Cuicatlán. *Elevations*: sea level to 3,600 ft.

*Breeding*: 28 March 1961, enlarged follicle (13 × 12 mm, near Ixhuatán, Schaldach, AMNH 775955), to 28 May 1959, nest with two eggs (6.8 mi west of Niltepec, Binford observation); 29 May 1959, two juveniles (5.2 mi west of Niltepec, Binford observation).

*Subspecies*: *yucatanensis* Nelson, Atlantic Region; *nelsoni* Ridgway, Pacific and

Interior Regions. Oaxaca *nelsoni* approach *yucatanensis* in their darkness and small size, as pointed out by Griscom (1929a:7). I treat *sumichrasti* Ridgway (1912:91) from Tabasco as a synonym of *yucatanensis*.

*Nyctiphrynus mcleodii* (Brewster). Eared Poorwill.

Rare presumptive breeding bird in Pacific Region in grassy humid pine-oak forest of Sierra de Miahuatlán, where probably a permanent resident, but recorded only from 3 February to 13 May. Oaxaca localities are southeasternmost in entire range of species. *Elevations*: 3,600 to 5,800 ft.

*Breeding* (all data): range, habitat, and dates; see also below.

This species has been recorded as follows: one male (LSUMZ 33065, 36.4 g, little fat, testes not enlarged, stomach full of remains of many small brown beetles) taken by Binford on 13 May 1964 at 4,350 ft elevation 16 road mi north of San Gabriel Mixtepec; one of three birds taken (female, CAS 68858, 31.7 g, little fat, ovary small, largest follicle 1 mm) by Binford on 3 February 1974 at 3,600 ft elevation 7 mi south of Soledad; one female (WFVZ 24092, 35.3 g) and one male (CAS, 35.9 g, left testis 7 × 4 mm, right 5 × 4) collected by Rowley at 5,800 ft at La Cima on 8 and 9 March 1965, respectively. When I imitated a calling bird near Soledad, one immediately flew close and landed on a log "face to face" with the collected female; I interpreted this behavior as suggesting breeding. The call consisted of a very loud, descending, tremulous (three merging syllables) "teu-uu-uu," easily imitated by whistling and very similar in quality to the common call of *C. vociferus*. It was similar in duration and descent to the last note of the usual call of a Common Pauraque, but was much lower, clearer, and more mellow. A low "chuck" was heard when the two birds faced each other.

*Subspecies: rayi* (Miller 1948:224). Comparison shows the Oaxaca birds to be identical to the types of *rayi* (from Guerrero, MVZ); I have not evaluated this race, but Phillips (1963:335–336) considers it invalid.

*Caprimulgus carolinensis* Gmelin. Chuck-will's-widow.

Recorded only in Atlantic Region in tropical evergreen forest, where an occasional transient migrant. Only three Oaxaca records: a male taken by W. B. Richardson in April at an unknown elevation in the Sierra Santo Domingo (Salvin and Hartert 1892:566); a female (AMNH 778257, quite fat, largest follicle 2 mm) secured by Schaldach on 13 April 1962 along the Río Malatengo 14.5 road mi north of Matías Romero; and a female (WFVZ 23566, heavy fat, largest ovum 3 mm) taken by Schaldach on 2 May 1962 at Sarabia. *Elevations*: 300+ ft.

*Caprimulgus salvini* Hartert. Tawny-collared Nightjar.

Status uncertain; single date and scarcity of records from well-collected localities suggest a winter resident or visitant status. Only one definite record, a male (WFVZ-HC 4984) taken by Rook on 18 December 1960 in tropical evergreen forest of Atlantic Region at about 300 ft elevation 24 [road] mi north of Matías Romero. Data on female (MLZ 31787) taken by del Toro Avilés purportedly on 16 January 1944 at San Miguel Soyaltepec are questionable.

*Subspecies: salvini* Hartert.

*Caprimulgus ridgwayi* (Nelson). Buff-collared Nightjar.

Uncommon permanent resident in Pacific Region in arid tropical scrub and in open areas within tropical deciduous forest and locally (La Cima) pine-oak forest,

recorded north in Isthmus to Mezahuite and northwest in Río Tehuantepec basin to a point 18 mi southeast of Santiago Matatlán. Occurrence in the Interior is based on a male specimen (MLZ 33809) taken by del Toro Avilés purportedly on 11 June 1942 at San Pablo Villa de Mitla and the mention by Edwards (1976: S-106) of its presence at Monte Albán; I question both these records. *Elevations*: 100 to 6,000 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *ridgwayi* (Nelson).

*Caprimulgus vociferus* Wilson. Whip-poor-will.

Fairly common winter resident and uncommon permanent resident in Pacific Region (east and west of Isthmus) and Interior Region, breeding from 4,600 to 10,000 ft elevation in pine-oak forests (especially humid pine-oak) and wintering from at least 100 to 7,500 feet in pine-oak, tropical deciduous, tropical semideciduous, and Pacific swamp forests.

*Breeding*: 31 March 1965, nest with two eggs (3 miles north of San Andrés Chicahuatla, 8,000 feet, Rowley, WFVZ 24313), to 9 July 1965, prejuvenile (kilometer marker 178 near La Cima, 6,200 ft, Rowley and F. Flores, male, CAS 47.6 g).

*Subspecies*: *oaxacae* (Nelson), permanent resident west of Isthmus (see Type Localities); *vociferus* Wilson, winter resident. The breeding race east of the Isthmus is unknown; it might be *chiapensis* (Nelson) of Chiapas.

*Caprimulgus maculicaudus* (Lawrence). Spot-tailed Nightjar.

Fairly common breeding bird in savanna of Atlantic Region at Donají, from Loma Bonita northwest to the Río Papaloapan, and perhaps at Tutla; probably only a summer resident, recorded definitely only from 2 May to 10 July, but possibly a permanent resident; at least partially migratory elsewhere in range (A.O.U. 1983: 315). *Elevation*: 300 ft (Donají).

*Breeding*: 11 June, enlarged follicle (16 mm, AMNH 768804, some fat), to 10 July, enlarged follicle (5 mm, AMNH 768802, moderately fat; both records Donají, Schaldach, 1962).

I examined 27 specimens of the Spot-tailed Nightjar from Oaxaca. Eleven of these were collected by del Toro Avilés at Tutla, the first purportedly on 9 June 1939 (MLZ) and the remainder (FMNH) supposedly from 1 February to 22 April (not 1 January to 2 April as frequently misquoted in the literature); these records are questionable because of errors in dates and localities on other of his labels. At Donají Schaldach took nine birds from 10 June to 10 July 1962 (AMNH, WFVZ) and Rook collected seven on 7 May 1960 (LSUMZ, WFVZ). B. B. Coffey (in litt.) found this species to be "common" on 2 May 1966 along the road from Loma Bonita to the Río Papaloapan.

#### Family NYCTIBIIDAE

*Nyctibius griseus* (Gmelin). Common Potoo.

Very uncommon permanent resident in Isthmus portion of Atlantic Region in savanna and other openings within tropical evergreen forest and in Pacific Region west to El Guamol in openings near Pacific swamp forest. Probably occurs elsewhere in lower portions of Atlantic and Pacific Regions. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 4 April 1962, enlarged testes (9 × 7 mm, El Guamol, Schaldach, AMNH 778255, very fat); 6 May 1964, "nest" with one egg (near Rancho Sol y Luna, 1,000 ft, Galley [Rowley 1984:127–128], WFVZ 24322).

*Subspecies: mexicanus* Nelson.

#### Family APODIDAE

*Cypseloides niger* (Gmelin). Black Swift.

Rare breeding bird in highlands of Interior Region and Pacific Region west of Isthmus, recorded over pine-oak forests at La Cima, Guelatao, and Cerro San Felipe and above arid subtropical scrub at points 4 road mi east of Santiago Matatlán and 2 and 4 mi south of San Bartolo Coyotepec, near Oaxaca City (Colonia Solchimilco), and at Santa María del Tule; here treated as a permanent resident, but possibly only a summer resident, recorded only from 27 May to 12 August. Isthmus sight record by Graber and Graber (1959:68) possibly based on misidentification (R. R. Graber in litt.). Ridgway (1911:708 and 709–710), citing Salvin and Godman (1888–1904 [1894]:379), lists Guichicovi as a locality for this species, but latter authors never mention this town; in absence of other references, Guichicovi must be deleted from range of *C. niger*. *Elevations*: 5,000 to 6,300+ ft.

*Breeding* (all data): 27 May 1964, enlarged testes (13 × 6 mm, 4 road mi east of Santiago Matatlán, 6,100 ft, Binford, LSUMZ 33073, 39.9 g, moderately fat); 16 June 1965, enlarged follicle (8 mm, 4 mi south of San Bartolo Coyotepec, 5,000 ft, Galley, WFVZ 23756, 40.4 g, no fat); 27 June 1963, enlarged follicle (12 mm, 2 mi south of San Bartolo Coyotepec, Rowley, AMNH, 37.5 g); 27 June 1966, "large egg in oviduct" (Santa María del Tule, 5,000 ft, Rowley, adult WFVZ-HC 16636); 14 July 1965 (taken 15 July), nest with one egg (near kilometer marker 183 near La Cima, 6,000 ft, Rowley [1966:133], WFVZ 21355).

*Subspecies: costaricensis* Ridgway, according to Eisenmann and Lehmann (1962: 8).

*Cypseloides rutilus* (Vieillot). Chestnut-collared Swift.

Fairly common over coastal slopes of Sierra de Juárez, Sierra de Yucuyacua, Sierra de Miahuatlán, and Sierra Madre de Chiapas, breeding from 4,200 to 7,300 ft in caves in cloud, humid pine-oak, and upper tropical semideciduous forests and feeding down to adjacent lowlands; apparently, only a summer resident, being recorded with certainty only from 12 February (1974, 5 birds caught and released by Binford and Arnold at mouth of cave at 4,350 ft elevation 15 road mi north of Putla de Guerrero) to 6 October (1961, 10 seen by Binford and the Berretts at 900 ft elevation 11 road mi north of San Pedro Pochutla). Phillips (1962b:334) believes that all Mexican birds winter in South America. Unrecorded in Isthmus lowlands, which perhaps are too far from mountains. Two records for Interior, 10 birds seen well by L. L. Short (in litt.), R. H. Long, and F. C. Sibley on 26 August 1954 at La Cumbre near Cerro San Felipe, and a female (WFVZ-HC 16828, 25.6 g, heavy fat) taken by Galley from a flock near Oaxaca City (Colonia Solchimilco) on 12 August 1965. *Elevations*: 300 to 9,000 ft.

*Breeding* (all nest data summarized; see Rowley 1966:131–132 and 1984:130–132 for details): four nesting caves known, two at 4,600 ft at kilometer marker 123 on Putla de Guerrero Road, one at 7,300 ft at Río Molino, and one at 4,200

ft 20 km [12.4 mi] northwest of Colonia Rodolfo Figueroa (15 June 1968, two eggs collected, WFVZ 25763, Galley); nests each with two eggs noted from 29 May to 5 August, with nest-building as early as 21 May, fresh egg as late as 5 July, and nests with young as late as 19 August.

*Subspecies: griseifrons* (Nelson), west of Isthmus; presumably *nubicola* (Brod-korb 1938:1), east of Isthmus. I follow C. T. Collins (pers. comm.) in considering the Isthmus as the dividing line between these races.

*Streptoprocne zonaris* (Shaw). White-collared Swift.

Permanent resident, breeding and roosting in mountain caves in at least cloud and humid pine-oak forests and feeding over all terrestrial habitats in mountains and lowlands; most common in and adjacent to humid versants of coastal mountains, where very common in Atlantic Region, common in Pacific Region in Sierra de Miahuatlán, and fairly common elsewhere; rare to absent in arid portions of Interior. *Elevations*: 100 to 9,000 ft.

*Breeding* (all data): 5 April 1961, aerial copulation (1 mi southwest of Valle Nacional, 300 ft elevation, Binford); 11 April 1969, adult male (WFVZ 23758) taken from cave colony of about 200 birds (25 mi northwest of "Rancho Vicente" [= Colonia Rodolfo Figueroa], Galley); 30 April 1962, three nests, first empty but with sitting female containing egg in oviduct, second with one egg (WFVX 25609) plus sitting female (AMNH 766548) with 16 mm follicle, third empty and unattended (waterfall cave at 7,300 ft at Río Molino, Rowley [Rowley and Orr 1965: 449–451]); 7 May 1963, two nests, each with two eggs (same locality and citation, WFVZ 25611–25612); 30 May and 6 June 1965, same nest with one young each date (5,800 ft at kilometer marker 116 on Putla de Guerrero Road, Galley, both nestlings CAS).

*Subspecies: mexicana* Ridgway.

*Chaetura pelagica* (Linnaeus). Chimney Swift.

Very uncommon spring transient migrant, recorded only in Atlantic region over tropical evergreen forest and in Pacific Region at Colonia Rodolfo Figueroa in Sierra Madre de Chiapas. Should be sought as a fall transient migrant. Generally overlooked because of similarity to *C. vauxi*. First published record: Río Givicia, 21 March 1906, J. H. Batty, female, AMNH 106223 (Chapman 1931:120). *Dates*: 20 March to 19 April. *Elevations*: 200 to 300+ ft. This account based on specimens (nine) only.

*Chaetura vauxi* (Townsend). Vaux's Swift.

Common winter resident and fairly common permanent resident over all terrestrial habitats of Atlantic and Pacific Regions, breeding in mountains in tropical semideciduous forest from 1,900 to 4,700 ft and probably in tropical evergreen and low-elevation cloud forests from 300 to 5,900 ft and feeding there and over adjacent lowlands. Rare visitant or transient migrant (April and September) over arid and humid pine-oak forests of the Interior portions of at least the Sierra de Miahuatlán. *Elevations*: sea level to 6,500 ft.

*Breeding* (all data): first week of May 1963, adults hovering around prospective nest cavities (1,900 and 4,700 ft elevation); 5 July 1963, active nest, condition unknown (2,400 ft; above records on Puerto Escondido Road in Sierra de Miahuatlán and involved cavities in fig trees; Rowley [1966:126]); 20 May 1967,

“three pairs entering and leaving a dead partially burned out tree” (Colonia Rodolfo Figueroa, Rowley field notes in CAS).

*Subspecies: richmondi* Ridgway, permanent resident in Pacific Region east of Isthmus and Atlantic Region; *warneri* Phillips (1966:94), permanent resident in Pacific Region west of Isthmus (see Type Localities); *vauxi* (Townsend), winter resident. The name *C. v. similis* Salvin and Godman, an older name for *richmondi*, is not available (see Wetmore 1968:232–233). The form *richmondi* is sometimes considered a full species, the Dusky-backed or Richmond’s Swift, but the intermediacy of *warneri* indicates conspecificity.

*Aeronautes saxatalis* (Woodhouse). White-throated Swift.

Uncommon breeding bird in the Interior over arid subtropical scrub and arid pine-oak forest; probably a permanent resident but recorded only from 12 March to 26 June and on 3 December. No previously published record. Only three specimens. *Elevations*: –5,200 to 7,900 ft. (December record not included).

*Breeding* (all data): see below.

This species has been recorded on 13 dates and in 14 localities in Oaxaca. In 1961 Wolf and I saw 2 birds 4 mi east of Santiago Matatlán, 6,100 ft, on 9 May and 1 bird 6 mi east of San Pablo Villa de Mitla on 10 May. Near San Andrés Chicahuaxtla, Morony and I saw 3 birds at 7,400 ft elevation 6 mi northeast on 16 May 1964, of which two were collected (Binford, male, LSUMZ 33077, 47.7 g, little fat, testes 10 × 5 mm; Morony, female, LSUMZ 33076, 35.2 g, little fat, largest follicle 1 mm), and 14 birds at 6,600 ft 9 mi north on 25 May 1964. We also saw 1 at 7,700 ft elevation northwest of Oaxaca City on 26 May 1964 and 6 at 5,800 ft 5 mi northwest of Tamazulapan del Progreso on 13 June 1964. B. D. Parmeter (in litt.) and Arnold observed this species at kilometer marker 207 on the Puerto Escondido Road on 12 March 1968. B. B. (in litt.) and L. C. Coffey observed *Aeronautes* along the Pan-American Highway as follows: 6 birds on 3 December 1948 about 42 mi northwest of Tehuantepec City; single birds on 29 May 1953 at kilometer markers 500 and 420, about 28 and 79 road mi northwest of Oaxaca City, respectively; 5 on 26 April 1960 and 2 on 29 May 1961, all entering crevices in a church in San Mateo Yucucuy; and on 7 April 1976, 8 birds circling a church in Yanhuítlán and 5 birds 5 mi northwest of Yanhuítlán at kilometer marker 67. Rowley took a female (WFVZ-HC 19261) at 5,200 ft elevation 2 mi east of San Pablo Villa de Mitla on 27 June 1967 and saw 10 or 12 birds, two of which appeared to copulate, investigating possible nest sites at 6,800 ft on the Putla de Guerrero Road about 9 mi west of Santa María Asunción Tlaxiaco on 7 April 1965 (Rowley field notes in CAS).

*Subspecies: saxatalis* (Woodhouse). The specimen LSUMZ 33077 agrees well in all characters with a series (CAS) from California. Specimen WFVZ-HC 19261 approaches *nigrior* Dickey and van Rossem in some characters; I refer it to *saxatalis* on geographical grounds, believing that the Isthmus probably is the primary line of separation between the two races. I cannot allocate LSUMZ 33076, which is in very faded or possibly immature plumage.

[*Panyptila cayennensis* (Gmelin). Lesser Swallow-tailed Swift.]

No specimen or published record; numerous sight records. Status uncertain; possibly a rare and local permanent (or summer?) resident, as stated prematurely by the A.O.U. (1983:324), who consider the species non-migratory. Recorded

only in Atlantic Region at 300 ft elevation 1 mi southwest of Valle Nacional over tropical evergreen forest (1 to 9 birds seen by Wolf and Binford on 15 dates from 25 February to 7 April 1961).

*Subspecies*: unknown.

*Panyptila sanctihieronymi* Salvin. Great Swallow-tailed Swift.

Rare breeder in and near Sierra de Miahuatlán, Sierra de Yucuyacua, and Sierra Madre de Chiapas; most regular in Pacific Region over tropical semideciduous and cloud forests, but also found over nearby arid habitats of Interior; presumably a permanent resident, but recorded only from 3 February to 24 July. *Elevations*: 2,100 to 5,900 ft.

*Breeding* (all data): see below.

This species has been recorded on 12 dates and in 10 localities in Oaxaca, as follows: 3 February 1974, 2 birds seen, 2 mi south of Soledad, 4,650 ft, Binford; 11 February 1974, 2 seen, 15 road mi north of Putla de Guerrero, 4,350 ft, Binford; 2 March 1965, 1 seen, in Interior Region on ridge above San Miguel Sola de Vega, 5,000 ft, Rowley (field notes, CAS); 14 (8 birds) and 15 (species noted) March 1968, Jamaica Junction, about 2,400 ft, B. D. Parmeter (in litt.) and Arnold; 25 April 1966, flock of about 10 about 3 mi from Rizo de Oro, Chiapas, Galley (Rowley 1984:132); 28 April 1966, active nest completed, contents unknown but probably young, cliff on west side of Cerro Baúl, Galley observation (Rowley 1984:132); 7 May 1964, one taken (female, LSUMZ 33078, 46.9 g, little fat, largest follicle, 1 mm), 23 road mi north of San Gabriel Mixtepec, 5,900 ft, Binford; 12 May 1964, 2 seen, 16 road mi north of San Gabriel Mixtepec, 4,350 ft, Morony and Binford; 1 June 1963, female taken (AMNH 50.3 g, ovaries minute), Río Ranas, 2,100 ft, Rowley; and 16 (6 seen) and 24 July 1965 (male taken, CAS, 47.0 g, testes inactive) in Interior Region at kilometer marker 136 on the Puerto Escondido Road [= about 4 mi north of San Pedro Juchatengo], 3,500 ft, Rowley.

Birds on both February dates were calling, chasing, and flying side-by-side, a behavior that might be a courtship display and hence indicate breeding. On 11 February 1974, one common call was a high, clear, slightly descending, musical whistle: "p-e-e-r." When the two birds flew side-by-side, they uttered a fairly musical "preet-te-te-te," reminiscent of *Chaetura pelagica*.

#### Family TROCHILIDAE

*Phaethornis superciliosus* (Linnaeus). Long-tailed Hermit.

Fairly common permanent resident in tropical evergreen forest up to 2,600 ft in Atlantic Region, recorded northwest to a point 6 mi southeast of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec, and disjunctly in tropical semideciduous forest and lower reaches of cloud forest from 900 to at least 6,000 ft in Pacific Region west of Isthmus. Only one record from Pacific Region east of Isthmus, where apparently only a casual winter visitant: male (MLZ 47470) *P. s. veraecrucis* taken by Lamb on 1 February 1948 at Santa Efigenia, 800 ft. *Elevations*: 250 to 6,000 ft.

*Breeding*: 17 May 1963, nest under construction (contained two fresh eggs [WFVZ 35286] on 31 May; Río Ranas, 2,100 ft), to 3 July 1965, nest with two eggs (4 mi north of Putla de Guerrero, 3,200 ft; both records Rowley [1966:134, 136]).

*Subspecies: mexicanus* Hartert, Pacific Region west of Isthmus; *veraecrucis* Ridgway, Atlantic Region.

*Phaethornis longuemareus* (Lesson). Little Hermit.

Common permanent resident in undergrowth of semi-open portions of tropical evergreen forest of Atlantic Region northwest at least to Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 2,600+ ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: adolphi* Gould.

*Campylopterus curvipennis* (Deppe). Wedge-tailed Sabrewing.

Occurs in tropical evergreen forest of Atlantic Region; fairly common permanent resident from 1,900 to 4,600 ft; uncommon winter resident or visitant from 300 to 1,900 ft; status as a rare permanent resident down to 300 ft suggested by 2 birds seen by Binford on 23 May 1961 at 300 ft elevation 28 road mi north of Matías Romero. Distribution in relation to time of year poorly known.

*Breeding* (all data): March, nest with eggs (Teotalcingo, Boucard [Sclater 1959b: 385]).

*Subspecies: curvipennis* (Deppe). See *C. excellens* in Hypothetical List.

*Campylopterus rufus* Lesson. Rufous Sabrewing.

Fairly common in Pacific Region in cloud and upper tropical semideciduous forests of Sierra Madre de Chiapas. Presumably a permanent resident, because it is not known to be migratory or nomadic elsewhere (A.O.U. 1983:329), but recorded only from 3 December to 20 May. The only two records for Mexico east of Isthmus (Tutla) are questionable (see below). Oaxaca localities are northwest-most in entire range of species. *Elevations*: 4,000 to 6,000 ft.

*Breeding*: 12 April 1967, nest with two young (Rancho Carlos Minne, near Cerro Bául, 5,000 ft, Rowley [1984:134–135] observation), to 5 May 1967, nest with two eggs (3 mi north of Colonia Rodolfo Figueroa, 5,000 ft, Galley, WFVZ 21347).

I examined 20 study skins (LSUMZ, WFVZ) and four sets of eggs (WFVZ) with reliable data and obtained numerous sight records for this species in Oaxaca. Localities of record are as follows: at and near Cerro Bául; Rancho Carlos Minne, near Cerro Bául; at, above, 3 mi north, 2 mi southwest, 2 mi east-southeast, and 4 km (2.5 mi) northeast of Colonia Rodolfo Figueroa; 12 mi north-northeast of Zanatepec; and La Cumbre near Rancho Sol y Luna. M. del Toro Avilés purportedly took a female (FMNH 119485) on 2 February and a male (FMNH 119486) on 3 February 1941 at Tutla (Blake 1950:402); because these are the only Mexican records west of the Isthmus, are out of normal habitat, and were collected by the unreliable del Toro Avilés, the occurrence of *C. rufus* west of the Isthmus is highly doubtful.

*Campylopterus hemileucurus* (Deppe). Violet Sabrewing.

Fairly common breeder from 1,900 to 5,200 ft in cloud forest and upper reaches of tropical evergreen forest of Atlantic Region and apparently (specimens with "enlarged testes" and "large ova," 25 April to 3 June) locally at 250 ft elevation in several localities along Trans-Isthmian Highway (18 and 28 mi north of Matías Romero and 12 and 16 km [7.5 and 9.9 mi] east-northeast of Piedra Blanca).

Recorded northwest at least to a point 6 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to a point 8 mi south of Matías Romero and perhaps (del Toro Avilés) Escuilapa. Recorded below 800 ft in Atlantic Region on 24 August and from 31 January to 3 June only. Uncommon winter resident in Pacific Region in Sierra Madre de Chiapas (14 specimens, WFVZ; at and 4 km [2.5 mi] east, 4,300 ft elevation, of Colonia Rodolfo Figueroa; Rancho Cerro Bául; Rancho Sol y Luna), where noted only from 22 November to 23 February; these birds might come from Atlantic lowlands, where species then largely absent (no records from 22 November through 30 January). The Guerrero population often referred to in the literature (e.g., A.O.U. 1983:329), if it really exists, must be allopatric, because the species is unrecorded in Pacific Oaxaca west of the Isthmus. *Elevations*: 250 to 5,200 ft.

*Breeding* (all data): range, habitat, and dates; see also above; meagre data indicate breeding in late April through May.

*Subspecies*: *hemileucurus* (Deppe).

*Florisuga mellivora* (Linnaeus). White-necked Jacobin.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest, recorded northwest at least to near Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Sarabia, a point 12 km (7.5 mi) east-northeast of Piedra Blanca, and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300+ ft.

*Breeding* (all data): range, habitat, and dates.

A female (AMNH 776291, ovary slightly enlarged, many developing fol., oviduct not enlarged) taken by Schaldach on 19 June 1961 at Montebello is a rare example of a female in almost full adult male plumage.

*Subspecies*: *mellivora* (Linnaeus).

*Colibri thalassinus* (Swainson). Green Violet-ear.

Fairly common permanent resident in humid pine-oak forest of Interior and in adjacent upper reaches of cloud forest of Atlantic and Pacific Regions west of Isthmus; also found in upper reaches of tropical evergreen forest west of Isthmus (winter only?; 6 road mi southwest of Valle Nacional, 1,900 ft, 22 April 1961, 3 seen by Wolf and Binford). Unrecorded, but to be expected, in Sierra de Yucuyacua, because it breeds in Guerrero (Friedmann et al. 1950:164). *Elevations*: 1,900 to 9,500 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *thalassinus* (Swainson).

*Anthracothorax prevostii* (Lesson). Green-breasted Mango.

Fairly common breeder in Atlantic Region in openings with large isolated trees within general range of tropical evergreen forest, where recorded only from 3 March through 15 August and thus seemingly only a summer resident. Uncommon winter resident in Pacific Region at edges of Pacific swamp forest in foothills (below 800 ft) of Sierra Madre de Chiapas, where 10 specimens taken on 1 October and from 5 December to 1 February. *Elevations*: 100 to 800+ ft.

*Breeding* (all data): 4 March 1961, two nests under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observations).

*Subspecies*: *prevostii* (Lesson).

*Abeillia abeillei* (Lesson and De Lattre). Emerald-chinned Hummingbird.

Fairly common presumptive permanent resident of Pacific Region east of Isthmus in cloud forest and upper reaches of tropical semideciduous forest, recorded from 27 March to 28 May and from 25 November to 3 December in the following localities: 12 mi north-northeast of Zanatepec, 4,900 ft; at and above (5,000 ft) Colonia Rodolfo Figueroa; La Cumbre near Rancho Sol y Luna; Cerro Baúl; Rancho Cerro Baúl; and 25 km (15.5 mi) northwest of Tapanatepec, 3,000 ft. Only other Oaxaca "records" and only ones west of Isthmus (Friedmann et al. 1950:164), two males collected by del Toro Avilés purportedly at San Miguel Soyaltepec (26 December 1943, MLZ 31234) and Moctum (14 September 1941, MLZ 30950), are questionable, although these could be migrants from Veracruz.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: abeillei* (Lesson and De Lattre).

*Lophornis helenae* (De Lattre). Black-crested Coquette.

Rare in Atlantic Region in tropical evergreen forest; presumably a permanent resident, because it is believed to be sedentary elsewhere (A.O.U. 1983:335). Only two reliable records, a male (LSUMZ 28753, testes not or slightly enlarged, "shot in bushes in the low understory in forest") taken by "J. G. B." 24 [road] mi north of Matías Romero [at about 300 ft elevation] on 17 March 1962, and 2 birds seen by Binford at 1,900 ft elevation 6 road mi southwest of Valle Nacional on 22 April 1961. All previously published records (e.g., Friedmann et al. 1950:165) are based on del Toro Avilés specimens supposedly from Lacova and Lachixola (USNM) and from Tutla and Escuilapa (MLZ) and hence are questionable.

*Breeding* (all data): range, habitat, and dates.

*Chlorostilbon canivetii* (Lesson). Fork-tailed Emerald.

Permanent resident in Atlantic and Pacific Regions, common in open scrub situations throughout general range of tropical evergreen and tropical semideciduous forest and uncommon in riparian forest and semiarid tropical scrub within the tropical deciduous forest that lies adjacent to humid forests; also recorded in arid tropical scrub of Interior in San Miguel Sola de Vega valley (kilometer marker 136 on Puerto Escondido Road). *Elevations*: 100 to 4,500 ft.

*Breeding*: 1 March 1961, nest with one egg and one hatching young (1 mi southwest of Valle Nacional, 300 ft, Wolf [1964:51–53] and Binford observation), to 28 April 1965, nest with two eggs (near Jamaica Junction, Rowley [1966:134]).

*Subspecies: auriceps* (Gould), Pacific Region west of Isthmus and Interior Region; *canivetii* (Lesson), Pacific Region east of Isthmus and Atlantic Region.

*Cynanthus sordidus* (Gould). Dusky Hummingbird.

Fairly common permanent resident in arid subtropical scrub throughout Interior, recorded east to Rancho Las Animas, the southeasternmost point in entire range of species. *Elevations*: 3,000 to 7,300 ft.

*Breeding* (all data): 28 November 1964, active nest completed but empty (10 mi southeast of Oaxaca City, Rowley [1984:135]); 18 December 1964, nest with two eggs (3 mi south of San Bartolo Coyotepec, 5,200 ft, Rowley, WFWZ 24284); 29 March 1968, nest with two eggs (San Felipe del Agua, 5,200 ft, Rowley, WFWZ 25765).

*Subspecies: monotypic*. See *C. latirostris* and Type Localities. The supposed

hybrid (MLZ 37930) between *sordidus* and *C. l. latirostris* reported by Friedmann et al. (1950:167) is a variant of *sordidus* (Binford 1985).

*Cynanthus latirostris* Swainson. Broad-billed Hummingbird.

Common permanent resident in Pacific Region in arid tropical scrub and open tropical deciduous forest, occurring north in Tehuantepec region to Tequisistlán (Binford et al. sight record, male, 28 May 1959), Chihuitán, and Chivela. Unrecorded in the Interior (contra Friedmann et al. 1950:167, who give "northern Oaxaca"). In the absence of other Interior records, I question the identification of the nest containing one addled egg (WFVZ 35287) and one young found by Rowley (1984:135) on 15 September 1964 in Oaxaca City; no adult was collected. Record listed by Graber and Graber (1959:69) for Atlantic side of Isthmus in December undoubtedly erroneous; their original field notes state only "1 *Cynanthus l.?*" *Elevations*: sea level to 900 ft.

*Breeding* (all data): range, habitat, and dates. But see above.

*Subspecies*: *doubledayi* (Bourcier). I agree with Ridgway (1911:377) that *C. l. nitida* (Salvin and Godman) is a synonym of *doubledayi*. Friedmann et al. (1950:167) list *C. l. latirostris* Swainson from Oaxaca on the basis of two females in the MLZ taken "near Tequisistlán" in February. I found only one such specimen, an immature female (MLZ 45107) taken by Lamb at 3,000 ft at Rancho Las Animas on 18 February 1947. This specimen cannot be identified to race; even its specific identity is questionable, the tail color closely resembling that of *C. sordidus*. The form *doubledayi* has sometimes been considered a distinct species, but the great phenotypic differences between it and the *latirostris* complex are partially bridged by the race *toroi* (Berlioz). See *C. sordidus*.

*Hylocharis eliciae* (Bourcier and Mulsant). Blue-throated Goldentail.

Status uncertain; recorded only at Rancho Sol y Luna in Sierra Madre de Chiapas, where Rook and Galley collected 18 specimens (WFVZ) on 30 November and 1, 2, 4, 8, and 9 December 1962, 6 and 15 November 1963, and 9 November 1965; all labeled males, a fact that makes me question their sexing method. Lack of records from other months at this well-collected locality indicates a winter resident (irregular?) status. Habitat and elevation unknown, but Rancho Sol y Luna located at about 800 ft in tropical deciduous and Pacific swamp forests.

*Hylocharis leucotis* (Vieillot). White-eared Hummingbird.

Very common to common permanent resident in humid and semiarid pine-oak forests west of Isthmus in all Regions. Wanders into arid subtropical scrub of valleys of Interior at least during flowering season. Status in arid pine-oak forest uncertain, but probably breeds. Only one record east of Isthmus, a male (WFVZ-HC 13044, testes enlarged) taken by Rook at Rancho Cerro Baúl on 22 November 1963, where species is apparently only a casual winter visitant. *Elevations*: 4,350 to 9,700 ft.

*Breeding* (all data): 24 July 1967, nest with two eggs (0.5 mi south of El Carrizal above Díaz Ordaz, 8,500 ft, Rowley [1984:136], WFVZ 21288); 20 November 1964, prejuvenile or nestling (specimen obtained from native, near San José del Pacífico, A. R. Phillips [in litt.], male?, ARPC 7894); 3 December 1964, nest with two eggs (La Cumbre near Cerro San Felipe, 9,000 ft, Rowley, WFVZ 24282); 6 December 1964, nest with two eggs (Cerro San Felipe, 9,500 ft, Rowley, WFVZ

24283); 3 February 1965, nest with two eggs (Río Guajolote, 6,000 ft, Rowley [1966:137]).

*Subspecies: leucotis* (Vieillot).

*Amazilia candida* (Bourcier and Mulsant). White-bellied Emerald.

Permanent resident in state as a whole, but some data indicate strong local movements. From mid-February through mid-July in Atlantic Region, a very common breeder at low elevations in tropical evergreen forest, occurring regularly south in Isthmus to La Ranchería and Sarabia, and uncommon at higher elevations up to lower edge of cloud forest. In these same areas, seemingly less common from mid-July through mid-November and virtually absent for 11 weeks from 23 November to 11 February; only record for latter period, a specimen (LSUMZ 40137, unsexed) taken by K. Wolfe 5 mi south of Matías Romero on 2 January 1960, might not qualify as within the species normal breeding range. All other winter records are for the Pacific Region, in areas where species does not occur at other times of year and, thus, has winter resident or winter visitant status only. These are as follows: southern Isthmus, a specimen (ARPC) taken 4 km (2.5 mi) south of Chivela on 7 January 1965 (A. R. Phillips in litt.); tropical semideciduous forest of Pacific Region west of Isthmus in Sierra de Miahuatlán, two females collected by Phillips, one at San Gabriel Mixtepec on 8 December 1963 (ARPC 7300) and the other 2 km (1.2 mi) south of San Gabriel Mixtepec on 24 November 1963 (ARPC 7085); Pacific swamp forest of Pacific Region east of Isthmus in Sierra Madre de Chiapas, two females and two males on 2 December 1962 and three males on 5 December 1962, all taken by Rook at Rancho Sol y Luna (WVZ 8999–9005), and eight males and two females (MLZ) from 15 January to 7 February 1948 and one unsexed bird (WVZ) on 29 January 1959, all collected by Lamb at Santa Efigenia. *Elevations*: 250 to 5,250 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: candida* (Bourcier and Mulsant). I follow Blake (1950:403) in treating *genini* (Meise 1938:2) as a synonym of *A. c. candida*.

*Amazilia cyanocephala* (Lesson). Azure-crowned Hummingbird.

Uncommon permanent resident in Pacific Region east of Isthmus and in Atlantic Region, inhabiting humid, low-elevation, oak and pine-oak forests, especially those adjacent to tropical evergreen and tropical semideciduous forests. *Elevations*: 650 to 4,650 ft.

*Breeding* (all data): March, nest with eggs (Choapan, Boucard [Sclater 1859b: 386]); 2 April 1966, nest with two eggs taken (Cerro Baúl, 3,200 ft, Galley [Rowley 1984:136–137]); 8 April 1966, nest with two eggs (El Salto near Cerro Baúl, about 3,000 ft, Galley, WVZ 35249).

*Subspecies: cyanocephala* (Lesson).

*Amazilia beryllina* (Deppe). Berylline Hummingbird.

Common permanent resident in all Regions west of Isthmus, breeding in late summer and fall in pine-oak forests from 4,500 to 10,000 ft and “wintering” from at least 7,000 down to at least 2,400 in many adjacent habitats, including arid subtropical scrub, tropical deciduous forest, tropical semideciduous forest, and cloud forest; unrecorded in Sierra de Juárez. Not known to breed in the Sierra Madre de Chiapas, where, however, the expected breeding race, *devillei*, has been

recorded during the nonbreeding season from 800 to 4,300 ft on 12 April and on numerous dates between 19 January and 23 February; these birds might come from Chiapas or the high unexplored peaks of eastern Oaxaca.

*Breeding* (all nest data; all by Rowley [1966:135; 1984:138]): breeds in late summer and fall; nest under construction, 6 July 1965 (no locality); nests with two eggs each in 1964, on 5, 14, 18 September (one egg), and 8 October (San Felipe del Agua, 5,400 ft, WFVZ 24287, 24288, no number, 24290, respectively), 11 and 17 September (8 mi northeast of Oaxaca City, 6,000 ft, latter WFVZ 24289), 1 October (La Cima), and 15 October (Río Jalatengo, 4,500 ft, WFVZ 24291).

*Subspecies: devillei* (Bourcier and Mulsant), Sierra Madre de Chiapas; *beryllina* (Deppe), remainder of state. See *Amazilia sumichrasti* in Type Localities.

*Amazilia tzacatl* (De la Llave). Rufous-tailed Hummingbird.

Very common permanent resident in Atlantic Region in openings within tropical evergreen forest south in Isthmus to a point 4 mi north and 2 mi east of Matías Romero and perhaps (del Toro Avilés) Escuilapa. Only one record for Pacific Region, where apparently only a casual winter visitant: male (WFVZ-HC 16840) taken by Rowley 2 mi north of Tapanatepec at 400 ft on 13 April 1966. *Elevations*: 100 to 800 ft (record for Choapan perhaps higher but elevations of town and exact point of collection unknown; extreme elevation of 5,700 ft given by Friedmann et al. [1950:173] almost certainly erroneous).

*Breeding*: 4 March 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 6 August 1964, enlarged follicle (6 mm, 5 kilometers [3.1 miles] northeast of Sarabia, Schaldach, WFVZ 21461); 27 March 1961, prejuvenile being fed by adult (1 mi southwest of Valle Nacional, 300 ft, Binford observation).

*Subspecies: tzacatl* (De la Llave).

*Amazilia yucatanensis* (Cabot). Buff-bellied Hummingbird.

Status uncertain. Only one record, a male (LSUMZ 40175) taken by Rook and L. Petite on 21 August 1961 in Atlantic Region 24 road mi north of Matías Romero (at or near Montebello; ranch at 300 ft, but elevation at exact point of collection unknown). Specimen record in Salvin and Hartert (1892:215) from "Tomatla" probably pertains to Tomatlán, Veracruz (see Gazetteer).

*Subspecies: cerviniventris* (Gould).

*Amazilia rutila* (De Lattre). Cinnamon Hummingbird.

Common permanent resident in Pacific Region in arid tropical scrub, tropical deciduous forest, and lower edge of tropical semideciduous forest, extending northwest into Río Tehuantepec basin as far as Tequisistlán; northern limits in Isthmus unknown. *Elevations*: sea level to 3,000+ ft.

*Breeding* (all data): 25 June 1966, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 20714); 21 November 1964, nest with two eggs (3 mi south of San Gabriel Mixtepec, 3,000 ft, Rowley, WFVZ 24292); February nesting (Friedmann et al. 1950:172), probably based on Lamb label notations, requires confirmation.

*Subspecies: rutila* (De Lattre).

*Amazilia violiceps* (Gould). Violet-crowned Hummingbird.

Uncommon inhabitant of arid subtropical scrub in extreme northwestern portion of Interior; presumably a permanent resident, because it is not known to be migratory in the southern part of its range (A.O.U. 1983:346), but recorded only from 16 July to 27 October; Oaxaca localities here considered southeasternmost in entire range of species (but see below). Localities based on specimens examined: vicinities of Tamazulapan del Progreso (2 mi west, 6,000 ft, LSUMZ and WFVZ; 3 mi northwest, 5,600 ft, MLZ) and Huajuapán de León (34 road mi north-northeast [near Santiago Chazumba], 6,100 ft, LSUMZ; 4 mi east, 5,000 ft, UK). Additional published records probably pertaining to this species: specimens from "Huajuapán" [= Huajuapán de León] and Santa María [near Huajuapán de León] (Martin del Campo 1942:353). Additional sight record: 5 seen by Binford at Santiago Miltepec, 5,600 ft, on 25 September 1961. Questionable records: sighting near Oaxaca City (Edwards 1955:16) and statement by Boucard (1895:112) that he found it "in 1857 at Oaxaca." Localities published under *A. violiceps* but pertaining to *A. viridifrons*: "Putla" [= Putla de Guerrero]; Santa Efigenia; and "Tapaná" [= Tapanatepec]. Phillips (1964:221) suggests that all Chiapas records of *A. violiceps* pertain to *A. viridifrons*, a position that I tentatively follow; however, Alvarez del Toro (1971:112) considers *violiceps* relatively common in the central portion of Chiapas. *Elevations*: 5,000 to 6,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *violiceps* (Gould); see Type Localities. I prefer to follow Friedmann et al. (1950:173–174) in considering *A. violiceps* and *A. viridifrons* specifically distinct. According to Phillips (1964:222), these two similar forms apparently are sympatric over a wide area in Guerrero, although they have not been found breeding at the same locality and the apparent sympatry might be due to unknown movements of *A. violiceps*. Unless intergradation or migration can be demonstrated clearly, allocation to the subspecific level, as tentatively advocated by Phillips (1964:217–223), or the theory of wandering birds would only further confuse an already difficult problem. In their distribution, *A. viridifrons* appears to be largely tropical and *violiceps*, subtropical. The paper by Phillips (1964) is the only publication that gives a clear understanding of plumages, range, and synonymy in this complex and, aside from its treatment of *viridifrons* as a race, should be used as a basis for further studies. See *A. viridifrons*.

*Amazilia viridifrons* (Elliot). Green-fronted Hummingbird.

Fairly common permanent resident in Pacific and adjacent Interior Regions in tropical semideciduous forest, tropical deciduous forest, and arid tropical scrub. Recorded in three areas as follows: near Putla de Guerrero (1 mi east, *A. v. viridifrons*) and near San Pedro Juchatengo (kilometer marker 136 on Puerto Escondido Road; intergrades closest to *A. v. viridifrons*); from Cycad Camp and a point 8.7 mi southeast of Santiago Matatlán east to Tehuantepec City and a point 12 mi northeast of Juchitán (*A. v. wagneri*); and in extreme eastern Oaxaca (a point northeast of Zanatepec, Santa Efigenia, Rancho Sol y Luna, Tapanatepec, and two localities 5 road mi east and 8 road mi southeast of Tapanatepec, all typical *A. v. viridifrons*). Records of *A. v. viridifrons* from "Putla" [= Putla de Guerrero], Santa Efigenia, and Tapanatepec often erroneously ascribed to *A. violiceps*. Juvenile specimen (ARPC 5453) taken 7 km (4.3 mi) west-northwest of

“Tamazulapan” [= Tamazulapan del Progreso] on 14 December 1959 appears to be *A. viridifrons* but could be a variant of *A. violiceps* (A. R. Phillips in litt.); this locality should be searched as a possible area of overlap. M. del Toro Avilés took a female (MLZ 38413) purportedly at San Pablo Villa de Mitla on 17 June 1942; this record and the sight record of *A. violiceps* near Oaxaca City (Edwards 1955: 16) are doubtful. *Elevations*: 100 to 4,000+ ft.

*Breeding* (all data): 17 May 1963, two ruptured follicles (2.5 mi north of San Gabriel Mixtepec on Río Ranas, 2,100 ft, Rowley, AMNH); 30 May 1966, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 20713); 28 September 1964, nest with two eggs (Rook, WFVZ 24294) and nest with one egg plus female with egg in oviduct (Rowley, nest egg WFVZ 21289; adult WFVZ 21539; all three records at Cycad Camp, 1,900 ft); 7 October 1961, adult carrying nest material (11 mi north of San Pedro Pochutla, 900 ft, Binford, female LSUMZ 27432, 5.5 g, little fat).

*Subspecies*: *viridifrons* (Elliot); *wagneri* Phillips (1964:222), endemic; see ranges above and Type Localities. I prefer to maintain *A. violiceps* and *A. viridifrons* as distinct species (see *A. violiceps*). I place *wagneri* with *A. viridifrons* rather than with *A. violiceps* because the first two share a dark green crown. The race *wagneri* has an unusual distribution in that it apparently separates two identical populations of *A. v. viridifrons*. This situation suggests the possibility that *wagneri* might be specifically distinct from *viridifrons*. Such might be the case only if the extreme amount of variation in the intensity and extent of rusty coloration in *wagneri* can be accounted for by age and sex rather than geography; Phillips (1964:222) considers as intergrades birds from the eastern range of *wagneri*. Although the possibility of specific distinctness is remote, a thorough field and laboratory study should be made to explore this idea. That *wagneri* is not a hybrid between *A. viridifrons* and *A. rutila* is indicated by non-interbreeding sympatry of these two species near Putla de Guerrero and Tapanatepec and by the absence of *rutila* in the upper portion of the Río Tehuantepec basin, where *wagneri* is fairly common. See *Uranomitra atricapilla* in Type Localities.

*Eupherusa eximia* (De Lattre). Stripe-tailed Hummingbird.

Uncommon permanent resident in Atlantic Region from 2,600 to 4,100+ ft elevation in upper reaches of tropical evergreen forest and lower reaches of cloud forest and in Pacific Region from 4,200 to 5,000 ft in cloud and upper tropical semideciduous forests of Sierra Madre de Chiapas. The only reliable records at lower elevations in Atlantic Region apparently represent nonbreeding birds: 3 seen on 21 November and 2 seen and another taken (male, LSUMZ 27434, 4.4 g, little fat, testes 1 mm, D. G. Berrett) on 22 November 1961 at 1,900 ft elevation 6 road mi southwest of Valle Nacional by the Berretts and Binford; female (GMSC, some fat, ovary small) taken by J. W. Graber 1 mi south of Loseta on 18 December 1957; male (AMNH 766677, little fat, testes slightly enlarged) secured by Schaldach 16 km (9.9 mi) east-northeast of Piedra Blanca on 24 May 1962; last two records from about 300 ft elevation.

*Breeding* (all data): 24 April 1964, three nests, each with two eggs (Colonia Rodolfo Figueroa, 4,500 ft, Galley, WFVZ 24293); 25 April 1967 (same locality, Rowley, WFVZ 21286); 1 May 1967 (above Colonia Rodolfo Figueroa, 5,000 ft, Rowley, WFVZ 21287).

*Subspecies*: *nelsoni* Ridgway. See *E. poliocerca*.

*Eupherusa cyanophrys* Rowley and Orr. Blue-capped Hummingbird.

Endemic to Pacific versant of Sierra de Miahuatlán, where locally a fairly common permanent resident in cloud forest and upper reaches of tropical semideciduous forest, occasionally wandering to lower elevations on adjacent mountain slopes. Recorded at numerous localities along Puerto Angel Road and Puerto Escondido Road. *Elevations*: 2,400 ft (Jamaica Junction, 11 June 1963, Rowley, immature male, AMNH, 5.3 g); 4,200 to 8,600 ft.

*Breeding* (all data): 3 May 1965, nest with two eggs (kilometer marker 183 near La Cima, 6,000 ft, Rook, WFVZ 24340); 1 October 1964, nest with two young (near La Cima, 5,800 ft, Rowley [1966:149] and Rook observation); 30 October 1964, nest with two eggs (Cerro Verde, Rook observation [Rowley 1966:149]); 5 November 1964, nest with one young (near kilometer marker 195 on Puerto Escondido Road, 4,200 ft, Rowley, alcoholic nestling CAS), and "soft egg" in oviduct (near La Cima, 5,200 ft, Rowley, WFVZ 21557, 4.5 g).

*Subspecies*: monotypic; endemic; see Type Localities and *E. poliocerca*.

*Eupherusa poliocerca* Elliot. White-tailed Hummingbird.

Very uncommon permanent resident in Pacific Region in tropical semideciduous and cloud forests, recorded in Oaxaca only in the Sierra de Yucuyacua from 4 to about 11.5 road mi north of Putla de Guerrero. Endemic to Oaxaca and Guerrero. *Elevations*: 3,000 to 4,800 ft. See Chinantla in Gazetteer.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: monotypic; see Type Localities. Tentatively, I agree with Rowley and Orr (1964a) and the A.O.U. (1983:346–347) in recognizing three species of *Eupherusa* in Oaxaca. That *cyanophrys* is distinct seems likely on the basis of its blue crown, which in a hummingbird could act as an important isolating mechanism. That differences in size, rectrix width, and tail pattern are sufficient to isolate *poliocerca* from *eximia* is much less certain; merging only these two, however, would obscure the fact that on phenotypic and zoogeographic grounds *poliocerca* is more closely related to *cyanophrys*. Two female *Eupherusa* from Río Jalatengo (9 May 1962, Rowley, AMNH 766563; 11 May 1962, Phillips, ARPC 6146) listed by Rowley and Orr (1964a:82) as *poliocerca*, as well as a female from 12 mi west of San Pedro Juchatengo (2 March 1965, Rook no. 4197a, CAS, 3.3 g, no fat) identified on the label as *poliocerca*, represent the only evidence of sympatry with *cyanophrys*. However, in my opinion, females of these two forms cannot now be separated. The amount of black in the outer rectrices of *cyanophrys* varies greatly and cannot be used as a character to distinguish it from *poliocerca* as Rowley and Orr (1964a:81) believed. Neither can I find other characters that separate females of the two, unless length of the exposed culmen, possibly longer in *cyanophrys*, proves useful when a larger series is available. These two forms should be considered allopatric until adult males are found together or the characters of females are better defined.

*Lampornis viridipallens* (Bourcier and Mulsant). Green-throated Mountain-gem.

Fairly common presumptive permanent resident in Pacific Region in cloud forest of Sierra Madre de Chiapas. I examined 12 study skins (LSUMZ, WFVZ) and 1 set of eggs (WFVZ) from the following localities: Cerro Baúl, 5,200 ft; at (5,000 ft elevation), 6 km (3.7 mi) north (5,200 ft), and 2 mi east-southeast (4,700

to 5,700 ft) of Colonia Rodolfo Figueroa; La Cumbre near Rancho Sol y Luna; and 12 mi north-northeast of Zanatepec, 4,900 ft. These are northwesternmost localities in entire range of species. Recorded dates extend from 23 January to 13 June.

*Breeding* (all data): 13 June 1968, nest with two eggs (Cerro Baúl, 5,200 ft, Galley, WFFVZ 25766).

*Subspecies: amadoni* Rowley, according to Rowley (1968:2-3); endemic; see Type Localities. This race needs a thorough evaluation; I doubt that it is separable from nominate *viridipallens*.

*Lampornis amethystinus* Swainson. Amethyst-throated Hummingbird.

Common permanent resident in cloud forest and humid pine-oak forest in all Regions west of Isthmus. Unrecorded, but should be sought, in Sierra de Yucuyacua and Sierra Madre de Chiapas. *Elevations*: 4,100 to 9,500 ft.

*Breeding* (all data): 24 April 1961, nest with two eggs (15 road mi southwest of Valle Nacional, 4,100 ft, Binford observation); 29 May 1965, nest with two eggs (near Río Molino, 7,300 ft, Rowley, WFFVZ 24286); 13 October 1964, nest with two eggs (Cerro Verde, 8,000 ft, Rook, WFFVZ 35288).

*Subspecies: circumventus* (Phillips 1966:103), endemic to Sierra de Miahuatlán (known only from type locality: 6,000 ft elevation at kilometer marker 183 near La Cima; see Type Localities); *margaritae* (Salvin and Godman), elsewhere in Sierra de Miahuatlán (Río Molino and Cerro Verde), plus Sierra de Cuatro Venados (15 mi southeast of Oaxaca City; see *Delattria pringlei* in Type Localities); *amethystinus* Swainson, Sierras de Zempoaltepec, Juárez, and Aloapaneca. The race *circumventus* is weakly-marked and probably should be treated as a synonym of *L. a. amethystinus*; however, until a thorough revision of the complex is forthcoming, recognition is convenient. According to Phillips (1966:104), *henricus* (Lesson and De Lattre), to which some Oaxaca specimens have been referred, is a valid race but is restricted to northeastern Mexico, and *brevirostris* (Ridgway 1908:195), sometimes considered to range into Oaxaca, is a synonym of *L. a. amethystinus*. The blue-throated type (*margaritae*) might prove to be a separate species, because it has been collected on Cerro Verde (CAS), which is close to the type locality of the pink-throated *circumventus* (see Phillips 1966:103-104); additional collecting and a thorough revision are needed to clarify this situation.

*Lampornis clemenciae* (Lesson). Blue-throated Hummingbird.

Uncommon permanent resident west of Isthmus in humid pine-oak forests of Sierra Aloapaneca and Sierras de Yucuyacua and Miahuatlán, recorded east to Río Molino (and nearby localities), La Cumbre near Cerro San Felipe, and La Parada. Occasionally wanders into arid subtropical scrub of Interior (species seen by Phillips in mid-May in arid barrancas southeast of Huajuapán de León); local movements not understood. Male specimens from Amatepec (USNM 462887, 20 May 1949; USNM 462888, 12 May 1949) collected by del Toro Avilés and, thus, of doubtful origin. Oaxaca localities might be southeasternmost in entire range of species if Chiapas records (Friedmann et al. 1950:175; Alvarez del Toro 1971:113) are incorrect; not listed for Chiapas by the A.O.U. (1983:350), and records questioned by A. R. Phillips (in litt.) and me; perhaps only a visitant to Chiapas. *Elevations*: -6,000 to 9,700 ft.

*Breeding* (all data): 5 and 19 August 1967, two nests with two eggs each (Río Molino, 7,300 ft, Rowley, WFVZ 21291–21292, respectively).

*Subspecies: clemenciae* (Lesson).

*Lamprolaima rhami* (Lesson). Garnet-throated Hummingbird.

Uncommon permanent resident in all Regions west of Isthmus in cloud forest and humid pine-oak forest. Unrecorded in Sierra de Yucuyacua; should be sought there and east of Isthmus, because it occurs in Guerrero and Chiapas (Friedmann et al. 1950:177). *Elevations*: 4,100 to 9,000 ft.

*Breeding* (all data): 18 December 1965, two nests with two eggs each (Río Molino, Galley, WFVZ 35289–35290); 12 January 1965, “nest nearly completed” (Río Molino, 7,300 ft, Rowley [1966:151]); 2 February 1974, nest under construction and on 7 March containing two small young (6 mi south of San Miguel Suchixtepec, 7,500 ft, Arnold and Binford photographs); 13 February 1965, nest recently occupied but young gone (Río Molino, 7,300 ft, Rowley [1966:151]); 25 April 1961, nest with two eggs (18 road mi southwest of Valle Nacional, about 4,900 ft, Binford and Wolf observations); all nests under shelter of overhanging earthen banks as described by Rowley (1966:151); the record of two eggs (MLZ) collected by del Toro Avilés supposedly at Moctum on 20 October 1941 is best disregarded.

*Subspecies: rhami* (Lesson). On geographical grounds, I would expect birds from the Sierra de Miahuatlán to be *occidentalis* Phillips (1966:103); however, they are not, being well within the size and color variation of nominate *rhami*; thus, *occidentalis* is either endemic to Guerrero or invalid.

*Eugenes fulgens* (Swainson). Magnificent Hummingbird.

Permanent resident in all Regions of state, fairly common in humid pine-oak forest and uncommon in cloud forest and arid pine-oak forest, occasionally wandering into adjacent arid subtropical scrub and juniper scrub. *Elevations*: 4,100 to 9,500 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: fulgens* (Swainson), west of Isthmus; *viridiceps* Boucard, east of Isthmus. Three specimens (LSUMZ, WFVZ) from the Sierra Madre de Chiapas have the long bill and more greenish (less blackish) breast of *viridiceps*.

*Heliomaster longirostris* (Audebert and Vieillot). Long-billed Starthroat.

Uncommon permanent resident in tropical evergreen forest, tropical semideciduous forest, and lower reaches of cloud forest, recorded in Pacific Region west of Isthmus (Sierras de Yucuyacua and Miahuatlán) northwest at least to Putla de Guerrero and in Atlantic Region northwest to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and Río Tonto. Uncommon presumptive breeder in Pacific Region east of Isthmus in foothills of Sierra Madre de Chiapas (Tapanatepec, Santa Efigenia, Pericos, Rancho Sol y Luna, Rancho Cerro Baúl), where perhaps not a permanent resident, the only dates being 10 May and from 22 November into January. *Elevations*: 250 to 6,000 ft.

*Breeding* (all data): *pallidiceps*, 24 May 1962, moderately enlarged testes (4 × 3 mm, 16 km [9.9 mi] east-northeast of Piedra Blanca, Schaldach, AMNH 766672, little fat); *masculus*, 6 November 1964, active nest, condition unknown, and

19 November 1964, nest with two eggs (WFVZ 24343, both records at Jamaica Junction, about 2,400 ft, Rowley [1966:152]).

*Subspecies: masculinus* Phillips, according to Phillips (1966:105), endemic to Pacific Region in Sierras de Miahuatlán and Yucuyacua (see Type Localities); *pallidiceps* Gould, remainder of Oaxaca range. I have not seen sufficient material to assess the validity of *masculinus*. Birds from Guerrero (Friedmann et al. 1950:178) have not been identified subspecifically; they are probably *masculinus*.

*Heliomaster constantii* (De Lattre). Plain-capped Starthroat.

Fairly common permanent resident in tropical deciduous forest and arid tropical scrub, occurring along entire length of Pacific Region, northwest in Río Tehuantepec basin to 18 mi southeast of Santiago Matatlán, north across Isthmus into Atlantic Region to Lagunas, and into San Miguel Sola de Vega valley of Interior (kilometer marker 136 on Puerto Escondido Road). *Elevations*: 50 to 3,500 ft.

*Breeding* (all data): 10 November 1964, enlarged testes (right  $4.2 \times 3$  mm, left  $3 \times 2.8$ , 7.0 g) and enlarged testes (right  $4 \times 3$ , left  $3 \times 3$ , 7.1 g; both specimens Cycad Camp, 1,900 ft, Rowley, WFVZ 21777-21778).

*Subspecies: leocadiae* (Bourcier and Mulsant).

*Tilmatura dupontii* (Lesson). Sparkling-tailed Hummingbird.

Very uncommon permanent resident in the Sierras de Yucuyacua and Miahuatlán, occurring in humid pine-oak forest and at least some adjacent arid pine-oak forest. *Elevations*: 3,000 to 8,000 ft.

*Breeding* (all data): range, habitat, and dates.

The only acceptable records are the following. On 14 March 1964 Morony and I saw 2 birds, one of which was taken (Binford, immature male, LSUMZ 33106, little fat, testes 1 mm), at 3,000 ft elevation 11 road mi north of San Gabriel Mixtepec. On 25 May 1964 we saw an adult male at 8,000 ft elevation 1 mi north of San Andrés Chicahuaxtla. In 1965 Rowley collected a male (CAS, 2.2 g) on 16 July and a female (WFVZ 21792, 2.6 g) on 25 July, and F. Flores took a female (WFVZ-HC 16858, 2.45 g, no fat) on 4 September at 3,500 ft elevation at kilometer marker 136 on the Puerto Escondido Road. Schaldach collected two adult males (DEL 18965, little fat, testes small; DEL 18966, little fat, testes small) at Río Jalatengo on 18 November 1964 (D. M. Niles in litt.). Ridgway (1911:639), in synonymy, cites a Boucard reference for Oaxaca, but because he does not include the state in the range of this species, I consider the record invalid.

*Subspecies: monotypic*, following Monroe (1968:192).

*Calothorax lucifer* (Swainson). Lucifer Hummingbird.

Rare winter resident in arid subtropical scrub of Interior and arid habitat in Isthmus. Only three definite records, as follows: female (DEL 18682, 2.7 g, little or no fat, ovary well-developed, but evidently immature) taken by Phillips 9 km (5.6 mi) south of Chivela on 26 December 1969 (identification by A. R. Phillips and D. M. Niles in litt.); immature male (MLZ 54435) taken by Lamb at 5,600 ft elevation 3 mi northwest of Tamazulapan del Progreso on 25 October 1952; female (CAS, 3.5 g) secured by Rowley and Rook at 5,200 ft elevation 15 mi southeast of Oaxaca City on 30 November 1964. A fourth specimen (female, DEL 18677, 2.75 g, very little fat, a few follicles about 0.4–0.5 mm), taken by Phillips

1.2 mi north of Santiago Matatlán on 21 August 1959, is probably *lucifer* (D. M. Niles in litt.). Additional specimens already in collections might be identified when confusion with female *C. pulcher* is resolved (A. R. Phillips in litt.).

*Calothorax pulcher* Gould. Beautiful Hummingbird.

Uncommon permanent resident in the Interior in arid subtropical scrub, recorded west to a point 5 mi west of San Pedro Totolapan at 3,200 ft (28 May 1959, adult male seen by Binford). Presence in Pacific Region at "Putla" [= Putla de Guerrero] (Rébouch specimens; Salvin and Godman 1888–1904 [1892]:351) questionable in light of known distribution and habitat. Specimens taken by W. B. Richardson at "Tehuantepec" (Salvin and Hartert 1892:391) probably pertain to Tehuantepec region. *Elevations*: 3,200 to 7,300 ft.

*Breeding* (all data): 8 May 1965, nest with two eggs (Oaxaca City, Rowley [1984: 142–143], WFVZ 24285); statement "breeding" (Friedmann et al. 1950:180) is based on Lamb specimen label (Tamazulapan del Progreso, 6,000 ft, 8 July 1943, MLZ 37877) which does not give adequate details.

*Subspecies*: monotypic; see Type Localities.

*Archilochus colubris* (Linnaeus). Ruby-throated Hummingbird.

Fairly common winter resident in all major terrestrial habitats throughout state but perhaps most common in lowlands of Atlantic and Pacific Regions. *Dates*: 14 September to 7 April. *Elevations*: sea level to 6,400+ ft.

*Stellula calliope* (Gould). Calliope Hummingbird.

Rare winter resident in humid pine-oak forest of Pacific mountains west of Isthmus. Only one record, the southeasternmost in entire range of species: an adult male (ARPC 6002) taken by Phillips on 30 November 1961 at about 7,300 ft at Río Molino (mentioned without details by Phillips 1966:89).

*Subspecies*: monotypic, following Phillips (pers. comm.), who believes that *lowei* Griscom is based on nonbreeding migrants from the north and, thus, is not a valid subspecies. The one Oaxaca specimen does not differ from United States birds.

*Atthis heloisa* (Lesson and De Lattre). Bumblebee Hummingbird.

Uncommon permanent resident west of Isthmus in humid pine-oak forest and perhaps cloud forest. Record of typical example of *A. heloisa* from the Sierra Madre de Chiapas ("Montañas Gineta," 6 February 1939, del Toro Avilés, adult male, MLZ 25873) is highly questionable because of errors concerning other specimens taken by this collector and because on geographical grounds *A. ellioti*, although not definitely recorded in Oaxaca, is the form to be expected in these mountains (see *A. ellioti* in Hypothetical List). Southeasternmost definite points in entire range of species are Totontepec (Boucard) and Río Molino. *Elevations*: –5,800 to 10,000 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *heloisa* (Lesson and De Lattre).

*Selasphorus platycercus* (Swainson). Broad-tailed Hummingbird.

Very uncommon winter resident in pine-oak forest of Interior, recorded east to Tonagua and Río Molino, the southeasternmost localities in entire range of

the nominate race. Possibly a permanent resident. *Dates*: September to February; date of 17 April 1942 is based on a del Toro Avilés specimen (Totontepec, male, MLZ 38418) and, thus, is questionable. *Elevations*: 6,000 to 8,600 ft.

*Subspecies*: *platycercus* (Swainson).

*Selasphorus rufus* (Gmelin). Rufous Hummingbird.

Uncommon bird in pine-oak forests of Interior; presumably a winter resident but recorded only from 16 September to 14 December. Río Molino is southeasternmost locality in entire range of species. *Elevations*: 5,000 to 7,300 ft (higher, between 8,800 and 9,300 ft, at a point 15 mi southeast of Oaxaca City, but exact elevation unknown).

#### Family TROGONIDAE

*Trogon melanocephalus* Gould. Black-headed Trogon.

Common permanent resident in Atlantic Region in tropical evergreen forest, occurring south in Isthmus at least to Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *melanocephalus* Gould. I cannot agree with the frequent practice of considering as conspecific the Pacific slope form, *T. citreolus*, and the Atlantic slope form, *T. melanocephalus*. The ranges of these two taxa probably overlap in the Isthmus of Tehuantepec, although at present there is no conclusive evidence for this assumption. I have seen no intergrades. Four major phenotypic differences separate the two forms. Although *citreolus* exhibits considerable variation in the darkness of the head and breast, the darkest birds are paler than the lightest *melanocephalus*. The width of the white on the tail tips also varies, but I can find no overlap in measurements. In female *melanocephalus* the ventral surface of the folded tail presents an aspect of alternating black and white bars, whereas in female *citreolus* the tail (except for the extreme base) appears all white from below. The race *T. c. sumichrasti* Brodkorb, which occupies the range closest to that of *melanocephalus*, exhibits more white in the tail than the nominate race, a fact that suggests reinforcement of what might be a species-specific character. Perhaps the major differences between these two forms are in the colors of the iris and fleshy eye-ring. In *melanocephalus* the iris is dark brown, and the eye-ring is very pale blue. At a distance the dark eye matches the darkness of the head feathering, and the pale eye-ring gives the bird a spectacled appearance. In *citreolus*, on the other hand, the iris is bright rich yellow, and the eye-ring is a dark bluish-slate color that almost matches the head feathering. This combination gives *citreolus* the appearance of having a small light spot on each side of the head. The different aspects presented by the two taxa might well function in species recognition and hence act as isolating mechanisms. Numerous minor differences exhibiting varying degrees of overlap also serve to separate the two forms. The purple color of the rump is usually of a darker hue and always of greater extent in *melanocephalus*. The back of *melanocephalus* is generally bluer but might be equalled by extreme examples of *citreolus*. There is much overlap in the shade of yellow of the abdomen, but *melanocephalus* averages darker. The amount of white on the breast is on the average more extensive in *citreolus*. Finally, in *melanocephalus* the wings average

darker, and the dorsal surface of the tail averages slightly bluer. A thorough field study of courtship behavior is needed to determine the role that phenotypic differences might play in isolating these two forms as separate species.

*Trogon citreolus* Gould. Citreoline Trogon.

Very common permanent resident in Pacific Region in tropical deciduous forest, Pacific swamp forest, arid tropical scrub, and lower reaches of tropical semideciduous forest, recorded northwest in Río Tehuantepec basin to Rancho Las Animas and north in Isthmus to Chihuitán, Chivela, and "Chimalapa" (A. C. Buller specimen [AMNH 50407] and W. B. Richardson specimens [published by Sharpe and Ogilvie-Grant 1892:462] are from either Santa María Chimalapa or San Miguel Chimalapa); also extends into San Miguel Sola de Vega valley of Interior (kilometer marker 136 on Puerto Escondido Road). *Elevations*: sea level to 3,500 ft.

*Breeding*: 8 May 1967, nest with three eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 21375), to 20 August 1914, prejuvenile (Tehuantepec City, Shufeldt, female, UMMZ 137716).

*Subspecies: sumichrasti* Brodkorb, from Chiapas border west to Las Tejas and Bahía Santa Cruz. At these towns intergradation with nominate *citreolus* Gould begins and extends into the Interior and to the Guerrero border. See Type Localities and *T. melanocephalus*.

*Trogon violaceus* Gmelin. Violaceous Trogon.

Permanent resident, fairly common in Atlantic Region in tropical evergreen forest south in Isthmus to a point 2 mi north and 2 mi east of Matías Romero, and uncommon in Pacific Region in tropical semideciduous and Pacific swamp forests of Sierra Madre de Chiapas (points 3 mi northwest and 7 mi north-northwest of Ciénega, Chiapas; Cerro Baúl; Rancho Carlos Minne, 3,900 ft; Rancho de Cacoprieto; Santa Efigenia). *Elevations*: 250 to 4,650 ft.

*Breeding* (all data): 13 March 1961, active nest, condition unknown (1 mi southwest of Valle Nacional, 300 ft, Binford); 23 June 1895, prejuvenile (Guichicovi, Nelson and Goldman, male, USNM 155115).

*Subspecies: braccatus* (Cabanis and Heine); see Type Localities.

*Trogon mexicanus* Swainson. Mountain Trogon.

Permanent resident west of Isthmus in all Regions, common in humid pine-oak forest and uncommon in arid pine-oak forest. Should be sought east of Isthmus. *Elevations*: 3,500 to 9,700 ft.

*Breeding* (all data): 3 April 1948, nest with two eggs (La Cumbre near Cerro San Felipe, L. L. Short [in litt.] observation); 22 May 1965, nest with two young (Río Molino, 7,300 ft, Rowley and Rook; nestlings collected 25 May, WFVZ 21924 and CAS).

*Subspecies: mexicanus* Swainson.

*Trogon elegans* Gould. Elegant Trogon.

Very uncommon permanent resident in all Regions east to Lalana, San Gabriel Mixtepec, and a point 2 road mi west of San Pedro Totolapan. Should be sought east of Isthmus. Habitats poorly understood; known habitats are humid and arid pine-oak forests and (one locality) short-tree tropical deciduous forest. *Elevations*: 2,350 to 7,000 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: ambiguus* Gould.

*Trogon collaris* Vieillot. Collared Trogon.

Fairly common permanent resident along entire lengths of Atlantic and Pacific Regions in cloud forest, tropical semideciduous forest, and upper reaches (above 1,900 ft) of tropical evergreen forest. Only three reliable records for tropical evergreen forest of Atlantic lowlands, where probably only a rare winter resident: 18 mi north of Matías Romero, 15 November 1960, Rook, male, LSUMZ 44800, and 9 December 1959, Schaldach, female, WFVZ-HC 5488; 25 mi north of Matías Romero, 11 April 1960, Rook, male, WFVZ-HC 7139. Unrecorded at my locality 1 mi southwest of Valle Nacional, 300 ft, 11 February–7 April 1961. *Elevations:* 250 ft; 1,900 to 6,500 ft.

*Breeding:* 25 April 1961, nest with two young just hatched (17 road mi southwest of Valle Nacional, 4,850 ft, Binford observation), to 11 June 1965, nest with two fresh eggs (kilometer marker 183 near La Cima, 6,000 ft, J. D. Webster, WFVZ 21266).

A male (CAS, 64.5 g, testes  $7 \times 4$  mm) taken by Rook on 5 April 1965 at La Cima seems identical in all respects to *T. aurantiiventris* Gould. The range of that species (Costa Rica and Panama), as well as the lack of similar specimens from this well-collected locality, make me believe that it is an aberrant *T. collaris*.

*Subspecies: xalapensis* Du Bus de Gisignies, Pacific Region east of Isthmus and Atlantic Region; "*puella*" Gould (type from Guatemala), Pacific Region west of Isthmus. Females from the Pacific side of the Sierra Madre de Chiapas match those from the Atlantic Region of Oaxaca in being a darker brown on the breast and upperparts than those from the Sierra de Miahuatlán. In revising the northern *T. collaris*, Phillips (1966:105) considered all Pacific populations from Guerrero to Guatemala to be the pale *puella*. Although these birds might be identical in color, they represent at least two distinct populations, because that of the Sierra de Miahuatlán is geographically isolated by the lowlands of the Isthmus of Tehuantepec and also separated from the Guatemala population by the intervening dark population (*xalapensis*) of the Oaxaca portion of the Sierra Madre de Chiapas. A thorough revision might demonstrate that the west-Mexican population deserves separate nomenclatural recognition; temporarily, I treat it as *puella*, which, thus, consists of at least two allopatric populations.

*Trogon massena* Gould. Slaty-tailed Trogon.

Fairly common permanent resident in Atlantic Region in dense tropical evergreen forest northwest at least to Monte Alto and south in Isthmus to La Ranchería and perhaps (del Toro Avilés) Escuilapa. *Elevations:* 250 to 1,900 ft.

*Breeding* (all data): 16 June 1895, nest with young (La Ranchería, Nelson and Goldman, nestling USNM 155132); statement "breeding" (Miller et al. 1957:11) is based on Lamb specimen label (18 mi north of Matías Romero, 400 ft, 15 April 1956, LSUMZ 44802), which gives only the inadequate information "about ready to lay."

*Subspecies: massena* Gould.

*Pharomachrus mocinno* De la Llave. Resplendent Quetzal.

Very uncommon permanent resident in cloud forest of Sierra Madre de Chiapas at the following localities: 12 mi "east" [= east-southeast] of La Gloria; north-

northeast of Zanatepec; Sierra Reten, 7,500 ft (=4.5 km [2.8 mi] north of Rancho Cerro Baúl); above Rancho Carlos Minne, Cerro Baúl, 5,000 ft; near Cerro Baúl, about 3,000 ft; Rancho Cerro Baúl. Oaxaca localities are northwesternmost in entire range of species. *Elevations*: about 3,000 feet to 7,500 ft.

*Breeding* (all data): 29 March 1964, nest with one egg (near Cerro Baúl, about 3,000 ft, Rook, WFVZ 24328); 12 April 1964, nest with two eggs (Sierra Reten, 7,500 feet, Rook, WFVZ 24329); 29 April 1967, nest with one egg (above Rancho Carlos Minne, Cerro Baúl, 5,000 ft, Rowley, WFVZ 21381).

*Subspecies*: *mocinno* De la Llave.

#### Family MOMOTIDAE

*Hylomanes momotula* Lichtenstein. Tody Motmot.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus at least to a point 15 km [9.3 mi] east of Sarabia and perhaps (del Toro Avilés) Escuilapa. One record for Pacific Region east of Isthmus, where apparently a casual winter visitant: female (WFVZ-HC 19254) taken by Galley on 25 April 1967 at 4,700 ft elevation at Colonia Rodolfo Figueroa. *Elevations*: 250 to 1,900 ft; 4,700 ft.

*Breeding* (all data): range, habitat, and dates.

All specimens from San Miguel Soyaltepec and Escuilapa (MLZ) and from Tutla (FMNH), which form the basis for most if not all previously published records (e.g., Blake 1950:404), were taken by del Toro Avilés and, thus, are of questionable origin and date. I examined 18 reliable specimens from four localities in addition to the two above: 1 mi southwest of Valle Nacional; 18 and 24 [road] mi north of Matías Romero; and 12 km (7.5 mi) east-northeast of Piedra Blanca. In addition, I saw this species at a point 6 road mi southwest of Valle Nacional.

*Subspecies*: *momotula* Lichtenstein; see Type Localities.

*Aspatha gularis* (Lafresnaye). Blue-throated Motmot.

Uncommon presumptive permanent resident in Pacific Region in cloud forest of Sierra Madre de Chiapas. Recorded by Morony and Binford from 4,900 to 5,200 ft elevation 12 mi north-northeast of Zanatepec, as follows: 3 seen and two of them collected by Binford on 28 March 1964 (male, LSUMZ 33120, 65.3 g, little fat, black testes slightly enlarged [6 × 3 mm]; female, LSUMZ 33119, 67.3 g, little fat, follicles not enlarged); 1 bird seen on 30 and 31 March; 2 birds each seen on 2 April and 5 April. Only other records are two males (WFVZ-HC 12393 and 12394) collected by Rook on 25 and 27 March 1964, respectively, on "Sierra Reten, 40 km. [24.9 mi] NW Tapanatepec," a locality probably close to mine. Oaxaca localities are northwesternmost in entire range of species.

*Breeding* (all data): see above.

*Momotus momota* (Linnaeus). Blue-crowned Motmot.

Common permanent resident in Atlantic Region up to at least 1,900 ft in dense and semi-open tropical evergreen forest, recorded south in Isthmus to Chivela, and apparently in Pacific Region up to 4,650 ft in tropical semideciduous forest of Sierra Madre de Chiapas (seen by Binford in 1972 in Oaxaca near Ciénega, Chiapas, 1 on 10 May at 4,650 ft elevation 3 mi northwest and 2 on 11 May at 4,350 ft elevation 7 mi north-northwest; six males [WFVZ] collected by Rook at Colonia Rodolfo Figueroa, 13 December 1963 and 15 January 1964, Rancho

Cerro Bául, 28 November 1963, and La Cumbre near Rancho Sol y Luna, 9–11 May and 18 May 1963). Sumichrast (*in* Lawrence 1876:9) considered it a “wanderer” to the Pacific Region but cited no records; he might be correct. *Elevations*: 200 to 4,650 ft.

*Breeding* (all data): 2 April 1961, one enlarged follicle (12 mm) and four ruptured follicles (1 mi southwest of Valle Nacional, 300 ft, Wolf, LSMZ 24376, 149.1 g, moderately fat); 24 April 1962, pair “investigating bank hole” (near Piedra Blanca, Schaldach, label notation on male, WFFVZ 25015, testes 8 × 6 mm).

*Subspecies*: *lessonii* Lesson. On the basis of specimens I have examined, I agree with Wetmore (1943:267–268) and others that *goldmani* Nelson (1900:256) is not valid.

*Momotus mexicanus* Swainson. Russet-crowned Motmot.

Very common permanent resident in tropical semideciduous, tropical deciduous, and Pacific swamp forests, and in arid tropical scrub and adjacent lower arid subtropical scrub, occurring in the Interior in valleys of San Miguel Sola de Vega, San Juan Bautista Cuicatlán, and Huajuapán de León, along entire length of Pacific Region, northwest in Río Tehuantepec basin to vicinity of San Pedro Totolapan, and north across Isthmus into Atlantic Region to a point 3 mi north of Matías Romero. *Elevations*: sea level to 6,000 ft.

*Breeding*: 25 April 1964, at least two ruptured follicles (11 road mi north of San Pedro Pochutla, 900 ft, Binford, LSMZ 33123, 103.4 g, little fat), to 2 June 1917, nest with three eggs (Tehuantepec City, Shufeldt field notes in UMMZ, eggs collected); 13 June 1963, four juveniles seen as they left nest (Cycad Camp, 1,900 ft, Rowley [1966:155]).

*Subspecies*: *saturatus* Nelson, Pacific Region and probably southern Interior Region (see Type Localities); *mexicanus* Swainson, northern Interior Region, extending there from Río Balsas basin (see Nelson 1897:50).

*Eumomota superciliosa* (Sandbach). Turquoise-browed Motmot.

Casual vagrant, at least formerly (no recent records), in unknown habitats in Pacific Region in or near Sierra Madre de Chiapas: “Cacoprieto” [= Rancho de Cacoprieto] (February 1880, Sumichrast, original number 42, male, USNM 145282), Santa Efigenia (Sumichrast 1881:239), and Tapanatepec (27 April 1869, Sumichrast, male, UNSM 58830). Label of a third specimen (USNM 145279), taken by Sumichrast in 1874, gives only “Tehuantepec” [= Tehuantepec region] as a locality; possibly, the month of May listed by Lawrence (1876:30) and the locality Santa Efigenia given by Sumichrast (1881:239) pertain to this specimen. Record from Tolosa, Veracruz, given by Ridgway (1914:480) might pertain to Tolosa, Oaxaca (see Gazetteer). Sumichrast (*in* Lawrence 1876:9) considered his Pacific records to represent “wanderers,” and no recent records have been forthcoming despite intensive collecting in these areas. Occurs at Tonalá, Chiapas, not far from Oaxaca border (Alvarez del Toro 1971:125).

*Subspecies*: *bipartita* Ridgway; see Type Localities.

#### Family ALCEDINIDAE

*Ceryle torquata* (Linnaeus). Ringed Kingfisher.

Fairly common permanent resident at the forested edges of open aquatic habitats throughout lower portions of Atlantic and Pacific Regions. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 8 March 1964, moderately enlarged follicle (3 mm, 16 road mi northwest of Puerto Escondido, Binford, LSUMZ 33117, 245.9 g, little fat); 28 March 1961, moderately enlarged testes (9 × 4 mm, Río Ostuta, 4 mi west of Zanatepec, Schaldach, AMNH 775981).

*Subspecies: torquata* (Linnaeus).

*Ceryle alcyon* (Linnaeus). Belted Kingfisher.

Fairly common winter resident at edges of open aquatic habitats throughout lower portions of Atlantic and Pacific Regions. Unrecorded in the Interior. *Dates*: 18 October to 28 April. *Elevations*: sea level to 800 ft.

*Subspecies: monotypic*, following Phillips (1963:336–338).

*Chloroceryle amazona* (Latham). Amazon Kingfisher.

Fairly common permanent resident in forest-edged freshwater habitats throughout Atlantic Region and in Pacific Region in and east of Isthmus. Probably occurs sparingly in Pacific Region west of Isthmus. *Elevations*: sea level to 800 ft.

*Breeding* (all data): 17 April 1966, female observed “excavating burrow in bank along river” (El Zopilote, 400 ft, Rowley field notes in CAS).

*Subspecies: mexicana* Brodkorb.

*Chloroceryle americana* (Gmelin). Green Kingfisher.

Common permanent resident at edges of open aquatic habitats in Atlantic and Pacific Region, penetrating Interior along rivers at least near Santa María Asunción Tlaxiaco (see below), San Miguel Sola de Vega (April, M. Trujillo, female specimen), San Pedro Juchatengo (April, M. Trujillo, female specimen), and Oaxaca City (March, M. Trujillo, specimens of one male and one female), the last three localities published by Sharpe and Ogilvie-Grant (1892:136). *Elevations*: sea level to 5,800 ft.

*Breeding* (all data): 19 March 1961, enlarged testes (7 × 4 mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24370, 38.0 g, little fat); 30 June 1961, two prejuveniles (Rancho Sol y Luna, Schaldach, females, AMNH 776312–776313); 20 August 1954, enlarged testes (7 mm, 2 mi east of Santa María Asunción Tlaxiaco, 5,800 ft, F. C. Sibley, CU 26368, 42.7 g).

*Subspecies: septentrionalis* (Sharpe).

*Chloroceryle aenea* (Pallas). American Pygmy Kingfisher.

Uncommon permanent resident in swamp forest and forest-edged ponds and streams of Atlantic Region. One record for Pacific Region, where apparently a casual visitant: female (labeled “male”; FMNH 246559) taken by Sumichrast at Santa Efigenia on 19 April 1871. *Elevations*: 100 to 800 ft.

*Breeding* (all data): 25 May 1962, enlarged testes (7 × 4 mm, 16 km [10 mi] east-northeast of Piedra Blanca, Schaldach, AMNH 787518).

*Subspecies: stictoptera* (Ridgway).

#### Family BUCCONIDAE

*Bucco macrorhynchos* Gmelin. White-necked Puffbird.

Very uncommon permanent resident in Pacific Region in Pacific swamp forest of Sierra Madre de Chiapas (Santa Efigenia and Tapanatepec) and in Atlantic Region in tropical evergreen forest northwest at least to Montebello and perhaps

(del Toro Avilés) Río Tonto and San Miguel Soyaltepec and south in Isthmus to a point 2 mi north and 2 mi east of Matías Romero. *Elevations*: 300 to 800 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *hyperrhynchus* Sclater.

#### Family GALBULIDAE

*Galbula ruficauda* Cuvier. Rufous-tailed Jacamar.

Fairly common permanent resident in Atlantic Region in dense and semi-open tropical evergreen forest, recorded northwest to a point 1 mi southwest of Valle Nacional (Binford and Wolf specimens, LSUMZ) and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300+ ft.

*Breeding* (all data): 10 June 1961, prejuvenile (Sarabia, Schaldach, male, AMNH 776314).

*Subspecies*: *melanogenia* Sclater.

#### Family RAMPHASTIDAE

*Aulacorhynchus prasinus* (Gould). Emerald Toucanet.

Permanent resident in Atlantic and Pacific Regions, very common in cloud forest and uncommon in tropical semideciduous forest. *Elevations*: *A. p. prasinus*, 2,000 to 5,700 ft; *wagleri*, 900 ft (common in May) and 2,000 to 8,600 ft.

*Breeding*: *A. p. prasinus*: 24 April 1966, nest with four eggs (Cerro Baúl, 4,300 ft, Rowley, WFVZ 21364), to 16 May 1966, nest with two eggs (ridge above Rancho Sol y Luna, 2,000 ft, Rowley, WFVZ 24281). *A. p. wagleri* (all data): 9 May 1963, active nest, condition unknown (6 km [4 mi] from La Cima, 4,700 ft, Rowley [1966:155]); 9 May 1964, three enlarged follicles (15, 12, and 10 mm, 18 road mi north of San Gabriel Mixtepec, 4,900 ft, Binford, LSUMZ 33135, 189.3 g, little fat); 24 June 1963, two enlarged follicles (one 11 mm, 6 km [4 mi] from La Cima, 4,700 ft, Rowley [1966:155], AMNH, 188.6 g).

*Subspecies*: *wagleri* (Sturm), Pacific Region west of Isthmus (Sierras de Miahuatlán and Yucuyacua); *prasinus* (Gould), Pacific Region east of Isthmus and Atlantic Region (see Type Localities).

*Pteroglossus torquatus* (Gmelin). Collared Aracari.

Common permanent resident in Pacific Region in Pacific swamp forest from foothills of Sierra Madre de Chiapas south to Pacific coast at Punta Paloma and in Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and Río Tonto. *Elevations*: sea level to 1,500 ft.

*Breeding*: 27 April 1966, nest with three eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 20756), to 30 June 1961, prejuvenile (Rancho Sol y Luna, Schaldach, male, AMNH 776318).

*Subspecies*: *torquatus* (Gmelin).

*Ramphastos sulfuratus* Lesson. Keel-billed Toucan.

Common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to Valle Nacional. Should be sought on Pacific side of Sierra Madre de Chiapas, where Sumichrast (*in* Lawrence 1876:34) thought it might

occur. *Elevations*: 150 to 1,500 ft; elevation of 4,000 ft for "Chimalapa" [= Santa María Chimalapa?] record (Sclater and Shelley 1891:458) possibly erroneous.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *sulfuratus* Lesson.

#### Family PICIDAE

*Melanerpes formicivorus* (Swainson). Acorn Woodpecker.

Fairly common permanent resident in pine-oak forests of all Regions, including oak patches down to 100 ft elevation within tropical evergreen forest; population in the Interior connects through Isthmus mountains with that in Sierra Madre de Chiapas. *Elevations*: 100 to 9,700 ft.

*Breeding* (all data): 30 April 1964, enlarged testes (12 × 7 mm, 3 mi north of Pluma Hidalgo, 5,000 ft, Binford, LSUMZ 33145, 85.6 g, little fat); 5 May 1964, nest with four eggs (Colonia Rodolfo Figueroa, Galley, WFVZ 24330); 11 June 1955, nest with three eggs (south of Oaxaca City, 5,000 ft, T. C. Meitzen and L. Garcia, WFVZ 88413).

*Subspecies*: *formicivorus* (Swainson), west of Isthmus; *lineatus* (Dickey and van Rossem), east of Isthmus in Sierra Madre de Chiapas.

*Melanerpes pucherani* (Malherbe). Black-cheeked Woodpecker.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 6 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to La Gloria. Records for "Cuicatlán" [= San Juan Bautista Cuicatlán] and Oaxaca City (Ridgway 1914: 122) probably erroneous. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): 21 May 1962, two specimens with enlarged testes (8 × 5 mm, 27 km [16.8 mi] east-northeast of Piedra Blanca, Schaldach, AMNH 787522 and WFVZ 25215).

*Subspecies*: *perileucus* Todd.

*Melanerpes chrysogenys* (Vigors). Golden-cheeked Woodpecker.

Common permanent resident in Pacific Region in tropical deciduous forest east to Bahía Santa Cruz. Specimen from Tehuantepec City (10 November 1913, Shufeldt, female, UMMZ 137900), the southeasternmost record in entire range of species and the only record east of Bahía Santa Cruz, perhaps represents a migrant or visitant, as might be a specimen (17 February 1965, Rook, female, CAS) taken purportedly at 7,200 ft elevation 10 mi east of Santos Reyes Nopala. *Elevations*: sea level to 2,400 ft; 7,200 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *flavinuchus* (Ridgway).

*Melanerpes hypopolius* (Wagler). Gray-breasted Woodpecker.

Common permanent resident in arid subtropical scrub of Interior east to a point 2 road mi west of San Pedro Totolapan (where sympatric with *M. aurifrons*), the southeasternmost locality in entire range of species. *Elevations*: -2,950 to 7,900 ft.

*Breeding* (all data): 2 May 1966, nest with four eggs (15 mi southeast of Oaxaca City, 5,000 ft, Rowley, WFVZ 20705).

*Melanerpes aurifrons* (Wagler). Golden-fronted Woodpecker.

Common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in arid tropical scrub and short-tree tropical deciduous

forest from near Chiapas border northwest through Río Tehuantepec basin to San Juan del Río and a point 2 road mi west of San Pedro Totolapan (where sympatric with *M. hypopolius*) and west along Pacific coast at least to Ventosa; absent from rest of Pacific Region. *Elevations*: sea level to 3,200+ ft.

*Breeding*: 30 March 1961, four ruptured follicles (1 mi southwest of Valle Nacional, 300 ft, Wolf, LSUMZ 24398, 76.5 g, slightly fat), to 21 May 1966, nest with five eggs (El Zopilote, 400 ft, Rowley, WFVZ 21390); 29 May 1917, two prejuveniles collected from brood of four (Tehuantepec City, females, Shufeldt [UMMZ 137904] and A. D. Harvey [UMMZ 137905]).

*Subspecies*: *grateloupenis* (Lesson), Atlantic Region; *polygrammus* (Cabanis), Pacific Region (see Type Localities). These two races intergrade in the Isthmus, with the steepest part of the cline to the north (La Ranchería, Santa Domingo Petapa, Sarabia, and Guichicovi) but with some gene flow apparent as far south as the Gulf of Tehuantepec (Huilotepec and Tequisistlán). I follow Selander and Giller (1963) in merging *veraecrucis* Nelson with *grateloupenis*, and *frontalis* Nelson with *polygrammus*; if these were recognized, all Atlantic Region birds would be *veraecrucis*, and some individuals from the southeastern base of the Sierra Madre de Chiapas would be *polygrammus* > *frontalis*.

*Sphyrapicus varius* (Linnaeus). Yellow-bellied Sapsucker.

Uncommon winter resident in mountainous areas of all Regions, occurring primarily in humid pine-oak forest, but recorded also in tropical semideciduous forest and to be expected in almost any wooded habitat, at least on migration. *Dates*: 27 October to 8 April. *Elevations*: 800 ft (Santa Efigenia, 28 January 1869, Sumichrast, female, USNM 57837); 2,300 to 9,500 ft.

*Subspecies*: *varius* (Linnaeus).

*Picoides scalaris* (Wagler). Ladder-backed Woodpecker.

Permanent resident, uncommon in arid subtropical scrub of the Interior east to Oaxaca Valley and Río Jalatengo, very uncommon and local in adjacent Pacific Region west of Isthmus in tropical deciduous forest, arid tropical scrub, and probably lower reaches of pine-oak forest, and rare in Atlantic Region in open, semiarid scrubby areas within tropical evergreen forest of extreme northern Oaxaca (two records, 1 bird seen by Morony and me along road between San Juan Bautista Tuxtepec and Loma Bonita on 6 June 1964, and 1 seen by us 3 road mi east of Temascal on 8 June 1964). One record for Pacific Region east of Isthmus, where apparently only a casual winter visitant: female (MLZ 45471) taken by Lamb at the Río Ostuta 5 mi west of Zanatepec, 135 ft, on 27 January 1947. The data on two males collected by del Toro Avilés supposedly at San Pablo Villa de Mitla on 10 June 1942 (MLZ 33741) and 20 December 1942 (MLZ 35122) are doubtful (Phillips 1966:105–106). *Elevations*: 150 to 6,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *percus* (Oberholser), according to Miller et al. (1957:41), based on Río Ostuta specimen, casual winter visitant to Pacific Region east of Isthmus; *lambi* Phillips (1966:106), Pacific Region west of Isthmus. I cannot allocate birds from the Interior Region; they are larger and paler than *lambi*, but smaller than *sinaloensis* (Ridgway) and *centrophilus* (Oberholser); they might represent *azelus* (Oberholser), which, however, was merged with *sinaloensis* by Phillips (1966:106); if *azelus* is a synonym of *sinaloensis*, the Interior Oaxaca birds probably

represent an undescribed subspecies. Birds from the Atlantic Region might prove to be *ridgwayi* (Oberholser) when specimens become available.

*Picoides villosus* (Linnaeus). Hairy Woodpecker.

Fairly common permanent resident in pine-oak forests (primarily humid) above 3,500 ft throughout state. *Elevations*: 3,500 to 9,700 ft.

*Breeding* (all data): 6 April 1965, nest with one egg (4 mi north of San Andrés Chicahuaxtla, 8,000 ft, Rowley, WFVZ 24331).

*Subspecies: jardinii* (Malherbe), northern and northeastern portions of Interior; *sanctorum* (Nelson), east of Isthmus. Birds from the Sierra de Miahuatlán (WFVZ, CAS) are variably intermediate in size and color between these two races. Specimens (LSUMZ, WFVZ) from east of the Isthmus I refer to *sanctorum* on the basis of their small size (seven females, wings 102.3–104.6 mm [ $\bar{X}$  = 103.5], tails 57.5–60.7 [ $\bar{X}$  = 59.9]) and rather dark and brownish (although mottled) underparts.

*Veniliornis fumigatus* (d'Orbigny). Smoky-brown Woodpecker.

Uncommon permanent resident in tropical evergreen forest of Atlantic Region south in Isthmus to La Ranchería and perhaps (del Toro Avilés) Escuilapa. Record for "Santo Domingo" (Miller et al. 1957:38) pertains to La Ranchería. Should be sought in Pacific Region on both sides of Isthmus. *Elevations*: 250 to 4,100 ft.

*Breeding* (all data): 14 March 1961, active nest, condition unknown (1 mi southwest of Valle Nacional, 300 ft, Binford).

*Subspecies: sanguinolentus* (Sclater).

*Piculus rubiginosus* (Swainson). Golden-olive Woodpecker.

Fairly common permanent resident in Atlantic Region, ranging northwest at least to the vicinity of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec, and in Pacific Region in the Sierra Madre de Chiapas, inhabiting semi-open portions of tropical evergreen and tropical semideciduous forests. Record from "15 mi. NE Tapanatepec" (Miller et al. 1957:28) pertains to Finca Cacahuatl, Chiapas. *Elevations*: 200 to 4,900 ft.

*Breeding* (all data): 3 April 1964, enlarged testes (largest 10 × 6 mm, 12 mi north-northeast of Zanatepec, 4,900 ft, Morony, LSUMZ 33140, 103.6 g); 20 April 1966, nest with four eggs (Cerro Baúl, 4,300 ft, Rowley, WFVZ 21387); 22 April 1961, enlarged testes (largest 11 × 6 mm, 6 road mi southwest of Valle Nacional, 1,900 ft, Wolf, LSUMZ 24385, 88.6 g, little fat).

*Subspecies: yucatanensis* (Cabot), Atlantic Region; *maximus* Griscom, Pacific Region in the Sierra Madre de Chiapas, where some individuals are referable to *yucatanensis* and others to *maximus*. *P. r. aeruginosus* (Malherbe) has not been recorded in Oaxaca (contra Miller et al. 1957:28; see discussion in Gazetteer under Atoyac) but should be sought in the extreme northern part, perhaps near Cosolapa. See Baptista (1978) for an analysis of the conspecificity of *P. aeruginosus* and *P. rubiginosus*.

*Piculus auricularis* (Salvin and Godman). Gray-crowned Woodpecker.

Uncommon permanent resident in Pacific Region in Sierras de Miahuatlán and Yucuyacua, recorded (ARPC) east to Finca Mercedes and Copalita, the southeasternmost points in entire range of species; breeds primarily in humid pine-oak forest, wandering (breeding?) into adjacent arid pine-oak, cloud, and tropical

deciduous forests. One record for Interior, a male (WFVZ-HC 18535, 42.3 g, testes  $9 \times 5$  mm) taken in August 1965 at kilometer marker 136 on Puerto Escondido Road. *Elevations*: 2,400 to 8,600 ft.

*Breeding* (all data): moderately enlarged testes (see above); range, habitat, and dates.

*Subspecies*: *auricularis* (Salvin and Godman). I follow the treatment by Baptista (1978).

*Colaptes auratus* (Linnaeus). Northern Flicker.

Fairly common permanent resident in humid and arid pine-oak forests (including highland pine forest) of Interior Region and at high elevations in Pacific Region, recorded east to Cerro Zempoaltepec and La Cieneguilla. Should be sought in Sierra Madre de Chiapas. *Elevations*: 3,000 to 10,000 ft.

*Breeding* (all data): 4 April 1948, enlarged testes (13 mm, La Cumbre near Cerro San Felipe, 9,000 ft, H. E. Childs, Jr., MVZ 115399, 116.2 g); 5 May 1962, two active nests, condition unknown (Río Molino, 8,000 ft, Rowley [1966:156]).

*Subspecies*: *mexicanus* Swainson. The inclusion by the A.O.U. (1957:313) of Oaxaca in the winter range of *collaris* Vigors is erroneous; it probably is based on Bent (1939:294), who, however, did not recognize *mexicanus*.

*Celeus castaneus* (Wagler). Chestnut-colored Woodpecker.

Uncommon permanent resident in Atlantic Region in heavy tropical evergreen forest northwest at least to a point 5 mi west of Temascal and south in Isthmus to Sarabia, La Gloria, and "Chimalapa" [= Santa María Chimalapa?, W. B. Richardson; see Gazetteer]. *Elevations*: 250 to 1,500 ft.

*Breeding* (all data): 25 March 1962, enlarged follicle (5 mm with yolk, Montebello, Schaldach, AMNH 778290).

*Subspecies*: monotypic; see Type Localities.

*Dryocopus lineatus* (Linnaeus). Lineated Woodpecker.

Common permanent resident in Atlantic and Pacific Regions in tropical evergreen forest, tropical deciduous forest, Pacific swamp forest, palm forest, and lower reaches of tropical semideciduous forest; also ranges (breeding?) into arid tropical scrub of Tehuantepec region and of Interior Region in vicinity of San Pedro Juchatengo (5 mi north, 2 November 1964, Rowley, male, WFVZ 25478, 140.8 g). *Elevations*: sea level to 4,350 ft.

*Breeding*: 22 March 1967, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 21385), to 12 June 1963, two juveniles being fed by two adults (near Cycad Camp, Rowley [1966:156]).

*Subspecies*: *scapularis* (Vigors), Pacific Region west of Isthmus and Interior Region; *similis* (Lesson), remainder of Oaxaca range, including Isthmus. Birds from Las Tejas and Rancho Las Animas are *scapularis* > *similis*, and birds in and east of the Isthmus are *similis* > *scapularis*.

*Campephilus guatemalensis* (Hartlaub). Pale-billed Woodpecker.

Fairly common permanent resident of Atlantic and Pacific Regions in tropical evergreen forest, Pacific swamp forest, the more arid portions of tropical semideciduous forest, and all tropical deciduous forest except in Río Tehuantepec basin west of Las Tejas. *Elevations*: sea level to 4,100 ft.

*Breeding* (all data): range, habitat, and dates; statement "laying" (Miller et al. 1957:44) is based on Lamb specimen label (Las Tejas, 150 ft, 6 February 1947, MLZ 45539) which gives inadequate supporting information.

*Subspecies*: *nelsoni* (Ridgway), western portion of Pacific Region; *regius* Reichenbach, northwestern Atlantic Region, according to Miller et al. (1957:44); *guatemalensis* (Hartlaub), remainder of Atlantic Region and in Pacific Region east of Isthmus.

#### Family FURNARIIDAE

*Synallaxis erythrothorax* Sclater. Rufous-breasted Spinetail.

Fairly common permanent resident in lower portions of Atlantic Region in brushy clearings within tropical evergreen forest northwest at least to a point 5 mi west of Temascal and south in Isthmus to Río Sarabia and possibly (del Toro Avilés) Escuilapa. *Elevations*: 100 to 500+ ft.

*Breeding* (all data): 29 May 1959, active nest, condition unknown (Palomares, Binford); 6 June 1964, nest under construction (7 mi west of Loma Bonita, 100 ft, Binford observation); 15 June 1961, enlarged testes (8 × 4 mm, Sarabia, Schaldach, AMNH 776334).

*Subspecies*: *furtiva* Bangs and Peters.

*Anabacerthia variegaticeps* (Sclater). Spectacled Foliage-gleaner.

Permanent resident in cloud forest, fairly common in Atlantic Region and in Pacific Region east of Isthmus, and rare in Pacific Region west of Isthmus (Sierra de Miahuatlán: La Cima area only). Should be sought in Sierra de Yucuyacua, because it occurs in Guerrero (Miller et al. 1957:52). *Elevations*: -4,100 to 6,000 ft.

*Breeding* (all data): 23 April 1961, enlarged testes (8 × 4 mm, 15 road mi southwest of Valle Nacional, 4,100 ft, Binford, LSUMZ 24435, 22.1 g, little fat).

*Subspecies*: *variegaticeps* (Sclater).

*Automolus ochrolaemus* (Tschudi). Buff-throated Foliage-gleaner.

Fairly common permanent resident of Atlantic Region in dense and semi-open tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Santa María Chimalapa and possibly (del Toro Avilés) Escuilapa. *Elevations*: 250 to 4,100 ft.

*Breeding*: 25 March 1962, enlarged testes (10 × 5 mm, AMNH 778311), to 19 June 1961, enlarged testes (12 × 8 mm, AMNH 776338; both records at Montebello, Schaldach).

*Subspecies*: *cervinigularis* (Sclater).

*Automolus rubiginosus* (Sclater). Ruddy Foliage-gleaner.

Permanent resident in cloud forest and upper reaches of tropical semideciduous forest west of Isthmus, uncommon in Pacific Region and very uncommon in Atlantic Region; requires earth banks for nesting. Should be sought in cloud forest east of Isthmus. *Elevations*: Atlantic Region, 4,100 to 5,250+ ft; Pacific Region, 3,200 to 6,200 ft, and 8,600 ft (Cerro Verde, 18 October 1964, Rook, female, WFVZ 25843, 47.8 g, fat).

*Breeding*: 8 April 1961, active nest, condition unknown (15 road mi southwest of Valle Nacional, 4,100 ft elevation, Binford), to 8 June 1965, nest under construction (near La Cima, Rowley [1966:160]); 12 May 1965, nest with two eggs

(kilometer marker 195 on Puerto Escondido Road, 4,200 ft, Rowley, WFVZ 21315).

*Subspecies: rubiginosus* (Sclater), Atlantic Region; *guerrerensis* Salvin and Godman, Pacific Region. See *Automolus pectoralis* in Type Localities.

*Xenops minutus* (Sparrrman). Plain Xenops.

Uncommon permanent resident of Atlantic Region in tropical evergreen forest northwest at least to Trans-Isthmian Highway and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300+ ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: mexicanus* Sclater.

*Sclerurus mexicanus* Sclater. Tawny-throated Leaf-tosser.

Permanent resident, rare in cloud forest of Atlantic Region and uncommon in cloud and tropical semideciduous forests of the Pacific Region east of Isthmus. *Elevations*: 3,000 to 5,250 ft.

*Breeding* (all data): 23 April 1967, soft-shelled egg in oviduct (near Cerro Baúl [Rowley 1984:150]).

This species is rarely reported in Mexico. I examined 13 specimens (LSUMZ, WFVZ, UK) from the following Oaxaca localities: 4.5 km (2.8 mi) north of Rancho Cerro Baúl; at or near Colonia Rodolfo Figueroa, 3,000 and 4,500 ft; La Cumbre near Rancho Sol y Luna; 12 mi north-northeast of Zanatepec, 4,900 ft; and Vista Hermosa, 5,250 ft.

*Subspecies: mexicanus* Sclater.

*Sclerurus guatemalensis* (Hartlaub). Scaly-throated Leaf-tosser.

Rare permanent resident in tropical evergreen forest of Isthmus. Should be sought elsewhere in lowlands of Atlantic Region. Known only from five specimens: one female (GMSC, 35 g, not fat, ovary not enlarged, skull ossified) taken by J. W. Graber at Rancho Boca del Río Sarabia (ranch at about 200 ft elevation) on 22 December 1957; three males and one female (all with gonads not enlarged) collected by Schaldach at Montebello (town at about 300 ft elevation) on 15, 23, and 24 March and 8 May 1962, respectively (AMNH 778314, 778315, 778313, and 768809, respectively).

*Breeding* (all data): range, habitat, and dates.

*Subspecies: guatemalensis* (Hartlaub).

#### Family DENDROCOLAPTIDAE

*Dendrocincla anabatina* Sclater. Tawny-winged Woodcreeper.

Very uncommon permanent resident in tropical evergreen forest of Atlantic Region northwest to a point 15 road mi southwest of Valle Nacional and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 4,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: anabatina* Sclater.

*Dendrocincla homochroa* (Sclater). Ruddy Woodcreeper.

Permanent resident, rare in Atlantic Region in cloud forest and upper reaches of tropical evergreen forest, recorded northwest to a point 15 road mi southwest

of Valle Nacional, the northwesternmost locality in entire range of species, and uncommon in Pacific Region in cloud and upper tropical semideciduous forests of Sierra Madre de Chiapas. *Elevations*: -4,000 to 5,200 ft.

*Breeding* (all data): 15 April 1967, enlarged testes (14 × 9 mm, 16 km [9.9 mi] north-northwest of Rancho Carlos Minne, 5,200 ft, Galley, WFVZ-HC 19237).

*Subspecies*: *homochroa* (Sclater); see Type Localities.

*Sittasomus griseicapillus* (Vieillot). Olivaceous Woodcreeper.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest and lower reaches of cloud forest and in Pacific Region in tropical semideciduous and lower cloud forests of Sierra Madre de Chiapas and Sierra de Miahuatlán; to be expected in the latter two habitats in the Sierra de Yucuyacua. *Elevations*: 250 to 5,200 ft.

*Breeding* (all data): 15 April 1967, enlarged testes (12 × 8 mm, 16 km [9.9 mi] north-northwest of Rancho Carlos Minne, 5,200 ft, Galley, WFVZ-HC 19173); 11 May 1963, adults carrying food into nest cavity (6 km [3.7 mi] from La Cima, 4,700 ft, Rowley [1966:156-157]); 11 May 1964, enlarged testes (10 × 5 mm, 16 road mi north of San Gabriel Mixtepec, 4,350 ft, Binford, LSUMZ 33153, 13.7 g, little fat); 24 May 1961, enlarged testes (11 × 7 mm, 28 road mi north of Matías Romero, Wolf, UMMZ 156482 skeleton, 13.5 g, little fat).

*Subspecies*: *sylvioides* Lafresnaye, at least Pacific Region east of Isthmus and Atlantic Region. More specimens are needed to assess *jaliscensis* Nelson of Jalisco and *harrisoni* Sutton of Tamaulipas. On zoogeographical grounds, I would expect both to be valid and *jaliscensis* to include the Sierra de Miahuatlán population.

*Glyphorhynchus spirurus* (Vieillot). Wedge-billed Woodcreeper.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to Isthmus and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to near Piedra Blanca and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300+ ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *pectoralis* Sclater and Salvin.

*Xiphocolaptes promeropirhynchus* (Lesson). Strong-billed Woodcreeper.

Very uncommon permanent resident in humid pine-oak forest of Interior in Sierra Aloapaneca, Sierra de Juárez, and Sierra de Zempoaltepec. A sight record by Webster (1965:598) from the Sierra de Miahuatlán (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, June 1965) seems improbable in the absence of other records from this well-collected area, although an endemic race occurs in Guerrero. *Elevation*: -9,300 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *sclateri* Ridgway.

*Dendrocolaptes certhia* (Boddaert). Barred Woodcreeper.

Permanent resident, uncommon in Atlantic Region in tropical evergreen forest northwest at least to a point 5 mi west of Temascal and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa, and (disjunctly) rare in Pacific Region in tropical semideciduous forest of Sierra de Miahuatlán west to a point

0.9 mi west of San Gabriel Mixtepec. Should be sought in Sierra de Yucuyacua. *Elevations*: 250 to 4,100 ft.

*Breeding* (all data): 4 May 1961, enlarged testes (18 × 9 mm, 19 road mi north of Puerto Angel, 900 ft, Binford, LSUMZ 24410, 70.9 g, very little fat, holotype of *sheffleri*).

*Subspecies*: *sheffleri* Binford (1965:1), endemic to Pacific Region in Sierra de Miahuatlán (see Type Localities); *sanctithomae* (Lafresnaye), Atlantic Region.

*Xiphorhynchus flavigaster* Swainson. Ivory-billed Woodcreeper.

Permanent resident, very common in Atlantic Region from 250 to 4,100 ft in tropical evergreen forest (dense and semi-open portions) and in Pacific Region east of Isthmus from sea level to 4,900 ft in tropical semideciduous forest, Pacific swamp forest, and dense-canopied tropical deciduous forest, and uncommon in Pacific Region west of Isthmus from 4,900 to 8,600 ft in cloud forest and humid pine-oak forest; recorded northwest in Río Tehuantepec basin to Jalapa. One record for arid portion of Interior, a specimen (sex?, WFVZ 25613, 63.1 g, no fat) taken by O. Cruz on 4 October 1964 at 4,000 ft elevation 5 mi north of San Pedro Juchatengo.

*Breeding*: 27 April 1965, nest with two eggs (Jamaica Junction, 2,400 ft, Rowley and F. Flores, WFVZ 24319), to 27 July 1894, prejuvenile (Santa Efigenia, Nelson and Goldman, female, USNM 154632).

*Subspecies*: *flavigaster* Swainson, Interior Region plus Pacific Region east through Isthmus to Tapanatepec; *eburneiostris* (Des Murs), Pacific Region from Santa Efigenia eastward; *ascensor* Wetmore and Parkes (1962:57), Atlantic Region. I follow the taxonomic treatment by Wetmore and Parkes (1962). See Type Localities.

*Xiphorhynchus erythropygius* (Sclater). Spotted Woodcreeper.

Fairly common permanent resident in Pacific Region east of Isthmus and in Atlantic Region, occurring in cloud forest and upper reaches of tropical evergreen forest. *Elevations*: 1,900 to 5,200 ft.

*Breeding* (all data): 2 April 1964, enlarged testes (13 × 7 mm, 12 mi north-northeast of Zanatepec, 4,900 ft, Binford, LSUMZ 33164, 46.5 g, little fat); 23 April 1961, enlarged testes (13 × 7 mm, 15 road mi southwest of Valle Nacional, 4,100 ft, Binford, LSUMZ 24420, 49.0 g, little fat).

*Subspecies*: *erythropygius* (Sclater); see Type Localities.

*Lepidocolaptes leucogaster* (Swainson). White-striped Woodcreeper.

Very uncommon permanent resident in the Interior in pine-oak forests of Sierra Aloapaneca, Sierra de Yucuyacua, Sierra de Miahuatlán, and Sierra de Cuatro Venados, recorded east to Cerro San Felipe and Río Molino, the southeasternmost localities in entire range of species. *Elevations*: 6,400 to 10,800 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *leucogaster* (Swainson).

*Lepidocolaptes souleyetii* (Des Murs). Streak-headed Woodcreeper.

Fairly common permanent resident, occurring in Atlantic Region in semi-open as well as fairly dense tropical evergreen forest northwest at least to vicinity of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south

in Isthmus to La Gloria and a point 2 mi north and 2 mi east of Matías Romero, and (disjunctly) in Pacific Region in tropical semideciduous forest of Sierra de Yucuyacua. *Elevations*: Atlantic Region, 250 to 1,900 ft; Pacific Region, 3,000 to 3,600 ft.

*Breeding* (all data): enlarged testes on 13 June 1961 (9 × 5 mm, Donají, AMNH 776330), 19 June 1961 (12 × 5 mm, Montebello, AMNH 776331), and 13 July 1962 (9 × 6 mm, Montebello, AMNH 787528, some fat; all collected by Schaldach).

*Subspecies*: *guerrerensis* van Rossem, Pacific Region; *insignis* (Nelson), Atlantic Region.

*Lepidocolaptes affinis* (Lafresnaye). Spot-crowned Woodcreeper.

Common permanent resident in all Regions in humid pine-oak and cloud forests. *Elevations*: 4,000 to 9,700 ft.

*Breeding*: 2 April 1964, enlarged testes (14 × 8 mm, 12 airline mi north-northeast of Zanatepec, 4,900 ft, Binford, LSUMZ 33166, 31.9 g, little fat), to 30 April 1964, enlarged testes (12 × 6 mm, 3 mi north of Pluma Hidalgo, 5,000 ft, Binford, LSUMZ 33171, 30.8 g, little fat).

*Subspecies*: *affinis* (Lafresnaye).

#### Family FORMICARIIDAE

*Taraba major* (Vieillot). Great Antshrike.

Uncommon permanent resident of Atlantic Region in openings within tropical evergreen forest northwest at least to Trans-Isthmian Highway and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 200 to 300+ ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *melanocrissus* (Sclater).

*Thamnophilus doliatus* (Linnaeus). Barred Antshrike.

Permanent resident, common in Atlantic Region in openings within tropical evergreen forest and uncommon in Pacific Region in openings in tropical semideciduous and adjacent Pacific swamp forests of Sierra Madre de Chiapas. *Elevations*: 100 to 4,500 ft.

*Breeding* (all data): 7 May 1967, nest with two eggs (Colonia Rodolfo Figueroa, 4,500 ft, Rowley, WFVZ 21316).

*Subspecies*: *intermedius* Ridgway.

*Thamnistes anabatinus* Sclater and Salvin. Russet Antshrike.

Rare permanent resident in tropical evergreen forest on Atlantic side of Isthmus, where recorded as follows: female (GMSC, 22.5 g, not fat) taken by J. W. Graber at Rancho Boca del Río Sarabia on 22 December 1957; one male (WFVZ-HC 4936, testes not enlarged) and one female (LSUMZ 40746) collected on 10 February 1960 by Schaldach at a point 18 road mi north of Matías Romero near junction of Trans-Isthmian Highway and the Río Sarabia. These records are northwesternmost in entire range of species. *Elevations*: 200 to 250 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *anabatinus* Sclater and Salvin.

*Microrhophias quixensis* (Cornalia). Dot-winged Antwren.

Uncommon permanent resident in lowlands of Atlantic Region in tropical evergreen forest northwest at least to a point 5 mi west of Temascal and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 350+ ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *boucardi* (Sclater); see Type Localities.

*Cercomacra tyrannina* (Sclater). Dusky Antbird.

Uncommon permanent resident in Atlantic Region in openings within tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300+ ft.

*Breeding* (all data): range, habitat, and dates.

All specimens (MLZ) from San Miguel Soyaltepec and Escuilapa, which form the basis for most if not all previously published records, were taken by del Toro Avilés and, thus, are of questionable origin and date. I have examined nine reliable Oaxaca specimens (LSUMZ, WFVZ, UMMZ) from five localities: 1 mi southwest of Valle Nacional; and 18, 20, 24, and 28 road mi north of Matías Romero.

*Subspecies*: *crepera* Bangs.

*Formicarius analis* (d'Orbigny and Lafresnaye). Black-faced Antthrush.

Fairly common permanent resident of Atlantic Region in lower reaches of cloud forest west of Isthmus and throughout tropical evergreen forest northwest at least to a point 5 mi west of Temascal and south in Isthmus to La Ranchería, Río Sarabia, and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 5,250 ft.

*Breeding*: 23 April 1961, enlarged testes (15 × 8 mm, 15 road mi southwest of Valle Nacional, 4,100 ft, Binford, LSUMZ 24448, 63.6 g, little fat), to 19 June 1961, enlarged testes (10 × 6 mm, Montebello, Schaldach, AMNH 776348).

*Subspecies*: *moniliger* Sclater.

*Grallaria guatemalensis* Prévost and Des Murs. Scaled Antpitta.

Uncommon permanent resident in all Regions, primarily in cloud forest and to a lesser extent in humid pine-oak forest. Three records for tropical evergreen forest of Atlantic lowlands, where possibly only a nonbreeding visitant: 18 mi north of Matías Romero, 15 February 1960, Schaldach, female, LSUMZ 40758; 24 mi north of Matías Romero, 21 January 1961, Rook, female, WFVZ-HC 4935; 12 km [7.5 mi] east-northeast of Piedra Blanca, 3 June 1962, Schaldach, male, AMNH 768810, some fat, testes 6 × 4 mm. *Elevations*: about 250 ft (first record above); 4,800 to 9,700 ft.

*Breeding*: 26 April 1965, two enlarged follicles (18 and 12 mm, Barranca Sin Nombre, 4,800 ft, Galley, CAS, 117.1 g, no fat), to 2 June 1965, nest with two eggs (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, Rowley, WFVZ 21314).

*Subspecies*: *ochraceiventris* Nelson, Sierra de Miahuatlán and Sierra de Yucuyacua, eastward to include the Sierra Aloapaneca; *mexicana* Sclater (1859d:366), Atlantic Region east at least to the Trans-Isthmian Highway; *guatemalensis* Prévost and Des Murs, Pacific Region east of Isthmus, where, however, some spec-

imens (e.g., LSUMZ 33178–33179, 12 mi north-northeast of Zanatepec) show some intermediacy toward *mexicana*. I agree with R. W. Dickerman (in litt.) that *mexicana* warrants recognition.

#### Family TYRANNIDAE

*Ornithion semiflavum* (Sclater and Salvin). Yellow-bellied Tyrannulet.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to a point 28 road mi north of Matías Romero and perhaps (del Toro Avilés) Palomares. In vicinity of Valle Nacional it frequents patches of oaks within tropical evergreen forest. *Elevations*: 250 to 4,100 ft.

*Breeding* (all data): see below.

The only previously published records (Miller et al. 1957:102) are based on del Toro Avilés specimens (MLZ) supposedly from San Miguel Soyaltepec, Tutla, and Palomares and, thus, are questionable. My field parties obtained the only satisfactory records for the state. At a point 1 mi southwest of Valle Nacional, 300 ft, in 1961, Wolf took a male (LSUMZ 24594, 7.4 g, testes enlarged, right 6 × 4 mm, left 7 × 3) on 26 February and Binford secured a female (LSUMZ 24595, 7.9 g, slightly fat, ovary slightly enlarged) on 5 March. At 1,900 ft elevation 6 road mi southwest of the same town, I saw 1 bird on 22 April 1961, and the Berretts and I saw a pair on 21 and again on 22 November 1961. On 27 November 1961, we saw 1 at 4,100 ft elevation 15 road mi southwest of Valle Nacional. The fourth and only other Oaxaca locality for this species is at 250 ft elevation on the Trans-Isthmian Highway 28 road mi north of Matías Romero, where Wolf and I saw 2 on 23 May 1961, including a female (UMMZ 156494, 6.7 g, little fat, follicles minute) taken by Wolf, and Morony and I saw 1 on 4 June 1964.

*Subspecies*: monotypic, after Wetmore (1972:584–585).

*Camptostoma imberbe* Sclater. Northern Beardless-Tyrannulet.

Common permanent resident in Pacific Region in tropical deciduous forest and arid tropical scrub and in the Interior (Oaxaca Valley, Santiago Chazumba, and Tamazulapan del Progreso) in lower reaches of arid subtropical scrub, ranging north in Isthmus to Río Sarabia (one record, 27 April 1956, Lamb, female with large follicles, LSUMZ 46069). Should be sought in arid portions of Atlantic Region. *Elevations*: sea level to 6,100 ft.

*Breeding* (all data): 9 May 1966, nest with one egg (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 20707); 3 June 1959, nest with young (8.9 road mi east of Tapanatepec, Binford observation).

*Subspecies*: *imberbe* Sclater.

*Myiopagis viridicata* (Vieillot). Greenish Elaenia.

Fairly common permanent resident from 250 to 300 ft elevation in tropical evergreen forest of Atlantic Region, from sea level to 5,000 ft in tropical semi-deciduous and adjacent Pacific swamp forests of Pacific Region, and up to 6,000 ft along rivers through arid tropical scrub of Interior to San Pedro Juchatengo and a point near Tamazulapan del Progreso. Unrecorded in Pacific Region between the Puerto Angel Road and Santa Efigenia.

*Breeding* (all data): 23 April 1964, enlarged testes (9 × 6 mm, 3 mi north of

Pluma Hidalgo, 5,000 ft, Morony, LSUMZ 33247, 11.7 g, little fat); 16 July 1957, prejuvenile (2 mi west of Tamazulapan del Progreso, 6,000 ft, Lamb, male, LSUMZ 46055).

*Subspecies: jaliscensis* Nelson, Pacific Region west of Isthmus and Interior Region; *placens* (Sclater), Pacific Region east of Isthmus and Atlantic Region.

*Elaenia flavogaster* (Thunberg). Yellow-bellied Elaenia.

Fairly common summer resident of Atlantic Region in semi-open portions and margins of tropical evergreen forest northwest at least to San Juan Bautista Tuxtepec and south in Isthmus to a point 3 mi east of Matías Romero. Record for 26 January (1961, 24 road mi north of Matías Romero, K. Wolfe, male, WFVZ) suggests it is a rare permanent resident. *Dates*: 26 January; 21 February to 19 July; definite arrival date in 1961 at my collecting locality 1 mi southwest of Valle Nacional was 8 March. *Elevations*: 100 to 300+ ft.

*Breeding*: 15 May 1962, active nest completed but empty, plus its female with enlarged follicles (9 and 4 mm, Sarabia, Schaldach, skin AMNH 787546), to 19 July 1961, nest with two eggs (Sarabia, Rook and L. Petite, WFVZ 35272); 12 June 1961, prejuveniles seen (Sarabia, Schaldach notations on adult male study skin, AMNH 776400, testes greatly enlarged, singing).

*Subspecies: subpagana* Sclater and Salvin.

*Mionectes oleagineus* (Lichtenstein). Ochre-bellied Flycatcher.

Uncommon in Atlantic Region in tropical evergreen forest and lower reaches of cloud forest, occurring northwest at least to a point 6 road mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa; presumably a permanent resident but recorded only from 22 November to 22 April. Only one record for Pacific Region, where apparently only a casual winter visitant: male (WFVZ-HC 9498) taken by Rook on 30 November 1962 at Rancho Sol y Luna. *Elevations*: 250 to 4,850 ft.

*Breeding* (all data): 22 April 1961, moderately enlarged testes (6 × 3 mm, 6 mi southwest of Valle Nacional, 1,900 ft, Binford, LSUMZ 24599, 15.6 g, little fat).

*Subspecies: assimilis* Sclater.

*Leptopogon amaurocephalus* Tschudi. Sepia-capped Flycatcher.

Fairly common permanent resident of Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 200 to 300 ft.

*Breeding* (all data): 29 March 1962, enlarged testes (7 × 4 mm, Montebello, Schaldach, AMNH 778348); 14 May 1957, two prejuveniles (Río Sarabia, 200 ft, Lamb, female LSUMZ 46082, male WFVZ-HC 15736); 4 June 1962, enlarged testes (10 × 5 mm, 12 km [7.5 mi] east-northeast of Piedra Blanca, Schaldach, AMNH 768812).

*Subspecies: pileatus* Cabanis.

*Oncostoma cinereigulare* (Sclater). Northern Bentbill.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 5 mi west of Temascal and in Pacific Region

in tropical semideciduous and Pacific swamp forests of Sierra Madre de Chiapas and adjacent coastal plain west to Santa Efigenia and Punta Paloma. *Elevations*: sea level to 4,700 ft.

*Breeding*: 5 April 1961, enlarged testes (6 × 4 mm, 1 mi southwest of Valle Nacional, 300 ft, Wolf, LSUMZ 24584, 6.8 g, little fat), to 15 June 1961, enlarged testes (5 × 4 mm, Sarabia, Schaldach, AMNH 776396); 15 May 1962, enlarged testes (8 × 5 mm, Sarabia, Schaldach, AMNH 787543, little fat).

*Todirostrum sylvia* (Desmarest). Slate-headed Tody-Flycatcher.

Uncommon permanent resident in Atlantic Region in brushy clearings within tropical evergreen forest northwest at least to San Juan Bautista Tuxtepec and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Tehuantepec region to Guichicovi and La Ranchería (erroneously published by Ridgway [1907:369] as "Santo Domingo"). *Elevations*: 100 to 1,500 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *schistaceiceps* Sclater; see Type Localities.

*Todirostrum cinereum* (Linnaeus). Common Tody-Flycatcher.

Rare permanent resident in Atlantic Region in brushy openings within general range of tropical evergreen forest, recorded with certainty only at two points near Loma Bonita: at 100 ft elevation 7 mi west (6 June 1964, one of two taken by Morony, female, LSUMZ 33246, 7.9 g, egg without shell in oviduct) and at 500 ft elevation 4 mi south (15 April 1955, Lamb, female, MLZ 59316). Specimens from Río Tonto (in 1943, female, Pardiñas 1946:220) and San Miguel Soyaltepec (4, 14, and 25 November 1943 and 17 January 1944, MLZ) collected by del Toro Avilés, and, thus, data questionable. Should be sought in suitable habitat elsewhere in lower portions of Atlantic Region.

*Breeding* (all data): see above.

*Subspecies*: *virididorsale* Parkes (1976:4).

*Rhynchocyclus brevirostris* (Cabanis). Eye-ringed Flatbill.

Fairly common permanent resident along the length of Atlantic Region and in Pacific Region west to Minitán and a point 1 mi east of Putla de Guerrero; breeds in cloud and tropical semideciduous forests from 4,100 to 5,250 ft elevation in Atlantic Region, 1,900 to 6,000 ft in Pacific Region, and 4,300 to 5,500 ft in Sierra Madre de Chiapas, and winters (December–March) in at least lower portions of breeding range and down to sea level in Pacific swamp forest and to 250 ft in tropical evergreen forest of Atlantic Region. Unrecorded farther northwest in Mexico.

*Breeding*: 5 May 1967, nest with two eggs (Colonia Rodolfo Figueroa, 4,500 ft, Rowley, WFVZ 21171), to 9 June 1965, active nest completed but empty (near La Cima, 6,000 ft, Rowley [1966:169]); 15 May 1963, nest with three newly-hatched young (Cycad Camp, 1,900 ft, Rowley [1966:169]).

*Subspecies*: *pallidus* Binford (1965:5), endemic to Pacific Region west of Isthmus (see Type Localities); *brevirostris* (Cabanis), Pacific Region east of Isthmus and Atlantic Region.

*Tolmomyias sulphurescens* (Spix). Yellow-olive Flycatcher.

Common permanent resident of Atlantic Region in dense and semi-open portions of tropical evergreen forest northwest at least to a point 1 mi southwest of

Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec, and of Pacific Region in tropical semideciduous and Pacific swamp forests of Sierra Madre de Chiapas and Isthmus mountains west to Mezahuite. *Elevations*: 150 to 4,900 ft.

*Breeding*: 20 April 1961, adults carrying nest material (1 mi southwest of Valle Nacional, 300 ft, Binford), to 30 June 1961, prejuvenile (Rancho Sol y Luna, Schaldach, female, AMNH 776388).

*Subspecies*: *cinereiceps* (Sclater); see Type Localities.

*Platyrinchus cancrominus* Sclater and Salvin. Stub-tailed Spadebill.

Fairly common permanent resident in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas and in Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec. *Elevations*: 200 to 4,900 ft.

*Breeding* (all data): 9 May 1963, nest with two eggs (La Cumbre near Rancho Sol y Luna, about 4,500 ft, Rook, WFVZ 64763 [Rowley 1966:163-165]).

*Subspecies*: *cancrominus* Sclater and Salvin.

*Onychorhynchus coronatus* (Müller). Royal Flycatcher.

Uncommon permanent resident of Atlantic Region in tropical evergreen forest northwest at least to Río Sarabia and perhaps (del Toro Avilés) Tutla and San Miguel Soyaltepec and of Pacific Region east of Isthmus in Pacific swamp forest (Punta Paloma, Rancho de Cacoprieto, Santa Efigenia, Rancho Sol y Luna, and Tapanatepec). *Elevations*: sea level to 800 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *mexicanus* (Sclater).

*Myiobius sulphureipygius* (Sclater). Sulphur-rumped Flycatcher.

Fairly common permanent resident in Atlantic Region in undergrowth of heavy tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *sulphureipygius* (Sclater).

*Xenotriccus mexicanus* (Zimmer). Pileated Flycatcher.

Very uncommon permanent resident of Interior in mesquite within arid subtropical scrub southeast to Rancho Las Animas, the southeasternmost point in entire range of species. Records for "Tequisistlán" (Moore 1953:210) pertain to Rancho Las Animas. *Elevations*: 3,000 to 6,000 ft.

*Breeding*: 3 May 1966, nest with three eggs, to 16 July 1963, nest with three young (2 mi south of San Bartolo Coyotepec, 5,000 ft, Rowley, WFVZ 20708, and Rowley [1984:162], respectively); 4 July 1943, prejuvenile (Tamazulapan del Progreso, 6,000 ft, Lamb, male, MLZ 37716).

*Mitrephanes phaeocercus* (Sclater). Tufted Flycatcher.

Fairly common permanent resident west of Isthmus, breeding in all Regions in humid and semiarid (and arid?) pine-oak forests from 4,350 to 8,900 ft and wintering there and in Atlantic Region in tropical evergreen forest down to 300 ft and in Pacific Region in tropical semideciduous forest down to 3,000 ft. To be expected as a breeding bird in the Sierra Madre de Chiapas.

*Breeding*: 21 February 1974, nest under construction (2 mi west of San Juan Lachao Pueblo Viejo, 6,500 ft, Binford observation), to 4 May 1965, egg without shell in oviduct (14 × 10 mm, kilometer marker 183 on Puerto Escondido Road, 5,600 ft, Rook, WFVZ 27670, 11.3 g, no fat); several active nests completed, contents uncertain but probably young, first week of May 1962 (Río Molino, Rowley [1966:169]).

*Subspecies* (according to Webster 1968): *burleighi* Phillips (1966:110), Sierras de Miahuatlán and Yucuyacua (see Type Localities); *phaeocercus* (Sclater), remainder of known Oaxaca range in Sierra Aloapaneca and Sierras de Juárez, Zempoaltepec, and probably Cuatro Venados.

*Contopus borealis* (Swainson). Olive-sided Flycatcher.

Uncommon transient migrant in all Regions, occurring in all major terrestrial habitats. Probable status as winter resident suggested by male specimens undergoing complete molt taken in Atlantic Region in tropical evergreen forest at 300 ft elevation 1 mi southwest of Valle Nacional on 27 February 1961 (Wolf, LSUMZ 24521, 34.1 g, slight fat) and 7 March 1961 (Binford, LSUMZ 24522, 38.1 g, very fat, skull ossified) and by sightings of single birds at points 6 (1,900 ft) and 11 (2,600 ft) road mi southwest of Valle Nacional on 21 and 22 November 1961, respectively (the Berretts and Binford). *Dates*: migration periods (excluding dates of possible winter residents mentioned above), 8 April to 19 May, 16 August (1961, Montebello, Rook, female, LSUMZ 45831), 25 September to 12 October, 9 November (1964, 1 mi south of Puerto Escondido, 100 ft, W. Durrant, male, WFVZ 27572, 33.6 g, fat); I found no basis for date of 30 May given by Miller et al. (1957:82). *Elevations*: 100 to 9,700 ft.

*Contopus pertinax* Cabanis and Heine. Greater Pewee.

Fairly common permanent resident from 4,500 to 8,500 ft in humid pine-oak forests of Sierra de Miahuatlán and Sierra de Yucuyacua and in arid pine-oak forest throughout most of Interior; unrecorded in Sierra de Zempoaltepec. Numbers augmented by winter residents from north. Winter resident at lower elevations west of Isthmus, fairly common down to 1,800 ft in Pacific Region and rare down to 1,900 ft in Atlantic Region (1 seen by the Berretts and Binford 6 road mi southwest of Valle Nacional on 21 and 22 November 1961). Only three records east of Isthmus, where probably a permanent resident: specimen taken on 11 January at Tapanatepec (Miller et al. 1957:85; supposed to be in MLZ, but I cannot find it); female (WFVZ-HC 19666) taken by Galley on 25 May 1968 at Colonia Rodolfo Figueroa; male (WFVZ-HC 16754) secured by Galley on 4 April 1966 at El Salto, 7 km (4.3 mi) north of Cerro Baúl, 3,500 ft.

*Breeding*: 2 May 1962, nest with two eggs (Río Molino, 7,300 ft, Rowley [1966:165]), to 22 June 1965, nest with two small young (near kilometer marker 116 on Putla de Guerrero Road, 5,800 ft, Rowley [1966:165]).

*Subspecies*: *pallidiventris* Chapman, according to Miller et al. (1957:85), winter resident; *pertinax* Cabanis and Heine, permanent resident.

*Contopus sordidulus* Sclater. Western Wood-Pewee.

Common transient migrant in all Regions and in virtually all major terrestrial habitats. Uncommon summer resident in arid pine-oak forest from Interior east through Isthmus mountains onto Pacific side of Sierra Madre de Chiapas. Blake

(1953:351) states that *C. s. peninsulae* winters in Oaxaca, but I can find no winter record for the species, the one record usually allocated to *peninsulae* being taken on 18 April (1869, Tapanatepec, Sumichrast, male, USNM 58854). *Dates*: extremes, 18 April to 26 October; major migration periods, April–May and October; date of 1 April 1942, based on a del Toro Avilés specimen (Totontepec, female, MLZ 36153), is questionable. *Elevations*: 100 to 9,700 ft. See *C. virens*.

*Breeding* (all data): 9 May 1961, nest under construction (4 mi east of Santiago Matatlán, 6,100 ft, Binford observation).

*Subspecies*: *sordidulus* Sclater, summer resident; *peninsulae* Brewster, transient migrant (see above). I am unable to see the characters supposedly distinguishing *griscomi* Webster (1957:337) of Guerrero and perhaps adjacent Oaxaca and consider it a synonym of *C. s. sordidulus*. I cannot find the specimen dated 2 May that formed the basis for the occurrence in Oaxaca of “*richardsonii* (Swainson)” (= *veliei* Coues) as stated by Miller et al. (1957:83). Oaxaca specimens need to be scrutinized for examples of other transient migrant subspecies.

*Contopus virens* (Linnaeus). Eastern Wood-Pewee.

Transient migrant; exact status uncertain because of confusion with *C. sordidulus*; probably, rare in entire Atlantic Region and in Pacific Region from Isthmus eastward. Only two specimens examined: males collected by Sumichrast, one (USNM 58856) on 7 May 1869 at Tapanatepec (elevation of town and exact point of collection unknown) and another (USNM 59632) on 5 October 1869 at Tehuantepec City (city at 115 ft but elevation at exact point of collection unknown), the latter record erroneously published by Lawrence (1876:27) under *C. sordidulus*. Lawrence (1876:27) lists April as the date of a Sumichrast specimen taken at Tapanatepec, but I can find only *C. sordidulus* with these data. Locality “Tehuantepec” given by Ridgway (1907:519) probably pertains to Tehuantepec region. A very worn male (AMNH 82073) taken by Sumichrast at Tehuantepec City on 7 October 1869 has been called both *sordidulus* and *virens* but cannot in my opinion be safely identified as either.

*Contopus cinereus* (Spix). Tropical Pewee.

Very uncommon breeding bird of Atlantic Region in semi-open portions of tropical evergreen forest northwest to a point 1 mi southwest of Valle Nacional and south in Isthmus to a point 4 mi north and 2 mi east of Matías Romero; presumably a permanent resident but recorded only from 18 February to 21 June. Record for “Santo Domingo” (Ridgway 1907:527) pertains to La Ranchería. *Elevations*: 100 to 1,500 ft.

*Breeding* (all data): 24 May 1962, enlarged follicle (4 mm, 16 km [9.9 mi] east-northeast of Piedra Blanca, Schaldach, AMNH 787540); 15 June 1962, enlarged testes (8 × 5 mm, 4 mi north and 2 mi east of Matías Romero, Schaldach, AMNH 787542).

*Subspecies*: *brachytarsus* (Sclater).

*Empidonax flaviventris* (Baird and Baird). Yellow-bellied Flycatcher.

Very common transient migrant and common winter resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous and Pacific swamp forests west at least to a point 5.1 mi southwest of San Gabriel Mixtepec. One record for Interior, a male (LSUMZ 24567, 11.9 g, slightly fat,

testes small) taken by Wolf in oak scrub at 6,100 ft elevation 4 road mi east of Santiago Matatlán on 9 May 1961. *Dates*: 29 September to 15 May. *Elevations*: 250 to 2,600 ft; 6,100 ft.

*Empidonax virescens* (Vieillot). Acadian Flycatcher.

Transient migrant; exact status uncertain, but apparently casual. One valid record, a male (WFVZ-HC 11583) taken by Rook on 16 May 1963 in the Sierra Madre de Chiapas at La Cumbre near Rancho Sol y Luna. Miller et al. (1957:86) record as *E. virescens* a female (MLZ 36138) taken by del Toro Avilés on 11 December 1941 in the Atlantic Region at Moctum, but A. R. Phillips, N. K. Johnson, and I have examined this specimen and concur that it is *E. hammondii*. Another female (MLZ 54550), taken by Lamb on 26 September 1952 at Rancho Las Animas, about 3,000 ft, was marked *E. virescens* on the label but was found by Phillips and me to be *E. minimus*.

*Empidonax traillii* (Audubon). Willow Flycatcher.

Transient migrant, fairly common in Pacific Region in arid tropical scrub and openings within tropical deciduous forest, often in vicinity of water, and very uncommon in Atlantic Region in openings within tropical evergreen forest. Possibly a rare winter resident in Pacific Region: the only two records, one specimen (sex?, LSUMZ 33216, 11.6 g, little fat) secured by Binford at Minitán on 26 February 1964 and another (male, LSUMZ 33218, 13.4 g, little fat, testes small) taken by Binford 6 road mi northwest of Puerto Escondido on 10 March 1964, are probably too early for migrants; a male (UMMZ 138221) taken by Shufeldt at Tehuantepec City on 7 October 1913 probably represents a late migrant. One summer record, a male (LSUMZ 45866, testes small) secured by Lamb on 8 July 1957 in Pacific Region at 3,000 ft at Rancho Las Animas. *Dates*: migration periods (excluding dates of possible winter residents mentioned above), 28 April to 4 June, 14 August to 9 September. *Elevations*: sea level to 3,000 ft.

*Subspecies*: unknown; until a thorough revision of this confusing complex is forthcoming, I cannot treat subspecies. Identification even to species is a major problem. Stein (1963) presents a formula to aid in distinguishing *E. traillii* from *E. alnorum* Brewster (sensu A.O.U. 1983) by morphology. Although I am not at all sure that this formula works, I have applied it to 11 of the 18 specimens known from Oaxaca and find that all 11 fit the "fitz-bew" type, *E. traillii*. In the above account, I have treated all Oaxaca records of the complex under this name; however, a few records (especially LSUMZ 45866 above) might prove to be *E. alnorum*, which would be expected.

*Empidonax albigularis* Sclater and Salvin. White-throated Flycatcher.

Very uncommon permanent resident, breeding in the Interior in arid subtropical scrub (Oaxaca Valley and Tamazulapan del Progreso) and wintering at lower elevations in Atlantic Region (at a point 1 mi southwest of Valle Nacional, 300 ft, 19 February 1961, LSUMZ 24569), in Isthmus of Tehuantepec ("Tehuantepec" [= Tehuantepec City?], 7 October; Moore 1940:380), and perhaps in Atlantic Region at Totontepec (8, 12, and 24 April and 3 May 1942, del Toro Avilés, four specimens, MLZ; data questionable). *Elevations*: breeding, 5,250 to 6,000 ft; winter, 300 ft.

*Breeding* (all data): 7 May 1961, enlarged testes (7 × 4 mm, 2 mi east of Oaxaca City, Wolf, LSUMZ 24568, 10.3 g, little fat).

*Subspecies*: *timidus* Nelson, according to Miller et al. (1957:93), winter resident (7 October; see above); *albigularis* Sclater and Salvin, permanent resident. I follow Wetmore (1972:473) in treating *axillaris* Ridgway as a synonym of *E. a. albigularis*.

*Empidonax minimus* (Baird and Baird). Least Flycatcher.

Winter resident, common in Atlantic and Pacific Regions and uncommon in the Interior, occurring in cloud forest, tropical evergreen forest, tropical semi-deciduous forest, tropical deciduous forest, Pacific swamp forest, arid tropical scrub, and arid subtropical scrub. Should be sought in pine-oak forests, at least on migration. *Dates*: 5 August to 21 May. *Elevations*: sea level to 6,000 ft. See *E. virescens*.

*Empidonax hammondii* (Xántus de Vesey). Hammond's Flycatcher.

Uncommon winter resident in pine-oak forests in all Regions west of Isthmus, usually at high elevations, and in Pacific Region east of Isthmus in Sierra Madre de Chiapas. Only one low elevation record, a female (MCZ 238295) taken by W. W. Brown on 15 February 1927 in Isthmus at Chivela (town at 689 ft but elevation at exact point of collection unknown). *Dates*: 29 September to 4 May; date of 12 September 1941, based on a del Toro Avilés specimen (Moctum, immature female, MLZ 36162), is questionable. *Elevations*: about 700 ft; 3,000 to 9,300 ft. See *E. virescens* and *E. oberholseri*.

*Empidonax oberholseri* Phillips. Dusky Flycatcher.

Very uncommon winter resident (6 October to 12 May) in the Interior in pine-oak forests, arid subtropical scrub, and perhaps arid tropical scrub (San Juan Bautista Cuicatlán; habitat at exact point of collection unknown). One record east of Isthmus, a female (MCZ 328966) taken by W. W. Brown at Tapanatepec on 7 November 1927. Published record for Chivela (Bangs and Peters 1928:395) probably based on the specimen of *E. hammondii* (MCZ 238295) originally misidentified as *oberholseri* (see *E. hammondii*). Additional published records, all of questionable identity, are from La Parada and "Villa de Etlá" [= San Pedro y San Pablo Etlá]. Additional specimens examined from Santos Reyes Pápalo (19 October 1894, Nelson and Goldman, female, USNM 154522), San Juan Bautista Cuicatlán (6 October 1894, Nelson and Goldman, female, USNM 154542), La Cumbre near Cerro San Felipe (9,000 ft, 3 April 1948, C. G. Sibley, male, MVZ 115442), Huajuapán de León (5,510 ft, 23 January 1949, Lamb, male, MLZ 49234), a point 3 mi south of San Bartolo Coyotepec (21 December 1964, Rowley, male, CAS, 11.0 g; and 2 December 1964, W. Durrant, sex?, WFBVZ 27643, 11.1 g, fat; both 5,200 ft), and at kilometer marker 117 on Putla de Guerrero Road (6,200 ft, 26 October 1964, Rowley, female, WFBVZ 27655, 12.9 g). A. R. Phillips (in litt.; D. M. Niles in litt.) took a female (DEL 25492, 12.0 g, moderate to rather fat) 10 road km (6.2 mi) southeast of Santiago Matatlán on 12 May 1971.

*Empidonax wrightii* Baird. Gray Flycatcher.

Winter resident in arid subtropical scrub of northwestern Oaxaca; probably uncommon. Only one record, the southeasternmost in entire range of species, a

male (LSUMZ 27503, 12.1 g, moderately fat, skull ossified, testes very small) taken by D. G. Berrett on 22 September 1961 in the Interior in arid subtropical scrub at 6,100 ft elevation 34 road mi north-northeast of Huajuapán de León (about 3 mi northeast of Santiago Chazumba).

*Empidonax affinis* (Swainson). Pine Flycatcher.

Rare bird in the Interior in humid pine-oak forests of Sierra de Juárez (Llano de las Flores), Sierra Aloapaneca (Cerro San Felipe, Cinco Señores, and La Parada), and Sierra de Miahuatlán (Río Molino), apparently breeding in at least the first two localities, which are southeasternmost in known breeding range of species. Probably a permanent resident, but recorded only from 5 May to 1 July, and apparently in October (La Parada; van Rossem 1934b:393); known to be at least partially migratory elsewhere in Mexico. To be expected in the same habitat elsewhere in state. *Elevations*: 7,300 to 9,700 ft. See *E. difficilis*.

*Breeding* (all data): 5 May 1964, enlarged testes (8 × 5 mm, Cerro San Felipe, 9,700 ft, Morony, LSUMZ 33221, 12.3 g); 30 June 1962, enlarged testes (7 × 3 mm, Llano de las Flores, "3,150 meters" [but see Gazetteer], E. E. Klaas, UK 40680).

*Subspecies*: *bairdi* Sclater, according to the taxonomic treatment by Traylor (1979a:142).

*Empidonax difficilis* Baird. Western Flycatcher.

Permanent resident in humid pine-oak forest, common in Pacific Region west of Isthmus from 4,350 to 7,400 ft in Sierra de Miahuatlán (east at least to Río Molino; six egg sets, WFVZ), and rare in the Interior in Sierra Aloapaneca (La Cumbre, 9,000 ft, 4 April 1948, H. E. Childs, Jr., male, MVZ 115438, 12.7 g, enlarged testes 8 mm; 1.2 mi northeast of La Cumbre, 15 May 1962, Rowley, male, ARPC 6154, very little fat, enlarged testes; see breeding record below); these are southeasternmost breeding localities in entire range of species. Recorded in Sierra de Yucuyacua only in winter, but to be expected as a breeding bird. Winter resident west of Isthmus; common in Pacific Region in nearly all forest habitats from sea level to at least 6,600 ft; and rare in Atlantic Region in at least cloud forest, where male (Binford, LSUMZ 27501, 11.6 g, moderately fat, testes small) and female (D. G. Berrett, LSUMZ 27502) collected on 26 November 1961 at 4,850 ft elevation 17 road mi southwest of Valle Nacional, and one male (BMNH; fide A. R. Phillips) taken in February at Totontepec. Record of a male (FMNH 119701) taken by del Toro Avilés supposedly at Tutla on 6 March 1941 is questionable. Rare in arid portions of Interior (Rancho Las Animas, 3,000 ft, 15 February 1947, Lamb, male, MLZ 45259; and 8 mi northeast of Oaxaca City, 6,000 ft, 11 September 1964, Rowley, male, 13.3 g, WFVZ 27623), where probably only a transient migrant. Unrecorded east of Isthmus. These records from Totontepec and Rancho Las Animas, together with one from Puerto de Huatulco (8 March 1938, G. Willett, sex?, LAMNH 19112), are southeasternmost in entire range of species; records from east of Oaxaca pertain to *E. flavescens* (A.O.U. 1983:455; N. K. Johnson, pers. comm.). Apparently sympatric with *E. affinis* on Cerro San Felipe.

*Breeding*: 29 April 1965, nest with three eggs (kilometer marker 178 on Puerto Escondido Road, 6,300 ft, Rowley, WFVZ 24580), to 19 July 1961, nest under construction (Rowley 1984:161) and hard-shelled egg in oviduct (label notation

on female AMNH 778513, both 10 mi northeast of Cerro San Felipe, 9,000 ft, Rowley); 10 June 1965, prejuvenile (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, Rowley, female, WFWZ 27630, 12.2 g).

*Subspecies* (according to treatment by Traylor 1979a:142–143): *occidentalis* Nelson, permanent resident in Pacific Region west of Isthmus and probably in the Interior; *difficilis* Baird, winter resident west of Isthmus. The races *annectens* Phillips (1966:109) from Oaxaca and *infelix* Phillips (1966:109) from Jalisco, to which Phillips refers two Oaxaca wintering specimens, are considered synonyms of *occidentalis*; the form *perplexus* Nelson is a synonym of *E. d. difficilis*. See Type Localities.

*Empidonax flavescens* Lawrence. Yellowish Flycatcher.

Fairly common permanent resident from 4,900 to 7,000 ft in cloud forest of Sierra Madre de Chiapas.

*Breeding* (all data): 29 March 1964, nest with three eggs (Sierra Reten, 7,000 ft, Rook, WFWZ 35278); enlarged testes on 26 March (left  $7 \times 4$  mm, right  $6 \times 2.5$ , Morony, LSUMZ 33232, 13.4 g), 1 April ( $7 \times 4$  mm, Binford, LSUMZ 33229, 12.4 g), 2 April ( $7 \times 3$  mm, Binford, LSUMZ 33228, 14.0 g), and 6 April ( $7 \times 4$  mm, Morony, LSUMZ 33230, 14.5 g; all four specimens in 1964, from 12 mi north-northeast of Zanatepec, 4,900 ft, and with little fat).

I examined 21 study skins (LSUMZ, WFWZ) and one set of eggs (WFWZ) from the following Oaxaca localities: Sierra Reten, 7,000 ft; Rancho Cerro Baúl; at and 6 km (3.7 mi) north (5,200 ft) of Colonia Rodolfo Figueroa; Sierra San Martínez, above El Salto, Cerro Baúl; 12 mi north-northeast of Zanatepec, 4,900 ft. The only previously published Oaxaca record is by Traylor (1979a:144), who lists Oaxaca in the range of this species on the basis of the above specimens but gives no details.

*Subspecies: salvini* Ridgway. Pending a thorough study, I agree with Zimmer (1953:3–7) and Traylor (1979a:143) in treating *E. flavescens* as specifically distinct from *E. difficilis* and in considering *salvini* a race of the former; Phillips (1960:362) advocates merging *E. flavescens* into *E. difficilis*.

*Empidonax fulvifrons* (Giraud). Buff-breasted Flycatcher.

Rare breeding bird and probably a rare permanent resident in pine-oak forests of Sierra de Miahuatlán, where recorded only at Río Molino as follows: one female (ARPC, holotype of *brodkorbi*) taken by Schaldach on 9 November 1964 (Phillips 1966:108); a nest containing one infertile egg and one slightly incubated egg (WFWZ 21182) found (Rowley 1966:168) and a very worn adult female secured (Rook, CAS, 7.7 g, no fat) on 22 May 1965 in second-growth oak association at 7,400 ft. Probably a rare and local permanent resident, but possibly only a rare winter resident, in pine-oak forest elsewhere in Oaxaca, recorded definitely only in Sierra Aloapaneca at San Felipe del Agua, where Lamb took a male (MLZ 47769) on 19 February 1948 at 5,700 ft. A specimen taken by Boucard in “Oaxaca” (Sclater 1859c:442) pertains to the state, not necessarily the city. Data on two specimens (24 December 1942, female, MLZ 35144; 3 January 1943, male, MLZ 35141) taken by del Toro Avilés supposedly at San Pablo Villa de Mitla are questionable.

*Breeding* (all data): see above.

*Subspecies: brodkorbi* Phillips (1966:108); endemic; see Type Localities. This

race, the breeding bird of the Sierra de Miahuatlán, is based on only one fresh specimen (plus the worn skin noted above) and requires confirmation.

*Sayornis nigricans* (Swainson). Black Phoebe.

Uncommon permanent resident along margins of freshwater habitats in all Regions of state, breeding within general ranges of tropical evergreen, tropical semideciduous, and cloud forests and occurring, perhaps as a breeder, near water within general ranges of tropical deciduous forest, arid subtropical scrub, and lower portions of pine-oak forest. *Elevations*: 250 to 6,300 ft.

*Breeding*: 2 April 1961, nest with young (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 9 May 1962, two nests with three eggs each (Río Jalatengo, 4,500 ft, Rowley [1966:162], WFVZ 25644).

*Subspecies*: *nigricans* (Swainson), according to Miller et al. (1957:67).

*Sayornis phoebe* (Latham). Eastern Phoebe.

Rare winter resident, probably in all Regions of state; exact habitat and elevations unknown but species to be expected virtually anywhere except in heavy forest. Only reliable Oaxaca records: one specimen (sex?, USNM 76981) taken by Sumichrast in March 1877 and one female secured by W. W. Brown on 7 November 1927 (Bangs and Peters 1928:394) both at Tapanatepec. Record of female (MLZ 35125) taken by del Toro Avilés purportedly on 9 January 1943 at San Pablo Villa de Mitla is questionable. The locality "Cuicatlán" [= San Juan Bautista Cuicatlán], published without details by the A.O.U. (1957:340), probably refers to a specimen supposedly taken by Nelson and Goldman, according to their original field notes; I cannot locate this specimen. December sight record for Atlantic side of Isthmus (Graber and Graber 1959:73) doubtful because of other errors of identification in their report.

*Sayornis saya* (Bonaparte). Say's Phoebe.

Status uncertain; known to be a rare summer resident in arid subtropical scrub of northwestern portion of Interior; elsewhere recorded with certainty only in fall in arid tropical and arid subtropical scrubs. The only lowland record, 1 bird seen by the Berretts and Binford in arid tropical scrub at 50 ft elevation 8 road mi southwest of Juchitán on 18 October 1961, is also southeasternmost in entire range of species. On 15 October 1961, the Berretts and I saw 1 bird at 5,100 ft elevation 1 mi east of Santa María del Tule, and D. G. Berrett took a male (LSUMZ 27475, 25.7 g, moderately fat, testes small) at 5,000 ft elevation 1 mi west of the same town. Only other reliable record for Oaxaca (Davis 1957:365; in litt.) is of a pair feeding nestlings on 29 June 1952 about 87 mi (via Pan-American Highway) northwest of Oaxaca City (by my calculations, probably located at about 7,500 ft elevation northeast of San Pedro y San Pablo Teposcolula near junction of Putla de Guerrero Road); this is southeasternmost breeding locality in entire range of species. Records from San Pablo Villa de Mitla (MLZ), obtained by del Toro Avilés, are questionable.

*Breeding* (all data): see above.

*Subspecies*: *pallida* (Swainson).

*Pyrocephalus rubinus* (Boddaert). Vermilion Flycatcher.

Common permanent resident throughout state in savanna, arid subtropical scrub, arid tropical scrub, brushy clearings, cultivated land, and grazed land. *Elevations*: sea level to 7,000 ft.

*Breeding*: 26 April 1966, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 21166), to 30 May 1912, nest with two eggs (San Pedro y San Pablo Etna, J. C. F. van Balen, USNM egg collection 35099).

*Subspecies*: *mexicanus* Sclater, Pacific and Interior Region. Birds from the Atlantic Region are intergrades between *mexicanus* and *blatteus* Bangs.

*Attila spadiceus* (Gmelin). Bright-rumped Attila.

Mostly a permanent resident; common in Atlantic Region in tropical evergreen forest east of Trans-Isthmian Highway and in Pacific Region in Pacific swamp forest, tropical semideciduous forest, and tall-tree tropical deciduous forest and very uncommon and local in tropical evergreen forest west of Isthmus (5 mi west of Temascal, one seen by Binford on 8 June 1964) and perhaps at San Miguel Soyaltepec (del Toro Avilés); rare in the Interior, where perhaps not breeding, recorded at a point 4 mi north of San Andrés Chicahuaxtla (8,000 ft, 7 July 1965, Rowley, male, CAS, 45.0 g) and at least formerly in the Río Atoyac basin at San Miguel Sola de Vega and San Pedro Juchatengo (Trujillo; records published by Salvin and Godman 1888–1904 [1891]:135). Local movements indicated by one Interior record from Rancho Las Animas (3,000 ft, 15 February 1947, Lamb, female, MLZ 45429). Apparently absent from Plains of Tehuantepec. *Elevations*: sea level to 5,600 ft; 8,000 ft.

*Breeding*: 21 March 1962, enlarged testes (12 × 6 mm, Montebello, Schaldach, AMNH 778317), to 13 June 1961, enlarged testes (11 × 6 mm, Donají, Schaldach, AMNH 776353); 5 May 1961, enlarged testes (14 × 6 mm, 19 road mi north of Puerto Angel, 900 ft, Binford, LSUMZ 24449, 45.7 g, slightly fat).

*Subspecies*: *pacificus* Hellmayr, Pacific Region west of Isthmus (east to Rancho Las Animas) and Interior Region; *flammulatus* Lafresnaye, Pacific Region east of Isthmus (Sierra Madre de Chiapas) and Atlantic Region.

*Laniocera rufescens* (Sclater). Speckled Mourner.

Based on its non-migratory status elsewhere (A.O.U. 1983:460), here considered a rare and local permanent resident in Atlantic Region in tropical evergreen forest. Only one record, a male (ARPC, “testes completely enlarged”) taken by Abraham Ramírez V. on 21 June 1962 in Atlantic Region at El Jobal (town at about 300 ft but elevation at exact point of collection unknown). This specimen represents the only record for Mexico outside Chiapas. Species listed for Oaxaca by Edwards (1972:141) but without supporting data.

*Breeding* (all data): range, habitat, and dates; see also above.

*Subspecies*: *rufescens* (Sclater).

*Rhytipterna holerythra* (Sclater and Salvin). Rufous Mourner.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest to a point 6 road mi southwest of Valle Nacional and south in Isthmus to Río Sarabia. One record for Pacific Region, where apparently only a casual winter visitant: male (LSUMZ 61647) taken by Lamb on 31 January 1959

at 800 ft at Santa Efigenia. *Elevations*: 250 to 1,900 ft (probably not to the 1,478 m [4,848 ft] indicated by Blake [1949:2] and subsequent authors for Tutla, even if that locality is correct [del Toro Avilés]).

*Breeding* (all data): range, habitat, and dates; Graber and Graber (1959:72) at 1 mi south of Loseta believe they saw a pair copulate on 22 December 1957, but the unusual date and their collection on 18 December of a male (GMSC) "not in breeding condition," suggest otherwise.

*Subspecies*: *holerythra* (Sclater and Salvin).

*Myiarchus tuberculifer* (D'Orbigny and Lafresnaye). Dusky-capped Flycatcher.

Permanent resident in all Regions of state, very common in tropical evergreen forest, common in tropical semideciduous forest and Pacific swamp forest, fairly common in cloud forest, humid pine-oak forest, semiarid pine-oak forest, and tropical deciduous forest, and uncommon in riparian situations within arid pine-oak forest, arid tropical scrub, and arid subtropical scrub. Numbers augmented by winter residents from north. *Elevations*: sea level to 9,700 ft.

*Breeding*: 27 March 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 8 June 1965, nest with four eggs (near La Cima, Rowley [1966:162]); 16 May 1944, prejuvenile (Teotitlán del Camino, 1,000 m [3,280 ft], H. O. Wagner, male, MLZ 31800).

*Subspecies*: *olivascens* Ridgway, winter resident (Santa Efigenia only); *querulus* Nelson, permanent resident, Pacific Region west of Isthmus and Interior; *lawrenceii* (Giraud), permanent resident, Pacific Region east of Isthmus and Atlantic Region. See Type Localities.

*Myiarchus cinerascens* (Lawrence). Ash-throated Flycatcher.

Uncommon winter resident in Pacific and Interior Regions in arid subtropical scrub, arid tropical scrub, and tropical deciduous forest. Possibly a rare permanent resident. *Dates*: 26 October to 12 May. *Elevations*: sea level to 5,700 ft. Account based solely on 29 specimens examined, literature references being hopelessly confused with *M. nuttingi*.

*Subspecies*: *cinerascens* (Lawrence). I follow Lanyon (1961:424) in synonymizing *mexicanus* (Kaup) with *M. c. cinerascens*.

*Myiarchus nuttingi* Ridgway. Nutting's Flycatcher.

Common permanent resident in arid tropical scrub and tropical deciduous forest of Pacific Region, recorded north in Isthmus to near Chivela, and in the Interior in lower reaches of arid subtropical scrub at Tamazulapan del Progreso, Santiago Chazumba, and Teotitlán del Camino. *Elevations*: sea level to 6,000 ft. Account based only on publication by Lanyon (1961) and on 62 specimens examined by me.

*Breeding*: 30 March 1966, nest with three eggs, to 22 May 1966, nest with three eggs (both Rancho Sol y Luna, 800 ft, Rowley [1984:160–161]).

*Subspecies* (according to Lanyon 1961): *inquietus* Salvin and Godman, Interior and entire Pacific Region; *flavidior* van Rossem and *nuttingi* Ridgway (see Type Localities), Pacific Region east of Isthmus. This last area supports "pure" individuals of, and intergrades between, all three races; *flavidior* extends into Oaxaca from the Pacific lowlands of Chiapas, and *nuttingi* enters from the interior of Chiapas (west to Chivela).

*Myiarchus crinitus* (Linnaeus). Great Crested Flycatcher.

Very uncommon transient migrant in Atlantic Region in tropical evergreen forest and on Pacific side of Tehuantepec region west to Tehuantepec City, probably in arid tropical scrub and Pacific swamp forest. Rare winter resident in Pacific Region east of Isthmus (Santa Efigenia; Punta Paloma; Río Ostuta, 5 mi west of Zanatepec), probably in Pacific swamp forest. *Dates*: migration periods, 28 March to 20 April, September to 5 November; winter, 23, 29, and 31 January and 4, 12, and 16 February. *Elevations*: sea level to 800 ft.

*Subspecies*: monotypic, following Monroe (1968:259) and Traylor (1979a:202–203).

*Myiarchus tyrannulus* (Müller). Brown-crested Flycatcher.

Permanent resident, fairly common in tropical deciduous forest, Pacific swamp forest, and arid tropical scrub of Pacific Region west of Isthmus (*magister*) and uncommon in the Interior in arid tropical scrub of valley of San Miguel Sola de Vega and arid subtropical scrub of Oaxaca Valley (*magister*). Uncommon permanent resident and fairly common winter resident in arid tropical scrub, Pacific swamp forest, and tropical deciduous forest of Pacific Region from Isthmus eastward (*cooperi*). Uncommon summer resident (3 March to 15 June) in open portions of tropical evergreen forest in Atlantic Region west of Isthmus, these birds probably wintering on both slopes from Isthmus eastward (*cooperi*). Arrival date in 1961 at my locality 1 mi southwest of Valle Nacional: 20 March. Should be sought in winter in Atlantic Region west of Isthmus. *Elevations*: sea level to 5,100 ft.

*Breeding* (all data): 2 April 1961, enlarged testes (13 × 6 mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24506, 42.0 g, little fat); 8 May 1966, nest with three eggs, and 21 May 1966, nest with two eggs (El Zopilote, 400 ft, Rowley, WFVZ 20720 and 21428, respectively).

*Subspecies*: *magister* Ridgway (see Type Localities); *cooperi* Baird; see ranges above. Intergradation occurs from La Ranchería and Sarabia southeast to Santa Efigenia and Tapanatepec and perhaps (winter residents only?) southwest to Rancho Las Animas and Las Tejas; from all six localities, populations are much closer to *cooperi*.

*Deltarhynchus flammulatus* (Lawrence). Flammulated Flycatcher.

Very uncommon permanent resident in tropical deciduous forest in lower portions of Pacific Region exclusive of Río Tehuantepec basin, recorded only at Rancho de Cacoprieto, Tapanatepec, Santa Efigenia, Punta Paloma, and points 4 mi west-northwest and 25 km (15.5 mi) northwest (3,000 ft) of Tapanatepec, 9 mi east of Chahuities, and 16 road mi northwest of Puerto Escondido. To be expected in tropical deciduous forest throughout lowlands and adjacent foothills of Pacific Region. Scarcity of records perhaps the result of confusion with *Myiarchus* in field. *Elevations*: sea level to 800 ft; 3,000 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: monotypic; see Type Localities.

*Pitangus sulphuratus* (Linnaeus). Great Kiskadee.

Permanent resident, very common in Pacific Region, common in Atlantic Region, and uncommon in the Interior (Oaxaca Valley); occurs in open situations

with large trees and (often) water, including edges of cultivated and grazed land, within general ranges of tropical evergreen, tropical deciduous, palm, and Pacific swamp forests, arid tropical and subtropical scrubs, and lower reaches of tropical semideciduous forest. *Elevations*: sea level to 5,100 ft.

*Breeding*: 28 March 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 4 June 1961, nest with three eggs (Tehuantepec City, Shufeldt field notes in UMMZ).

*Subspecies*: *derbianus* (Kaup), Pacific Region in and west of Isthmus and in Interior Region; *guatemalensis* (Lafresnaye), Pacific Region east of Isthmus and Atlantic Region. This arrangement agrees with van Rossem (1940:80–84) rather than Miller et al. (1957:76), the latter referring all birds from southern Mexico to *derbianus*.

*Megarynchus pitangua* (Linnaeus). Boat-billed Flycatcher.

Common permanent resident in Atlantic and Pacific Regions in tropical evergreen, tropical deciduous, tropical semideciduous, and Pacific swamp forests. Only record for Interior (male specimen not examined by me, Huajuapán de León, September 1937, Martín del Campo [1942:353]) questionable in light of known distribution. *Elevations*: 100 to 4,350 ft.

*Breeding*: 3 April 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 14 July 1962, prejuvenile (20 mi northwest of La Ventosa, M. D. Tuttle, unsexable, AMNH 781207).

*Subspecies*: *mexicanus* (Lafresnaye).

*Myiozetetes similis* (Spix). Social Flycatcher.

Very common permanent resident in Atlantic and Pacific Regions in openings within tropical evergreen, tropical deciduous, palm, and Pacific swamp forests and lower reaches of tropical semideciduous forest. *Elevations*: sea level to 3,000 ft.

*Breeding*: 27 March 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 25 May 1962, nest with four eggs (near Tapanatepec, Rowley, WFVZ 25558); 8 June 1955, two prejuveniles (18 mi north of Matías Romero, 300 ft, Lamb, males, MLZ 59754–59755).

*Subspecies*: *hesperis* Phillips (1966:107), according to Traylor (1979a:211), Pacific Region; *texensis* (Giraud), Atlantic Region. The race *hesperis* seems weakly differentiated from *texensis* and perhaps not valid.

*Myiodynastes maculatus* (Müller). Streaked Flycatcher.

Rare breeding bird of Atlantic Region in semi-open portions and margins of tropical evergreen forest; probably a summer resident and transient migrant but possibly a permanent resident. Recorded only at the following localities: La Ranchería at 1,500 ft (Nelson and Goldman, two adult females and one prejuvenile male, 17 June 1895, and one prejuvenile male, 20 June 1895, respectively USNM 144934–144937); a point 5 km (3.1 mi) east of Vista Hermosa at about 800 m (2,625 ft) elevation (male, 49.5 g, skull completely ossified, testes 9 mm; female, 42.7 g, ovary granular; both UK and collected by R. L. Holland on 21 June 1964); and a point at an unrecorded elevation 13 km (8.1 mi) north of Vista Hermosa (27 June 1964, D. A. Johnson, sex?, UK). Only record for Pacific Region (25 km [15.5 mi] northwest of Tapanatepec at 3,000 ft, 29 May 1965, Rook, male, CAS, 46.9 g, no fat) probably represents a transient migrant. Records for “Santo Do-

mingo" published by Ridgway (1907:661) and Miller et al. (1957:74) pertain to La Ranchería.

*Breeding* (all data): see above.

*Subspecies*: *insolens* Ridgway.

*Myiodynastes luteiventris* Sclater. Sulphur-bellied Flycatcher.

Fairly common summer resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest and locally in tropical deciduous and Pacific swamp forests; penetrates Interior along Río Atoyac at least as far as Juniper Camp; prefers riparian situations and margins and semi-open portions of forests. *Dates*: extremes, 25 March to October; arrival date in 1961 at a point 1 mi southwest of Valle Nacional was 25 March (Binford); arrives in Sierra de Miahuatlán in "last few days of April and the first of May" (Rowley 1966:162). *Elevations*: 250 to 5,000 ft; 6,000 ft (Webster 1965:598).

*Breeding*: 15 May 1965, nest with four eggs (Cycad Camp, 1,900 ft, Rowley [1966:162]), to 12 July 1957, prejuvenile (Rancho Las Animas, 3,000 ft, Lamb, male, WFWZ-HC 2873).

*Subspecies*: *luteiventris* Sclater. This species might be monotypic; see Monroe (1968:256) and Traylor (1979a:218).

*Legatus leucophaius* (Vieillot). Piratic Flycatcher.

Generally, a very uncommon, but locally a fairly common, spring and presumably summer resident in Atlantic Region in semi-open portions of tropical evergreen forest, recorded south in Isthmus to Río Sarabia. *Dates*: extremes, 4 March to 25 April; arrival date for breeding birds in 1961 at my locality 1 mi southwest of Valle Nacional, 300 ft, was 25 March; early date of 13 February (see below) is doubtful. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): appropriates nests of other species; range, habitat, and dates.

Most if not all previously published references for Oaxaca are based on specimens either from Playa Vicente (Sclater 1859c:442), which is in Veracruz, or from Tutla (Blake 1950:408), which pertains to a specimen (13 February 1941, male, FMNH 119689) with questionable data taken by del Toro Avilés. I examined nine valid specimens (AMNH, LSUMZ, UMMZ, WFWZ) from four localities: 1 mi southwest of Valle Nacional, 300 ft; 18 and 24 mi north of Matías Romero; and Río Givicia, 800 ft. In addition, Wolf and I saw 1 bird on 22 April 1961 at 1,900 ft elevation 6 road mi southwest of Valle Nacional.

*Subspecies*: *variegatus* (Sclater).

*Tyrannus melancholicus* Vieillot. Tropical Kingbird.

Permanent resident; very common below 3,000 ft in Atlantic and Pacific Regions in savanna and arid tropical scrub, and in brushy clearings, grazed land, and cultivated land where these habitats occur within general ranges of tropical evergreen and tropical deciduous forests; and fairly common in arid tropical scrub of valley of San Juan Bautista Cuicatlán. One record for Interior highlands, a female (LSUMZ 24477, 42.7 g, moderately fat, skull ossified, ovary not enlarged) collected by Wolf at 5,100 ft elevation 2 road mi east of Oaxaca City on 7 May 1961; probably, a rare visitant and not a permanent resident in Oaxaca Valley. *Elevations*: sea level to 3,000 ft; 5,100 ft.

*Breeding*: 27 April 1966, nest with three eggs (Rancho Sol y Luna, 800 ft,

Rowley, WFVZ 20718), to 25 May 1962, nest with two eggs (near Tapanatepec, Rowley, WFVZ 25646); 15 May 1915, nest with one fresh egg and three well-advanced young (Tehuantepec City, Shufeldt field notes in UMMZ).

*Subspecies: satrapa* (Cabanis and Heine). I agree with Traylor (1979b) that the race *occidentalis* Hartert and Goodson does not warrant recognition and that the name *chloronotus* Berlepsch is a synonym of *T. couchii*, thus requiring the resurrection of the name *satrapa*. Four hybrids between *T. m. satrapa* and *T. couchii* are known from Oaxaca, two males (Wolf, LSUMZ 24483, 44.2 g, testes not enlarged; Binford, LSUMZ 24485, 46.4 g, little fat, enlarged testes 10 × 6 mm) collected on 26 February and 21 March 1961, respectively, at 300 ft elevation 1 mi southwest of Valle Nacional, and a male (LSUMZ 45643, testes not enlarged) and a female (LSUMZ 45644) taken by Schaldach on 10 March 1960 at a point "18 miles north of Matias Romero" [= Río Sarabia]; these identifications were made by M. A. Traylor, Jr. (in litt.).

*Tyrannus couchii* Baird. Couch's Kingbird.

Status uncertain. Only one definite record: adult female (LSUMZ 24486, 47.4 g, slight fat, follicles not enlarged) secured by Binford on 12 March 1961 in an opening within tropical evergreen forest at 300 ft elevation 1 mi southwest of Valle Nacional. Only other record, a female (FMNH 119688) taken by del Toro Avilés supposedly at Tutla on 4 March 1941, is questionable. Traylor (1979a:223 and 1979b) lists this species for Oaxaca but gives no details.

*Subspecies: monotypic.* See Traylor (1979b) for an analysis of the specific distinctness of *T. couchii* from *T. melancholicus*. See *T. melancholicus* for list of hybrids.

*Tyrannus vociferans* Swainson. Cassin's Kingbird.

Fairly common permanent resident in the Interior in arid subtropical scrub, oak scrub, and adjacent portions of open, arid pine-oak forest. The only lowland record, a bird seen by the Berretts and Binford in Pacific Region at 350 ft elevation 3 road mi north of Puerto Angel on 10 October 1961, probably was a bird that bred elsewhere. Santiago Matatlán record below represents southeasternmost in entire range of species. *Elevations:* 350 ft; 4,550 to 6,400 ft.

*Breeding* (all data): 16 May 1964, nest under construction (11 road mi southwest of San Andrés Chicahuaxtla, 6,400 ft, Morony and Binford observation); 23 May 1964, egg without shell in oviduct (from female [LSUMZ 33192, 49.9 g, little fat, Morony] associated with above-mentioned nest); 27 May 1964, enlarged testes (11 × 5 mm, 4 road mi east of Santiago Matatlán, 6,100 ft, Morony, LSUMZ 33193, 41.7 g, little fat).

*Subspecies: monotypic.* Specimens in the CAS, including three female topotypes taken in summer, fail to uphold any of the supposed characters of *xenopterus* Griscom (1934:391) from Chilpancingo, Guerrero; synonymizing this race renders the species monotypic.

*Tyrannus crassirostris* Swainson. Thick-billed Kingbird.

Winter resident, fairly common in lower portions of Pacific Region (east to near Chiapas border) in savanna, arid tropical scrub, and in openings within tropical deciduous forest, and very uncommon in the Interior in arid tropical scrub and arid subtropical scrub. Permanent resident in riparian situations within both lower

reaches of arid subtropical scrub at Tamazulapan del Progreso (6,000 ft elevation; six records for June and July) and arid tropical scrub of the San Miguel Sola de Vega valley (two records: kilometer marker 136 on Puerto Escondido Road, 3,500 ft, 24 July 1965, Rowley and F. Flores, male, 56.0 g; kilometer marker 154 near San Pedro Juchatengo, 3,800 ft, 1 June 1965, J. D. Webster, female, 51.7 g, largest follicle 3 mm; both CAS), the southeasternmost breeding localities in entire range of species. One summer record for Interior highlands (Cerro San Felipe, 21 June 1894, Nelson and Goldman, female, USNM 144899). Possibly a permanent resident in arid habitats elsewhere in state. Rare visitant in Atlantic Region (two records: 6 mi south of Matías Romero at Río Grande, 9 April 1962, Schaldach, male, AMNH 778341, moderately fat, testes not enlarged; 10 mi north of Matías Romero, 18 February 1961, K. Wolfe, female, WFVZ). *Dates*: extremes for winter residents, 24 September to 28 April. *Elevations*: sea level to 6,000+ ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *crassirostris* Swainson.

*Tyrannus verticalis* Say. Western Kingbird.

Uncommon transient migrant in the Interior in arid subtropical scrub and in Pacific Region in arid tropical scrub, savanna, and openings within tropical deciduous forest. Very uncommon winter resident in same habitats in Pacific Region from at least San Pedro Pochutla east to Chiapas border. Only record for Atlantic Region, a female (MLZ 36218) taken by del Toro Avilés purportedly at Moctum on 12 October 1941, is questionable. *Dates*: 14 October to 14 May. *Elevations*: 100 to 4,800 ft.

*Tyrannus tyrannus* (Linnaeus). Eastern Kingbird.

Fairly common May transient migrant on Pacific side of Isthmus in savanna, arid tropical scrub, and openings within tropical deciduous forest. Although species almost certainly crosses Isthmus from south to north, the only records for Atlantic Region are as follows: Boucard is said to have taken a specimen at Acatepec in March 1857 (Sclater 1858:302); M. del Toro Avilés supposedly took a male (FMNH 119680) and a female (FMNH 119681) at Tutla on 18 February and 1 March 1941, respectively, and a male (MLZ 26108) at Palomares on 4 May 1939. The exact location of Acatepec is unknown, and the del Toro Avilés records, especially the dates, are questionable. To be expected as a fall transient migrant. *Dates*: March (Boucard); 3 to 21 May. *Elevations*: sea level to 800 ft.

*Tyrannus forficatus* (Gmelin). Scissor-tailed Flycatcher.

Occurs in savanna, arid tropical scrub, and arid subtropical scrub and in brushy clearings, cultivated land, grazed land, and towns within tropical evergreen and tropical deciduous forests. Transient migrant throughout state, abundant on Pacific side of Isthmus of Tehuantepec, common on Atlantic side of Isthmus, fairly common elsewhere in Pacific lowlands, and uncommon elsewhere in Atlantic lowlands and in the Interior. Winter resident, fairly common on Pacific side of Isthmus, uncommon to locally very common (722 birds counted going to roost at Puerto Escondido on 6 February 1974, Binford) in remainder of Pacific Region, and rare in the Interior; no certain winter record for Atlantic Region (winter dates of specimens in FMNH taken by del Toro Avilés supposedly at Tutla are questionable). *Dates*: extremes, 29 September to 22 May; major migration periods,

last half of March through first half of April, and October. *Elevations*: sea level to 5,100 ft.

*Tyrannus savana* Vieillot. Fork-tailed Flycatcher.

Status uncertain. Only one valid record, a female (LSUMZ 61593) taken by Rook on 28 March 1960 in Atlantic Region at low elevation (probably below 300 ft) 25 mi south of San Juan Bautista Tuxtepec. Boucard specimen record from Playa Vicente (Sclater 1859b:384) pertains to Veracruz. Records from "Oaxaca" (Ridgway 1907:720; and Blake 1953:340) stem from Playa Vicente specimen. Specimen (MLZ 51725) said to be from "Oaxaca (near Loma Bonita, February 26)" (Miller et al. 1957:70) taken by Lamb at Arroyo Claro, Veracruz. Traylor (1979a:225) lists Oaxaca in the range of this species but without supporting data.

*Subspecies*: *monachus* Hartlaub.

*Pachyramphus cinnamomeus* Lawrence. Cinnamon Becard.

Very uncommon permanent resident in Atlantic Region lowlands in semi-open portions of tropical evergreen forest northwest at least to Trans-Isthmian Highway and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. Oaxaca localities are north-westernmost in entire range of species (A.O.U. 1983:477). *Elevations*: 250 to 300+ ft.

*Breeding* (all data): 29 March 1962, enlarged testes (7 × 3 mm, Montebello, Schaldach, AMNH 778321).

*Subspecies*: *fulvidior* Griscom.

*Pachyramphus major* (Cabanis). Gray-collared Becard.

Fairly common permanent resident; in Atlantic Region, breeds from 2,600 to 5,250 ft in cloud forest and adjacent tropical evergreen forest and winters down to 300 ft in tropical evergreen forest; in Pacific Region west of Isthmus (Sierra de Miahuatlán only; unrecorded in Sierra de Yucuyacua) breeds and winters from 900 to 7,400 ft in tropical semideciduous forest, cloud forest, and possibly lower reaches of humid pine-oak forest; in Pacific Region east of Isthmus, collected (WFVZ, MLZ) in Pacific swamp and tropical semideciduous forests at Cerro Baúl, Colonia Rodolfo Figueroa, Santa Efigenia, and Rancho de Cacoprieto, where it apparently breeds in at least the latter habitat. Only record for Interior (La Parada; Ridgway 1907:835) should be viewed with caution until substantiated by an extant specimen.

*Breeding*: 24 May 1965, two enlarged follicles from which eggs "ready to be laid in 4 days" (Río Molino, 7,300 ft, Galley, WFVZ 27008, 25.4 g, slightly fat), to 26 September 1964, adults attending three juveniles (Jamaica Junction, Rook [Rowley 1966:161]).

*Subspecies*: *uropygialis* Nelson, Pacific Region west of Isthmus; *major* (Cabanis), Atlantic Region. The racial identity of the population east of the Isthmus is unknown, because only males have been taken; on distributional grounds, it might be *matudai* Phillips (1966:107) of Chiapas.

*Pachyramphus aglaiae* (Lafresnaye). Rose-throated Becard.

Permanent resident; fairly common in Pacific Region from sea level to 8,600 ft (perhaps less abundant at higher elevations) in tropical deciduous, tropical semideciduous, cloud, and Pacific swamp forests, extending into Río Tehuantepec basin as far as Rancho Las Animas; uncommon in Atlantic Region from 250 to

4,850 ft in tropical evergreen forest and lower reaches of cloud forest; and very uncommon in the Interior up to at least 3,500 ft in arid tropical habitats of the San Juan Bautista Cuicatlán and San Miguel Sola de Vega valleys. Occurrences at "Oaxaca" [= Oaxaca City?] (Sumichrast 1881:249) and "Yanhuitlán?" [= Yanhuitlán] (Ferrari-Perez 1886:156) need confirmation by additional data.

*Breeding*: 9 May 1966 to 29 May 1966, each a nest with six eggs (Rancho Sol y Luna, 800 ft, WFVZ 20715 and 21317, respectively).

*Subspecies* (according to Webster 1963): *aglaiae* (Lafresnaye), Pacific Region west of Isthmus and Interior; *sumichrasti* (Nelson), Pacific Region east of Isthmus and Atlantic Region.

*Tityra semifasciata* (Spix). Masked Tityra.

Permanent resident in Atlantic and Pacific Regions, common in semi-open portions of tropical evergreen forest, fairly common in semi-open portions of tropical semideciduous forest, Pacific swamp forest, and lower reaches of cloud forest, and uncommon in tropical deciduous forest exclusive of upper Río Tehuantepec basin, where unrecorded. *Elevations*: sea level to 5,500 ft.

*Breeding*: 4 April 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 4 June 1963, active nest, condition unknown (above Jamaica Junction, 3,000 ft, Rowley [1966:161]); 26 April 1963, nest with three eggs (Colonia Rodolfo Figueroa, 5,500 ft, Galley, WFVZ 24339).

*Subspecies*: *griseiceps* Ridgway, Pacific Region west of Isthmus; *personata* Jardine and Selby, Pacific Region east of Isthmus and Atlantic Region, recorded southwest to Chivela (Bangs and Peters 1928:398).

*Tityra inquisitor* (Lichtenstein). Black-crowned Tityra.

Uncommon permanent resident of Atlantic Region in tropical evergreen forest. One record for Pacific Region in humid forests of Sierra Madre de Chiapas (Santa Efigenia, 800 ft, 18 January 1948, Lamb, female, MLZ 47452), where probably only a casual winter visitant. *Elevations*: 100 to 4,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *fraserii* (Kaup).

#### Family COTINGIDAE

*Lipaugus unirufus* Sclater. Rufous Piha.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest to a point 6 road mi southwest of Valle Nacional and south in Isthmus to La Gloria and perhaps (del Toro Avilés) Escuilapa. Record for "Juchitán" (Miller et al. 1957:60) pertains to La Gloria, District of Juchitán. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): 10 March 1960, enlarged testes (9 × 5 mm, 18 mi north of Matías Romero, Schaldach, WFVZ-HC 5728); 24 May 1961, enlarged testes (10 × 5 mm, 28 road mi north of Matías Romero, Wolf, LSUMZ 24451, 83.8 g, little fat); 22 November 1961, adult feeding juvenile or prejuvenile (6 road mi southwest of Valle Nacional, 1,900 ft, Binford observation).

*Subspecies*: *unirufus* Sclater; see Type Localities.

*Cotinga amabilis* Gould. Lovely Cotinga.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest, often in association with oaks, northwest at least to points 6, 11, and 15

road mi southwest of Valle Nacional and south in Isthmus to "Chimalapa" [= Santa María Chimalapa?, W. B. Richardson; see Gazetteer] and to a point 0.5 mi south of Matías Romero. *Elevations*: 300 to 4,100 ft.

*Breeding* (all data): 21 May 1962, enlarged follicle (5 mm, 27 km [16.8 mi] east-northeast of Piedra Blanca, Schaldach, WFVZ 27064).

#### Family PIPRIDAE

*Schiffornis turdinus* (Wied). Thrushlike Manakin.

Uncommon permanent resident in lowlands of Atlantic Region in tropical evergreen forest west to Trans-Isthmian Highway and perhaps (del Toro Avilés) Tutla and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300+ ft.

*Breeding* (all data): 23 May 1961, enlarged testes (10 × 5 mm, 28 road mi north of Matías Romero, Binford, LSUMZ 24467, 32.8 g, little fat).

*Subspecies*: *veraepacis* (Sclater and Salvin).

*Manacus candei* (Parzudaki). White-collared Manakin.

Fairly common permanent resident in lowlands of Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia. *Elevations*: 250 to 300 ft.

*Breeding* (all data): range, habitat, and dates.

*Chiroxiphia linearis* (Bonaparte). Long-tailed Manakin.

Fairly common permanent resident in tropical semideciduous, tropical deciduous and Pacific swamp forests in Pacific Region in Isthmus mountains and Sierra Madre de Chiapas, recorded from Chiapas border west to Chivela, the northwesternmost locality in entire range of species. Locality "Sierra de Santo Domingo" (Ridgway 1907:740) doubtful in absence of specimens or prior published data. *Elevations*: -700 to 4,900 ft.

*Breeding*: 5 May 1967 to 30 May 1966, each a nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 21336-21337, respectively).

*Subspecies*: *linearis* (Bonaparte).

*Pipra mentalis* Sclater. Red-capped Manakin.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): 10 June 1962, enlarged testes (7 × 4 mm, 8 km [5.0 mi] southeast of Donají, Schaldach, WFVZ 27088).

*Subspecies*: *mentalis* Sclater.

#### Family ALAUDIDAE

*Eremophila alpestris* (Linnaeus). Horned Lark.

Fairly common permanent resident in the Interior in savanna and steppe from Oaxaca Valley northwest to Tamazulapan del Progreso and (disjunctly) in Pacific Region on salt flats, sand dunes, and savanna from Tehuantepec City and Salina Cruz north and east at least to Chivela and Santa María del Mar, the southeast-

ernmost specific locality for North American populations of species; not collected farther east but reported to occur through Pacific lowlands as far as Chiapas border (Nelson 1897:54). Numbers slightly augmented in winter by birds from north (see below). *Elevations*: sea level to 6,800 ft.

*Breeding*: 16 May 1895, prejuvenile (San Mateo del Mar, Nelson and Goldman, female, USNM 145004), to 22 July 1967, prejuvenile (2 mi east of San Pablo Villa de Mitla, 5,200 ft, male, WFVZ-HC 19236).

*Subspecies*: *oaxacae* (Nelson), permanent resident (endemic; see Type Localities; breeding birds from San Pablo Villa de Mitla [Nelson and Goldman, USNM] not typical); *diaphora* (Oberholser), winter resident or visitant (Tamazulapan del Progreso, 14 November 1894, Nelson and Goldman, male, USNM 144955, not quite typical).

### Family HIRUNDINIDAE

*Progne subis* (Linnaeus). Purple Martin.

Rare, but probably regular, transient migrant through Pacific Region. Only two records: one bird taken by Wolf (adult male, LSUMZ 24601, 52.5 g, heavy fat, testes  $3 \times 1.5$  mm) and 13 others seen by Wolf and Binford on 18 May 1961 over mud flats at sea level 19 road mi southwest of Juchitán at southwestern edge of Laguna Superior; 1 adult male seen by the Berretts and Binford on 6 October 1961 at 600 ft in an opening in tropical deciduous forest 3 road mi north of San Pedro Pochutla.

*Subspecies*: unknown; the only specimen is an adult male that has measurements fitting both *subis* (Linnaeus) and *hesperia* Brewster, both of which are likely in Oaxaca.

*Progne chalybea* (Gmelin). Gray-breasted Martin.

Locally a fairly common summer resident in lower portions of Atlantic Region (2 March to 3 July) and Pacific Region, nesting in buildings, under bridges, and occasionally in offshore cliffs within general range of tropical evergreen forest, tropical deciduous forest, and arid tropical scrub. Uncommon and local winter resident in its summer habitats in Pacific Region from San Pedro Pochutla east to Tehuantepec City and from there north across Isthmus into Atlantic Region to El Barrio. Possibly a winter resident elsewhere in lowlands and adjacent foothills. *Dates*: recorded in all but one month; not recorded between 25 August and 22 October. *Elevations*: sea level to 2,400 ft.

*Breeding* (all data): 20 April 1964, about 5 adults entering presumed nest cavities in large rock (just offshore from Puerto Angel, Binford); 21 April 1962, enlarged testes ( $16 \times 10$  mm, Sarabia, Schaldach, AMNH 778365, moderately fat); 3 May 1962, enlarged testes ( $13 \times 10$  mm, 16 mi north of Matías Romero, Schaldach, WFVZ 30261, quite fat); 9 May 1962, enlarged testes ( $12 \times 9$  mm, 13 mi east of Juchitán, Schaldach, AMNH 787553, moderately fat).

*Subspecies*: *chalybea* (Gmelin). I have not assessed *P. c. warneri* Phillips (1986: 12) from Michoacán, said by Phillips to breed probably in Pacific Oaxaca.

*Tachycineta albilinea* (Lawrence). Mangrove Swallow.

Fairly common permanent resident in lowlands of Atlantic and Pacific Regions, frequenting large rivers, coastal lagoons and lakes, and Black Mangrove swamp.

One record for Interior, a bird seen by Wolf and Binford on 29 April 1961 at 6,300 ft elevation at Guelatao. *Elevations*: sea level to 300 ft; 6,300 ft.

*Breeding* (all data): 22 February 1964, nest under construction (Minitán, sea level, Binford observation).

*Subspecies*: monotypic, following Wetmore et al. (1984:11).

*Tachycineta thalassina* (Swainson). Violet-green Swallow.

Fairly common transient migrant and very uncommon winter resident in the Interior, feeding over humid and arid pine-oak forests and arid subtropical scrub; rare spring transient migrant (see below; no fall records) in Atlantic Region lowlands, feeding over rivers. No record for Pacific Region. Possibly a rare permanent resident; only one summer record, a female (USNM 143514) taken by Nelson and Goldman on 28 June 1894 at San Pablo Villa de Mitla; Rowley (field notes in CAS) saw birds he thought were investigating nest sites in a cliff at kilometer marker 70 on the Putla de Guerrero Road on 7 April 1965. *Dates*: extremes, 26 September to 27 April; major migration periods, late March through early April, and late September. *Elevations*: 300 ft (2 seen on 1 April and 25 on 2 April 1961, 1 mi southwest of Valle Nacional, Wolf and Binford); 5,250 to 9,300 ft.

*Subspecies*: *thalassina* (Swainson). I agree with Phillips (1986:15) that *lepida* Mearns probably is indistinguishable.

*Stelgidopteryx serripennis* (Audubon). Northern Rough-winged Swallow.

Very common transient migrant and common permanent resident throughout state, breeding from 300 to at least 8,000 ft in virtually all terrestrial habitats where earth banks are available and migrating over all habitats including open ocean. Although species present all year, at least some breeding birds reported to leave in October and not return until June (e.g., at Teotitlán del Camino and San Juan Bautista Cuicatlán; Wagner 1951). *Elevations*: sea level to 8,950 ft.

*Breeding*: 6 May 1962, nest with five fresh eggs (Río Molino, 7,300 ft, Rowley, WFVZ 25648), to 5 June 1955, prejuvenile (Río Sarabia, Lamb, male, MLZ 59815).

*Subspecies* (according to Phillips 1986:21–25): *psammochrous* Griscom, Pacific Region west of Isthmus and Interior Region; *fulvipennis* (Sclater), Atlantic Region; *stuarti* Brodtkorb, Pacific Region east of Isthmus (male and female, 21 April 1980, 15 road km [9.3 mi] northeast of Zanatepec, *fide* A. R. Phillips in litt.). Phillips (1986) considers *stuarti* a race of a separate species, *S. ridgwayi*, which might eventually prove correct. On distributional grounds, nominate *serripennis* (Audubon) should occur as a transient migrant.

*Riparia riparia* (Linnaeus). Bank Swallow.

Uncommon transient migrant at low elevations in Atlantic and Pacific Regions, recorded over open ocean, coastal lagoons, tropical evergreen forest, arid tropical scrub, and savanna. Should be sought in the Interior. *Dates*: 1 April to 19 May; 28 September to 21 October. *Elevations*: sea level to 300 ft.

*Subspecies*: *riparia* (Linnaeus).

*Hirundo pyrrhonota* Vieillot. Cliff Swallow.

Fairly common transient migrant throughout state; especially conspicuous in spring and fall on Pacific coast of Isthmus; to be expected over any habitat. Uncommon summer resident in the Interior within general range of arid sub-

tropical scrub, Oaxaca breeding localities (see below) being southeasternmost in entire range of species. *Dates*: extremes, 18 March to 26 October; known migrants (not necessarily transient migrants), 18 March to 19 May, and 22 August to 22 October. *Elevations*: sea level to 8,950 ft.

*Breeding* (all data): three colonies known; cliff 1 mi west of Santa María del Tule, 5,050 ft, 15 adults on 27 May 1964, Binford and Morony; a building about midway between Oaxaca City and San Felipe del Agua, 35 to 40 nests and "fully fledged juveniles" attended by adults in latter part of June 1966, but only three or four birds present on 4 July 1966, Rowley (1984:167–168) observation; cave about 3 mi east of San Pablo Villa de Mitla, about 20 pairs, all with nests containing half-grown young on 25 June 1967, Rowley (1984:168) and Galley.

*Subspecies* (according to Phillips 1986:32–36): *swainsoni* (Sclater), summer resident; *tachina* (Oberholser), transient migrant. Other races almost certainly occur as transient migrants.

*Hirundo rustica* Linnaeus. Barn Swallow.

Transient migrant, fairly common in entire Atlantic Region and in Pacific Region from Tehuantepec City eastward, and very uncommon in Pacific Region west of Isthmus; to be expected over any habitat. Only records for Interior are a series of specimens (BMNH) collected by M. Trujillo in April 1889 at San Miguel Sola de Vega and San Pedro Juchatengo, up to 4 seen 27 November–5 December in Oaxaca Valley, and about 6 seen on 14 December at San Pedro Juchatengo (Phillips 1986:27 and in litt.). To be expected as a transient migrant elsewhere in Interior Region. Other late fall records are as follows: Coffey (1960:295) saw 8 on 2 December 1948 at Salina Cruz and 4 the next day northwest of Tehuantepec City, and Phillips (1986:27–28) recorded it from 21 November to 21 December at Río Malatengo and at five localities from Tapanatepec to San Pedro Pochutla; the lack of dates between 21 December and 20 March indicates to me that these are all late migrants, not winter residents as thought by Phillips. Should be sought as a summer resident. *Dates*: 20 March to 22 May; June and September (Oaxaca Valley, Nelson and Goldman, *vide* Phillips 1986:28); 7 July (4 seen east of La Ventosa by C. A. Ely, *vide* Phillips 1986:28); 17 October to 21 November; 2 to 21 December; record for August (Ridgway 1904:83) apparently erroneous, because it was based on Lawrence (1876:17), who does not mention August. *Elevations*: sea level to 9,300 ft.

*Subspecies*: *erythrogaster* Boddaert.

#### Family CORVIDAE

*Cyanocitta stelleri* (Gmelin). Steller's Jay.

Common permanent resident in the Interior in humid pine-oak forest and upper reaches of arid pine-oak forest adjacent to humid pine-oak. No Oaxaca record east of Isthmus. *Elevations*: 5,600 to 10,800 ft.

*Breeding*: 2 April 1948, enlarged follicle (16 mm, La Cumbre near Cerro San Felipe, 9,000 ft, H. E. Childs, Jr., MVZ 115454, 98.7 g), to 23 May 1965, pre-juvenile (Río Molino, 7,400 ft, Rook, sex?, CAS).

*Subspecies*: *coronata* (Swainson). In a series of 17 specimens (WfVZ, CAS) from the Sierra de Miahuatlán, I am unable to detect the characters that are supposed to separate *restricta* Phillips (1966:110) of that region and consider it a

synonym of *coronata*; Phillips (1986:45) now also questions this race; see Type Localities. No Oaxaca birds, even those from the Sierra de Yucuyacua (WFVZ), match the Guerrero race *teotepecensis* Moore, which (contra Phillips 1986:45) is recognizable in a series, although not in all individuals.

*Calocitta formosa* (Swainson). White-throated Magpie-Jay.

Very common permanent resident in Pacific Region in tropical deciduous forest, arid tropical scrub, and extreme lower edge of tropical semideciduous forest, ranging northwest in Río Tehuantepec basin to San Juan del Río and a point 2 road mi east of San Pedro Totolapan, north across Isthmus into Atlantic Region as far as a point 2.3 mi north of Matías Romero (Selander 1959:403), and into San Miguel Sola de Vega valley of Interior as far as a point 4 road mi north of San Pedro Juchatengo (3,350 ft, 15 February 1974, 1 seen by Binford). *Elevations*: sea level to 3,350+ ft.

*Breeding*: 22 March 1967, nest with four eggs (Rancho Sol y Luna, Rowley [1984:214] observation), to 11 July 1934, active nest completed, contents unknown (adult sitting, Matías Romero, Skutch [1953:70]); 11 July 1957, three prejuveniles (2.3 mi north of Matías Romero, R. K. Selander, female MVZ 142278, males 142279–142280).

*Subspecies*: *formosa* (Swainson), Pacific Region west of Isthmus. From near Tequisistlán (UK) eastward, *formosa* intergrades with *azurea* Nelson of Pacific coastal Chiapas. In the same area, *formosa* (and *azurea*?) might intergrade also with *pompata* Bangs (thus paralleling intergradation in *Myiarchus nuttingi*), if Griscom (1932:402) and Miller et al. (1957:132) are correct in allocating to *pompata* the population of interior Chiapas and specimens from Chivela, Oaxaca; Wetmore (1944:65) does not consider *pompata* (or its synonym, *impudens* van Rossem) to occur in Mexico, a view with which I tentatively agree.

*Cyanocorax yncas* (Boddaert). Green Jay.

Permanent resident, common in Pacific Region and fairly common in Atlantic Region, inhabiting tropical evergreen forest, tropical semideciduous forest, and lower reaches of cloud forest; also extends into Interior along Río Atoyac to a point 8 road mi north of San Pedro Juchatengo (riparian growth at 3,550 ft, 15 February 1974, 2 seen by Binford). *Elevations*: 250 to 6,000 ft.

*Breeding*: 20 April 1969, nest with three eggs (13 mi northwest of Colonia Rodolfo Figueroa, 4,800 ft, Galley, WFVZ 52083), to 8 July 1934, nest with two young jays and one young *Molothrus aeneus* (near Matías Romero, A. F. Skutch [Bent 1958:462]); 13 June 1961, prejuvenile (Sarabia, Schaldach, male, AMNH 776407).

*Subspecies*: *vivida* (Ridgway), Pacific Region west of Isthmus and adjacent Interior Region (see Type Localities); *confusus* Phillips (1966:111), Pacific Region east of Isthmus and Atlantic Region. Birds from the Sierra Madre de Chiapas are larger than those in the Atlantic Region but have the same yellow eyes and dark feathering.

*Cyanocorax morio* (Wagler). Brown Jay.

Very common permanent resident at low elevations throughout Atlantic Region in tropical evergreen forest, occurring south in Isthmus to a point 4.1 mi north of Matías Romero. White-tipped birds recorded at Guichicovi (25 June 1895,

Nelson and Goldman, male, USNM 144601), in region of San Juan Bautista Tuxtepec, and along Trans-Isthmian Highway from a point 4.1 mi north of Matías Romero north to the Río Jumuapán; unrecorded in areas not also frequented by plain-tipped birds. *Elevations*: 100 to 800 ft.

*Breeding*: 15 March 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation; only plain-tipped birds occur here), to 13 July 1961, nest with three eggs (Donají, Rook, WFVZ 35294); 11 July 1957, two plain-tipped prejuveniles (males, MVZ 137068–137069) attended by one white-tipped and one plain-tipped adults or subadults (4 mi north of Matías Romero, Selander [1959:397]).

*Subspecies* (according to Phillips 1986:56–57): *morio* (Wagler). Although I follow Selander (1959) in treating *C. mexicanus* (Rüppell) as a color phase of *C. morio*, I do not consider the evidence conclusive. The case should not be closed until additional field work produces nestlings of both color types hatched from eggs definitely laid by a single parent.

*Cyanolyca cucullata* (Ridgway). Azure-hooded Jay.

Common permanent resident in cloud forest of Atlantic Region west of Isthmus and of Pacific Region east of Isthmus (WFVZ). *Elevations*: –4,100 to 5,200 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *mitrata* Ridgway, west of Isthmus; *guatemalae* Pitelka, east of Isthmus. Four specimens (MLZ) from Moctum, assigned to *guatemalae* by Miller et al. (1957:120–121), are somewhat intermediate and are best treated as *mitrata* or disregarded entirely, because they were taken by del Toro Avilés and, thus, are of doubtful origin; the same authors list *mitrata* from Choapan, which is only 11 mi from Moctum and not separated by any important barrier.

*Cyanolyca nana* (Du Bus de Gisignies). Dwarf Jay.

Fairly common permanent resident at high elevations in humid pine-oak forest of Interior in Sierra Aloapaneca, Sierra de Juárez, and Sierra de Zempoaltepec. Cerro Zempoaltepec (Nelson and Goldman) is southeasternmost locality in entire range of species. *Elevations*: 8,200 to 10,000 ft.

*Breeding*: 4 April 1965, nest under construction (near La Cumbre, Hardy [1971: 18] observation), to 21 June 1966, adult female taken with “oedematous brood patch and mouth filled with insects” (Cerro San Felipe, 9,500 ft, Rowley field notes in CAS and WFVZ-HC 16698); 16 May 1967, two nests with young (near La Cumbre, Hardy [1971:18] observations, latest nests recorded); as suggested by Hardy (1971:26), dates of 12 and 18 April 1942 on two prejuveniles (female MLZ 33377, male MLZ 33378, respectively) taken by del Toro Avilés at Totontepec seem early and are probably erroneous.

*Cyanolyca mirabilis* Nelson. White-throated Jay.

Permanent resident in humid pine-oak forest and possibly cloud forest of Interior in Sierras de Miahuatlán and Yucuyacua. Recorded at only three localities: 1 mi north of San Andrés Chicahuaxtla, 8,000 ft, where common; and at Río Molino and Río Guajolote, the southeasternmost points in entire range of species, where very uncommon or rare. *Elevations*: about 6,000 ft to 8,000 ft.

*Breeding* (all data): 24 May 1964, slightly enlarged follicle (3.5 mm, 1 mi north of San Andrés Chicahuaxtla, 8,000 ft, Binford, LSUMZ 33255, 53.8 g, little fat).

*Subspecies: hardyi* Phillips (1966:111), endemic (see Type Localities). Although I tentatively accept this race, I question whether its characters warrant taxonomic recognition; even Phillips (1986:60) now questions it. Compared to a large series from Guerrero (CAS), three specimens (LSUMZ) from the San Andrés Chicahuaxtla locality average slightly deeper blue throughout; the white frontal band also seems to average slightly narrower, a character not mentioned by Phillips. Their bills, however, are not deeper or stubbier, but the same length and slightly shallower (depth at anterior edge of nostril, 7.85 and 7.95 mm in two Oaxaca birds, compared to 8.03–8.47,  $\bar{X}$  = 8.25, in seven Guerrero birds). However, these Oaxaca birds might be intermediates, because they were taken between the type localities of *hardyi* (Río Molino) and *C. m. mirabilis* Nelson (Omiteme, Guerrero).

*Aphelocoma coerulescens* (Bosc). Scrub Jay.

Common permanent resident in the Interior in arid subtropical scrub, arid pine-oak forest, oak scrub, and peripheral portions of humid pine-oak forest. Southeasternmost localities in entire range of species are Cerro Zempoaltepec, a point 10 road mi southeast of El Camaron, and a point about 1 mi north of Río Guajolote. *Elevations*: 4,000 to 10,800 ft.

*Breeding*: 7 April 1965, nest with 3 eggs (5 mi north of San Andrés Chicahuaxtla, 8,000 ft, Rowley, WFWZ 24388), to 21 July 1943, nest with two small young and one egg (Rancho de las Rosas, 7,000 ft, Lamb notation on label of adult female MLZ 38101).

*Subspecies: sumichrasti* (Ridgway). Specimens from the Sierras de Yucuyacua and Miahuatlán exhibit some intergradation with the poorly-marked race *remota* Griscom of Guerrero, to which Phillips (1986:48) refers them.

*Aphelocoma unicolor* (Du Bus de Gisignies). Unicolored Jay.

Fairly common permanent resident in Atlantic Region in cloud forest of Sierra de Juárez and Sierra de Zempoaltepec. Apparently absent east of Isthmus. Should be sought in Pacific Region west of Isthmus, as it occurs in Guerrero. *Elevations*: 4,100 to 5,250+ ft.

*Breeding* (all data): 25 April 1961, moderately enlarged testes (right 6 × 4 mm, left 10 × 5, 17 road mi southwest of Valle Nacional, 4,850 ft, Wolf, LSUMZ 24619, 121.4 g, little fat); data on four prejuveniles (MLZ 33388–33391) collected by del Toro Avilés purportedly at Totontepec on 22 May and 21, 20, and 11 April 1942, respectively, are questionable.

*Subspecies: oaxacae* Pitelka, endemic; see Type Localities.

*Corvus corax* Linnaeus. Common Raven.

Permanent resident in mountains, fairly common in the Interior and in Pacific Region in Sierra Madre de Chiapas, and very uncommon in highland portions of Pacific Region west of Isthmus, occurring primarily in arid subtropical scrub and to a lesser extent in pine-oak forests and openings within upland portions of tropical deciduous forest. *Elevations*: –1,000 to 9,700 ft.

*Breeding* (all data): first week of April 1948, courtship flights observed (La Cumbre near Cerro San Felipe, L. L. Short in litt.); 2 May 1966, active nest completed, contents unknown (about 15 mi south of Oaxaca City, Rowley [1984: 215]).

*Subspecies: sinuatus* Wagler.

## Family PARIDAE

*Parus sclateri* Kleinschmidt. Mexican Chickadee.

Uncommon permanent resident in the Interior in highland pine forest and humid pine-oak forest; unrecorded in lower arid pine-oak forest. Southeasternmost localities in entire range of species are Río Molino and a point 38 road mi southwest of Valle Nacional. Unrecorded in Sierras de Yucuyacua and Zempoaltepec. *Elevations*: 7,300 to 10,000 ft.

*Breeding* (all data): 9 April 1961, active nest, condition unknown (38 road mi southwest of Valle Nacional, 9,300 ft, E. Armstrong); 10 June 1967, nest with three young (Cerro San Felipe, 10,000 ft, Rowley [1984:188]).

*Subspecies*: *sclateri* Kleinschmidt. Miller and Storer (1950:301) allocate a specimen (USNM 142750) from Cerro San Felipe to their subspecies *rayi*, but birds between there and the type locality (Omilteme, Guerrero), at Río Molino (CAS), are too gray-backed and not yellowish enough below for that race and are closest to nominate *sclateri*, to which I assign all Oaxaca specimens.

*Parus wollweberi* (Bonaparte). Bridled Titmouse.

Uncommon permanent resident in oaks of arid pine-oak forest throughout Interior and down to at least 6,400 ft in adjacent portions of Pacific Region in Sierra de Yucuyacua, recorded east to a point 3 mi south of Nejapa, the southeasternmost locality in entire range of species. *Elevations*: 1,850 ft (2 mi south of Nejapa; UK); 6,000 to 8,000 ft.

*Breeding* (all data): 8 May 1962, nest with three eggs (8 mi south of San Andrés Miahuatlán, 6,000 ft, Rowley [1966:172], WFVZ 25656).

*Subspecies*: *caliginosus* van Rossem.

## Family AEGITHALIDAE

*Psaltriparus minimus* (Townsend). Bushtit.

Permanent resident throughout Interior and down to at least 6,400 ft in Pacific Region west of Isthmus, fairly common in oak scrub and arid pine-oak forest and uncommon in humid pine-oak forest. Should be sought in and east of Isthmus. *Elevations*: 3,500 to 9,700 ft. See Capulalpan in Gazetteer.

*Breeding* (all data): 2 May 1962 to 29 May 1965, two nests with four eggs each (Río Molino, 7,300 ft, Rowley, WFVZ 25617 and 21319, respectively).

*Subspecies*: *melanotis* (Hartlaub).

## Family SITTIDAE

*Sitta carolinensis* Latham. White-breasted Nuthatch.

Uncommon permanent resident in most of Interior in pine-oak forests east to La Parada and Río Molino, the southeasternmost localities in entire range of species. Unrecorded in Sierra de Juárez and Sierra de Zempoaltepec. *Elevations*: 6,200 to 9,000+ ft.

*Breeding* (all data): 16 March 1965, soft-shelled egg in oviduct plus two enlarged follicles (above Río Molino, 7,300 ft, Rowley [1966:172]); 8 May 1963, full-sized juvenile begging from adult (4 mi southwest of San Miguel Sola de Vega, 7,000 ft, Rowley [1966:172], male, AMNH).

*Subspecies*: taken as a whole, intermediate between *kinneari* van Rossem and *mexicana* Nelson and Palmer. Oaxaca specimens are pale-backed like *kinneari*, but many fall within the low size range of the larger *mexicana*.

## Family CERTHIIDAE

*Certhia americana* Bonaparte. Brown Creeper.

Uncommon permanent resident in humid pine-oak forest of Interior Region. Apparent absence from Sierra de Yucuyacua and from all arid pine-oak serves to isolate populations in humid pine-oak patches of the various high mountain ranges. *Elevations*: 6,200 to 9,700+ ft.

*Breeding*: 19 March 1965, adult carrying nest material (Rowley notation on female specimen), to 6 May 1965, prejuvenile (Galley, male; both records Río Molino, 7,300 ft, CAS).

*Subspecies*: *alticola* Miller. I follow Webster (1986:201) in synonymizing *molinensis* Phillips (1966:125) of the Sierra de Miahuatlán with *alticola*; see Type Localities.

## Family TROGLODYTIDAE

*Campylorhynchus zonatus* (Lesson). Band-backed Wren.

Permanent resident, fairly common in Atlantic Region in brushy clearings within tropical evergreen forest south in Isthmus to Chivela, and rare in Pacific Region in openings within tropical semideciduous forest of Sierra Madre de Chiapas. *Elevations*: 100 to 3,900 ft.

*Breeding*: 27 May 1954, two nests with four and five eggs (near Tehuantepec City, T. C. Meitzen, WFVZ 88177–88178, respectively), to 16 June 1995, prejuvenile (La Ranchería, Nelson and Goldman, female, USNM 142832).

*Subspecies*: *zonatus* (Lesson), northwestern portion of Atlantic Region; *restrictus* (Nelson), remainder of Oaxaca range, being somewhat intermediate toward *zonatus* in Isthmus. The race *impudens* (Bangs and Peters), type from Chivela, Oaxaca, is based on intergrades between *restrictus* and nominate *zonatus* and is here considered a synonym of the former, to which it is closest. I examined five adult specimens (WFVZ) of *vonbloekeri* Rowley (1968:3) from the Sierra Madre de Chiapas, including the type, and consider it a synonym of *restrictus*; the supposed distinguishing characters are in my opinion attributable to wear (darker crown), fading (whiter back bars), and individual variation; the specimens are very similar to five (WFVZ) from the Matías Romero area. See Type Localities.

*Campylorhynchus megalopterus* Lafresnaye. Gray-barred Wren.

Common permanent resident in the Interior in humid pine-oak forest of Sierra Aloapaneca, Sierra de Juárez, and Sierra de Zempoaltepec, recorded east to Cerro Zempoaltepec (Nelson and Goldman), the southeasternmost locality in entire range of species. *Elevations*: –9,000 to 10,000 ft.

*Breeding* (all data): 26 April 1962, adults (female, AMNH 766587) feeding three full-sized juveniles (male, AMNH 766588; 10 mi northeast of Cerro San Felipe, 9,000 ft, Rowley [1984:172]); 27 April 1961, one ruptured follicle and one enlarged follicle (11 mm, 38 road mi southwest of Valle Nacional, 9,300 ft, Wolf, LSUMZ 24629, 37.4 g, slightly fat); 3 June 1966, prejuvenile (La Cumbre near Cerro San Felipe, 9,000 ft, Rowley, male, WFVZ-HC 16690); 8 and 27 June 1967, nests (for breeding or dormitories) under construction (Cerro San Felipe, 10,000 ft, Rowley [1984:172], Galley, and J. Nee).

*Subspecies*: *nelsoni* (Ridgway).

*Campylorhynchus rufinucha* (Lesson). Rufous-naped Wren.

Very common permanent resident in tropical deciduous forest and arid tropical scrub of entire Pacific Region, extending northwest in Río Tehuantepec basin to a point 2 road mi northwest of San Pedro Totolapan (3,200 ft, Binford observations) and San Juan del Río and north in Isthmus to Lagunas (Selander 1964: 71). *Elevations*: sea level to 4,000 ft.

*Breeding*: 12 May 1966, nest with four eggs (Rancho Sol y Luna, 800 ft, Rowley, WFFVZ 21408), to 15 August 1967, nest with three eggs (6 mi south of Presa Benito Juárez, 1,000 ft, Rowley, WFFVZ 21412); 13 July 1957, prejuvenile (Rancho Las Animas, 3,000 ft, Lamb, male, WFFVZ-HC 3323).

*Subspecies*: *humilis* Sclater. Extension of the range of *C. r. rufinucha* (Lesson) into Oaxaca (e.g., Miller et al. 1957:151; Selander 1964:58, 229) is erroneous, being based on records published by Sclater (1859b:371) from Playa Vicente (a town in Veracruz; see Gazetteer) and "Juquila" [= Santa Catarina Juquila; see Gazetteer], the latter a Boucard locality in southern Oaxaca within the range of *humilis*, not in northern Oaxaca as suggested by Selander (1964:58); specimen from Santa Catarina Juquila should be reexamined if still in existence.

*Campylorhynchus jocosus* Sclater. Boucard's Wren.

Permanent resident in the Interior, common in arid subtropical scrub, uncommon in oak scrub and arid pine-oak forest, and of unknown abundance at San Juan Bautista Cuicatlán, presumably in arid tropical scrub; overlaps mountains into Pacific Region, where an uncommon permanent resident down to 4,350 ft in semiarid pine-oak forests of Sierra de Miahuatlán and Sierra de Yucuyacua. Southeasternmost localities in entire range of species are points 8 mi north-northwest of Nejapa (Selander 1964:235) and 13 road mi south of San Miguel Suchixtepec. *Elevations*: 3,000 ft (8 mi south of San Pedro y San Pablo Ayutla, 14 June 1966, Rowley, set of four eggs, WFFVZ 20739) to 8,500 ft; perhaps lower at San Juan Bautista Cuicatlán (6 October 1894, Nelson and Goldman, female, USNM 142852; specimen lacks label elevation, although Selander [1964:122] assumed 1,800 ft, the approximate elevation of town) and at the Nejapa site.

*Breeding*: 10 April 1961, nest under construction (4 mi southeast of Tlacolula de Matamoros, Binford observation), to 8 July 1961, nest with three eggs (3 mi south of Santa María Coyotepec, Rowley, WFFVZ 26662); 14 July 1943, prejuvenile (Tamazulapan del Progreso, 6,000 ft, Lamb, male, MLZ 37912); see also above and *Molothrus ater*.

*Subspecies*: monotypic; see Type Localities.

*Salpinctes obsoletus* (Say). Rock Wren.

Uncommon permanent resident in the Interior in arid subtropical scrub and steppe, recorded east to a point 4 mi south of Santiago Matatlán. Two records for Pacific lowlands, single specimens taken at "Cacoprieto" [= Rancho de Cacoprieto] by Sumichrast in June 1872 (Lawrence 1876:13) and by W. W. Brown on 6 July 1927 (Bangs and Peters 1928:399), perhaps represent wanderers. *Elevations*: -4,600 to 7,300 ft; much lower at Rancho de Cacoprieto, but elevation of ranch and exact point of collection unknown.

*Breeding* (all data): 2 June 1956, moderately enlarged testes (5 × 4 mm, 9 mi east of Oaxaca City, D. A. Zimmerman, UMMZ 151460, 17.6 g).

*Subspecies: obsoletus* (Say), according to Miller et al. (1957:167), who treat *notius* Ridgway (1903a:168) as a synonym.

*Catherpes mexicanus* (Swainson). Canyon Wren.

Permanent resident in hilly, arid, rocky situations within oak scrub, arid subtropical scrub, arid tropical scrub, and arid pine-oak forest adjacent to the first three habitats; fairly common in the Interior, east through Río Tehuantepec basin to Santo Domingo Petapa and a point 8 mi west-northwest of Tehuantepec City, and in adjacent upper Pacific Region southwest of San Andrés Chicahuaxtla; and (disjunctly) rare in Pacific foothills of eastern Sierra Madre de Chiapas. *Elevations:* 800 to 6,400+ ft.

*Breeding* (all data): 2 June 1912, nest with four eggs (San Pedro y San Pablo Etna, J. C. F. van Balen, FMNH egg collection 15138); 2 June 1965 (kilometer marker 123 on Putla de Guerrero Road, 4,600 ft) and 4 June 1963 (near Juniper Camp, 5,000 ft), two nests with two young each (both Rowley [1966:178]).

*Subspecies: mexicanus* (Swainson).

[*Hylorchilus sumichrasti* (Lawrence). Slender-billed Wren.]

No reliable specimen or published record; one valid sight record. Rare in heavy tropical evergreen forest with rocky (limestone) substrate of extreme northwestern portion of Atlantic Region; presumably a permanent resident, as it is believed to be sedentary elsewhere (A.O.U. 1983:525). Recorded with certainty only at 250 ft elevation on an island 5 mi west of Temascal (8 June 1964, 2 seen at very close range by Morony and Binford). The only other record (Miller et al. 1957:169) might not be valid, although the locality is very close to mine, because it is based on a specimen (female, MLZ 31790) taken by del Toro Avilés supposedly on 6 November 1943 at San Miguel Soyaltepec, "600 meters" (1,969 ft; probably much too high). Should be sought in rocky forests throughout Atlantic Region.

*Breeding* (all data): range, habitat, and date.

*Subspecies: sumichrasti* (Lawrence), based on range. This species is polytypic because of the description of *navai* Crossin and Ely (1973:137) from Chiapas.

*Thryothorus maculipectus* Lafresnaye. Spot-breasted Wren.

Permanent resident, very uncommon in Pacific Region east of Isthmus and common in Atlantic Region, inhabiting margins of, and brushy clearings within, tropical evergreen and tropical semideciduous forests. *Elevations:* 100 to 5,200 ft.

*Breeding:* 22 March 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 10 June 1961, enlarged follicle (4 × 3 mm, Sarabia, Schaldach, AMNH 776425); 21 June 1895, prejuvenile (La Ranchería, Nelson and Goldman, sex?, USNM 142963).

*Subspecies: umbrinus* Ridgway, Atlantic Region from Isthmus eastward; *maculipectus* Lafresnaye, northwestern third of Atlantic Region; *varians* (Griscorn), Pacific Region east of Isthmus. Most individuals from the northern portion of the Isthmus are referable to *umbrinus*, but some are similar to *maculipectus*; the steepest part of the cline between these two is just west of the Isthmus.

*Thryothorus sinaloa* (Baird). Sinaloa Wren.

Very common in Pacific Region in scrub situations within tropical semideciduous forest and tropical deciduous forest at points 1 mi east, 6 mi northeast, and 7 mi north of Putla de Guerrero, the southeasternmost localities in entire range

of species; presumably a permanent resident but recorded only in May, June, and December. *Elevations*: 2,400 to 3,000+ ft.

*Breeding* (all data): see below.

In 1964 Morony and I found the Sinaloa Wren to be one of the most common species in the valley of Putla de Guerrero. On 21 May we saw 26 birds, of which 10 (LSUMZ 33272–33281) were collected, as follows: three females weighing 15.4, 16.9, and 17.7 g and each possessing an ovary with the largest follicle measuring 1 mm in diameter; seven males weighing 17.6, 18.1, 18.2, 18.3, 18.4, 19.2, and 19.8 g and possessing testes measuring from  $11 \times 7$  to  $8 \times 4$  mm; all 10 specimens had little fat and completely ossified skulls. On the same date I saw two nests under construction; in one case a male was taken at a nearly completed nest; in the other case two adults, presumably male and female, were observed constructing a nest. The next day Morony and I observed 10 birds, of which one was secured (Binford, male, LSUMZ 33271, 20.0 g, little fat, skull completely ossified, testes  $8 \times 4$  mm). On 23 May at a point 6 road mi northeast of Putla de Guerrero we saw 4 birds. The only other records for Oaxaca are a specimen in the possession of R. W. Dickerman (in litt.) taken at Putla de Guerrero on 17 December 1965 and a male (CAS, 18.0 g) taken by Galley about 3 mi north of Putla de Guerrero, at kilometer marker 134, on 4 June 1965.

*Subspecies: russeus* (Nelson). Oaxaca birds continue the north-south cline from paler and browner birds in Sonora to darker and redder in Guerrero; although the Oaxaca birds are the reddest on the flanks and upperparts and could be described as a distinct race, I prefer to treat them as extremes of *russeus* (described from Guerrero) because of the clinal nature of the variation.

*Thryothorus pleurostictus* Sclater. Banded Wren.

Permanent resident in Pacific Region, common in arid tropical scrub and tropical deciduous forest and uncommon in tropical semideciduous forest, recorded northwest in Río Tehuantepec basin to San Juan del Río and a point 2 road mi northwest of San Pedro Totolapan and north in Isthmus to Guichicovi; also extends into arid tropical habitats of San Miguel Sola de Vega valley of Interior as far as kilometer marker 136 on Puerto Escondido Road, where of unknown abundance. *Elevations*: sea level to 5,600 ft.

*Breeding*: 9 May 1966, nest with three eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 21397), to 31 July 1965, nest with three eggs (kilometer marker 136 on Puerto Escondido Road, Rowley [1966:175]); 26 June 1961, prejuvenile (Rancho Sol y Luna, Schaldach, male, AMNH 776411).

*Subspecies: oaxacae* Brodkorb; see Type Localities. Birds from the Isthmus eastward show minor intergradation with *acaciarum* Brodkorb of western Chiapas.

*Thryothorus felix* Sclater. Happy Wren.

Fairly common permanent resident in Pacific Region in tropical semideciduous and tropical deciduous forests, recorded east to Puerto Angel and a point 7 mi south of Soledad, the southeasternmost localities in entire range of species. *Elevations*: sea level to 6,000 ft.

*Breeding* (all data): 8 May 1964, enlarged testes ( $6 \times 4$  mm, 18 road mi north of San Gabriel Mixtepec, 4,900 ft, Morony, LSUMZ 33290, 15.5 g, little fat); 3 July 1965, nest with three wren eggs and one of *Molothrus aeneus* (kilometer

marker 135 on Putla de Guerrero Road, 3,200 ft, Rowley [1966:175], WFVZ 21431).

*Subspecies: felix* Sclater; see Type Localities.

*Thryothorus modestus* Cabanis. Plain Wren.

Common in Pacific Region in openings within tropical semideciduous forest and adjacent upper reaches of tropical deciduous forest of Sierra Madre de Chiapas at a point 12 mi north-northeast of Zanatepec, where presumably a permanent resident; this is the northwesternmost locality in entire range of species. Recorded by Morony and Binford in 1964 as follows: 7 April, 3 birds seen; 8 April, 7 seen, of which two were collected by Binford at 4,900 ft elevation (male, LSUMZ 33270, 21.3 g, little fat, skull completely ossified, testes  $4 \times 3$  mm; female, LSUMZ 33269, 17.4 g, little fat, follicles not enlarged); 12 April, 8 seen. *Elevations:* 4,400 to 4,900 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: modestus* Cabanis. On the basis of specimens I have examined, I agree with Monroe (1968:292) and others that *pullus* (Ridgway) does not warrant recognition.

*Thryomanes bewickii* (Audubon). Bewick's Wren.

Fairly common permanent resident in the Interior in arid subtropical scrub, oak scrub, and adjacent portions of arid pine-oak forest, recorded east to a point 5 road mi northwest of San Pedro Totolapan, the southeasternmost locality in entire range of species. *Elevations:* 3,200 to 7,000 ft.

*Breeding* (all data): 6 May 1961, moderately enlarged testes ( $4 \times 3$  mm, 6 mi east of Santa María del Tule, Wolf, LSUMZ 24656, 10.7 g, slightly fat); 11 May 1961, moderately enlarged testes (4 mi east of Santiago Matatlán, 6,100 ft, Wolf, LSUMZ 24655, 11.2 g, little fat); 27 June 1966, full-sized juveniles attended by adult (near Santa María del Tule, 5,000 ft, Rowley [1984:172], male, WFVZ-HC 16727); data on prejuvenile specimen (male, MLZ 38410) taken by del Toro Avilés supposedly at San Pablo Villa de Mitla on 11 June 1942 are questionable.

*Subspecies: mexicanus* (Deppe); see Type Localities.

*Troglodytes aedon* Vieillot. House Wren.

*T. aedon* ssp. (*aedon* group).—Uncommon winter resident in Atlantic Region in openings within tropical evergreen forest, in Pacific Region in openings within tropical semideciduous forest, and in the Interior in arid subtropical scrub, occurring east, respectively, to the vicinity of Valle Nacional (and perhaps Moctum; del Toro Avilés), a point 4 km (2.5 mi) north of San Juan Lachao Pueblo Nuevo (WFVZ 30708), and Rancho Las Animas, the southeasternmost localities in entire range of this group. *Dates:* 7 October to 4 March. *Elevations:* 250 to 6,000 ft.

*T. a. brunneicollis* (*brunneicollis* group).—Common permanent resident in the Interior in humid pine-oak forest and adjacent semiarid pine-oak forest, recorded east to Cerro Zempoaltepec (Nelson and Goldman) and Río Molino, the southeasternmost points in entire range of this group. *Elevations:* 5,500 to 10,000 ft. *Breeding:* 5 May 1965, nest with four eggs (Río Molino, 7,300 ft, Rowley, WFVZ 21417), to 13 August 1952, prejuvenile (20 mi northwest of Oaxaca City, 7,100 ft, J. D. Webster, male, CAS 61487).

*T. a. intermedius* (*musculus* group).—Uncommon permanent resident, recorded

in Atlantic Region at Totontepec and perhaps (del Toro Avilés, see below) Amatepec and Moctum and in the Interior at Capulalpan, these localities apparently being northwesternmost in entire range of this group, and in Pacific Region in Sierra Madre de Chiapas; habitat in Oaxaca unknown except in last area, where species has been recorded at margins of tropical semideciduous forest and lower reaches of cloud forest. *Elevations*: 4,300 to 5,000 ft. *Breeding*: 21 April 1966, nest with five eggs (Cerro Baúl, 4,300 ft, Rowley, WFVZ 21405), to 5 May 1967, nest with four eggs (Colonia Rodolfo Figueroa, 4,500 ft, Rowley, WFVZ 21407).

I examined Oaxaca specimens of *T. a. intermedius* from the following localities west of the Isthmus: Amatepec (9 May 1949, del Toro Avilés, male, USNM 462879); Moctum (2 October and 20 December, two females, respectively MLZ 38346 and 38334; and 16 and 19 September, 21 November, and 9 and 15 December, five males, respectively MLZ 38355, 38356, 38337, 38360, and 38362; all seven collected by del Toro Avilés in 1941); and Totontepec (14 July 1894, Nelson and Goldman, immature female, USNM 143039, possibly *brunneicollis*?; and 30 April, female, MLZ 38395, and 8 April, male, MLZ 38401, both collected by del Toro Avilés in 1942). Sclater (1862:18) lists the localities "Capulalpam" [= Capulalpan] and Totontepec on the basis of Boucard specimens (some of which might still be in the British Museum). Baird (1864–1872 [1864]:142) records a specimen from Totontepec (January 1858, male, USNM 29710), received from Sallé but almost certainly taken by Boucard, that apparently is one of the same birds examined by Sclater (1862:18). The del Toro Avilés specimens are questionable in locality and date. Despite the above treatment, I question the occurrence of *intermedius* west of the Isthmus; confirmation by additional specimens is needed. From east of the Isthmus, I examined (WFVZ) five study skins and three sets of eggs from the general region of Cerro Baúl.

*Subspecies*: *aedon* Vieillot (one record, Oaxaca City, March 1889, according to Webster [1984:206]); *parkmanii* Audubon; *brunneicollis* Sclater; *intermedius* Cabanis. I regard *nitidus* Nelson as a synonym of *T. a. brunneicollis*, and *hypaedon* Sclater as a synonym of *T. a. intermedius*; see Type Localities.

I follow Marshall (1956), Lanyon (1960), and others in considering *T. brunneicollis* Sclater conspecific with *T. aedon* Vieillot on the basis of intergradation in southern Arizona and New Mexico and similarities in songs, eggs, nests, and plumages. Most authorities (see Paynter 1957, Lanyon 1960, and A.O.U. 1983: 531) now also merge *T. musculus* with *T. aedon*, pointing out that the *brunneicollis* group, known to interbreed with *parkmanii*, bridges the gap between phenotypes. Although I accept this treatment, I do so tentatively, because isolating mechanisms in wrens are often based on behavior and voice rather than phenotype, and the *musculus* group is not known to interbreed with the other two groups.

The statement by Miller et al. (1957:162) that "... *brunneicollis* and *musculus* [*T. a. intermedius*] are strongly differentiated where they closely approach geographically in the uplands of Oaxaca . . ." is questionable. Although such appears to be the case when one compares adult *intermedius* from Moctum with adult *brunneicollis* from other Oaxaca localities, final proof for such a statement should be based only on differences between examples from the same locality, and not on specimens collected by del Toro Avilés. The collection of MLZ contains two *intermedius* and two *brunneicollis* purportedly from Totontepec, all taken by del Toro Avilés. The specimens of *brunneicollis* (MLZ 38372 and 39557) are both

in juvenal plumage, and even though they appear to be typical of that form, they cannot be used for comparison with adult *intermedius*. Of the two *intermedius*, one (MLZ 38401) appears typical in all respects, comparing minutely with Tabasco specimens. The other specimen of *intermedius* from Totontepec, however, is unusually dark and richly colored below, more so than any *brunneicollis* I have examined; the shade of color below is intermediate between the pinkish-brown of *intermedius* and the yellow-brown of *brunneicollis*; perhaps it is "foxed." These specimens might have been taken elsewhere, but indicate the need for additional study of this wren complex. Such a study could be made either near Totontepec, where *brunneicollis* and *intermedius* perhaps occur together or in close proximity to one another, or at Capulalpan, a locality listed for both species by Salvin and Godman (1879–1904 [1880]:100, 103).

*Cistothorus palustris* (Wilson). Marsh Wren.

Winter resident in marshes west of Isthmus; probably occasional. Only one record, the southeasternmost in entire range of species, a male (LSUMZ 33266, 10.5 g, little fat, skull completely ossified, testes  $1 \times 1$  mm, molting) taken by Binford on 17 February 1964 at the marshy edge of a small pond situated in savanna within tropical deciduous forest in Pacific Region at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande.

*Subspecies: laingi* (Harper), according to Phillips (1986:112).

*Uropsila leucogastra* (Gould). White-bellied Wren.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest south in Isthmus to a point 8 mi north of Matías Romero. Should be sought in Pacific Region both east and west of Isthmus. *Elevations*: 100 to 300 ft.

*Breeding*: 20 April 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 14 May 1957, prejuvenile (Río Sarabia, 200 ft, Lamb, male, LSUMZ 46742).

*Subspecies* (according to Phillips 1986:132–133): *leucogastra* (Gould); see *Cyphorinus pusillus* in Type Localities.

*Henicorhina leucosticta* (Cabanis). White-breasted Wood-Wren.

Common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas, recorded south in Isthmus to Guichicovi. Occurs side-by-side with *H. leucophrys* at points 15 road mi southwest of Valle Nacional (4,100 ft) and 2 mi east-southeast of Colonia Rodolfo Figueroa (5,100 ft). *Elevations*: 250 to 5,100 ft.

*Breeding*: 22 April 1966, nest with three eggs (near Cerro Baúl, 4,300 ft, Rowley, WFVZ 20763), to 18 May 1967, nest with three eggs (above Colonia Rodolfo Figueroa on Cerro Baúl, 5,000 ft, Rowley, WFVZ 21413).

*Subspecies: prosthelauca* (Sclater).

*Henicorhina leucophrys* (Tschudi). Gray-breasted Wood-Wren.

Common permanent resident in all Regions in cloud forest and humid pine-oak forest. *Elevations*: 4,100 to 9,700 ft. See *H. leucosticta*.

*Breeding*: 9 May 1963, "constructing a nest" (probably for breeding, 11 mi south of San Pedro Juchatengo, 4,700 ft, Rowley notation on female specimen, AMNH), to 11 June 1968, nest with three eggs (Valle de Piedras, Cerro Baúl, Galley notation on label of female WFVZ-HC 19596).

*Subspecies: festiva* Nelson, Sierra de Miahuatlán and Sierra de Yucuyacua;

*mexicana* Nelson, Sierra de Juárez, Sierra Aloapaneca, Sierra de Zempoaltepec;  
*capitalis* Nelson, Sierra Madre de Chiapas.

#### Family CINCLIDAE

*Cinclus mexicanus* Swainson. American Dipper.

Very uncommon and local permanent resident in Pacific Region west of Isthmus, where recorded along rushing mountain streams in humid pine-oak forest at Río Jalatengo (4,500 ft, May) and Río Molino (7,300 ft, May and November). Perhaps also occurs in Sierra de Zempoaltepec, but only record, a female (MLZ 38445) taken by del Toro Avilés purportedly at Totontepec on 17 May 1942, is questionable. The only other record is a female taken by Fenochio in "Oaxaca" (Cambridge University collection, A. R. Phillips in litt.).

*Breeding* (all data): 6 May 1962, nest with three young (Río Molino, Rowley [1966:173] observation).

*Subspecies: dickermani* Phillips (1966:126), Sierra de Miahuatlán; see Type Localities.

#### Family MUSCICAPIDAE

*Regulus satrapa* Lichtenstein. Golden-crowned Kinglet

Status uncertain. Only one record, a male (USNM 148857) taken by Boucard on an unknown date in the Interior at "la Parada" [= La Parada] (town at 7,900 ft but elevation at exact point of collection unknown).

*Subspecies: aztecus* Lawrence.

*Regulus calendula* (Linnaeus). Ruby-crowned Kinglet.

Winter resident in the Interior and adjacent high mountain slopes of Atlantic and Pacific Regions, common in pine-oak forest (especially the humid portions) and uncommon in cloud forest. Should be sought in mountains east of Isthmus. No certain record for lowlands, although Graber and Graber (1959:75; in litt.) believe they observed 1 bird 1 mi south of Loseta on 11 December 1957, and D. G. Berrett probably saw 1 at Temascal on 30 November 1961. *Dates*: 23 October to 1 May; dates of 10 and 11 October 1941 on del Toro Avilés specimens (females MLZ 38357 and 38361) purportedly from Moctum are questionable. *Elevations*: 4,100 to 9,300 ft.

*Subspecies: calendula* (Linnaeus). I follow Browning (1979) in treating *cinereus* Grinnell and *arizonensis* Phillips as synonyms of *R. c. calendula*.

*Ramphocaenus melanurus* Vieillot. Long-billed Gnatwren.

Fairly common permanent resident in Atlantic Region in brushy clearings within tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to a point 8 mi north of Matías Romero and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: rufiventris* (Bonaparte).

*Polioptila caerulea* (Linnaeus). Blue-gray Gnatcatcher.

Common winter resident throughout lower portions of Atlantic and Pacific Regions in tropical evergreen forest, tropical semideciduous forest, tropical deciduous forest, arid tropical scrub, and Pacific swamp forest. Fairly common

permanent resident in the Interior in arid subtropical scrub and in adjacent portions of oak scrub, juniper scrub, and arid pine-oak forest, breeding east to a point 4 mi north of San Pedro Totolapan. *Dates*: extremes for known winter residents: 30 September to 24 March. *Elevations*: permanent residents, 3,200 to 6,300 ft; definite winter residents, sea level to 4,500 ft.

*Breeding*: 5 May 1966, nest with one gnatcatcher egg and one *Molothrus ater* egg (10 mi east of Oaxaca City, 5,200 ft, Rowley [1984:186], WFVZ 20773), to 21 May 1963, nest with four eggs (Juniper Camp, 5,600 ft, Rowley, WFVZ 26623).

*Subspecies*: *nelsoni* Ridgway, permanent resident (see Type Localities); *deppei* van Rossem, winter resident at least in Pacific Region from Isthmus eastward; *caerulea* (Linnaeus), winter resident in Atlantic and Pacific Regions. I find no evidence that any race other than *nelsoni* occurs in the Interior or breeds in the state, although *deppei* might be expected to breed in the lowlands of the Atlantic Region. The type of *Poliioptila c. mexicana* (Bonaparte) is the only record aside from *nelsoni* from the Interior and, thus might be of questionable locality despite its migrant status; see Type Localities.

*Poliioptila albiloris* Sclater and Salvin. White-lored Gnatcatcher.

Permanent resident, very common in Pacific Region in tropical deciduous forest and arid tropical scrub and common in the Interior in arid tropical scrub of valley of San Juan Bautista Cuicatlán and arid subtropical scrub near Santiago Chazumba, extending north in Isthmus to Chivela and northwest in Río Tehuantepec basin to vicinity of San Pedro Totolapan. Populations in valley of San Juan Bautista Cuicatlán and Pacific Region apparently connected via Río Balsas basin. *Elevations*: sea level to 6,100 ft. See *P. plumbea* below and *P. nigriceps* in Hypothetical List.

*Breeding*: 15 May 1966, nest with four young (Rancho Sol y Luna, Rowley [1984:187], to 12 July 1962, prejuvenile (20 mi northwest of La Ventosa, M. D. Tuttle, male, AMNH 781214); see also *Molothrus ater*.

*Subspecies*: *vanrossemei* Brodkorb; see Type Localities.

*Poliioptila plumbea* (Gmelin). Tropical Gnatcatcher.

Rare permanent resident in openings within tropical evergreen forest of lowlands on Atlantic side of Isthmus of Tehuantepec, recorded at only four localities, points 18 (Río Sarabia), 24 (Montebello), and 28 road mi north of Matías Romero and at a point 1 mi south of Loseta, the north-westernmost localities in entire range of species. *Elevations*: 250 to 300 ft.

*Breeding* (all data): range, habitat, and dates.

I examined four specimens, know of two others, and made one additional observation of the Tropical Gnatcatcher. Two males were taken by Lamb at the Río Sarabia 18 road mi north of Matías Romero, 300 ft, on 1 June (MLZ 59658) and 10 June (MLZ 59657) 1955. Graber and Graber (1959:75) reported as *P. albiloris* a male *plumbea* (GMSC, 7 g, skull not completely ossified, testes very small) they took on 15 December 1957 near the junction of the Río Jumuapán (erroneously published as "Río Jaltepec") and the Trans-Isthmian Highway 1 mi south of Loseta (specimen labeled 22 mi south of Jesús Carranza, Veracruz). Sight records by the Grabers, published as "*P. albiloris* or *P. caerulea*," probably represent a composite of *plumbea* and *caerulea*. On 28 March 1962 at Montebello, Schaldach took a female *plumbea* (AMNH 778378, skull ossified, ovary not en-

larged). I saw a bird on 4 June 1964 at a point 28 road mi north of Matías Romero. A. R. Phillips (in litt.) has in his collection two unsexed birds collected by Schaldach, one (6.3 g, little or no fat) on 10 December 1959, 18 road mi north, and one (little fat) on 31 March 1962, "24 road miles north of Matías Romero" [= Montebello].

*Subspecies: brodkorbi* Parkes, according to Parkes (1979:73).

*Sialia sialis* (Linnaeus). Eastern Bluebird.

Fairly common permanent resident in Pacific Region west of Isthmus and in the Interior, inhabiting highland pine forest and open, arid pine-oak forest. Should be sought east of Isthmus. *Elevations:* 2,900 to 9,300+ ft.

*Breeding* (all data): 26 April 1961, enlarged testes (9 × 4 mm, 38 road mi southwest of Valle Nacional, 9,300 ft, Wolf, LSUMZ 24701, 26.2 g, moderately fat); 28 April 1961, active nest, condition unknown (same locality, Binford); 17 May 1964, enlarged testes (11 × 6 mm, 9 mi south of Putla de Guerrero, 2,900 ft, Morony, LSUMZ 33350, 30.7 g, little fat).

*Subspecies: fulva* Brewster. I follow the taxonomic treatment by Webster (1973).

*Myadestes occidentalis* Stejneger. Brown-backed Solitaire.

Permanent resident above 3,900 ft in humid and semiarid pine-oak forests, common in Pacific Region in Sierra Madre de Chiapas and Sierra de Miahuatlán and fairly common in the Interior; visitant and perhaps breeding in cloud and tropical semideciduous forests adjacent to pine-oak forest in Sierra de Miahuatlán, Sierra de Yucuyacua, and Sierra Madre de Chiapas. Unrecorded in Atlantic Region west of Isthmus. *Elevations:* 3,900 to 9,700 ft. See *M. unicolor*.

*Breeding:* 24 March 1964, nest with three eggs (12 mi north-northeast of Zanatepec, 4,900 ft, Binford observation), to 12 July 1965, nest with two fresh eggs (kilometer marker 183 near La Cima, 6,000 ft, Rowley, WFWZ 21259); 3 April 1964, prejuvenile (Colonia Rodolfo Figueroa, Rook, WFWZ-HC 13509).

*Subspecies: occidentalis* Stejneger, Pacific and Interior Regions in Sierra de Miahuatlán and Sierra de Yucuyacua; ssp., formerly *obscurus* Lafresnaye, now without a specific name as the result of merging *Phaeornis obscurus* (Gmelin) into *Myadestes* (see A.O.U. 1985), Interior in Sierra de Juárez, Sierra Aloapaneca, and Sierra de Zempoaltepec; *oberholseri* Dickey and van Rossem, Pacific Region east of Isthmus in Sierra Madre de Chiapas. I cannot see the characters that supposedly distinguish *deignani* Phillips (1966:128) of the Sierra de Miahuatlán and consider it a synonym of *M. o. occidentalis*; see Type Localities.

*Myadestes unicolor* Sclater. Slate-colored Solitaire.

Common permanent resident in Pacific Region east of Isthmus and in Atlantic Region, breeding from 2,600 to 7,000 ft in cloud forest and adjacent upper limits of tropical evergreen forest and wintering in breeding range and down to 1,900 ft in tropical evergreen forest. Record from Pacific Region at Zapotitlán (Sumichrast 1881:241) probably pertains to *M. occidentalis*, a species not listed by Sumichrast.

*Breeding:* 12 April 1964, nest with three eggs (Sierra Reten, 7,000 ft, Rook, WFWZ 35307), to 23 April 1961, nest with two eggs (15 road mi southwest of Valle Nacional, 4,100 ft, Binford observation).

I examined 17 study skins (LSUMZ, WFWZ, UK) and one set of eggs (WFWZ)

from seven localities: 11 and 15 road mi southwest of Valle Nacional, 2,600 and 4,100 ft, respectively; Vista Hermosa, 1,400 to 1,600 m (4,593 to 5,249 ft); 12 mi north-northeast of Zanatepec, 4,900 ft; La Cumbre near Rancho Sol y Luna; Colonia Rodolfo Figueroa, 3,000 ft; and Sierra Reten, 4.5 km (2.8 mi) north of Rancho Cerro Baúl, 7,000 ft. I also saw this species 6 and 17 road mi southwest of Valle Nacional, at 1,900 and 4,850 ft, respectively, and 2 mi east-southeast of Colonia Rodolfo Figueroa, from 5,100 to 5,700 ft. The data on a specimen (female, MLZ 35693) taken by del Toro Avilés purportedly at Moctum on 9 October 1941 (Miller et al. 1957:196) are unreliable.

*Subspecies: unicolor* Sclater.

*Catharus aurantiirostris* (Hartlaub). Orange-billed Nightingale-Thrush.

Common permanent resident in all Regions of state, breeding in openings within cloud forest, tropical semideciduous forest, and humid pine-oak forest and wandering into and perhaps breeding in tropical evergreen forest, arid pine-oak forest, oak scrub, and arid subtropical scrub. *Elevations:* breeds from 3,000 to 7,500 ft; winters (and breeds?) down to 300 ft (1 mi southwest of Valle Nacional, 7 April 1961, Binford, male, LSUMZ 24699, 28.6 g, slightly fat, skull not completely ossified, testes  $2 \times 1$  mm).

*Breeding:* 29 April 1965, nest with three eggs (kilometer marker 182 on Puerto Escondido Road, 6,000 ft, Rowley, WFVZ 24369), to 7 September 1964, nest with three eggs (6 mi northeast of Oaxaca City, 5,500 ft, Rowley, WFVZ 24371); 9 June 1965, nest with young observed (kilometer marker 181 on Puerto Escondido Road, 6,000 ft, J. D. Webster notation on female study skin, WFVZ 30941, largest follicle 1 mm).

*Subspecies: melpomene* (Cabanis).

*Catharus occidentalis* Sclater. Russet Nightingale-Thrush.

Common permanent resident in Pacific and Interior Regions in all microhabitats within humid pine-oak forest except for the shadiest ravines, recorded east to Cerro Zempoaltepec (Nelson and Goldman) and Río Molino, the southeasternmost definite localities in entire range of species. A more eastern record, from Zapotitlán (Lawrence 1876:11; not in Puebla as often stated), probably belongs here but might pertain to *C. frantzii*. All records for Atlantic Region proper (San Miguel Soyaltepec, 4 February 1944, MLZ 31301; Moctum, MLZ) are based on specimens taken by del Toro Avilés and are questionable, although the species occurs at higher elevations on Atlantic versant of Interior Region. Sympatric with *C. frantzii* at Río Molino, near La Cima, on Cerro San Felipe (10 mi northeast and 3 mi east of La Cumbre), and probably on Cerro Zempoaltepec. Relative abundances for *C. occidentalis* and *C. frantzii* are tentative because the two species are difficult to separate in the field; abundances here based solely on specimens. For a thorough Oaxaca field study of these two species, see Raitt and Hardy (1970). *Elevations:* 5,800 to 10,800 ft.

*Breeding:* 29 April 1962, nest with young [Río Molino, 7,300 ft, Rowley [Rowley and Orr 1964b:312]], to 7 August 1966, prejuvenile (Ixtlán de Juárez, 7,200 ft, L. F. Baptista, sex?, CAS 67099); two prejuveniles taken by Rook at Río Molino on 21 (CAS) and 23 (WFVZ 30950) May 1965 and published as *C. frantzii* by Rowley (1966:185) are *C. occidentalis*; early April dates on prejuveniles (MLZ) taken by del Toro Avilés supposedly at Totontepec (Miller et al. 1957:193) are questionable; see also *Molothrus aeneus*.

*Subspecies: occidentalis* Sclater; endemic; see Type Localities. See Phillips (1969) for a thorough discussion of races and the specific distinctness of *Catharus occidentalis* and *C. frantzii*.

*Catharus frantzii* Cabanis. Ruddy-capped Nightingale-Thrush.

Uncommon permanent resident in cloud forest and along the shadiest ravines in humid pine-oak forest, recorded in Pacific Region in Sierra Madre de Chiapas and Sierra de Miahuatlán, in Atlantic Region in Sierra de Juárez and Sierra de Zempoaltepec, and in the Interior in Sierra Aloapaneca. *Elevations:* 4,850 to 10,000 ft. See *C. occidentalis*.

*Breeding:* 5 April 1964, one ruptured follicle and one enlarged follicle (3.5 mm, 12 mi north-northeast of Zanatepec, 4,900 ft, Binford, LSUMZ 33341, 32.3 g, moderately fat), to 8 June 1966, nest with two eggs (Cerro San Felipe, 9,500 ft, Rowley, WFVZ 20758); 9 May 1967, nest with two young (3 mi east of La Cumbre near Cerro San Felipe, Raitt and Hardy [1970:32]); see *C. occidentalis*.

*Subspecies* (according to Phillips 1969): *omiltemensis* Ridgway, Pacific Region west of Isthmus; *nelsoni* Phillips, Atlantic Region west of Isthmus and Interior (see Type Localities); *chiapensis* Phillips (1969:617), Sierra Madre de Chiapas. Phillips (1969:618) could not allocate specimens (LSUMZ) from the Pacific Region east of the Isthmus; I include them in *chiapensis* only on geographical grounds.

*Catharus mexicanus* (Bonaparte). Black-headed Nightingale-Thrush.

Common permanent resident in cloud forest and tropical semideciduous forest of Pacific Region east of Isthmus in Sierra Madre de Chiapas; uncommon breeder in cloud forest of Atlantic Region in Sierra de Juárez, where presumably a permanent resident but recorded only from 8 April to 21 June and not seen by me southwest of Valle Nacional during period of intensive field work from 23 to 29 November 1961. To be expected in cloud forest elsewhere in Atlantic Region. *Elevations:* 3,000 to 5,500 ft.

*Breeding:* 30 April 1967, nest with three eggs (above Colonia Rodolfo Figueroa, 5,500 ft, Rowley, WFVZ 21209), to 26 May 1967, nest with two eggs (Colonia Rodolfo Figueroa, 4,500 ft, Rowley, WFVZ 21214).

This species has rarely been reported from Oaxaca. I examined 41 study skins (LSUMZ, WFVZ, UK) and 6 sets of eggs (WFVZ) from the following localities: 12 mi north-northeast of Zanatepec, 4,900 ft; La Cumbre near Rancho Sol y Luna; at (4,500 ft), above (5,500 ft), near (3,000 ft), 4 km (2.5 mi) northwest (5,200 ft), and 5 km (3.1 mi) northwest (4,800 ft) of Colonia Rodolfo Figueroa; Cerro Baúl, 4,300 and 4,000 ft; at (3,900 ft) and above (4,500 ft) Rancho Carlos Minne, Cerro Baúl; 7 km (4.3 mi) above El Salto in Sierra San Martínez; 15 road mi southwest of Valle Nacional, 4,100 ft; and Vista Hermosa, 1,600 m (5,249 ft). I also saw this species 2 mi east-southeast of Colonia Rodolfo Figueroa, 4,700 to 5,300 ft, and 17 road mi southwest of Valle Nacional, 4,850 ft.

*Subspecies: cantator* Griscom, according to A. R. Phillips (pers. comm.), east of Isthmus; *mexicanus* (Bonaparte), west of Isthmus.

*Catharus dryas* (Gould). Spotted Nightingale-Thrush.

Fairly common permanent resident in Pacific Region in cloud forest of Sierra Madre de Chiapas. Oaxaca localities are northwesternmost in entire range of species. *Elevations:* 4,700 to 6,400 ft.

*Breeding:* 26 May 1968, two nests with two eggs each (Valle de Piedras, Cerro

Baúl, 6,400 ft, Galley, WFVZ 25767–25768), to 28 October 1965, prejuvenile (Cerro Baúl, 5,500 ft, Rook, male, WFVZ-HC 16942).

I have examined 32 study skins (LSUMZ, WFVZ) and two sets of eggs (WFVZ) from the following localities: 12 mi north-northeast of Zanatepec, 4,900 ft; Arroyo de los Pajareros below La Cumbre (above Rancho Sol y Luna); Valle de Piedras, Cerro Baúl, 6,400 ft; Cerro Baúl, 5,500 ft; at and 4.5 km (2.8 mi) north of Rancho Cerro Baúl; at (4,700 ft), above (5,000 ft), 6 km (3.7 mi) north (Canyon of Cerro Baúl, 5,200 ft), and 3 km (1.9 mi) west (La Golfa) of Colonia Rodolfo Figueroa. Weights of three specimens (LSUMZ 33332–33334, respectively; all with little fat) from the first locality are: 35.9 g (4 April 1964, female), 41.1 g (30 March 1964, male), and 35.8 g (7 April 1964, male).

*Subspecies: harrisoni* Phillips and Rook (1965:4); endemic; see Type Localities. My examination of the type series of *harrisoni* in January 1980, after the specimens had faded badly, revealed that the upperparts are darker gray and slightly more olive (less pure gray) than faded examples of *ovandensis* Brodtkorb of Chiapas. The differences in color of the bare parts and underparts (including chest spots) noted by Phillips and Rook are no longer apparent.

*Catharus ustulatus* (Nuttall). Swainson's Thrush.

Uncommon winter resident in Pacific Region both east and west of Isthmus from sea level to 6,500 ft in Pacific swamp, tropical semideciduous, and cloud forests (*ustulatus* and *oedicus*). Fairly common transient migrant on north-south axis through Isthmus (*swainsoni*). Only records for Atlantic Region outside Isthmus (San Miguel Soyaltepec, 1 November 1943, male, MLZ 31299; Tutla, 1 February and 1 March 1941, males, FMNH 119764–119765, respectively) are based on del Toro Avilés specimens and are questionable, especially the dates. I did not record this species near Valle Nacional during daily surveys from 14 February to 7 April 1961. *Dates*: extremes, 3 October to 2 May; major spring migration period in Isthmus, late March and early April.

*Subspecies: ustulatus* (Nuttall), *oedicus* (Oberholser), and *swainsoni* (Tschudi); see ranges above. Oberholser (1898:306) recorded as *almae* (Oberholser) a specimen from "Japaná" [= Tapanatepec], but the only specimen (USNM 58886) that I can find from that locality seems to be *swainsoni*. I follow the taxonomic treatment by Bond (1963).

*Catharus guttatus* (Pallas). Hermit Thrush.

Very uncommon winter resident in pine-oak forests of Interior, reliably recorded east to Cerro Verde and a point 10 road km (6.2 mi) southeast of Santiago Matatlán. All records for Atlantic Region questionable: two specimens from Río Tonto (Pardiñas 1946:218) and two from Moctum (10 and 14 October 1941, females, MLZ 35967 and 35926, respectively) taken by del Toro Avilés have unreliable data; sight record by Graber and Graber (1959:75) for Atlantic side of Isthmus retracted by authors (in litt.). *Dates*: 18 October to 12 May. *Elevations*: 5,700 to 9,300 ft.

*Subspecies: auduboni* (Baird). The occurrence of *faxoni* (Bangs and Penard) in Oaxaca (Miller et al. 1957:190) is based on a del Toro Avilés specimen (MLZ 35967) from Moctum that is of questionable origin and might be exceptionally "foxed." I follow the treatment by Aldrich (1968); both he and Phillips (1962b) consider *polionotus* (Grinnell), listed for Oaxaca by Miller et al. (1957:189), a synonym of *auduboni*.

*Hylocichla mustelina* (Gmelin). Wood Thrush.

Fairly common winter resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas. One record for Pacific Region west of Santa Efigenia, a specimen taken by Sumichrast in an unknown habitat at Tehuantepec City (Lawrence 1876:11). Recorded during migration at 4,900 ft in cloud forest of Sierra Madre de Chiapas (12 mi north-northeast of Zanatepec, 3 April 1964, 1 seen by Binford). *Dates*: 27 November to 6 April; although species probably arrives in early fall, dates of 10, 20, and 24 October 1943 on del Toro Avilés specimens (MLZ) are not reliable. *Elevations*: 100 to 2,600 ft; 4,900 ft.

*Turdus infuscatus* (Lafresnaye). Black Robin.

Fairly common permanent resident in all Regions in cloud and humid pine-oak forests. *Elevations*: 4,900 to 9,700 ft.

*Breeding*: 20 April 1969, nest with two eggs (approximately 25 mi northwest of Colonia Rodolfo Figueroa, 5,400 ft, Galley, WFVZ 52084), to 9 June 1966, nest with two eggs (Cerro San Felipe, 9,500 ft, Rowley, WFVZ 20744); 6 July 1894, prejuvenile (Cerro Zempoaltepec, Nelson and Goldman, male, USNM 142537); the dates of 21 and 27 April 1942 on two male prejuveniles (MLZ 33850–33851, respectively) taken by del Toro Avilés supposedly at Totontepec are questionable.

*Turdus plebejus* Cabanis. Mountain Robin.

Very uncommon resident, presumably permanent, in cloud forest of Sierra Madre de Chiapas. Oaxaca localities are northwesternmost in entire range of species. Five records, all specimens (WFVZ-HC 19141 and 19682–19685, respectively) with ossified skulls, as follows: Canyon of Cerro Baúl, 6 km (3.7 mi) north of Colonia Rodolfo Figueroa, 5,200 ft, 25 May 1967, female (“brood patch,” Galley); Valle de Piedras, Cerro Baúl, 6,400 ft, 11 June 1968, female (egg in oviduct, Galley), female (Galley), female (“brood patch,” Galley), and male (testes 15 × 12 mm, P. Flores).

*Breeding* (all data): see above.

*Subspecies*: *differens* (Nelson).

*Turdus grayi* Bonaparte. Clay-colored Robin.

Common permanent resident in Atlantic Region in openings within tropical evergreen forest, in Pacific Region foothills of Sierra Madre de Chiapas in Pacific swamp forest and openings within tropical semideciduous forest, and in the Interior in unknown habitat at Teotitlán del Camino. Absent from Pacific Region west of Isthmus; occurrence as a breeding bird in Guerrero (Miller et al. 1957: 184) needs confirmation. *Elevations*: 100 to 4,350 ft.

*Breeding*: 23 April 1966, nest with three eggs (Arroyo Las Minas, Galley, WFVZ 35300), to 13 July 1961, nest with three eggs (Donají, Rook, WFVZ 68418); 21 July 1894, prejuvenile (near Totontepec, Nelson and Goldman, female, USNM 142488).

*Subspecies*: *lanyoni* Dickerman (1981a:287), Atlantic Region; *linnaei* Phillips (1966:127), Pacific and Interior Regions. Most specimens from the Pacific and Interior Regions, north in Isthmus to a point 18 road mi north of Matías Romero, are variously intermediate between *lanyoni* and *linnaei* (from interior Chiapas) but are closer to the latter, especially those near the Chiapas border.

*Turdus assimilis* Cabanis. White-throated Robin.

Permanent resident in Atlantic and Pacific Regions, very common in cloud forest and common in tropical evergreen forest above 1,900 ft and tropical semideciduous forest down to 900 ft. Only two records for Interior (Sierra Aloapaneca, Cerro San Felipe, 23 June 1894, Nelson and Goldman, female, USNM 142509; 4 mi south of San Pedro y San Pablo Ayutla, 13 June 1966, Rowley, female, WFVZ-HC 19257), where status uncertain. Uncommon winter resident or winter visitant in tropical evergreen forest from 300 to 1,900 ft. *Elevations*: 300 to 8,600+ ft.

*Breeding*: 3 April 1964, nest with two eggs (Colonia Rodolfo Figueroa, Cerro Baúl, 4,500 ft, Galley, WFVZ 35303), to 7 June 1968, nest with three eggs (Cerro Baúl, 3,900 ft, Galley, WFVZ 25756); 12 May 1965, prejuvenile (kilometer marker 187 on the Puerto Escondido Road, 5,800 ft, Rook, male, CAS, 62.4 g, some fat); the dates of 3 and 18 (not "8") May 1942 on two prejuveniles (MLZ 33917 and 33853, respectively) taken by del Toro Avilés supposedly at Totontepec (Miller et al. 1957:184) are questionable.

*Subspecies*: *oaxacae* Orr and Webster (1968:38), Pacific Region west of Isthmus in Sierras de Miahuatlán and Yucuyacua (see Type Localities); *assimilis* Cabanis, northwestern third of Atlantic Region (southwest to near Loma Bonita; Lamb) and, according to Orr and Webster (1968:39), Sierra Aloapaneca; *leucauchen* Sclater, Pacific Region east of Isthmus. Birds from Totontepec and Tutla (del Toro Avilés, MLZ; localities questionable) and from La Ranchería (Nelson and Goldman, USNM) are variously intermediate between the last two subspecies, with those from La Ranchería closest to *leucauchen*. The race *oaxacae* is fairly well-marked.

*Turdus rufopalliatu*s Lafresnaye. Rufous-backed Robin.

Common permanent resident west of Isthmus in tropical deciduous forest, Pacific swamp forest, and riparian situations within arid tropical scrub and adjacent lower reaches of arid subtropical scrub, occurring in three probably disjunct populations, as follows: in the Interior at Teotitlán del Camino and near San Juan Bautista Cuicatlán; in the Interior at several points near Tamazulapan del Progreso; and in Pacific Region from near Guerrero border east to Tehuantepec City and thence northwest in Río Tehuantepec basin to San Juan del Río. The two Interior populations apparently extend into Oaxaca from the Río Balsas basin. Records for tropical evergreen forest at points 18 and 24 road mi north of Matías Romero (14 March 1961, AMNH 776113; 22 March 1962, AMNH 778379–778380; all Schaldach, females, ovaries not enlarged) represent casual winter visitants. Rowley mentions a nest containing three robin eggs and two of *Molothrus aeneus* on 18 June 1965 at 5,000 ft elevation at Oaxaca City (Friedmann 1966: 8 and Rowley 1984:185–186); the robin identification is questionable, because the species is otherwise unknown from the Oaxaca Valley. Oaxaca localities are southeasternmost in entire range of species. *Elevations*: sea level to 6,000 ft.

*Breeding*: 18 May 1964, two family groups with adults feeding prejuveniles (1 mi east of Putla de Guerrero, 2,400 ft, Binford observations), to 3 July 1965, nest with three eggs (kilometer marker 135 on Putla de Guerrero Road, Rowley, WFVZ 21239); see also above.

*Subspecies*: *rufopalliatu*s Lafresnaye.

*Turdus migratorius* Linnaeus. American Robin.

Fairly common permanent resident in humid and semiarid pine-oak forests of Interior, breeding east to Cerro Zempoaltepec and Río Molino, the southeasternmost breeding localities in entire range of species. Numbers augmented by winter residents from north. Not recorded outside geographic and elevational breeding range even in winter. *Elevations*: 6,000 to 10,000 ft.

*Breeding*: 28 April 1968, nest with two eggs (Cerro San Felipe, 9,500 ft, Rowley, WFVZ 25755), to 22 June 1967, nest with one egg and one newly-hatched young (Cerro San Felipe, 10,000 ft, Rowley [1984:186]); 7 July 1965, prejuvenile (4 mi north of San Andrés Chicahuaxtla, 8,000 ft, Rowley and F. Flores, male, WFVZ 23939).

*Subspecies*: *phillipsi* Bangs, permanent resident; *propinquus* Ridgway, winter resident.

*Ridgwayia pinicola* (Sclater). Aztec Thrush.

Very uncommon permanent resident in the Interior in broadleaved portions (especially ravines) of humid pine-oak forest of Sierra de Miahuatlán and Sierra Aloapaneca, recorded only in general vicinities of Río Molino, La Cima, and La Cumbre. Should be sought in similar habitats elsewhere west of Isthmus. Oaxaca localities are southeasternmost in entire range of species. *Elevations*: 6,000 to 9,000 ft.

*Breeding*: 2 May 1962, nest with at least one egg (near Río Molino, 8,500 ft, Rowley [1966:181]), to 5 June 1965, nest with two eggs (above kilometer marker 183 on Puerto Escondido Road, about 6,500 ft, Rowley, WFVZ 21364).

#### Family MIMIDAE

*Dumetella carolinensis* (Linnaeus). Gray Catbird.

Winter resident, fairly common in Atlantic Region in tropical evergreen forest and uncommon in Pacific Region in Pacific swamp and tropical semideciduous forests of Sierra Madre de Chiapas and Sierra de Miahuatlán. *Dates*: 5 December to 20 April; undoubtedly arrives earlier in fall, but dates of 8, 12, 15, 16, and 22 October 1943 on specimens (MLZ) collected by del Toro Avilés supposedly at San Miguel Soyaltepec are unreliable. *Elevations*: 200 to 800+ ft.

*Subspecies*: monotypic. On the basis of specimens I have examined, I agree with Monroe (1968:300) and others that variation in this species is too slight to warrant taxonomic recognition of *ruficrissa* Aldrich (1946:132) and *meridianus* Burleigh (1959:29).

*Mimus polyglottos* (Linnaeus). Northern Mockingbird.

Uncommon permanent resident in the Interior in arid subtropical scrub, adjacent oak scrub, and perhaps arid tropical scrub, breeding east at least to a point 4 road mi east of Santiago Matatlán (see below). Hybrids between *M. polyglottos* and *M. gilvus* (see below) indicate status as a rare permanent resident in Isthmus, but pure *polyglottos* apparently unrecorded in Isthmus during breeding season; normal breeding range of species apparently ends just west of Isthmus. Winter resident from north, very uncommon in Atlantic Region (San Ildefonso Villa Alta; a point 1 mi southwest of Valle Nacional; probably Río Givicia, exact location

uncertain; 24 February to 21 March) in openings within tropical evergreen forest and uncommon throughout Pacific Region (29 October to 11 March) in arid tropical scrub and openings within tropical deciduous forest. *Elevations*: permanent residents (excluding hybrids), 3,450 to 6,100 ft; winter residents, sea level to 3,000 ft.

*Breeding* (all data): 10 April 1961, nest under construction, and 27 May 1964, nest with one egg (both 4 road mi east of Santiago Matatlán, 6,100 ft, Binford observations); 6 May 1963, nest with three eggs (near San Andrés Miahuatlán, about 5,200 ft, Rowley [1984:177], WFVZ 26632).

*Subspecies: leucopterus* (Vigors). Wetmore (1943:302–303) discusses interbreeding between *M. polyglottos* and *M. gilvus* in the Isthmus of Tehuantepec and considers the crosses to be hybrids rather than intergrades, thus treating the two forms as separate species. Phillips (1962b:346–347), on the other hand, merges the two forms because of close similarity in morphology, songs, calls, and habits. I have seen only two definite hybrids from Oaxaca: San Mateo del Mar, 15 May 1895, Nelson and Goldman, male, USNM 142603; Sarabia, 27 March 1962, Schaldach, female, CAS 70152. Three specimens of *gilvus* from Tehuantepec City (UMMZ 138567–138569) exhibit characters that possibly are attributable to hybridization but might instead represent individual variation. The fact that no pure *polyglottos* has been collected during the breeding season within the Oaxaca range of *gilvus* indicates that hybridization must be rare. Possibly, the few *polyglottos* that remain in the Isthmus during the breeding season mate with *gilvus* because of the difficulty of locating other *polyglottos*. What would happen were the two forms both common in an area of sympatry remains a matter of conjecture. A detailed hybrid index should be applied to the Isthmus population, and a careful field study of isolating mechanisms among parents and selective pressures on progeny should be made. Until the two forms are shown to intergrade freely, or as freely as occurrence together allows, I prefer to recognize two species.

*Mimus gilvus* (Vieillot). Tropical Mockingbird.

Permanent resident in Isthmus of Tehuantepec, common in arid tropical scrub of Pacific Region from Ixhuatán and Niltpec west to Tehuantepec City and Chivela and rare in openings within tropical evergreen forest in Atlantic Region (one record, near Mogoñé, 20 May 1962, Schaldach, male, AMNH 787562, testes  $4 \times 2$  mm, little fat). Northwestern limit of entire range of species is in Isthmus. *Elevations*: sea level to 700 ft.

*Breeding* (all data): 15 May 1895, two prejuveniles (San Mateo del Mar, Nelson and Goldman, female, USNM 142589, sex?, USNM 142596).

*Subspecies: gracilis* Cabanis. The race *lawrencei* Ridgway (see Type Localities), here treated as a synonym of *gracilis*, might prove valid when hybridization with *M. polyglottos* is clarified; at least some of the characters of *lawrencei* are the same as those exhibited by hybrids. See *M. polyglottos*.

*Toxostoma ocellatum* (Sclater). Ocellated Thrasher.

Uncommon permanent resident in the Interior, inhabiting primarily oak scrub but also bushy areas within arid pine-oak and adjacent humid pine-oak forests and arid subtropical scrub adjacent to first two habitats, recorded east to a point 4 road mi east of Santiago Matatlán, the southeasternmost locality in entire range of species. *Elevations*: –5,750 to 9,000 ft.

*Breeding* (all data): 12 May 1971, nest with two eggs (southeast of Santiago Matatlán, A. R. Phillips [in litt.] observation).

*Subspecies: ocellatum* (Sclater); see Type Localities. I have not assessed *villai* Phillips (1986:189) from Distrito Federal, which, if invalid, would render the species monotypic.

*Toxostoma curvirostre* (Swainson). Curve-billed Thrasher.

Common permanent resident in the Interior in arid tropical scrub in valley of San Juan Bautista Cuicatlán and throughout arid subtropical scrub, recorded east to a point at 3,200 ft elevation 2 road mi northwest of San Pedro Totolapan, the southeasternmost definite locality in entire range of species. Occurrence in Atlantic Region at Moctum (17 September 1941, del Toro Avilés, female, MLZ 35520) is questionable. *Elevations*: 3,100 to 7,000 ft.

*Breeding*: 26 April 1968, nest with three eggs (San Felipe del Agua, 5,200 ft, Rowley, WFVZ 25759), to 24 July 1961, nest with three young (near Santa María Coyotepec, Rowley [1984:178] observation); 12 July 1943, prejuvenile (Tamazulapan del Progreso, 6,000 ft, Lamb, male, MLZ 38224).

*Subspecies: curvirostre* (Swainson).

*Melanotis caerulescens* (Swainson). Blue Mockingbird.

Permanent resident west of Isthmus, common in Pacific Region in openings in humid pine-oak and adjacent cloud forests and in the Interior in oak scrub, arid subtropical scrub adjacent to oak scrub, openings in humid pine-oak forest, and brushy, arid pine-oak forest, and uncommon and local in Atlantic Region in uncertain habitat at Totontepec (Boucard) and perhaps (del Toro Avilés) Moctum. Very rare winter visitant to lowlands of Atlantic Region (one record, margin of tropical evergreen forest at 300 ft elevation 1 mi southwest of Valle Nacional, 27 February 1961, Wolf, male, LSUMZ 24675, 59.6 g, testes small). Recorded east to Zapotitlán, Totontepec, and perhaps (del Toro Avilés) Moctum, the southeasternmost localities in entire range of species. *Elevations*: 300 feet; 2,400 to 9,700 ft.

*Breeding*: 28 April 1968, nest with two eggs (Cerro San Felipe, 9,500 ft, Rowley, WFVZ 25757), to 12 July 1965, nest with two eggs (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, Rowley, WFVZ 21274); 25 July 1957, prejuvenile (2 mi west of Tamazulapan del Progreso, 6,000 ft, Lamb, male, WFVZ-HC 3488).

*Subspecies: caerulescens* (Swainson).

#### Family MOTACILLIDAE

*Anthus spinoletta* (Linnaeus). Water Pipit.

Winter resident in savannas of Pacific and Interior Regions, generally very uncommon but found to be common (up to 28 birds in flock) from 14 to 20 February 1964 at a point 9 road mi west-northwest of San José Estancia Grande (Morony and Binford). *Dates*: 2 November to April; date of 1 November given by Ridgway (1904:15), citing Lawrence (1876:14), probably erroneous, because Lawrence lists only "November" and the only specimen (USNM 59597) that I can find taken by Sumichrast bears the date 2 November. *Elevations*: sea level to 300+ ft; doubtless much higher for Huajuapán de León and San Pedro Juchatengo records.

*Subspecies: rubescens* (Tunstall); *pacificus* Todd. Because specimens (MLZ) taken at San Pablo Villa de Mitla by del Toro Avilés are of highly questionable origin, the race *alticola* Todd (Miller et al. 1957:210) should be removed from the Oaxaca list.

#### Family BOMBYCILLIDAE

*Bombycilla cedrorum* Vieillot. Cedar Waxwing.

Fairly common winter resident in all terrestrial habitats throughout state; apparently most numerous in tropical deciduous forest in lowlands of Pacific Region. *Dates*: 11 December to 21 May; date of 26 May 1949 is based on del Toro Avilés specimen (Amatepec, female, USNM 462881) and, thus, is questionable. *Elevations*: sea level to 8,600 ft.

*Subspecies*: monotypic. On the basis of specimens I have examined, I agree with Monroe (1968:313) that *larifuga* Burleigh (1963:178) and *aquilonia* Burleigh (1963:179) are not well enough marked to warrant taxonomic recognition.

#### Family PTILOGONATIDAE

*Ptilogonys cinereus* Swainson. Gray Silky-flycatcher.

Common permanent resident in Pacific Region west of Isthmus and in the Interior, breeding above 5,000 ft in pine-oak forest and juniper scrub and occasionally wintering down into both oak scrub and arid subtropical scrub of Interior and lower reaches of pine-oak forest of Pacific Region west of Isthmus. Should be sought in similar habitats east of Isthmus. *Elevations*: 3,600 to 9,700 ft.

*Breeding* (all data): 29 April 1965, nest with two eggs (Cerro San Felipe, 9,000 ft, Rowley, WFVZ 21174); May 1858, nest with eggs (Oaxaca [City?], Boucard [Sclater 1859b:376]); no date, nests with young (in and near the Sierra de Miahuatlán, Rowley observations [1966:188]).

*Subspecies: cinereus* Swainson. The race *schistaceus* Phillips (1966:129), described from Río Molino, Oaxaca, is based on color differences that are visible only in fresh-plumaged fall females and are so slight as to be of no practical taxonomic value; I therefore consider *schistaceus* a synonym of *P. c. cinereus*; see Type Localities. On the other hand, *palescens* Griscom from Guerrero, merged with *cinereus* by Phillips (1966:129), seems to me a poorly-marked but valid subspecies.

*Phainopepla nitens* (Swainson). Phainopepla.

Uncommon winter resident in arid subtropical scrub of extreme northwestern portion of Interior; possibly a permanent resident. Oaxaca records are southeasternmost in entire range of species. Recorded by Berretts and Binford in 1961 at 6,100 ft elevation 34 road north-northeast of Huajuapán de León (about 3 mi northeast of Santiago Chazumba), as follows: 22 September, 12 seen, of which one male was taken by Binford (LSUMZ 27541, 29.1 g, little fat, skull completely ossified, testes small); 23 and 24 September, 2 seen each day. Record from "Tehuantepec (State of Puebla, near Mexico)" (Sumichrast 1869:548), which apparently formed the basis for Bent's (1950:113) locality "Oaxaca (Tehuantepec)," probably does not pertain to Oaxaca. Records for San Pablo Villa de Mitla (Miller

et al. 1957:213) based on del Toro Avilés specimens (11–18 January 1943, 10 specimens, MLZ), are questionable.

*Subspecies: nitens* (Swainson).

#### Family LANIIDAE

*Lanius ludovicianus* Linnaeus. Loggerhead Shrike.

Winter resident, fairly common in the Interior in arid subtropical scrub, arid tropical scrub, savanna, and cultivated land and uncommon in lowlands in Pacific Region (6 October to 19 February) in arid tropical scrub and savanna, recorded east to La Ventosa and Tehuantepec City, the southeasternmost localities in entire range of species, except for one December record from Guatemala (Ericsson 1981). Uncommon permanent resident in the Interior in arid subtropical scrub and adjacent savanna, cultivated land, and grazed land, occurring, and presumably breeding, east to a point 4 road mi east of Santiago Matatlán (6,100 ft, 11 May 1961, 1 bird seen by Binford and Wolf), the southeasternmost locality in entire breeding range of species. *Elevations:* presumably breeds (recorded May–July) from 5,000 to 7,900 ft; winters, 100 to 6,900 ft.

*Breeding:* 3 May 1966, nest with four eggs (WFVZ 20735), to 24 June 1966, nest with five young nearly ready to leave (Rowley field notes in CAS; both nests 2 mi south of San Bartolo Coyotepec, 5,000 ft).

*Subspecies: mexicanus* Brehm, permanent resident; *excubitorides* Swainson, winter resident.

#### Family VIREONIDAE

*Vireo brevipennis* (Sclater). Slaty Vireo.

Very uncommon permanent resident in the Interior and adjacent upper reaches of Pacific and possibly (del Toro Avilés; Moctum, Totontepec, Amatepec) Atlantic Regions, inhabiting oak scrub and undergrowth of pine-oak forests east to kilometer marker 183 near La Cima and to a point 4 road mi east of Santiago Matatlán, the southeasternmost localities in entire range of species. *Elevations:* 5,600 to 6,100 ft; elevation of 2,100 m (6,888 ft) given for Amatepec specimens (Briggs 1953:157) is questionable.

*Breeding* (all data): 7 June 1965, nest with two eggs (WFVZ 21378, kilometer marker 183 on Puerto Escondido Road, 6,000 ft, Rowley [1966:190]); 22 June 1965, prejuvenile (kilometer marker 116 on Putla de Guerrero Road, 5,800 ft, Galley, male, CAS, 11.9 g, no fat); purported “stubby-tailed fledgling” taken on 12 July 1965 (kilometer marker 183, WFVZ 33105, Rowley [1966:190]) is a full-sized juvenile.

*Subspecies: monotypic.* On the basis of specimens I have examined, I agree with Phillips (1963:352–353) that *browni* (Miller and Ray) is not a valid subspecies.

*Vireo griseus* (Boddaert). White-eyed Vireo.

Winter resident, fairly common in Atlantic Region in openings within tropical evergreen forest and uncommon in Pacific Region in openings within tropical deciduous forest of foothills of Isthmus mountains and Sierra Madre de Chiapas from Chivela and a point 4 km (2.5 mi) south of Chivela east at least to Santa

Efgenia. *Dates*: 20 November to 22 March; dates of 16 and 17 November 1943, based on del Toro Avilés specimens (San Miguel Soyaltepec, MLZ), are unreliable. *Elevations*: 100 to 1,900 ft.

*Subspecies*: *griseus* (Boddaert); *noveboracensis* (Gmelin).

*Vireo bellii* Audubon. Bell's Vireo.

Winter resident, fairly common along entire length of Pacific Region in tropical deciduous forest and arid tropical scrub and rare in the Interior in arid subtropical scrub (Huajuapán de León and Guelatao) and in Atlantic Region in tropical evergreen forest (points 1 mi southwest of Valle Nacional and 18 road mi north of Matías Romero). *Dates*: 24 September to 8 May. *Elevations*: sea level to 6,300 ft.

*Subspecies*: *medius* Oberholser; *bellii* Audubon.

*Vireo atricapillus* Woodhouse. Black-capped Vireo.

Rare winter resident in Pacific Region in tropical semideciduous forest of Sierras de Miahuatlán and Yucuyacua; should be sought in the Interior. A. R. Phillips (in litt.) informs me that he saw a bird on 15 December 1966 at Copalita (town at 2,100 ft but elevation at exact point of observation unknown). On 11 February 1974 I saw a bird at 3,000 ft elevation 6 road mi north of Putla de Guerrero. The only other Oaxaca records are two adult females taken by Phillips (1966:89) on 8 December 1963 (ARPC 7298, little fat, skull completely ossified, ovary not enlarged) and 11 December 1963 (ARPC 7334) just north of San Gabriel Mixtepec (elevation at exact point of collection unknown but probably near 2,400 ft). Oaxaca localities are southeasternmost in entire range of species.

*Vireo nelsoni* Bond. Dwarf Vireo.

Very uncommon breeding bird of Interior in arid subtropical scrub, recorded from a point 22 km (13.7 mi) southeast of Huajuapán de León to a point 5 km (3.1 mi) southeast of Tamazulapán del Progreso, the latter the southeasternmost locality in entire range of species; presumably a permanent resident but recorded only from 10 May to 22 July. Should be sought in arid subtropical scrub throughout Interior. Perhaps winters at elevations higher than those on breeding grounds (Phillips 1962a:308). *Elevation*: 6,000 ft.

*Breeding* (all data): 4 June 1959, male with enlarged testes (4 × 3 mm, UMMZ 154653, 9.0 g) taken at nest with one egg (2 mi northwest of Tamazulapán del Progreso, D. A. Zimmerman and Binford).

*Vireo solitarius* (Wilson). Solitary Vireo.

Winter resident, fairly common in Atlantic Region in tropical evergreen forest and cloud forest and in Pacific Region in tropical semideciduous, tropical deciduous, and Pacific swamp forests and uncommon throughout Interior in pine-oak forests and to a lesser extent in arid subtropical scrub. Uncommon permanent resident in the Interior from 5,000 to 7,000 ft in arid pine-oak forest and oak scrub, occurring east to a point 4 road mi east of Santiago Matatlán, and at 4,300 ft in Pacific Region east of Isthmus (adult [WVZ-HC 16823] taken with nest [see below]). *Dates*: extremes of known winter residents, 12 October to 4 May (1965, CAS); dates of 6 and 10 September 1941, based on del Toro Avilés specimens (Moctum, males, MLZ 38335 and 39330, respectively), are questionable. *Elevations*: sea level to 9,300 ft.

*Breeding* (all data): 24 April 1966, nest with two eggs (Cerro Baúl, 4,300 ft, Rowley, WFVZ 21377); 27 June 1963, nest with two young "nearly in fledging stage" (Juniper Camp, Rowley [1966:189] observation).

*Subspecies*: *repetens* van Rossem, permanent resident west of Isthmus; *notius* Van Tyne (1933:1), permanent resident east of Isthmus; *solitarius* (Wilson), *plumbeus* Coues (southeasternmost records for race), and *cassinii* Xantus, winter residents. I follow Monroe (1968:316–317) in synonymizing *montanus* van Rossem with *notius*.

*Vireo flavifrons* Vieillot. Yellow-throated Vireo.

Uncommon winter resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest and adjacent Pacific swamp forest in lower portions of Sierra de Miahuatlán (west to points 5.1 mi southwest of San Gabriel Mixtepec and 19 road mi north of Puerto Escondido) and Sierra Madre de Chiapas. One record for arid lowlands of Pacific Region, a female (MLZ 44975) taken by Lamb on 8 February 1947 at Las Tejas. *Dates*: 28 September to 25 March. *Elevations*: 150 to 2,700 ft.

*Vireo huttoni* Cassin. Hutton's Vireo.

Fairly common permanent resident in all Regions west of Isthmus in humid and semiarid pine-oak forests, recorded east to Cerro Zempoaltepec, Río Molino, and a point 10 mi northeast of Cerro San Felipe. Should be sought in highest mountains east of Isthmus. *Elevations*: 5,500 to 10,800 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *pacificus* Phillips (1966:129), Sierra de Miahuatlán and Sierra de Yucuyacua; *mexicanus* Ridgway, remainder of Oaxaca range. The race *pacificus* is weakly-marked and perhaps not worthy of recognition.

*Vireo hypochryseus* Sclater. Golden Vireo.

Permanent resident west of Isthmus, common in Pacific Region in tropical semideciduous forest and uncommon in Pacific Region in Pacific swamp forest and tropical deciduous forest and in the Interior (near Tamazulapan del Progreso and in valleys of San Juan Bautista Cuicatlán and San Miguel Sola de Vega) in arid tropical scrub and adjacent arid subtropical scrub, occurring east to Guelatao, Rancho Las Animas, and a point 3 road mi north of Pluma Hidalgo, the southeasternmost points in entire range of species. Unrecorded in Oaxaca Valley. Reaches Rancho Las Animas probably from southeast and enters valley of San Juan Bautista Cuicatlán and region of Tamazulapan del Progreso probably from Río Balsas basin. *Elevations*: 100 to 6,300 ft.

*Breeding*: 13 June 1963, nest with three young (Cycad Camp, Rowley [1966:189] observation), to 5 July 1963, nest with three eggs (above Jamaica Junction, Rowley [1966:189]).

*Subspecies*: *hypochryseus* Sclater.

*Vireo gilvus* (Vieillot). Warbling Vireo.

Common spring transient migrant (*V. g. gilvus*) and uncommon winter resident (*swainsonii*) in Atlantic Region in tropical evergreen forest. Fairly common winter resident (mostly *swainsonii*; some *brewsteri*, A. R. Phillips in litt., southeasternmost records for race; some *V. g. gilvus* at least in Pacific Region east of Isthmus)

throughout remainder of state, occurring in virtually all forest and scrub habitats. Uncommon permanent resident (*connectens*) in pine-oak forests of Interior and adjacent upper reaches of Pacific and perhaps Atlantic Regions, recorded east to near Juniper Camp, kilometer marker 183 near La Cima, San Miguel Sola de Vega, and Rancho de las Rosas; records from Moctum and San Pablo Villa de Mitla (del Toro Avilés) doubtful. Oaxaca localities are southeasternmost in entire breeding range of species. *Dates*: latest spring date for non-permanent residents, 6 May; migration period in Atlantic Region, 23 March to 20 April. *Elevations*: permanent residents, 5,600 to 7,000 ft; winter residents and transient migrants, sea level to 7,300 ft.

*Breeding* (all data): 27 June 1963, nest with three young (Juniper Camp, 5,600 ft, Rowley [1966:190] observation).

*Subspecies*: *gilvus* (Vieillot), *swainsonii* Baird, *brewsteri* (Ridgway), and *connectens* van Rossem; see above. See *V. leucophrys*.

*Vireo leucophrys* (Lafresnaye). Brown-capped Vireo.

Fairly common presumptive permanent resident (recorded 18 March–16 May) in Pacific Region in cloud forest of Sierra Madre de Chiapas, known only from the following localities (eight specimens, LSUMZ and WFVZ): 12 mi north-northeast of Zanatepec, 4,900 ft elevation; at, above (5,000 ft; but see below), and 4 km (2.5 mi) southwest (5,500 ft) of Colonia Rodolfo Figueroa; and at La Cumbre near Rancho Sol y Luna. Should be sought in cloud forest of Atlantic Region west of Isthmus.

*Breeding* (all data): enlarged testes on 25 (7 × 3 mm, LSUMZ 33368, 12.8 g, little fat) and 30 March 1964 (7 × 3 mm, LSUMZ 33370, 13.4 g, little fat; both 12 mi north-northeast of Zanatepec, 4,900 ft, Binford), 27 April 1967 (7 × 4 mm, above “Rancho Vicente” [= Colonia Rodolfo Figueroa], Cerro Baúl, 5,000 ft [given by Rowley, 1968:5, as “4,500 feet”], Rowley and Juan Nava S., WFVZ 19594, holotype of *bulli*), and 9 May 1967 (7 × 5 mm, 4 km [2.5 mi] southwest of Colonia Rodolfo Figueroa, 5,500 ft, Galley, WFVZ).

*Subspecies*: *bulli* Rowley, according to Rowley (1968:5–7); endemic; see Type Localities. This race is easily separable from *amauronotus* Salvin and Godman of Veracruz; I have not compared it with *strenuus* Nelson of Chiapas. This species might be conspecific with *V. gilvus*, as treated by Miller et al. (1957:233) and others. However, because of differences in song and morphology between the two forms, together with the peculiar distributional pattern exhibited by *leucophrys*, I prefer to recognize two species pending a thorough study.

*Vireo philadelphicus* (Cassin). Philadelphia Vireo.

Transient migrant; exact status uncertain, but apparently casual in spring in Atlantic (Isthmus) and Interior Regions; to be expected in fall. Only three records as follows: Río Sarabia (elevation given on label as 400 ft but probably closer to 262 ft), 26 April 1956, Lamb, female (WFVZ-HC 3707); near Piedra Blanca, 24 April 1962, Schaldach, male (A. R. Phillips [in litt.] collection, quite fat, testes small); and 5 km (3.1 mi) northwest of Yanhuatlán, 11 May 1971, J. C. Barlow (in litt.), female (Royal Ontario Museum 109597, 12.3 g, heavy fat, ovary 5.3 mm long, largest follicle 1 mm).

*Vireo olivaceus* (Linnaeus). Red-eyed Vireo.

No specimen examined; two unpublished specimen records. Transient migrant; exact status uncertain, but apparently casual in spring in Atlantic (Isthmus) and Interior Regions; to be expected in fall. Only two records: a male (14.5 g, very little fat, testes slightly enlarged) taken by Phillips 6.5 km (4.0 mi) north-northeast of Tamazulapan del Progreso on 10 May 1971, and a female (heavy fat, ovary not enlarged) secured by Schaldach 27 km (16.8 mi) east-northeast of Piedra Blanca on 21 May 1962, both in collection of A. R. Phillips (in litt.).

*Subspecies*: monotypic, following Monroe (1968:317) and others in considering the characters of *V. o. caniviridis* Burleigh (1960:214) too slight to warrant taxonomic recognition; but see Wetmore et al. (1984:217).

*Vireo flavoviridis* (Cassin). Yellow-green Vireo.

In general a very common, and locally an abundant, summer resident in Atlantic and Pacific Regions in mangrove swamp and in semi-open portions and margins of tropical evergreen forest, tropical deciduous forest, and lower reaches of tropical semideciduous forest. Also a transient migrant (*forreri*). *Dates*: 29 March (1961, arrival date at my locality 1 mi southwest of Valle Nacional) to 8 October (1961, 1 seen by Binford 3 mi north of Puerto Angel, 300 ft). *Elevations*: sea level to 3,500 ft.

*Breeding*: 16 May 1966, nest with four eggs (ridge above Rancho Sol y Luna, 2,000 ft, Rowley, WFVZ 24367), to 26 July 1961, nest with one egg (8 mi west-northwest of Tapanatepec, Rook, WFVZ 35315); 15 June 1895, prejuvenile (La Ranchería, Nelson and Goldman, female, USNM 143395).

*Subspecies*: *forreri* Madarasz, according to Miller et al. (1957:229), transient migrant; *flavoviridis* (Cassin), summer resident.

*Hylophilus ochraceiceps* Sclater. Tawny-crowned Greenlet.

Fairly common permanent resident in Atlantic Region in heavy tropical evergreen forest west to the Trans-Isthmian Highway and perhaps (del Toro Avilés) Tutla and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 300 ft.

*Breeding* (all data): 24 May 1961, enlarged testes (6 × 3 mm, 28 road mi north of Matías Romero, Binford, LSUMZ 24746, 11.0 g, slightly fat).

*Subspecies*: *ochraceiceps* Sclater; see Type Localities.

*Hylophilus decurtatus* (Bonaparte). Lesser Greenlet.

Common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous and Pacific swamp forests along foothills of Sierra Madre de Chiapas from above Zanatepec east to a point 2 mi east-southeast of Colonia Rodolfo Figueroa. *Elevations*: 250 to 4,700 ft.

*Breeding*: 23 May 1961, enlarged testes (6 × 5 mm, 28 road mi north of Matías Romero, Wolf, UMMZ 156509, 8.8 g, little fat), to 29 June 1961, enlarged testes (6 × 4 mm, Rancho Sol y Luna, Schaldach, AMNH 776445).

*Subspecies*: *decurtatus* (Bonaparte).

*Vireolanius melitophrys* Bonaparte. Chestnut-sided Shrike-Vireo.

Permanent resident in Pacific Region west of Isthmus and in portions of Interior, occurring in oaks of humid pine-oak forest; fairly common in Sierra de Miahuatlán

and very uncommon in Sierra de Yucuyacua (4 mi north of San Andrés Chicahuaxtla), Sierra Aloapaneca (Capulalpan and a point 10 mi northeast of Cerro San Felipe), and perhaps Sierra de Zempoaltepec (the only record, a female, MLZ 39559, taken by del Toro Avilés purportedly on 12 September 1941 at Moctum, is questionable). *Elevations*: 4,350 to 9,000 ft.

*Breeding* (all data): 13 May 1964, enlarged testes (10 × 5 mm, 16 road mi north of San Gabriel Mixtepec, 4,350 ft, Morony, LSUMZ 33354, 32.7 g, little fat); 16 June 1963, three ruptured follicles (La Cima, Rowley [1966:188]); 7 July 1965, prejuvenile (4 mi north of San Andrés Chicahuaxtla, 8,000 ft, Rowley, sex?, CAS, 37.7 g).

*Vireolanius pulchellus* Sclater and Salvin. Green Shrike-Vireo.

Common permanent resident in Atlantic Region in tropical evergreen forest and lower reaches of cloud forest, recorded northwest to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and Río Tonto and south in Isthmus to Montebello and perhaps (del Toro Avilés) Escuilapa. One record for Pacific Region, where apparently only a casual winter visitant: male (WFVZ-HC 9107) taken by Rook on 29 November 1962 at Rancho Sol y Luna. *Elevations*: 250 to 4,850 ft.

*Breeding* (all data): 25, 28, and 31 March 1962, enlarged testes (respectively, 10 × 7 mm, 11 × 7 and 11 × 8, AMNH 778393, 778391, and 778392, Montebello, Schaldach).

*Subspecies*: *pulchellus* Sclater and Salvin.

*Cyclarhis gujanensis* (Gmelin). Rufous-browed Peppershrike.

Uncommon permanent resident in Atlantic Region in brushy clearings within tropical evergreen forest south in Isthmus to Almoloya and a point 8 mi south of Matías Romero. *Elevations*: 100 to 1,500+ ft.

*Breeding* (all data): 15 April 1962, enlarged testes (7 × 5 mm, Sarabia, Schaldach, AMNH 778394).

*Subspecies*: *flaviventris* Lafresnaye.

#### Family EMBERIZIDAE

*Vermivora pinus* (Linnaeus). Blue-winged Warbler.

Very uncommon bird in Atlantic Region in openings within tropical evergreen forest and in Pacific Region in tropical semideciduous forest; exact status uncertain; probably a winter resident, but all records could pertain to transient migrants. Recorded as follows: 1 each seen on 5 and 15 March and 1, 6, and 7 April and single specimens taken on 26 February (Wolf, male, LSUMZ 24758, 7.9 g, testes tiny) and 16 March (Binford, sex?, LSUMZ 24759, 8.2 g, slight fat, skull completely ossified) 1961 by Wolf and Binford at 300 ft elevation 1 mi southwest of Valle Nacional; 1 seen by Binford on 22 April 1961 at 1,900 ft elevation 6 road mi southwest of Valle Nacional; a male taken (DEL 26223) by Phillips (1966:88; in litt.) on 21 November 1963 just above San Gabriel Mixtepec (at about 2,400 ft elevation).

[*Vermivora chrysoptera* (Linnaeus). Golden-winged Warbler.]

No specimen or published record; two sight records. Status uncertain. Wolf saw 1 bird on 22 April 1961 in Atlantic Region in tropical evergreen forest at 1,900

ft elevation 6 road mi southwest of Valle Nacional, and Phillips (1966:88; in litt.) observed a female on 3 December 1963 in Pacific Region at about 2,400 ft elevation just above San Gabriel Mixtepec.

*Vermivora peregrina* (Wilson). Tennessee Warbler.

Transient migrant, common in Atlantic Region in tropical evergreen and cloud forests and very uncommon in Pacific Region in cloud forest (see Migration, Transient Migrants) and in arid habitat on Plains of Tehuantepec (Tehuantepec City, 24 October 1914, Shufeldt, male, UMMZ 138804). Winter resident in Pacific Region, fairly common in Pacific swamp forest of foothills of Sierra Madre de Chiapas (Santa Efigenia, 3 January to 5 February) and very uncommon in tropical semideciduous and cloud forests west of Isthmus. *Dates*: extremes, 2 October to 25 April; spring migration period in Atlantic Region, 12 March to 25 April. *Elevations*: 100 to 4,900 ft; 7,500 ft (6 road mi south of San Miguel Suchixtepec, 2 February 1974, 1 seen by Binford).

*Vermivora celata* (Say). Orange-crowned Warbler.

Winter resident in all Regions but most widespread and abundant in the Interior; fairly common in arid and humid pine-oak forests, juniper scrub, oak scrub, and arid subtropical scrub and very uncommon in arid tropical scrub and openings within tropical evergreen forest. *Dates*: 23 September to 28 April. *Elevations*: sea level to 9,500 ft.

*Subspecies*: *orestera* Oberholser, southeasternmost records for race; *celata* (Say), one record, a female (CAS, 9.1 g, fat) taken by Rook at 5,200 ft elevation 10 mi southeast of Oaxaca City on 28 November 1964.

*Vermivora ruficapilla* (Wilson). Nashville Warbler.

Winter resident throughout state in virtually all terrestrial habitats; common in forests (notably in humid portions) and uncommon elsewhere. Numbers augmented by transient migrants (see Migration, Transient Migrants). *Dates*: August (La Parada; Sclater 1858:298); 23 September to 8 May. *Elevations*: sea level to 9,300 ft.

*Subspecies*: *ridgwayi* van Rossem; *ruficapilla* (Wilson).

*Vermivora virginiae* (Baird). Virginia's Warbler.

Very uncommon winter resident in the Interior in arid subtropical scrub east to Rancho Las Animas, the southeasternmost locality in entire range of species. One record for Pacific Region, a bird seen by the Berretts and Binford on 23 January 1962 at 500 ft in tropical deciduous forest at San Pedro Pochutla. *Dates*: 22 September to 13 February. *Elevations*: 500 ft; 2,600 to 6,100 ft.

*Parula americana* (Linnaeus). Northern Parula.

Uncommon transient migrant and very uncommon winter resident in lowlands and adjacent foothills of Atlantic Region in tropical evergreen forest and of Pacific Region in tropical semideciduous, tropical deciduous, and Pacific swamp forests, recorded west along Pacific coast to Minitán. To be expected as a rare transient migrant in the Interior. *Dates*: 2 October to 4 April. *Elevations*: sea level to 2,350 ft.

*Parula pitiayumi* (Vieillot). Tropical Parula.

Uncommon permanent resident in Atlantic Region from 300 to 1,900 ft in tropical evergreen forest (28 road mi north of Matias Romero) and oak patches

within tropical evergreen forest (Valle Nacional area) and in Pacific Region west of Isthmus from 2,900 to 4,900 ft in oak patches within tropical semideciduous forest (from a point 9 road mi south of Putla de Guerrero east to San Gabriel Mixtepec). The one record from Pacific coastal lowlands (at sea level in Pacific swamp forest at Minitán, 1 March 1964, Binford, male, LSUMZ 33384, 8.1 g, moderately fat, skull completely ossified, testes small) might represent a migrant from northwestern Mexico.

*Breeding:* 30 March 1961, enlarged testes ( $6 \times 3$  mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24776, 6.4 g, little fat), to 23 May 1961, enlarged testes ( $7 \times 5$  mm, 28 road mi north of Matías Romero, Wolf, UMMZ skeleton 156511, 6.8 g, little fat).

The only previously published record (Miller et al. 1957:243) is questionable, because it is based on a specimen (San Miguel Soyaltepec, 600 m [1,969 ft], 3 November 1943, female, MLZ 31766) taken by del Toro Avilés. I examined 11 reliable specimens (LSUMZ, UMMZ, ARPC) from the following localities: 1 mi southwest of Valle Nacional, 300 ft; 28 road mi north of Matías Romero; Minitán; 9 road mi south of Putla de Guerrero, 2,900 ft; at San Gabriel Mixtepec and 17 km (10.6 mi; 3,400 ft), 16 mi (4,350 ft), and 18 mi (4,900 ft) by road north. In addition, I observed 3 birds each on 8 and 22 April 1961 at 1,900 ft elevation 6 road mi southwest of Valle Nacional.

*Subspecies:* *nigrilora* Coues, Atlantic Region; *pulchra* (Brewster), Pacific Region. All Atlantic specimens exhibit intergradation with *inornata* Baird of Chiapas, but are closest to *nigrilora*. Birds from the Pacific Region (LSUMZ, ARPC) might represent an undescribed race, but until additional specimens become available I refer them to *pulchra*, which they resemble rather closely.

*Parula superciliosa* (Hartlaub). Crescent-chested Warbler.

Common permanent resident in oaks of humid and semiarid pine-oak forests of Interior and adjacent upper reaches of Pacific Region. *Elevations:* 5,500 to 10,800 ft.

*Breeding:* 6 May 1965, nest with three eggs (Río Molino, 7,300 ft, Galley, WFVZ 21383), to 10 June 1966, nest with three eggs (Cerro San Felipe, 9,500 ft, Rowley, WFVZ 20764); 22 May 1965, prejuvenile (Río Molino, 7,300 ft, Rowley, CAS, male, 9.6 g).

*Subspecies:* *mexicana* Bonaparte. Birds from "Mount Zempoaltepec" are believed by Miller et al. (1957:242) to be "intergrades"; I assume they mean intergrades between *mexicana* and *superciliosa* (Hartlaub), because six specimens (MLZ) collected by del Toro Avilés supposedly at Totontepec are so designated on their labels; because of the known unreliability of his data, these specimens should be disregarded. J. D. Webster has identified specimens (WFVZ) from the Sierra de Miahuatlán as *palliata* (van Rossem); because this race is so poorly characterized, I cannot confirm this. The races *sodalis* (Moore) and *palliata* need reassessment. Birds from the northeastern part of the Interior are clearly *mexicana*, and pending revision I assign all Oaxaca birds to this race.

*Dendroica petechia* (Linnaeus). Yellow Warbler.

*D. petechia* ssp. (*aestiva* group).—Winter resident, very common in lower portions of Pacific Region in mangrove swamp, Pacific swamp forest, and tropical deciduous forest, and fairly common in lower portions of Atlantic Region in

tropical evergreen forest. Very uncommon transient migrant in the Interior in arid subtropical scrub and arid tropical scrub. *Dates*: 20 August to 23 May; date of 1 June 1949, based on specimen (Amatepec, female, USNM 467965) taken by del Toro Avilés, is questionable. *Elevations*: recorded in winter from sea level to 1,600 ft; noted during migration from sea level to 5,600 ft.

*D. p. rhizophorae* (*erithachorides* group).—Fairly common bird along Pacific coast in mangrove swamp, recorded at Minitán, Punta Paloma, and a point 15 road mi south of Reforma (1 June 1964, 4 seen by Morony and Binford); recorded only from 9 February to 1 June; here treated as a winter resident, but 1 June date suggests possible status as a permanent resident. *Elevation*: sea level.

*Subspecies*: *rhizophorae* van Rossem; *amnicola* Batchelder; *rubiginosa* (Pallas); *aestiva* (Gmelin); *morcomi* Coale. The data on the only specimen of *sonorana* Brewster supposedly from Oaxaca (Tutla, 5 February 1941, del Toro Avilés, male, FMNH 119791; Blake 1950:412) are questionable.

*Dendroica pensylvanica* (Linnaeus). Chestnut-sided Warbler.

Transient migrant, very uncommon in Atlantic Region in tropical evergreen forest and casual in the Interior in arid subtropical scrub (one record, 1 seen by A. R. Phillips [in litt.] on 13 May 1971 at about 6,100 ft elevation 6 road km [3.7 mi] southeast of Santiago Matatlán). Rare winter resident in Atlantic Region in tropical evergreen forest (1 mi southwest of Valle Nacional, 300 ft, 15 and 19 February 1961, 1 seen by Wolf and Binford) and in Pacific Region in tropical semideciduous forest of Sierra de Miahuatlán (San Gabriel Mixtepec, 14 December 1963, Santos Farfán B., female, DEL 26277). Data on specimen (FMNH 119798) taken by del Toro Avilés supposedly at Tutla on 23 February 1941 are questionable. *Dates*: 14 December to 13 May. *Elevations*: 300 to 2,600 ft; about 6,100 ft.

*Dendroica magnolia* (Wilson). Magnolia Warbler.

Winter resident, very common in Atlantic Region in tropical evergreen forest, fairly common in Pacific Region in Pacific swamp and tropical deciduous forests in foothills of Sierra Madre de Chiapas, uncommon on Plains of Tehuantepec in arid tropical scrub, and very uncommon in Pacific Region from Isthmus west through Río Tehuantepec basin to Rancho Las Animas and along coast to Minitán, occurring in cloud forest, tropical deciduous forest, and Pacific swamp forest. One record for Interior, 2 birds seen by Phillips (in litt.) on 12 December 1977 at point 3 km (1.9 mi) south of San Juan Bautista Cuicatlán. *Dates*: 19 October to 5 May. *Elevations*: sea level to 5,000 ft.

*Dendroica coronata* (Linnaeus). Yellow-rumped Warbler.

*D. c. coronata*.—Very uncommon winter resident in tropical evergreen and tropical deciduous forests, recorded in Atlantic Region from Temascal southeast to a point 3 mi north of Loma Bonita and in Pacific Region from a point 2 mi northwest of San José Manialtepec east to Santa Efigenia. One record for Interior, a specimen (ARPC) taken on 6 January 1965 at Santa María del Tule (A. R. Phillips in litt.). To be expected elsewhere in the state. *Dates*: 1 December to 31 March. *Elevations*: 50 to 5,050 ft.

*D. c. auduboni*.—Transient migrant, occurring in all Regions, common at higher elevations in pine-oak forests and uncommon at lower elevations in tropical

evergreen forest, tropical deciduous forest, and arid subtropical scrub. Winter resident, fairly common in pine-oak forests of Interior and very uncommon in tropical deciduous and tropical semideciduous forests of Pacific Region from points 6 road mi north of Putla de Guerrero and 9 road mi west-northwest of San José Estancia Grande east to a point 2 mi northwest of San José Manialtepec. To be expected elsewhere in winter. *Dates*: extremes, 14 October to 5 May, and 21 May (1962, 27 km [16.8 mi] east-northeast of Piedra Blanca, Schaldach, male, ARPC); major migration periods, 29 March to 5 May, and 14 to 25 October. *Elevations*: sea level to 9,700 ft.

*Subspecies*: *coronata* (Linnaeus); *auduboni* (Townsend). I follow the treatment by Hubbard (1969, 1970), who considers *D. coronata* (Linnaeus) and *D. auduboni* (Townsend) conspecific, *hooveri* McGregor a synonym of *D. c. coronata*, and *memorabilis* Oberholser a synonym of *D. c. auduboni*.

*Dendroica nigrescens* (Townsend). Black-throated Gray Warbler.

Uncommon winter resident in the Interior in arid subtropical scrub, oak scrub, and lower reaches of arid pine-oak forest, recorded east to points 8 road mi south of San Andrés Miahuatlán and 4 road mi east of Santiago Matatlán. Oaxaca localities are southeasternmost in regular range of species, there being only one record farther south (Guatemala; Land 1970:289). *Dates*: 22 September to 10 April. *Elevations*: 4,000 to 7,000+ ft.

*Subspecies*: *nigrescens* (Townsend). This species is usually considered monotypic, but I follow Lowery and Monroe (1968:25).

*Dendroica townsendi* (Townsend). Townsend's Warbler.

Fairly common transient migrant and winter resident in all Regions, occurring primarily in humid pine-oak forest but also cloud forest, tropical semideciduous forest, and upper reaches of tropical evergreen forest. Uncommon transient migrant in the Interior in arid subtropical scrub. Doubtless occurs in arid pine-oak forest west of Isthmus. Only record for lowlands (San Miguel Soyaltepec, 15 February 1944, del Toro Avilés, female, MLZ 31391) is questionable. *Dates*: 27 August to 29 April. *Elevations*: 2,400 to 9,300 ft.

*Subspecies*: monotypic. A. R. Phillips (in litt.) informs me that on 22 November 1964 at Río Molino he took an immature male (ARPC 7911) which he believes to be a hybrid between *D. townsendi* and *D. occidentalis*.

*Dendroica occidentalis* (Townsend). Hermit Warbler.

Winter resident in pine-oak forests, especially humid portions; uncommon in the Interior and rare in adjacent Pacific Region (one record, 1 bird seen by Binford at 3,600 ft elevation 7 road mi south of Soledad on 4 February 1974), recorded east to the point just noted and to a point 37 road mi southwest of Valle Nacional. East of Isthmus apparently only a rare transient migrant (only one record, a male [WVZ-HC 16919, very fat] taken by Galley at 3,500 ft elevation 7 km [4.3 mi] north of Cerro Baúl [at El Salto] on 4 April 1966). Rare in arid subtropical scrub of Interior, at least during migration. *Dates*: 13 August to 26 April. *Elevations*: 3,500 and 3,600 ft; 5,800 to 9,300 ft.

*Subspecies*: monotypic. See *D. townsendi*.

*Dendroica virens* (Gmelin). Black-throated Green Warbler.

Winter resident, very common in Atlantic Region in cloud and tropical evergreen forests, fairly common in Pacific Region east of Isthmus in cloud, tropical semideciduous, and Pacific swamp forests of Sierra Madre de Chiapas, and very uncommon in Pacific Region west of Isthmus in cloud and tropical semideciduous forests of Sierra de Miahuatlán west to Finca Sinai. Transient migrant, common in Sierra Madre de Chiapas (see Migration, Transient Migrants) and very uncommon in humid pine-oak forest of Interior in Sierra de Juárez. One record for Interior outside of Sierra de Juárez, a specimen taken by Boucard at San Miguel Talea de Castro (Sclater 1859b:373). Bird banded at Overbrook, in Philadelphia, Pennsylvania, on 4 October 1934 shot by native at Tetela, Oaxaca, about 1 April 1936 (Lincoln 1936:170). Numbers in Atlantic Region augmented by transient migrants. *Dates*: extremes, 27 September to 30 April; major migration (up to 20 per day) noted by Wolf and Binford 4–7 April 1961 in Atlantic Region 1 mi southwest of Valle Nacional, 300 ft. *Elevations*: 250 to 9,300 ft.

*Subspecies*: monotypic, following Lowery and Monroe (1968:26–27).

*Dendroica fusca* (Müller). Blackburnian Warbler.

Rare spring transient migrant (22 April to 21 May), recorded as follows: in Atlantic Region in and west of Isthmus in tropical evergreen forest (1 each seen by Binford on 22 and 24 April 1961 at points, respectively, 6 road mi southwest, 1,900 ft, and 15 road mi southwest, 4,100 ft, of Valle Nacional; one taken by Schaldach on 21 May 1962 at a point 27 km [16.8 mi] east-northeast of Piedra Blanca, male, DEL 26253, heavy fat); in the Interior in humid pine-oak forest (1 seen by Binford on 27 April 1961 at 9,300 ft elevation 38 road mi southwest of Valle Nacional) and arid subtropical scrub (1 seen by A. R. Phillips [in litt.] on 13 May 1971 at about 6,100 ft elevation 6 road km (3.7 mi) southeast of Santiago Matatlán); in Pacific Region east of Isthmus in tropical semideciduous forest (one taken by Binford on 27 April 1972 at a point 2 mi east-southeast of Colonia Rodolfo Figueroa, 4,900 ft, male, CAS 68569, very fat; 1 each seen by Binford on 10 May 1972 at points 3 mi northwest and 7 road mi north-northwest of Ciénega, Chiapas, at 4,650 and 4,350 ft, respectively); and at low elevations in arid habitats of Plains of Tehuantepec, where recorded by Sumichrast at Tehuantepec City (Lawrence 1876:15) and Juchitán (Sumichrast 1881:243). Data on four specimens (FMNH) collected by del Toro Avilés supposedly at Tutla on 4, 6, 7, and 21 February 1941 and representing the only winter records for Mexico are questionable. Should be sought in fall.

*Dendroica dominica* (Linnaeus). Yellow-throated Warbler.

Rare, recorded in Atlantic Region in an opening within tropical evergreen forest and in Pacific Region in pines; probably a winter resident, although the Atlantic record might represent a transient migrant. Only four reliable records: male specimen, "Oaxaca" [= Oaxaca City?], Boucard (Sclater 1859b:374); Santa Efigenia, elevation at exact point of record and date unknown, Sumichrast (1881:243); female (LSUMZ 24795, 10.6 g, moderately fat, skull completely ossified, ovary small), 1 mi southwest of Valle Nacional, 300 ft, 24 March 1961, Binford; 1 seen in pines near San Gabriel Mixtepec, about 2,400 ft, 26 November 1963, A. R. Phillips (pers. comm.). All data on male (USNM 467966) taken by del Toro

Avilés supposedly at 2,100 m (6,888 ft) at Amatepec on 13 May 1949 are questionable.

*Subspecies: albilora* Ridgway.

*Dendroica graciae* Baird. Grace's Warbler.

Uncommon permanent resident along entire length of Pacific Region, in the Interior at extreme south end of the Sierra de Cuatro Venados, and in Atlantic Region in Isthmus of Tehuantepec, frequenting pines of humid and arid pine-oak forests; recorded north in Tehuantepec region to La Ranchería, to a locality 3 mi south of Nejapa, and to a point 4 mi north and 2 mi east of Matías Romero. The foregoing account applies to the breeding race, *D. g. remota*. The only other records for Interior (Llano Verde, 7,000 ft, 25 to 28 February 1948, Lamb, five specimens, MLZ) represent *D. g. graciae* and, thus, are presumably winter residents from the north. This is one of the few pine-oak forest birds able to cross lowland gap of Isthmus. *Elevations: 700 to 7,600 ft.*

*Breeding* (all data): 8 May 1964, enlarged testes ( $7 \times 5$  mm, 18 road mi north of San Gabriel Mixtepec, 4,900 ft, Morony, LSUMZ 33388, 8.6 g, little fat); 17 May 1964, enlarged testes ( $5 \times 3$  mm, 9 road mi south of Putla de Guerrero, 2,900 ft, Binford, LSUMZ 33389, 8.8 g, little fat); 24 June 1965, adult attending full-sized juvenile (near La Cima, 6,000 ft, male juvenile WFVZ 29017).

*Subspecies: remota* Griscom, permanent resident; *graciae* Baird, winter resident, the southeasternmost records for race. I follow the taxonomic treatment by Webster (1961), who synonymizes *ornata* Brodtkorb with *remota*.

*Dendroica discolor* (Vieillot). Prairie Warbler.

Status uncertain; apparently, a rare winter resident in arid habitats of Pacific Region at least west of Isthmus and of Interior. Only three records: 1 seen by the Berretts and Binford on 8 October 1961 in brushy clearing within area of tropical deciduous forest at 350 ft elevation 3 road mi north of Puerto Angel; male (LSUMZ 33391, 7.0 g, little fat, skull completely ossified, testes very small) taken by Morony on 19 February 1964 in tropical deciduous forest at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande; male (ARPC 8213, little fat, testes very small) secured by K. C. Parkes on 6 January 1965 at Santa María del Tule (A. R. Phillips in litt.). Oaxaca records represent only published occurrences in Mexico outside of Quintana Roo.

*Subspecies: discolor* (Vieillot).

*Dendroica palmarum* (Gmelin). Palm Warbler.

Very uncommon winter resident in extreme southwestern part of Pacific Region in arid tropical scrub, open mangrove swamp around edges of shallow saline coastal lagoons, and savanna within tropical deciduous forest. Recorded only by Morony and Binford in 1964 as follows: at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande, 12 February (Binford, male, LSUMZ 33392, 9.9 g, little fat, skull completely ossified, testes very small), 15 February (1 bird seen), and 16 February (1 seen); and sea level at Minitán, 22 February (1 seen), 23 February (1 seen), 24 February (2 seen), and 26 February (2 seen; another taken by Binford, female, LSUMZ 33393, 9.4 g, little fat, skull completely ossified,

ovary very small). Occurrence in Oaxaca, based on these records, published without details by Lowery and Monroe (1968:32) and the A.O.U. (1983:618).

*Subspecies: palmarum* (Gmelin).

*Dendroica striata* (Forster). Blackpoll Warbler.

Accidental vagrant. Only one record, a specimen (female?, USNM 59595) taken by Sumichrast on 19 October 1869 on Pacific side of Isthmus at Tehuantepec City (town at 115 ft but elevation at exact point of collection unknown). Erroneously reported by Lawrence (1876:15) and some subsequent authors as *D. castanea*.

*Mniotilta varia* (Linnaeus). Black-and-white Warbler.

Common transient migrant and winter resident below 5,000 ft in Atlantic and Pacific Regions, occurring in cloud forest, tropical evergreen forest, tropical semi-deciduous forest, tropical deciduous forest, dense arid tropical scrub, and Pacific swamp forest. Fairly common transient migrant above 5,000 ft in same Regions and uncommon transient migrant in pine-oak forests of Interior. *Dates*: 19 August to 28 April; 12 May (1964; 16 road mi north of San Gabriel Mixtepec, 4,350 ft, 1 seen by Binford). *Elevations*: sea level to 9,000 ft; elevation of 10,000 ft for La Parada (Cooke 1904:22) is erroneous.

*Setophaga ruticilla* (Linnaeus). American Redstart.

Winter resident below 4,100 ft in Atlantic and Pacific Regions, very common in tropical evergreen forest, common in tropical semideciduous and Pacific swamp forests, fairly common in cloud and tropical deciduous forests, and uncommon in arid tropical scrub. Rare transient migrant in the Interior in arid subtropical and arid tropical scrubs (two records, 1 seen by Wolf and Binford on 6 May 1961 at 5,100 ft elevation 6 road mi east of Santa María del Tule and one unsexable specimen, MLZ 31801, taken by H. O. Wagner on 22 May 1944 at Teotitlán del Camino). *Dates*: 1 October to 6 May; 22 May. *Elevations*: recorded in winter from sea level to 4,100 ft; noted during migration up to 5,100 ft.

*Subspecies*: monotypic, following Lowery and Monroe (1968: 34).

*Helmitheros vermivorus* (Gmelin). Worm-eating Warbler.

Very uncommon winter resident in lowlands and adjacent foothills of Atlantic and Pacific Regions in tropical evergreen, tropical semideciduous, and tropical deciduous forests; found west in Pacific Region at least to Minitán. *Dates*: 7 November to 27 March; dates of 4 October 1943 (San Miguel Soyaltepec, female, MLZ 31682) and 2 April 1941 (Tutla, male, FMNH 119790) on del Toro Avilés specimen labels are questionable; date of 4 December (Miller et al. 1957:238) should be 4 October, but see above. *Elevations*: sea level to about 2,400 ft.

*Seiurus aurocapillus* (Linnaeus). Ovenbird.

Winter resident, common in Atlantic Region in tropical evergreen forest and uncommon in Pacific Region in cloud, tropical semideciduous, and Pacific swamp forests. To be expected as a rare transient migrant in the Interior. *Dates*: 13 September to 28 April; dates on three males (USNM 467968–467970) collected by del Toro Avilés allegedly at Lacova on 9 and 31 July 1949 and at Amatepec

on 1 May 1949 are questionable, especially because of the very fresh plumage of both July birds. *Elevations*: sea level to 5,000 ft.

*Subspecies*: *aurocapillus* (Linnaeus). Data on del Toro Avilés specimens (MLZ) tentatively referred to *furvior* Batchelder by Miller et al. (1957:256) are questionable.

*Seiurus noveboracensis* (Gmelin). Northern Waterthrush.

Winter resident, common along Pacific coast from Minitán to Puerto Escondido in mangrove swamp and flooded portions of Pacific swamp forest, fairly common on remainder of Pacific coast in same habitats, and uncommon in Atlantic Region at edges of aquatic habitats in tropical evergreen forest. *Dates*: 19 October to 5 May. *Elevations*: sea level to 800 ft.

*Subspecies*: monotypic, following Eaton (1957) and Lowery and Monroe (1968: 35–36). I have examined some Oaxaca specimens (not collected by del Toro Avilés) that could be referred to *noveboracensis* (Gmelin) and others to *notabilis* Ridgway.

*Seiurus motacilla* (Vieillot). Louisiana Waterthrush.

Uncommon winter resident in Atlantic and Pacific Regions at edges of aquatic habitats within tropical evergreen, cloud, tropical semideciduous, and Pacific swamp forests, recorded west in Pacific Region to Río Ranas. Two records for Interior, a female (USNM 143355) taken by Nelson and Goldman on 14 October 1894 at San Juan Bautista Cuicatlán and a male (CAS, 19.1 g) taken by Rowley on 9 September 1964 at 9,000 ft elevation 10 mi northeast of Cerro San Felipe; both probably represent transient migrants. *Dates*: 9 September; 22 September to 23 March; date of 13 April 1941, based on del Toro Avilés specimen (Tutla, female, FMNH 119804), is questionable. *Elevations*: 250 to 7,300 ft; 9,000 ft.

*Oporornis formosus* (Wilson). Kentucky Warbler.

Winter resident, fairly common in Atlantic Region in tropical evergreen forest northwest to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec, and uncommon in Pacific Region east of Isthmus in Pacific swamp forest of foothills of Sierra Madre de Chiapas (Rancho Sol y Luna). One record for Pacific Region west of Isthmus, an immature male (ARPC 6028) taken by Phillips on 9 December 1961 at Finca Mercedes. To be expected elsewhere in Pacific Region. *Dates*: 13 September to 7 April. *Elevations*: 250 to about 2,700 ft (Finca Mercedes; exact elevations of town and point of collection unknown).

*Oporornis philadelphia* (Wilson). Mourning Warbler.

Very uncommon spring transient migrant in tropical evergreen forest on Atlantic side of Isthmus and in Pacific swamp forest of Pacific Region east of Isthmus. Should be sought as a fall transient migrant. Supposed winter record published by Miller et al. (1957:258) is based on an immature female (MLZ 31526) collected by del Toro Avilés on 20 December 1943 at San Miguel Soyaltepec. I cannot identify this specimen; its measurements (wing chord, 60.2 mm, tail, 50.1) are intermediate but closest to *O. tolmiei*; even if *philadelphia*, data are questionable because of collector's unreliability. *Dates*: 6 to 25 May. *Elevations*: 200 to 1,600 ft.

I know of only seven acceptable records: male (WVZ-HC 3051) taken by Lamb on 11 May 1957 at 200 ft at "Sarabia" [= Río Sarabia], "20" [=18] road

mi north of Matías Romero; 1 bird seen and another taken (Wolf, female, LSUMZ 24812, 10.0 g, heavy fat, skull completely ossified, ovary not enlarged) by Binford and Wolf on 20 May 1961 at 1,600 ft elevation 9 road mi east of Tapanatepec; 1 seen and two others collected (Wolf, male, LSUMZ 24814, 10.3 g, little fat, skull completely ossified, testes small; Wolf, female, LSUMZ 24813, 10.4 g, little fat, skull completely ossified, ovary not enlarged) by Binford and Wolf on 24 May 1961 at 300 ft elevation 28 road mi north of Matías Romero; one female (WFVZ-HC 11477) secured by Rook on 23 May 1963 at a point 10 mi north of Matías Romero; and three specimens (ARPC; A. R. Phillips in litt.) collected by Schaldach in 1962, one male (= female?) on 24 May and one male (testes slightly or not enlarged, heavy fat) on 25 May, 16 km (9.9 mi) east-northeast of Piedra Blanca, and a male (heavy fat) on 6 May at Montebello.

*Oporornis tolmiei* (Townsend). MacGillivray's Warbler.

Common winter resident in all Regions and all major terrestrial habitats except open savanna, steppe, and highland pine forest. *Dates*: 25 September to 17 May; date of 27 May 1942, based on del Toro Avilés specimen (Totontepec, male, MLZ 38388), is questionable. *Elevations*: sea level to 7,900 ft. See *O. philadelphia*.

*Subspecies*: *monticola* Phillips, according to A. R. Phillips (in litt.), based on identification of specimen ("Oaxaca," BM, Deppe); *tolmiei* (Townsend).

*Geothlypis trichas* (Linnaeus). Common Yellowthroat.

Fairly common winter resident in all Regions in marshes, at edges of other aquatic habitats, and in undergrowth of humid forests, recorded within general ranges of tropical evergreen forest, tropical deciduous forest, Pacific swamp forest, arid subtropical scrub, and arid tropical scrub. Perhaps a rare permanent resident in Pacific Region at Putla de Guerrero, where a male of *G. t. melanops*, the resident race of southern Mexico, was taken on 16 December 1965 (R. W. Dickerman in litt.), and the species has been seen as late as 20 May (1964, Binford). Should be sought as a permanent resident in marshes throughout state, especially in Oaxaca Valley. *Dates*: 7 October to 20 May; date of 2 October 1943, based on del Toro Avilés specimen (San Miguel Soyaltepec, male, MLZ 31520), is questionable. *Elevations*: sea level to 5,050 ft.

*Subspecies*: *melanops* Baird (see above); *occidentalis* Brewster and *trichas* (Linnaeus), winter residents. Miller et al. (1957:260) list *brachidactylus* (Swainson) and *scirpicola* Grinnell for Oaxaca, but Lowery and Monroe (1968:39, 41), who are followed here, treat the former as a synonym of *G. t. trichas* and the latter as occurring (nonmigratory) south only to Sonora.

*Geothlypis nelsoni* Richmond. Hooded Yellowthroat.

Uncommon permanent resident in bunch grassland and underbrush of humid pine-oak forest of Interior, occurring east at least to La Cumbre and to a point 3 km (1.9 mi) south of San Miguel Suchixtepec, the southeasternmost definite localities in entire range of species, and southwest to San Andrés Chicahuaxtla in Sierra de Yucuyacua (8,100 ft, 23 May 1964, male, Morony, LSUMZ 33396, 11.8 g, little fat, enlarged testes 7 × 5 mm), the northwesternmost record in Pacific slope range of species. All records from farther east (Moctum and Totontepec, del Toro Avilés, MLZ) are questionable. *Elevations*: 8,000 to 9,300 ft.

*Breeding* (all data): 29 April 1961, enlarged testes (7 × 4 mm, 12 road mi

northeast of Guelatao, Binford, LSUMZ 24825, 10.1 g, little fat); 23 May 1964 (see above).

*Subspecies: karlenae* Moore; see Type Localities.

*Geothlypis poliocephala* Baird. Gray-crowned Yellowthroat.

Uncommon permanent resident throughout lower portions of Atlantic Region, in Pacific Region at southern foot of Sierra Madre de Chiapas, and disjunctly in valley of Putla de Guerrero, frequenting hedgerows and brushy clearings (including guamil) within tropical evergreen and tropical deciduous forests. *Elevations:* 150 to 800 ft; 2,400 ft (Putla de Guerrero).

*Breeding:* 15 May 1966, two ruptured follicles and two eggs without shells in oviduct (one 18 × 14 mm, other smaller, Rancho Sol y Luna, Rowley [1984: 204]), to 18 May 1964, egg without shell in oviduct (1 mi east of Putla de Guerrero, 2,400 ft, Binford, LSUMZ 33398, 15.6 g, little fat).

*Subspecies: poliocephala* Baird, Pacific Region in valley of Putla de Guerrero; *caninucha* Ridgway, Pacific Region east of Isthmus; *palpebralis* Ridgway, Atlantic Region. I follow the taxonomic treatment by Lowery and Monroe (1968:45–46).

*Wilsonia citrina* (Boddaert). Hooded Warbler.

Fairly common winter resident in Atlantic Region in tropical evergreen forest south in Isthmus to Rancho Boca del Río Sarabia. One record for Pacific Region, a female (MLZ 50034) taken by Lamb on 21 September 1949 at 150 ft at the Río Patos 6 mi west of Tapanatepec. *Dates:* 21 September to 31 March (departure date in 1961 at my collecting locality 1 mi southwest of Valle Nacional); dates on specimens collected by del Toro Avilés supposedly at Lacova on 10 July 1949 (USNM 467959) and Tutla on 10 (FMNH 119819) and 23 (FMNH 119820) April 1941 are highly questionable. *Elevations:* 150 to 300 ft.

*Wilsonia pusilla* (Wilson). Wilson's Warbler.

Abundant to fairly common winter resident throughout state in all but the most open terrestrial habitats; most numerous in humid forests and least numerous in arid scrub. *Dates:* 20 August to 11 May; dates of 2 and 4 June 1949 (Amatepec, del Toro Avilés, females, USNM 467960–467961) are questionable. *Elevations:* sea level to 9,700 ft.

*Subspecies: pileolata* (Pallas); *chryseola* Ridgway; *pusilla* (Wilson).

*Wilsonia canadensis* (Linnaeus). Canada Warbler.

Uncommon transient migrant in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous, tropical deciduous, and Pacific swamp forests from Rancho Las Animas east to a point in Oaxaca 3 mi northwest of Ciénega, Chiapas (4,650 ft, 2 seen by Binford on 10 May 1972). Only record for Interior, a male (DEL 26545, 10.1 g, little fat) taken by J. C. Barlow on 12 May 1971 at a point 10 road km (6.2 mi) southeast of Santiago Matatlán, probably represents a transient migrant. *Dates:* 22 April to 12 May; 8 to 27 September; dates of 8 February (1941, Tutla, male, FMNH 119827; date given erroneously as 28 February by Blake [1950:414] and subsequent authors; probably only winter "record" for Mexico) and 14 April (1939, Escuilapa, female, MLZ 25942) on del Toro Avilés specimens are questionable. *Elevations:* 150 to 4,650+ ft.

*Cardellina rubrifrons* (Giraud). Red-faced Warbler.

Very uncommon winter resident in pine-oak forest of Interior and adjacent upper reaches of Pacific Region west of Isthmus (Sierra de Miahuatlán and Sierra Aloapaneca) and in cloud and humid pine-oak forests of Pacific Region east of Isthmus. *Dates*: 21 September to 27 April. *Elevations*: 4,900 to 8,600 ft.

*Ergaticus ruber* (Swainson). Red Warbler.

Common permanent resident in humid and semiarid pine-oak forests of Interior east to Cerro Zempoaltepec (Nelson and Goldman) and Río Molino, the south-easternmost localities in entire range of species. *Elevations*: -7,100 to 9,700+ ft.

*Breeding*: 8 May 1967, nest under construction (last of three eggs laid 15 May, Cerro San Felipe, about 9,000 ft, Mayfield [1968:271]), to 31 May 1965, nest with three eggs (last of which laid on that date, Río Molino, 7,300 ft, Rowley [1966:192] and Galley, WFVZ 21384); 25 May 1965, prejuvenile (Río Molino, 7,400 ft, Rook, male, WFVZ 32515, 10.0 g, slightly fat).

*Subspecies*: *rowleyi* Orr and Webster, according to Orr and Webster (1968:39-40), Sierra de Miahuatlán and presumably Sierra de Yucuyacua (see Type Localities); *ruber* (Swainson), remainder of Oaxaca range.

*Myioborus pictus* (Swainson). Painted Redstart.

Permanent resident in arid and semiarid pine-oak forests, fairly common in Pacific Region in Sierra de Yucuyacua and in the Interior east to points 10 road mi southeast of El Cameron and 8 road mi south of San Andrés Miahuatlán and perhaps (del Toro Avilés) to Totontepec, and rare in Pacific Region east of Isthmus (3 birds seen by Binford on 11 May 1972 at 4,350 ft elevation in Oaxaca 7 road mi north-northwest of Ciénega, Chiapas). *Elevations*: 3,500 to 9,000 ft.

*Breeding* (all data): 8 May 1963, nest with one egg, plus two broken eggs on ground (above San Miguel Sola de Vega, 7,000 ft, Rowley [1966:192]; 10 May 1961, ovary with one ruptured and another enlarged follicle (5 mm, 6 road mi east of San Pablo Villa de Mitla, Wolf, LSUMZ 24856, 11.9 g, little fat); 22 June 1965, adult female "feeding juvenile flying about" (kilometer marker 116 on Putla de Guerrero Road, 5,800 ft, Rowley notation on adult, CAS).

*Subspecies*: *pictus* (Swainson), west of Isthmus. On distributional grounds, birds east of the Isthmus (sight record only, see above) should be *guatemalae* (Sharpe). The locality for male (USNM 467958) taken by del Toro Avilés supposedly west of the Isthmus at Amatepec on 12 May 1949 is questionable, because the bird is typical *guatemalae*.

*Myioborus miniatus* (Swainson). Slate-throated Redstart.

Common permanent resident in humid pine-oak forest of Pacific Region west of Isthmus (east to Zapotitlán) and of the Interior (east to Totontepec; Boucard) and in cloud forest of Pacific Region in Sierra Madre de Chiapas. Winter resident at lower elevations in all Regions west of Isthmus, fairly common in cloud forest of Atlantic Region, uncommon in tropical semideciduous (down to 3,600 ft) and arid pine-oak forests adjacent to humid pine-oak forest in Pacific and Interior Regions, and rare in Atlantic Region in tropical evergreen forest (1 seen by D. G. Berrett on 24 November 1961 at 2,600 ft elevation 11 road mi southwest of Valle Nacional); data on male (MLZ 31400) taken by del Toro Avilés supposedly

at San Miguel Soyaltepec on 2 November 1943 are questionable. *Elevations:* breeds from 4,650 to 10,800 ft; winters from at least 7,500 ft down to at least 2,600 ft.

*Breeding:* 26 April 1961, enlarged follicle (4 mm, 38 road mi southwest of Valle Nacional, 9,300 ft, Binford, LSUMZ 24857, 8.4 g, moderately fat), to 7 June 1967, nest with two eggs (Cerro San Felipe, 10,000 ft, Galley, WFVZ 21361); 12 June 1965, prejuvenile (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, Rowley, female, CAS, 9.5 g).

*Subspecies:* *miniatus* (Swainson), west of Isthmus; *intermedius* (Hartlaub), east of Isthmus. Two specimens (USNM 467955, 467957) taken by del Toro Avilés supposedly west of the Isthmus at Lacova on 11 and 30 July 1949 seem to be typical *intermedius*, and, thus, the locality is questionable.

*Euthlypis lachrymosa* (Bonaparte). Fan-tailed Warbler.

Permanent resident, fairly common in Pacific Region in tropical semideciduous forest of Sierra de Yucuyacua, Sierra de Miahuatlán (recorded east to Pluma Hidalgo), and (disjunctly) Sierra Madre de Chiapas and in Pacific swamp forest adjacent to latter two mountain ranges, and (disjunctly) very uncommon in Atlantic Region in the most arid sections of tropical evergreen forest at a point 5 mi west of Temascal (1 seen by Binford on 8 June 1964). The only intervening records are of two males (MCZ) collected by W. W. Brown in May 1927 at Chivela (Bangs and Peters 1928:401), a locality that probably delineates the northernmost Isthmus range of the Pacific population. *Elevations:* 250 to 5,000 ft; 5,800 ft (La Cima, 15 April 1965, Rowley, CAS).

*Breeding:* 5 May 1964, nest with four eggs (Colonia Rodolfo Figueroa, N. Flores, WFVZ 35322), to 9 June 1965, prejuvenile (kilometer marker 134 on Putla de Guerrero Road, 3,600 ft, Rook, male, CAS, 18.8 g, some fat).

*Basileuterus culicivorus* (Deppe). Golden-crowned Warbler.

Permanent resident in Pacific Region (Sierra Madre de Chiapas, Sierra de Miahuatlán, Sierra de Yucuyacua), very common in tropical semideciduous forest above 2,400 ft and uncommon in cloud forest up to 7,300 ft. Common permanent resident in tropical evergreen forest of Atlantic Region, breeding down to 200 ft within Isthmus (south to La Ranchería and perhaps [del Toro Avilés] Escuilapa) and from 1,500 to 4,100 ft elevation west of Isthmus. Uncommon winter resident down to 300 ft elevation west of Isthmus, where recorded only as late as 3 March. Record for "Santo Domingo" (Ridgway 1902:754) pertains to La Ranchería.

*Breeding:* 28 April 1972, nest with four eggs (2 mi east-southeast of Colonia Rodolfo Figueroa, 4,800 ft, Binford observation), to 13 June 1961, "nest noted" (Donají, Schaldach notation on adult male, AMNH 776465, testes  $7 \times 4$  mm); 3 June 1963, nest with four young (Jamaica Junction, Rowley [1966:194] observation).

*Subspecies:* *ridgwayi* Phillips (1966:130), endemic to Pacific Region west of Isthmus (see Type Localities); *culicivorus* (Deppe), Pacific Region east of Isthmus and Atlantic Region. The subspecies *ridgwayi* is intermediate between *flavescens* Ridgway of Colima northward and nominate *culicivorus*; its apparent geographic isolation from either of those forms makes recognition convenient. On the other hand, I cannot agree with Phillips (1966:130) that the range of *ridgwayi* should

be extended to Pacific Chiapas; specimens (WFVZ, LSUMZ) from there and from the Sierra Madre de Chiapas in Oaxaca are similar if not identical to nominate *culcivorus*, to which I refer them.

*Basileuterus rufifrons* (Swainson). Rufous-capped Warbler.

Common permanent resident in all Regions in brushy clearings within tropical evergreen, tropical semideciduous, and pine-oak forests and in oak scrub and arid subtropical scrub; apparently most closely associated with underbrush of oak woodland, even when in general regions of tropical evergreen and tropical semideciduous forests; absent from Pacific Region below 2,400 ft. *Elevations*: 100 to 9,000 ft.

*Breeding* (all data): enlarged testes on 17 (7 × 4 mm, Binford, LSUMZ 24862, 10.6 g, slightly fat) and 26 March 1961 (7 × 4 mm, Wolf, LSUMZ 24866, 10.4 g, slightly fat; both 1 mi southwest of Valle Nacional, 300 ft), 13 May 1964 (7 × 5 mm, 16 road mi north of San Gabriel Mixtepec, 4,350 ft, Binford, LSUMZ 33428, 10.8 g, little fat), and 22 May 1962 (8 × 5 mm, a point 4 mi north and 2 mi east of Matías Romero, Schaldach, AMNH 787574, little fat); 4 June 1965, nest with three eggs (kilometer marker 123 on Putla de Guerrero Road, 4,600 ft, Galley, WFVZ 35321).

*Subspecies*: *rufifrons* (Swainson), highlands of northeastern portion (Sierra Aloapaneca, Sierra de Juárez, Sierra de Zempoaltepec) east through Isthmus mountains to Pacific side of Sierra Madre de Chiapas; *dugesi* Ridgway, Pacific Region west of Isthmus and southern, western, and central portions of Interior; *flavigaster* Nelson (1897:67), lowlands of Atlantic Region. The race *flavigaster* is intermediate between nominate *rufifrons* and *salvini* Cherrie and is merged with the latter by some authors; I find its recognition convenient because of its extensive range and for analyzing the intricacies of gene flow in this species. The exact region of intergradation between *dugesi* and *B. r. rufifrons* is uncertain, but seems to include the western and southern foot of the Sierra Aloapaneca.

*Basileuterus belli* (Giraud). Golden-browed Warbler.

Common permanent resident in all Regions in cloud forest and in dense oak patches within humid pine-oak forest. *Elevations*: breeds from 4,900 to 9,800 ft; winters (and breeds?) down to 4,100 ft in Atlantic Region west Isthmus.

*Breeding* (all data): 27 March 1964, enlarged testes (8 × 4 mm, 12 mi north-northeast of Zanatepec, 4,900 ft, Binford, LSUMZ 33424, 11.0 g, little fat); 24 May 1964, enlarged testes (9 × 5 mm, 1 mi north of San Andrés Chicahuaxtla, 8,000 ft, Binford, LSUMZ 33423, 10.4 g, little fat); 4 April 1948, enlarged testes (8 mm, La Cumbre, 5 mi northeast of Cerro San Felipe, 9,000 ft, H. E. Childs, Jr., MVZ 115553, 10.8 g); 12 June 1965, nest with four eggs (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, Rowley, WFVZ 21382).

*Subspecies*: *clarus* Ridgway, Sierras de Miahuatlán and Yucuyacua; *scitulus* Nelson, Sierra Madre de Chiapas; *belli* (Giraud), Sierra Aloapaneca, Sierra de Juárez, and Sierra de Zempoaltepec.

*Icteria virens* (Linnaeus). Yellow-breasted Chat.

Fairly common winter resident throughout lower portions of Atlantic and Pacific Regions in undergrowth within general ranges of tropical evergreen forest,

Pacific swamp forest, tropical deciduous forest, arid tropical scrub, and lower reaches of tropical semideciduous forest; apparently most numerous in more humid forests. *Dates*: 15 September to 4 May. *Elevations*: sea level to 2,000 ft.

*Subspecies*: *auricollis* (Deppe); *virens* (Linnaeus); see Type Localities.

*Granatellus venustus* Bonaparte. Red-breasted Chat.

Uncommon permanent resident along Pacific coastal lowlands in Pacific swamp forest and dense arid tropical scrub from Minitán west to Puerto Angel and in Pacific swamp forest of foothills of Isthmus mountains and Sierra Madre de Chiapas from a point 17 mi south of Matías Romero east to a point 9 road mi east of Tapanatepec. To be expected between Puerto Angel and Isthmus. *Elevations*: sea level to 1,600+ ft.

*Breeding*: 2 June 1964, enlarged testes (12 × 7 mm, 9 mi east of Tapanatepec, 1,600 ft, Binford, LSUMZ 33404, 14.1 g, little fat), to 31 [sic] June 1961, enlarged testes (11 × 7 mm, Rancho Sol y Luna, Schaldach, AMNH 776457).

*Subspecies*: *venustus* Bonaparte.

*Granatellus sallaei* (Bonaparte). Gray-throated Chat.

Very uncommon permanent resident in lowest portions of Atlantic Region in brushy clearings within tropical evergreen forest, recorded northwest to San Juan Bautista Tuxtepec and perhaps (del Toro Avilés) Río Tonto and San Miguel Soyaltepec and south in Isthmus to a point 28 road mi north of Matías Romero (24 May 1961, male taken by Binford, LSUMZ 24835, 10.9 g, little fat, enlarged testes 7 × 4 mm). Records from Playa Vicente (Sclater 1859b:375) pertain to Veracruz. *Elevations*: 100 to 500 ft.

*Breeding* (all data): see above.

*Subspecies*: *sallaei* (Bonaparte).

*Peucedramus taeniatus* (Du Bus de Gisignies). Olive Warbler.

Fairly common permanent resident in the Interior and adjacent upper reaches of Pacific Region, occurring in humid and semiarid pine-oak forests east at least to Río Molino and a point 38 road mi southwest of Valle Nacional. Unrecorded, but probably occurs, in Sierra de Yucuyacua and Sierra de Zempoaltepec. *Elevations*: 5,500 to 10,000 ft.

*Breeding*: 13 April 1965, prejuvenile (La Cima, 5,800 ft, Galley, male, CAS, 8.3 g, slightly fat [Rowley 1966:190]), to 1 May 1961, active nest, condition unknown (8 road mi north of San Miguel Suchixtepec, 7,950 ft, Binford).

*Subspecies*: *georgei* Phillips (1966:128); see Type Localities. The race *georgei*, which ranges into Guerrero and in Oaxaca occurs in most typical form in the Sierra de Miahuatlán, seems to me as valid as *jaliscensis* Miller and Griscom (neither is strongly marked); *georgei* is intermediate between nominate *taeniatus* and *jaliscensis* and if not recognized should be merged with the latter, which it more closely resembles, not with the former as advocated by Lowery and Monroe (1968:78). Birds from northern Oaxaca (Sierra Aloapaneca and Sierra de Juárez) approach nominate *taeniatus* (or *giraudi* Zimmer?).

*Coereba flaveola* (Linnaeus). Bananaquit.

Fairly common permanent resident in Atlantic Region in openings within tropical evergreen forest south in Isthmus to Río Sarabia and northwest at least to a

point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and Río Tonto. *Elevations*: 250 to 2,600 ft.

*Breeding* (all data): enlarged testes on 27 March 1962 (7 × 4 mm, AMNH 778414) and 19 June 1961 (7 × 4 mm, AMNH 776453; both records Montebello, Schaldach).

Most if not all previously published records for this species are based either on a record for Playa Vicente (Sclater 1859b:376), which is in Veracruz, or on specimens from Río Tonto (Pardiñas 1946:218), Tutla (Blake 1950:412), and Soyaltepec and Palomares (Miller et al. 1957:236), which were collected by del Toro Avilés and are of questionable origin and date. I examined 17 reliable specimens (LSUMZ, WFVZ, UMMZ, UK, AMNH) from eight localities: 1 and 2 mi southwest of Valle Nacional; 18, 24 (Montebello), 28, and 30 road mi north of Matías Romero; and at and 2 mi south of "Tollocita" [= Tolosa]. I also saw this species 6 and 11 road mi southwest of Valle Nacional at 1,900 and 2,600 ft, respectively.

*Subspecies*: *mexicana* (Sclater).

*Tangara larvata* (Du Bus de Gisignies). Golden-masked Tanager.

Permanent resident in Atlantic Region in semi-open portions and margins of tropical evergreen forest, fairly common east of Trans-Isthmian Highway and very uncommon from Isthmus west to a point 6 road mi southwest of Valle Nacional, ranging south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): 20 March 1962, enlarged testes (8 × 7 mm, Montebello, Schaldach, AMNH 778446).

*Subspecies*: *larvata* (Du Bus de Gisignies).

*Chlorophanes spiza* (Linnaeus). Green Honeycreeper.

Status uncertain. Only one certain record, a male (AMNH 778422, testes "not or slightly enlarged," moderate fat) taken by Schaldach on 20 March 1962 in a semi-open coffee finca in Atlantic Region at Montebello (ranch at 300 ft but elevation at exact point of collection unknown). An immature male specimen from "Chinantla (Oaxaca), 3 mai 1927" (Berlioz 1937:173–174), which apparently forms the basis of all previously published references for Oaxaca (e.g., Miller et al. 1957:235), is questionable, because it was collected by del Toro Avilés, and I can find no "Chinantla" in Oaxaca (see Gazetteer). A. R. Phillips (in litt.) informs me that del Toro Avilés gave him a male specimen (ARPC) of this species purportedly from Palomares; again, the data are questionable.

*Subspecies*: *guatemalensis* Sclater.

*Cyanerpes cyaneus* (Linnaeus). Red-legged Honeycreeper.

Permanent resident in Atlantic Region in margins and semi-open portions of tropical evergreen forest, common from February or March through July and generally very uncommon or locally absent at other times. Scarcity throughout state from September through January and absence at Valle Nacional from 14 February to 8 March but presence thereafter (males arriving 9 March, females 25 March) indicate partial or local migration. Only records for this period are: flock of 20 seen by Binford and the Berretts at 1,900 ft elevation 6 road mi southwest of Valle Nacional on 22 November 1961; 1 seen by Graber and Graber (1959:

76) 1 mi south of Loseta in December 1957; and one male (MLZ 31686) with doubtful data taken by del Toro Avilés supposedly on 26 November 1943 at San Miguel Soyaltepec. Only four records for Pacific Region, where species assumed, because of gonad condition, to be a breeder: 2 seen by Binford at 4,800 ft elevation 2 mi east-southeast of Colonia Rodolfo Figueroa on 28 April 1972; male (WFVZ-HC 19675, testes  $9 \times 7$  mm) secured by Galley at 3,500 ft elevation 3 km (1.9 mi) north of Colonia Rodolfo Figueroa on 30 May 1968; Rancho de Cacoprieto (Sumichrast 1881:244); and 3 seen by Binford (including an adult male taken, LSUMZ 33377, 14.2 g, little fat, skull completely ossified, testes  $8 \times 5$  mm) west of Isthmus in tropical semideciduous forest at 4,350 ft elevation 16 road mi north of San Gabriel Mixtepec on 10 May 1964, this record being the northwesternmost in entire Pacific slope range of species. Record for "Santo Domingo" (Miller et al. 1957:236) pertains to La Ranchería. *Elevations*: 250 to 4,800 ft.

*Breeding* (all data): enlarged testes on 10 May 1964 (see above), 30 May 1968 (see above) and 13 ( $9 \times 6$  mm, Donají, Schaldach, AMNH 776448) and 19 June 1961 (two specimens, testes  $9 \times 4$  mm and  $8 \times 4$ , Montebello, Schaldach, AMNH 776449–776450, respectively).

*Subspecies*: *carneipes* (Sclater); see Type Localities.

*Chlorophonia occipitalis* (Du Bus de Gisignies). Blue-crowned Chlorophonia.

Common permanent resident in cloud forest of Atlantic Region northwest at least to a point 15 road mi southwest of Valle Nacional and of Pacific Region east of Isthmus. The one record for low elevations, a male (WFVZ-HC 4976) taken by Schaldach on 19 February 1960 in Isthmus 18 road mi south of Matías Romero, probably represents a casual winter visitant from nearby breeding grounds. *Elevations*: 4,100 to 5,250 ft.

*Breeding*: 1 April 1964, nest under construction (by two birds that both looked like females, 12 mi north-northeast of Zanatepec, 4,900 ft, Binford observation), to 4 May 1964, nest with three eggs (near Cerro Baúl, about 4,500 ft, Galley, WFVZ 35263).

Most previous publications that record this species from Oaxaca (e.g., Miller et al. 1957:297) do so on the basis of questionable del Toro Avilés specimens (MLZ) supposedly from Moctum and Totontepec. I examined 38 reliable study skins (LSUMZ, WFVZ, UK, AMNH, MVZ) and one set of eggs (WFVZ) from the following localities: 15 and 17 road mi southwest of Valle Nacional, 4,100 and 4,850 ft respectively; Vista Hermosa, 1,600 m (5,249 ft); La Gloria; 18 mi south of Matías Romero; near (about 4,500 ft) and at Cerro Baúl; 4.5 km (2.8 mi) north of Rancho Cerro Baúl; Sierra Reten; at, above (5,000 ft), 3 km (1.9 mi) west, and 3 km north of Colonia Rodolfo Figueroa; La Cumbre near Rancho Sol y Luna; and 12 mi north-northeast of Zanatepec, 4,900 ft.

*Subspecies*: *occipitalis* (Du Bus de Gisignies).

*Euphonia affinis* (Lesson). Scrub Euphonia.

Fairly common permanent resident in Atlantic Region in openings within tropical evergreen forest and in Pacific Region in openings within tropical semideciduous, tropical deciduous, and Pacific swamp forests west at least to Minitán and Putla de Guerrero and northwest along Río Tehuantepec to Las Tejas. *Elevations*: sea level to 2,900 ft.

*Breeding*: active nest completed, contents unknown, 31 March 1961 (1 mi

southwest of Valle Nacional, 300 ft, Binford) to 13 May 1963, female with three enlarged follicles (largest  $8.5 \times 7.5$  mm, Cycad Camp, 1,900 ft, Rowley [1966: 195]).

*Subspecies* (according to Dickerman 1981b): *olmecorum* Dickerman (1981b:4), Atlantic Region, "south in Isthmus of Tehuantepec to about 25 km [15.5 mi] north of Matías Romero"; *affinis* (Lesson), Pacific Region.

*Euphonia hirundinacea* Bonaparte. Yellow-throated Euphonia.

Common permanent resident in Atlantic Region in openings within tropical evergreen forest, breeding south in Isthmus at least to Matías Romero and perhaps (del Toro Avilés) Escuilapa. Uncommon winter resident in Pacific Region in openings within at least tropical deciduous and Pacific swamp forests from Rancho Las Animas and Las Tejas east to Tehuantepec City and Juchitán (20 October–14 February) and from Río Ostuta east to Punta Paloma and Santa Efigenia (24 January–13 February; 2, 4 May). Meager data for Atlantic Region indicate numbers greater in spring and summer than in winter; more common after 5 March (1961) at my locality 1 mi southwest of Valle Nacional. *Elevations*: summering, 100 to 1,900 ft; wintering, sea level to 3,000 ft.

*Breeding*: 13 March through 3 April 1961, five nests under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observations), to 12 June 1961, "laying, 2 large ova, large oviduct" (Sarabia, Schaldach, AMNH 776489).

*Subspecies*: *caribbaea* Phillips (1966:149); see Type Localities. I tentatively accept this race, pending confirmation; Storer (1970:346) considers it a synonym of nominate *hirundinacea*.

*Euphonia elegantissima* (Bonaparte). Blue-hooded Euphonia.

Fairly common permanent resident in Atlantic Region in cloud forest of Sierra de Juárez (Vista Hermosa), in the Interior (east to Rancho Las Animas and a point 6 road mi south of San Miguel Suchixtepec) and adjacent upper reaches of Pacific Region (Sierras de Miahuatlán and Yucuyacua) in humid pine-oak forest, arid pine-oak forest, and oak scrub, and in Pacific Region east of Isthmus in tropical semideciduous and cloud forests of Sierra Madre de Chiapas. The only lowland record, a male (MLZ 31413) taken by del Toro Avilés supposedly on 3 February 1944 in Atlantic Region at San Miguel Soyaltepec, is questionable. Only constant elements in wide variety of habitats appear to be oaks and epiphytes. *Elevations*: 3,000 to 9,700 ft.

*Breeding*: 29 April 1961, adult male carrying nest material (6 mi southwest of Guelatao, Binford), to 11 May 1961, nest under construction by an adult male, an adult female (taken by Binford, LSUMZ 24902, 16.9 g, little fat, enlarged follicle 7 mm), and a third bird in female plumage, thus suggesting use of helpers (4 mi east of Santiago Matatlán, 6,100 ft, Binford observation); May, nest with eggs ("Juquila" [= Santa Catarina Juquila], eggs collected by Boucard [Sclater 1859b:378]).

*Subspecies*: *elegantissima* (Bonaparte).

*Euphonia gouldi* Sclater. Olive-backed Euphonia.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest (frequenting epiphytes) northwest at least to a point 1 mi southwest of Valle Nacional (Binford) and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia. *Elevations*: 250 to 4,100 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: gouldi* Sclater. The race *loetscheri* Phillips (1966:148) from Dos Amates, Veracruz, represents merely the large end of a north-south cline in size; color differences are slight if existent; I agree with Storer (1970:350) in treating it as a synonym of *E. g. gouldi*.

*Thraupis episcopus* (Linnaeus). Blue-gray Tanager.

Common permanent resident in Atlantic Region in openings within tropical evergreen forest south in Isthmus to Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 100 to 300 ft.

*Breeding*: 3 April 1961, nest under construction (1 mi southwest of Valle Nacional, 300 ft, Binford observation), to 13 May 1962, enlarged follicle (9 mm, Sarabia, Schaldach, WFVZ 28350); 16 June 1961, prejuvenile (Sarabia, Schaldach, male, AMNH 776490).

Most previous publications that list this species for Oaxaca (e.g., Pardiñas 1946: 220; Blake 1950:415; Miller et al. 1957:300) mention only unreliable del Toro Avilés specimens supposedly from Río Tonto, Moctum, Tutla, Palomares, and Escuilapa. I examined 15 valid specimens (LSUMZ, WFVZ, UMMZ, AMNH) and obtained numerous sightings from 11 localities.

*Subspecies: cana* (Swainson). See Storer (1970:318) for the nomenclature used herein.

*Thraupis abbas* (Deppe). Yellow-winged Tanager.

Common permanent resident in Atlantic Region in openings within tropical evergreen forest and lower reaches of cloud forest, ranging south in Isthmus to town of Río Grande. One record for Interior, 2 birds seen by A. R. Phillips (pers. comm.) 3 km (1.9 mi) south of San Juan Bautista Cuicatlán on 11 December 1977. Two records for Pacific Region, where apparently only a casual winter visitant: a female (WFVZ-HC 19634) from Cerro Baúl and a male (WFVZ-HC 19635) from "Villa" [= Rancho] Cerro Baúl, both taken by P. Flores on 7 April 1968. *Elevations*: 100 to 5,250 ft.

*Breeding*: 22 April 1961, adults carrying nest material (6 mi southwest of Valle Nacional, 1,900 ft, Binford), to 17 July 1961, nest with eggs taken (3 mi east of Matías Romero, Rook field notebook plus notation on female specimen LSUMZ 49060).

*Subspecies*: monotypic; see Type Localities.

*Eucometis penicillata* (Spix). Gray-headed Tanager.

Status uncertain; rare breeder in tropical evergreen forest (or openings within) on Atlantic side of Isthmus, where apparently a permanent resident. Only one reliable record, a female (AMNH 787588, egg 21 mm in diameter and without shell in oviduct, little fat) and its mate (Schaldach no. 11595, specimen not located by me) collected by Schaldach on 8 May 1962 at Montebello (ranch at about 300 ft but elevation at exact point of collection unknown). The only other record (Miller et al. 1957:310), a male (MLZ 26278) taken by del Toro Avilés supposedly at Escuilapa on 15 April 1939, is questionable.

*Breeding* (all data): see above.

*Subspecies: pallida* Berlepsch.

*Lanio aurantius* Lafresnaye. Black-throated Shrike-Tanager.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Guichicovi and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 200 to 1,900 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: monotypic. I follow the A.O.U. (1983:654) in treating *L. aurantius* and *L. leucothorax* Salvin as separate species, thus making *aurantius* monotypic.

*Habia rubica* (Vieillot). Red-crowned Ant-Tanager.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest and dense brush of associated clearings and in Pacific Region west of Isthmus in Pacific swamp forest and lowest reaches of tropical semideciduous forest, occurring south in Tehuantepec region to La Ranchería and perhaps (del Toro Avilés) Escuilapa and in Pacific Region from Minitán and kilometer marker 134 near Putla de Guerrero east to a point 1 mi north of San Pedro Pochutla. Unaccountably absent from Sierra Madre de Chiapas. Record for "Santo Domingo" (Miller et al. 1957:307) pertains to La Ranchería. *Elevations*: sea level to 3,300 ft. See *H. fuscicauda*.

*Breeding*: 12 June 1963, nest with three pierced tanager eggs and one egg of *Molothrus aeneus* (Cycad Camp, 1,900 ft, Rowley [1966:196], WFVZ 26702), to 14 June 1963, nest with one pierced tanager egg plus one fertile and one infertile egg of *Molothrus aeneus* (Río Ranas, 2,100 ft, Rowley [1966:196]); 19 June 1895, prejuvenile (La Ranchería, Nelson and Goldman, female, USNM 143570).

*Subspecies*: *affinis* (Nelson), endemic to Pacific Region (see Type Localities); *rubicoides* (Lafresnaye), Atlantic Region. Males (LSUMZ, WFVZ, AMNH) from the Sierra de Miahuatlán are darker and brighter red above and below and slightly larger than birds from the extreme southwestern Pacific Region (Minitán; near Putla de Guerrero; and Santiago Pinotepa Nacional, the type locality of *affinis*). Thus, true *affinis* is intermediate between the Sierra de Miahuatlán population and *rosea* (Nelson) of northwestern Mexico. However, rather than describing the Sierra de Miahuatlán birds as a new race and synonymizing *rosea* (1898) with the older name *affinis* (1897), or alternatively, considering them as intermediates between *affinis* and the geographically remote *rubicoides*, I prefer to treat them as large bright extremes of *affinis*. The only record for *holobrunnea* Griscom, a male (MLZ 31559) from San Miguel Soyaltepec (Miller et al. 1957:308) taken by del Toro Avilés, is questionable; birds (LSUMZ) from near Valle Nacional seem to be *rubicoides*.

*Habia fuscicauda* (Cabanis). Red-throated Ant-Tanager.

Very common permanent resident in Atlantic Region in tropical evergreen forest and dense brush of associated clearings, recorded south in Isthmus to La Ranchería, a point 4 mi north and 2 mi east of Matías Romero, and perhaps (del Toro Avilés) Escuilapa. Two "records" for Pacific Region east of Isthmus, where apparently only a casual winter visitant: Tapanatepec (Sumichrast 1881:244; record perhaps questionable, because I can find no specimen); Punta Paloma, female

(MLZ 47406) taken by Lamb on 12 February 1948. In Atlantic Region, often occurs side-by-side with *H. rubica*. *Elevations*: sea level to 1,900 ft.

*Breeding*: 16 June 1961, enlarged follicle (6 mm, Sarabia, Schaldach, AMNH 776481), to 19 June 1961, egg without shell in oviduct (24 × 16 mm, Montebello, Schaldach, AMNH 776480).

*Subspecies*: *salvini* (Berlepsch). No Oaxaca specimens I have examined are typical of *littoralis* Nelson, a race supposed to range close to the coast from Tamaulipas to Guatemala (Miller et al. 1957:308) but treated by Storer (1970:299) as a synonym of *salvini*.

*Piranga flava* (Vieillot). Hepatic Tanager.

Common permanent resident in all Regions in pine-oak forests, oak scrub, and juniper scrub. Breeding distribution continuous across lowland gap of Isthmus. *Elevations*: 650 to 8,000 ft.

*Breeding*: 28 May 1967, nest with three tanager eggs and one of *Molothrus aeneus* (not 1966 as in Friedmann [1971:253]; above Colonia Rodolfo Figueroa, about 5,000 ft, Rowley [1984:202], WFVZ 21542), to 29 May 1963, nest with eggs (near Juniper Camp, Rowley [1966:195] observation).

*Subspecies*: *hepatica* Swainson, Pacific Region west of Isthmus and most of Interior; *dextra* Bangs, mountains of northeastern Interior through and east of Isthmus. Tentatively, I follow the taxonomic treatment of Storer (1970:302–303), who considers *intensa* Phillips (1966:151) of the Sierra de Miahuatlán (see Type Localities) a synonym of *hepatica*; however, this species needs revision, and *intensa* might be valid.

*Piranga rubra* (Linnaeus). Summer Tanager.

Winter resident, common in Atlantic and Pacific Regions in cloud, tropical evergreen, tropical semideciduous, tropical deciduous, and Pacific swamp forests and arid tropical scrub, and very uncommon in the Interior in arid subtropical and juniper scrubs. *Dates*: 2 October to 25 April. *Elevations*: sea level to 8,600 ft.

*Subspecies*: *rubra* (Linnaeus); *cooperi* Ridgway, one record, the southeasternmost for the race, a female (LSUMZ 33478, 29.5 g, little fat, follicles small) taken by Binford on 15 February 1964 at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande.

*Piranga ludoviciana* (Wilson). Western Tanager.

Fairly common transient migrant and uncommon winter resident in all Regions, frequenting cloud, tropical evergreen, tropical semideciduous, and tropical deciduous forests, arid tropical and arid subtropical scrubs, and (to a lesser degree) pine-oak forests. *Dates*: extremes, 24 September to 12 May; movement of transient migrants noted by Binford and Wolf from 1 to 7 April 1961 at a point 1 mi southwest of Valle Nacional. *Elevations*: sea level to 7,900 ft.

*Piranga bidentata* Swainson. Flame-colored Tanager.

Rare permanent resident in Atlantic Region in Sierra de Juárez and in Pacific Region in Sierra Madre de Chiapas, Sierra de Miahuatlán, and Sierra de Yucucyacuá, inhabiting primarily cloud forest but also upper reaches of tropical semideciduous forest. *Elevations*: –2,900 to 8,600 ft.

*Breeding* (all data): 23 June 1964, enlarged testes (12 mm, Vista Hermosa, 1,600 m [5,249 ft], D. M. Power, UK).

*Subspecies: sanguinolenta* Lafresnaye. I am unable to see any characters that distinguish *alvarezi* Phillips (1966:151) of the Sierra de Miahuatlán (see Type Localities) and, thus, agree with Storer (1970:302) in treating it as a synonym of *sanguinolenta*. However, the situation needs to be reexamined, because on geographical grounds, the birds of southwestern Oaxaca could be the nominate race, which extends south to Guerrero (Miller et al. 1957:306). I suspect that *P. b. bidentata* is restricted to northern Guerrero and the race south of the Balsas is *sanguinolenta*.

*Piranga leucoptera* Trudeau. White-winged Tanager.

Uncommon permanent resident in Pacific Region in Sierra Madre de Chiapas and Atlantic Region, breeding from 1,900 to 5,000 ft in cloud forest and upper reaches of tropical evergreen and tropical semideciduous forests, and descending to 250 ft in Atlantic lowlands from 18 July to 5 April.

*Breeding* (all data): 8 April 1964, enlarged testes (left 7 × 4 mm, right 4 × 3, 12 mi north-northeast of Zanatepec, 4,900 ft, Morony, LSUMZ 33482, 14.6 g, little fat); 8 April 1961, copulation observed (6 road mi southwest of Valle Nacional, 1,900 ft, Binford).

*Subspecies: leucoptera* Trudeau.

*Piranga erythrocephala* (Swainson). Red-headed Tanager.

Permanent resident west of Isthmus in all Regions, fairly common in Sierra de Miahuatlán (southeast to a point 3 road mi north of Pluma Hidalgo) and Sierra de Yucuyacua and rare in Sierra Aloapaneca (Cerro San Felipe, 21 June 1984, Nelson and Goldman, female, USNM 143665) and Sierra de Zempoaltepec (Tontotepec, Boucard; and possibly Moctum, del Toro Avilés), occurring primarily in humid pine-oak forest and adjacent tropical semideciduous and cloud forests. Unrecorded in Sierra de Juárez. Oaxaca localities are southeasternmost in entire range of species. *Elevations*: 4,350 to 6,000+ ft (probably above 10,000 ft on Cerro San Felipe).

*Breeding*: 13 May 1964, egg without shell in oviduct (16 road mi north of San Gabriel Mixtepec, 4,350 ft, Morony, LSUMZ 33488, 24.5 g, little fat), to 12 June 1965, prejuvenile (kilometer marker 183 near La Cima, 6,000 ft, Rowley [1966:195], male, WFVZ 28186).

*Subspecies: erythrocephala* (Swainson).

*Ramphocelus sanguinolentus* (Lesson). Crimson-collared Tanager.

Fairly common permanent resident in Atlantic Region in brushy clearings within tropical evergreen forest northwest at least to a point 5 mi west of Temascal and south in Isthmus to a point 3 mi east of Matías Romero. *Elevations*: 100 to 1,900 ft.

*Breeding* (all data): 19 June 1961, enlarged testes (10 × 6 mm, Montebello, Schaldach, AMNH 776486); 20 June 1961, "large egg broken in oviduct" (Sarabia, Schaldach, notation on female, AMNH 776487).

*Subspecies: sanguinolentus* (Lesson).

*Chlorospingus ophthalmicus* (Du Bus de Gisignies). Common Bush-Tanager.

Very common permanent resident in all Regions, breeding from 4,100 to 9,300 ft in cloud forest, and perhaps adjacent humid pine-oak forest, of Sierra Madre de Chiapas, and Sierras de Juárez, Zempoaltepec, Miahuatlán, and Yucuyacua.

Very uncommon winter visitant between 4,100 and 300 ft in tropical evergreen forest of Atlantic Region west of Isthmus (points 1 and 6 road mi southwest of Valle Nacional, Binford; and perhaps San Miguel Soyaltepec, del Toro Avilés).

*Breeding: albifrons*, 6 June 1965, prejuvenile (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, J. D. Webster, female, CAS), to 11 June 1965, enlarged follicle (7 mm, near La Cima, 6,000 ft, J. D. Webster, CAS skeleton, 16.9 g); *ophthalmicus*, 12 April 1964, active nest completed, probably with young (12 mi north-northeast of Zanatepec, 4,900 ft, Binford), to 5 May 1967, nest with three eggs (5 km [3.1 mi] above Colonia Rodolfo Figueroa, 5,500 ft, Galley, WFVZ 21420).

*Subspecies: albifrons* Salvin and Goldman, Sierras de Miahuatlán and Yucucua; probably an undescribed race, Sierra Madre de Chiapas; *ophthalmicus* (Du Bus de Gisignies), remainder of Oaxaca range. Birds from the Sierra de Miahuatlán, named *persimilis* Phillips (1966:152), average slightly darker and more reddish-brown (less grayish-brown) on the crown than *C. a. albifrons*, but this difference is in my opinion too slight to warrant taxonomic recognition; I see none of the other characters mentioned by Phillips; see Type Localities. Storer (1970: 254) also treats *persimilis* as a synonym of *C. a. albifrons*. Birds (LSUMZ, WFVZ) from the Sierra Madre de Chiapas of Oaxaca (and two in CAS from near Cintalapa, Chiapas) probably represent an undescribed race.

*Saltator coerulescens* Vieillot. Grayish Saltator.

Permanent resident, common to fairly common in Pacific Region in margins of Pacific swamp and dense tropical deciduous forests from Guerrero border east to region of Puerto Angel and in foothills of Sierra Madre de Chiapas, and fairly common in Atlantic Region in brushy clearings within tropical evergreen forest. Unrecorded in Río Tehuantepec basin except at Tehuantepec City (2 June 1917, male, UMMZ 139547; 13 May 1917, female, UMMZ 139548; both Shufeldt), where probably a rare permanent resident. To be expected between Puerto Angel and Tehuantepec City. *Elevations*: sea level to 3,000 ft.

*Breeding*: 2 July 1961, nest with one egg (Sarabia, Rook, WFVZ 35316), to 9 September 1954, prejuvenile (Chacalapa, 650 ft, R. W. Dickerman, male, UK 31541).

*Subspecies: richardsoni* van Rossem, Pacific Region west of Isthmus; *grandis* (Deppe), Pacific Region east of Isthmus and Atlantic Region. The only specimen I have seen from the extreme eastern Pacific Region (Santa Efigenia, 6 January 1869, Sumichrast, male, USNM 57553) seems to be *grandis*; more specimens from here are needed to determine the presence of *hesperis* Griscom of adjacent Pacific Chiapas.

*Saltator maximus* (Müller). Buff-throated Saltator.

Common permanent resident in Atlantic Region in brushy clearings within tropical evergreen forest northwest at least to San Juan Bautista Tuxtepec and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to "Santo Domingo" [= La Ranchería] (Ridgway 1901:664), a point 4 mi north and 2 mi east of Matías Romero, and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 100 to 2,600 ft.

*Breeding*: 11 June, "large egg in oviduct" (AMNH 776503), to 17 June, enlarged follicle (5 mm, AMNH 776502; both 1961, Sarabia, Schaldach).

*Subspecies: gigantodes* Cabanis. Birds from at least the Isthmus eastward show minor intergradation with *magnoides* Lafresnaye.

*Saltator atriceps* (Lesson). Black-headed Saltator.

Permanent resident, frequenting openings within forests, as follows: common in Pacific Region west of Isthmus in tropical semideciduous and Pacific swamp forests, occurring east to a point 3 road mi north of Pluma Hidalgo; and fairly common in Atlantic Region in tropical evergreen forest, occurring south in Isthmus to Almoloya and Mezahuite, and in Pacific Region east of Isthmus in Pacific swamp forest of foothills of Sierra Madre de Chiapas. *Elevations*: sea level to 5,000 ft.

*Breeding*: 15 June 1895, prejuvenile (La Ranchería, Nelson and Goldman, female, USNM 143666), to 10 June 1965, nest with two eggs (on trail from La Cima to Santos Reyes Nopala, about 3,000 ft, Rowley, WFVZ 21362).

*Subspecies: flavicrissus* Griscom, Pacific Region west of Isthmus; *peeti* Brodkorb, Pacific Region east of Isthmus; *atriceps* (Lesson), Atlantic Region. Intergrades between *peeti* and *atriceps* have been taken as far north in Isthmus as La Ranchería.

*Caryothraustes poliogaster* (Du Bus de Gisignies). Black-faced Grosbeak.

Permanent resident in Atlantic Region in tropical evergreen forest, common east and uncommon west of Trans-Isthmian Highway, recorded northwest to a point 5 mi west of Temascal and south in Isthmus to a point 8 mi north of Matías Romero. *Elevations*: 250 to 2,600+ ft.

*Breeding* (all data): 22 April 1961, enlarged testes (12 × 7 mm, 6 road mi southwest of Valle Nacional, 1,900 ft, Binford, LSUMZ 24957, 47.7 g, little fat).

*Subspecies: poliogaster* (Du Bus de Gisignies).

*Cardinalis cardinalis* (Linnaeus). Northern Cardinal.

Permanent resident; fairly common in Pacific Region in tropical deciduous forest and arid tropical scrub, ranging east to Tehuantepec City and northwest in Río Tehuantepec basin to Rancho Las Animas; uncommon in Atlantic Region in brushy clearings within tropical evergreen forest from Temascal east to a point 4 mi south of Loma Bonita; and very uncommon elsewhere in low portions of Atlantic Region, occurring south in Isthmus to a point 3 mi north of Matías Romero. Surprisingly absent between Matías Romero and Tehuantepec City and in Pacific Region east of Isthmus, where habitat seems suitable. *Elevations*: Pacific Region, sea level to 3,000 ft; Atlantic Region, 100 to 500+ ft.

*Breeding* (all data): 2 June 1917, nest with two eggs collected (Tehuantepec City, Shufeldt field notes in UMMZ).

*Subspecies: carneus* (Lesson), Pacific Region; *coccineus* Ridgway, northwestern Atlantic Region (see Type Localities); *littoralis* Nelson, eastern Atlantic Region.

*Pheucticus chrysopleplus* (Vigors). Yellow Grosbeak.

No specimen examined; one published specimen record; one sight record. Status uncertain. Only two records, both in San Juan Bautista Cuicatlán valley: male (Museum of Natural History, Leiden, 34297) taken by O. Epping at Teotitlán del Camino (town at 3,198 ft) on 25 September 1962 (Mees 1970:244); about 6 seen on 10 December and 2 on 11 December 1977 by A. R. Phillips (in litt.) about 1 mi south of San Juan Bautista Cuicatlán.

*Subspecies: chrysopleplus* (Vigors), according to Mees (1970:244).

*Pheucticus ludovicianus* (Linnaeus). Rose-breasted Grosbeak.

Common transient migrant and uncommon winter resident in Atlantic Region in tropical evergreen forest and in Pacific Region in cloud, tropical semideciduous, tropical deciduous, humid pine-oak, and Pacific swamp forests and arid tropical scrub, recorded west in Pacific Region to a point 16 road mi northwest of Puerto Escondido. Rare transient migrant in the Interior, thus far found only above 8,600 ft in Sierra de Miahuatlán; should be sought elsewhere in the Interior at least during migration. *Dates*: 19 October to 28 April; date of 30 April 1941, based on del Toro Avilés specimen (Tutla, male, FMNH 119912; published by Blake 1950: 417), is questionable. *Elevations*: winter, sea level to 7,200 ft; migration, 8,600+ ft.

*Pheucticus melanocephalus* (Swainson). Black-headed Grosbeak.

Common permanent resident from 6,000 to 10,800 ft in the Interior in pine-oak forests (especially humid portions), oak scrub, and extreme upper limits of arid subtropical scrub. Rare winter visitant in Atlantic Region, and doubtless elsewhere, down to 4,100 ft into upper limits of tropical evergreen forest. Breeds east to points 17 road mi south of San Miguel Suchixtepec and 4 mi east of Santiago Matatlán and perhaps (del Toro Avilés; "September" and "December") to Moctum, the southeasternmost localities in entire breeding and wintering ranges of species; presence in Sierra de Zempoaltepec needs confirmation because based on unreliable del Toro Avilés specimens.

*Breeding*: 7 May 1965, nest with two young, to 29 May 1965, nest with three eggs (WFVZ 21309; both Río Molino, 7,300 ft, Rowley [1966:197]); 21 May 1965, prejuvenile (Río Molino, 7,300 ft, Galley, male, CAS, 33.2 g, no fat).

*Subspecies*: *melanocephalus* (Swainson), permanent resident; *maculatus* (Audubon), winter resident.

*Cyanocompsa cyanooides* (Lafresnaye). Blue-black Grosbeak.

Fairly common permanent resident in Atlantic Region in openings within tropical evergreen forest south in Isthmus to Río Sarabia and northwest to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and Río Tonto. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): 26 March 1961, nest with two eggs (1 mi southwest of Valle Nacional, 300 ft, Binford observation).

*Subspecies*: *concreta* (Du Bus de Gisignies); see Type Localities.

*Cyanocompsa parellina* (Bonaparte). Blue Bunting.

Permanent resident, common in tropical deciduous forest of Pacific Region exclusive of Río Tehuantepec basin northwest of Tehuantepec City, uncommon in Pacific Region west of Isthmus in tropical semideciduous forest and lower reaches of humid pine-oak and cloud forests and in Atlantic Region along Trans-Isthmian Highway in tropical evergreen forest, and very uncommon in Atlantic Region west of Isthmus (Totontepec, Boucard; 3 mi north of Loma Bonita, Lamb; perhaps San Miguel Soyaltepec, del Toro Avilés) in unknown habitats. In Isthmus, range extends south from Atlantic side to the Río Sarabia and north from Pacific side to Chivela and a point 17 mi south of Matías Romero. *Elevations*: sea level to 6,000 ft.

*Breeding* (all data): 19 May 1966, nest with two eggs (ridge above Rancho Sol y Luna, 1,000 ft, Rowley, WFVZ 21318); 23 May 1961, enlarged testes (9 × 8

mm, 28 road mi north of Matías Romero, Wolf, LSUMZ 24966, 15.4 g, little fat); 13 June 1961, enlarged testes (8 × 5 mm, Donají, Schaldach, AMNH 776533).

*Subspecies: indigotica* (Ridgway), Pacific Region; *parellina* (Bonaparte), Atlantic Region. Birds from the Pacific Region east of the Isthmus are close to *indigotica* but very slightly darker in both sexes, indicating some gene flow from the Atlantic Region (*C. p. parellina*). I agree with Todd (1923:68–69) in treating *sumichrasti* (Ridgway 1887:447) as a synonym of *indigotica*; see Type Localities.

*Guiraca caerulea* (Linnaeus). Blue Grosbeak.

Mainly a transient migrant and winter resident, common in arid tropical scrub on Pacific side of Isthmus from Tehuantepec City east to a point 8 mi southeast of Tapanatepec and very uncommon in Atlantic Region in openings within tropical evergreen forest from Trans-Isthmian Highway northwest to a point 1 mi southwest of Valle Nacional. No definite migration records for Interior. Uncommon permanent resident in the Interior in arid subtropical scrub, recorded east to a point 4 mi south of Santiago Matatlán, and (disjunctly) in Pacific Region in arid tropical scrub from Tehuantepec City east probably into Chiapas. Status in Pacific Region west of Isthmus uncertain; probably only a winter resident, having been recorded from 10 November to 28 April. *Elevations*: sea level to 7,300 ft.

*Breeding*: 26 May 1917, nest with three eggs (Tehuantepec City, Shufeldt [1917]), to 16 July 1963, nest with three eggs (4 mi south of San Bartolo Coyotepec, 5,000 ft, Rowley, WFVZ 25639); 4 July 1962, nest with two young (near Oaxaca City, Rowley [1984:197–198] observation).

*Subspecies: eurhyncha* Coues, permanent resident in the Interior; *chiapensis* Nelson, permanent resident in Pacific Region from Tehuantepec City eastward; *caerulea* (Linnaeus), *interfusa* Dwight and Griscom, and *salicaria* Grinnell (apparently southeasternmost record for race), winter residents or transient migrants. I base occurrence of the last two races on identifications by R. W. Storer and D. A. Zimmerman of specimens in the UMMZ. I follow the taxonomic treatment by Storer and Zimmerman (1959).

*Passerina rositae* (Lawrence). Rose-bellied Bunting.

Locally common permanent resident in Pacific Region portion of Isthmus in Pacific swamp forest and denser portions of tropical deciduous forest; recorded from Rancho Sol y Luna, Rancho de Cacoprieto, and a point on Pan-American Highway 0.7 mi from Chiapas border west through foothills of Sierra Madre de Chiapas to Chivela and three points 17 and 18 mi south of Matías Romero and 13 mi east of Juchitán. Endemic to Oaxaca and southwestern Chiapas. I examined 162 specimens of this local and monotypic species, of which only one is a skeleton and one an egg set! *Elevations*: –700 to 1,600 ft.

*Breeding*: 16 May 1966, nest with three eggs (ridge above Rancho Sol y Luna, 1,500 ft, Rowley, WFVZ 20730), to 30 July 1961, nest with fresh eggs taken (Mezahuite, Rook and L. Petite notations on labels of male and female study skins, WFVZ-HC 4770 and 4772, respectively).

*Subspecies*: monotypic; see Type Localities.

*Passerina cyanea* (Linnaeus). Indigo Bunting.

Common (lower elevations) to uncommon (higher elevations) winter resident in Atlantic and Pacific Regions in grazed land, cultivated land, and brushy clearings wherever these habitats occur within general ranges of cloud, tropical ever-

green, tropical semideciduous, and tropical deciduous forests, and arid tropical scrub. Recorded northwest in Río Tehuantepec basin to Rancho Las Animas. No definite record for Interior; Boucard's old record from "Oaxaca" (Sclater 1859b: 379) doubtfully pertains to the city. *Dates*: 20 October to 28 April. *Elevations*: sea level to 7,200 ft.

*Passerina versicolor* (Bonaparte). Varied Bunting.

Very uncommon permanent resident in the Interior in arid subtropical scrub from San Francisco Tlapancingo and Teotitlán del Camino southeast through Oaxaca Valley to Rancho Las Animas. *Elevations*: 3,000 to 5,100+ ft.

*Breeding* (all data): 29 May 1964, enlarged testes (9 × 5 mm, LSUMZ 33531, 13.3 g, little fat); 30 May 1964, enlarged testes (11 × 7 mm, LSUMZ 33530, 12.2 g, little fat; both records 18 road mi southeast of Santiago Matatlán, 3,200 ft, Morony).

*Subspecies*: *versicolor* (Bonaparte).

*Passerina leclancherii* Lafresnaye. Orange-breasted Bunting.

Common permanent resident in Pacific Region in tropical deciduous forest and arid tropical scrub, occurring west from Chiapas border at least to a point 16 road mi northwest of Puerto Escondido, northwest in Río Tehuantepec basin to San Juan del Río and a point 2 road mi northwest of San Pedro Totolapan, and north across Isthmus into Atlantic Region as far as Almoloya. *Elevations*: sea level to 3,200+ ft.

*Breeding* (all data): 14 May 1961, enlarged testes (4 × 3 mm, 3 mi east of Tehuantepec City, Wolf, UMMZ 156523 skeleton, 14.2 g, little fat); 25 May 1956, enlarged testes (5 × 3 mm, 2 mi southeast of Niltepec, D. A. Zimmerman, UMMZ 151518, 13.8 g).

*Subspecies*: *grandior* Griscom; see Type Localities.

*Passerina ciris* (Linnaeus). Painted Bunting.

Winter resident, common in Atlantic and Pacific Regions in brushy clearings, cultivated land, and grazed land wherever these habitats occur within general ranges of tropical evergreen forest, tropical semideciduous forest, tropical deciduous forest, and arid tropical scrub and rare in the Interior in openings within arid tropical scrub (San Juan Bautista Cuicatlán) and arid subtropical scrub (San Felipe del Agua). *Dates*: 5 October to 29 April; date of 30 April 1939, based on del Toro Avilés specimen (Escuilapa, male, MLZ 25995), is questionable. *Elevations*: sea level to 7,200 ft.

*Subspecies*: *ciris* (Linnaeus); *pallidior* Mearns.

*Spiza americana* (Gmelin). Dickcissel.

Common, and at times abundant, transient migrant during its flights on a north-south axis across Isthmus of Tehuantepec, recorded from Guichicovi and a point 18 road mi north of Matías Romero southwest to Tehuantepec City and southeast to Rancho de Cacoprieto; feeds in savanna and in openings within tropical evergreen forest and arid tropical scrub. Uncommon and local winter resident in Pacific coastal lowlands between points 9 road mi west-northwest of San José Estancia Grande (14 February) and 6 road mi northwest of Puerto Escondido (10 March), occurring in savanna and in openings within tropical deciduous forest. *Dates*: migration periods (including extremes for winter residents), August ("great

flocks" passing southeast through Isthmus; Phillips 1962a:310), 2 September to 27 October, 22 to 30 April; dates of 2, 3, 9, 13, and 17 April 1939, based on five del Toro Avilés specimens (Escuilapa, MLZ), are questionable. *Elevations*: sea level to 800 ft.

*Atlapetes albinucha* (d'Orbigny and Lafresnaye). White-naped Brush-Finch.

Fairly common permanent resident in Atlantic Region in openings within cloud forests of Sierra de Juárez (Vista Hermosa and points 15 and 17 road mi southwest of Valle Nacional) and Sierra de Zempoaltepec (Totontepec, Boucard; and perhaps Amatepec and Moctum, del Toro Avilés). Should be sought east of Isthmus. *Elevations*: 4,100 to 4,900+ ft.

*Breeding* (all data): 25 April 1961, enlarged testes (8 × 4 mm, 17 road mi southwest of Valle Nacional, 4,850 ft, Binford, LSUMZ 25005, 34.5 g, slightly fat).

*Subspecies*: *albinucha* (d'Orbigny and Lafresnaye).

*Atlapetes pileatus* Wagler. Rufous-capped Brush-Finch.

Common permanent resident in humid pine-oak forest west of Isthmus in the Interior and adjacent upper reaches of Atlantic and Pacific Regions, recorded east to Cerro Zempoaltepec and a point 6 road mi south of San Miguel Suchixtepec, the southeasternmost localities in entire range of species. *Elevations*: 5,800 to 10,800 ft.

*Breeding*: 3 June 1966, nest with two eggs (La Cumbre, 5 mi northeast of Cerro San Felipe, 9,000 ft, Rowley, WFVZ 20752), to 7 June 1966, nest with two eggs (Cerro San Felipe, 9,500 ft, Rowley, WFVZ 20754); 17 June 1965, prejuvenile (Río Molino, 7,300 ft, Rowley and Galley, male, WFVZ 26653, 23.4 g).

*Subspecies*: *pileatus* Wagler.

*Atlapetes brunneinucha* (Lafresnaye). Chestnut-capped Brush-Finch.

Common to locally very common permanent resident in undergrowth within humid pine-oak and cloud forests throughout state. Data on specimens (MLZ) taken by del Toro Avilés purportedly between 5 January and 14 February 1944 at "San Miguel Soyaltepec, 600 m." (1,969 ft) are questionable. *Elevations*: 4,000 to 10,000 ft.

*Breeding*: 28 March 1969, active nest completed but empty (La Cumbre near Cerro San Felipe, 9,000 ft, Cody and Brown [1970:304]), to 24 October 1964, prejuvenile (7 mi north of Putla de Guerrero, 3,500 ft, Rowley, male, CAS).

*Subspecies*: *brunneinucha* (Lafresnaye), Sierra de Juárez and probably (del Toro Avilés) Sierra de Zempoaltepec; *suttoni* Parkes, Sierra Aloapaneca, Sierra de Miahuatlán, and presumably (prejuvenile specimen only) Sierra de Yucuyacua (see Type Localities); *nigrilatera* Rowley (1968:7), Sierra Madre de Chiapas (see Type Localities). I follow Paynter (1978:341–345) in treating *parkesi* Phillips (1966: 153) from Veracruz and presumably northern Oaxaca as a synonym of *A. b. brunneinucha*. I am not satisfied with the above arrangement, suspecting that the primary break between *brunneinucha* (or *parkesi*) and "*suttoni*" should be between the Sierra Aloapaneca and Sierra de Miahuatlán. The race *nigrilatera* is easily separable from *A. b. brunneinucha* and from *macrourus* Parkes of Guatemala.

*Arremon aurantiirostris* Lafresnaye. Orange-billed Sparrow.

Fairly common permanent resident in Atlantic Region in underbrush within tropical evergreen forest northwest to a point 1 mi southwest of Valle Nacional

and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 1,900 ft.

*Breeding* (all data): 30 March 1962, enlarged testes (8 × 5 mm, Montebello, Schaldach, AMNH 778460); 10 June 1962, enlarged testes (10 × 7 mm, 8 km [5.0 mi] southeast of Donají, Schaldach, WFVZ 26517).

*Subspecies*: *saturatus* Cherrie.

*Arremonops rufivirgatus* (Lawrence). Olive Sparrow.

Common to locally very common permanent resident in brushy clearings within tropical evergreen and tropical deciduous forests, occurring in two allopatric populations, one in Atlantic Region south in Isthmus to Sarabia and the other in Pacific Region east to Huamelula. Does not occur on Pacific side of Isthmus region. *Elevations*: sea level to 2,400 ft.

*Breeding*: 10 June 1955, two prejuveniles (Río Sarabia, 300 ft, Lamb, male, MLZ 59790; female, MLZ 69789), to 18 July 1961, nest with two eggs (Montebello, Rook, WFVZ 35310).

*Subspecies*: *sumichrasti* (Sharpe), Pacific Region (see Type Localities); *crassirostris* (Ridgway), Atlantic Region.

*Melozona kieneri* (Bonaparte). Rusty-crowned Ground-Sparrow.

Very uncommon and apparently local permanent resident in upper reaches of Pacific Region west of Isthmus and in the Interior, Oaxaca localities being southeasternmost in entire range of species. Noted in arid subtropical, oak, and juniper scrubs. Only seven records in four general localities: female (USNM 136118) taken by Nelson and Goldman on 14 October 1894 at [= above?] San Juan Bautista Cuicatlán; male (ARPC 6747; type of *obscurior*) taken by Phillips on 22 May 1964 at 5,700 ft elevation "4 miles by road southeast of pass southwest of Sola de Vega"; 1 seen by G. H. Lowery, Jr. (pers. comm.) on 19 March 1965 at 5,800 ft along Pan-American Highway between Puebla border and a point 7.8 mi into Oaxaca; adult male (probably in BMNH) taken by Boucard on 1 May 1871 at [= above?] Putla de Guerrero (Sharpe 1888:732); and nest with two eggs (WFVZ 21350) collected by Galley on 20 June 1965 at 4,600 ft, two males collected by Galley (WFVZ 26506, 31.9 g) and Rook (CAS, 41.3 g, some fat, testes enlarged, skull ossified) on 4 June 1965 at 4,500 ft, and a bird seen by Binford on 12 February 1974 at 4,350 ft, all at kilometer marker 123 on Putla de Guerrero Road.

*Breeding* (all data): see above.

*Subspecies*: *rubricatum* (Cabanis). The two males from kilometer marker 123 cannot be distinguished from a series (CAS) of *M. k. rubricatum* from Morelos and have none of the characters attributed to the supposedly darker race, *obscurior* Phillips (1966:154). Although the type (and only specimen) of *obscurior* was taken slightly farther east, at a point southwest of San Miguel Sola de Vega (see Type Localities), I do not believe it represents a distinct race, because the habitat is probably continuous between the two areas, and I find both dark and light individuals in the Morelos series. I, therefore, consider *obscurior* a synonym of *rubricatum*.

*Pipilo ocai* (Lawrence). Collared Towhee.

Fairly common to locally very common permanent resident in humid pine-oak forest of Interior and adjacent extreme upper reaches of Atlantic and Pacific

Regions, recorded east to Cerro Zempoaltepec and the mountains near Santa María Ozolotepec (at La Cieneguilla), the southeasternmost localities in entire range of species. Unrecorded in Sierra de Cuatro Venados. Sympatric with *P. erythrophthalmus*, without interbreeding, in the Sierra Aloapaneca (La Parada; various points on Cerro San Felipe), Sierra de Zempoaltepec (Cerro Zempoaltepec, Nelson and Goldman; perhaps Totontepec, del Toro Avilés), Sierra de Miahuatlán (Río Molino; at 6,900 ft elevation 12 road mi south of San Miguel Sola de Vega), and Sierra de Yucuyacua (Cerro Yucuyacua, 8 mi south of Santa María Asunción Tlaxiaco; at 8,000 ft elevation about 3 mi north of San Andrés Chicahuaxtla). Generally prefers more humid vegetation and higher elevations than *P. erythrophthalmus*, although the two frequently overlap. *Elevations*: 6,550 to 10,800 ft.

*Breeding*: 30 March 1969, nest with eggs (La Cumbre near Cerro San Felipe, 9,000 ft, Cody and Brown [1970:304]), to 7 June 1967, two nests with two eggs each (Cerro San Felipe, 10,000 ft, Galley, WFVZ 21366–21367); 2 June 1966, prejuvenile (La Cumbre, 5 mi northeast of Cerro San Felipe, 9,000 ft, Rowley, female, WFVZ-HC 16675).

*Subspecies: ocai* (Lawrence). The differences used to separate *sympatricus* Phillips (1966:153) of the Sierra de Miahuatlán from nominate *ocai* are in my opinion individual and/or seasonal in nature (see Type Localities). I agree with Phillips that neither *guerrerensis* van Rossem nor *brunnescens* van Rossem (see Type Localities) is valid. Hence, I treat all populations in southern Mexico as nominate *ocai*. I support the treatment of *P. ocai* as a distinct species, despite interbreeding with *P. erythrophthalmus* outside Oaxaca.

*Pipilo erythrophthalmus* (Linnaeus). Rufous-sided Towhee.

Common to very common permanent resident in the Interior, primarily in oak scrub and arid pine-oak forest but also extending into adjacent arid subtropical scrub and humid pine-oak forest; recorded east to Cerro Zempoaltepec, a point 4 road mi east of Santiago Matatlán, and Río Molino. Unrecorded in Oaxaca east of Isthmus. *Elevations*: 5,100 to 10,800 ft. See *P. ocai*.

*Breeding*: 4 April 1948, enlarged testes (10 mm, La Cumbre, 5 mi northeast of Cerro San Felipe, 9,000 ft, C. G. Sibley, MVZ 115141, 41.8 g), to 23 August 1954, enlarged testes (10 mm, 2 mi east of Santa María Asunción Tlaxiaco, 5,800 ft, F. C. Sibley, CU 27528, 43.9 g).

*Subspecies: oaxacae* Sibley, see Type Localities. *Pipilo macronyx* Swainson, here considered a race of *P. erythrophthalmus* (see Sibley 1950:142), is listed for Oaxaca by Ridgway (1901:410), Hellmayr (1938:454), Goldman (1951:397), Eisenmann (1955:105), and Deignan (1961:636), presumably on the basis of the type specimen of *P. chlorosoma* Baird (see Type Localities), an adult male (USNM 50235) reportedly taken by Boucard in 1864 in the state of Oaxaca (Deignan 1961:636). If Sibley is correct in considering *P. chlorosoma* a synonym of *P. e. macronyx*, the locality "Oaxaca" must be incorrect, because the range of *macronyx* does not approach the borders of the state. Because no birds resembling *chlorosoma* have since been taken in Oaxaca and I can find no other indication that Boucard collected in the state in 1864, I believe that the locality "Oaxaca" on the type specimen of *chlorosoma* is erroneous.

*Pipilo fuscus* Swainson. Brown Towhee.

Fairly common permanent resident in northwestern portion of Interior in arid subtropical scrub and adjacent oak scrub, recorded only at the following localities:

at Tamazulapan del Progreso; at four points 2 mi west, 3 mi northwest, 8 mi east-southeast, and 9 mi south of that town; at points 16 and 34 road mi north-northeast of Huajuapán de León; and near Asunción Nochixtlán. Oaxaca localities are southeasternmost in entire range of species. At first three and last two of these localities, *P. fuscus* is sympatric with *P. albicollis*. Does not occur in Oaxaca Valley (see Type Localities). *Elevations*: 5,600 to 7,100 ft.

*Breeding* (all data): 17 July 1946, enlarged testes (12 mm, 9 mi south of Tamazulapan del Progreso, 7,100 ft, J. Davis, MVZ 96663); 22 September 1961, prejuvenile (34 road mi north-northeast of Huajuapán de León, 6,100 ft, F. M. Berrett, male, LSUMZ 27622); data on prejuvenile taken by del Toro Avilés supposedly on 3 June 1942 at San Pablo Villa de Mitla (Davis 1951:84) are erroneous (see Type Localities).

*Subspecies: toroi* Moore: see Type Localities.

*Pipilo albicollis* Sclater. White-throated Towhee.

Common permanent resident in the Interior, primarily in arid subtropical scrub but occasionally extending through oak scrub up to lower limit of arid pine-oak forest. Recorded from Huajuapán de León, a point 34 road mi north-northeast of that town, San Antonio del Río, and Santos Reyes Pápalo (October 1894, sight record from original field notes of Nelson and Goldman in USNM) south to San Miguel Sola de Vega and a point 3 mi southeast of Santa María Asunción Tlaxiaco and east to Cerro Zempoaltepec (Nelson and Goldman) and points 4 mi south of Santiago Matatlán and just northwest of San José del Pacífico, the southeasternmost localities in entire range of species. *Elevations*: 3,700 to 8,500 ft. See *Pipilo fuscus*.

*Breeding*: 27 May 1959, prejuvenile (4.1 road mi west-northwest of Tamazulapan del Progreso, Phillips, female, UA), to 12 September 1964, prejuvenile seen being fed by adult (San Felipe del Agua, Rowley [1984:193]); see also *Molothrus aeneus*.

*Subspecies* (according to Parkes 1974): *marshalli* Parkes (1974:459), extreme northwestern Interior from Puebla border southeast at least to a point 4 mi west-northwest of Tamazulapan del Progreso; *albicollis* Sclater, endemic from Oaxaca Valley southward and eastward (see Type Localities). The exact region of intergradation between these two races remains to be determined. The race *parvirostris* Davis is a synonym of *P. a. albicollis* (see Type Localities).

*Volatinia jacarina* (Linnaeus). Blue-black Grassquit.

Locally a very common permanent resident in moist savanna, humid guamil, and irrigated land as these habitats occur within arid scrub of Interior in Oaxaca Valley, tropical evergreen forest of Atlantic Region northwest at least to San Juan Bautista Tuxtepec, and tropical deciduous forest of entire Pacific Region (including Río Tehuantepec basin). *Elevations*: sea level to 5,050 ft.

*Breeding*: 6 May 1967, nest with three eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 21353), to 11 August 1961, "nest" (vicinity of Matías Romero, Rowley [1984:190]).

*Subspecies: splendens* (Vieillot). Here I follow Paynter (1970:132) in treating *diluta* van Rossem as a synonym of *splendens*; if *diluta* is valid on the basis of

female paleness, as Phillips (1963:356–357) believes, it probably occupies the Interior Region and western Pacific Region of Oaxaca, from which area I have seen only one female specimen (ARPC 7077).

*Sporophila schistacea* (Lawrence). Slate-colored Seedeater.

No specimen examined; two published specimen records. Status uncertain; here treated as a rare permanent resident, because it is believed to be sedentary elsewhere (A.O.U. 1983:687); habitat apparently open tropical evergreen forest. Known only from two specimens in the Muséum d'Histoire Naturelle in Paris, an adult male and a "female" [= immature male according to Meyer de Schauensee 1966:506] collected by del Toro Avilés allegedly on 5 and 22 September 1957, respectively, in Atlantic Region at the confluence of the Río Coatzacoalcos and the Río Sarabia, a point about 9 mi east-northeast of Palomares. Species otherwise unknown north of Honduras. Because of the known unreliability of the collector, I have strong reservations about admitting this species to the main list; I do so because the specimens represent the only examples of the race known to science; the type locality (if not the race itself) requires confirmation. *Elevation*: given by del Toro Avilés as 150 m (492 ft).

*Breeding* (all data): tentatively, range, habitat, and dates.

*Subspecies: subconcolor* Berlioz (1959:41), according to Meyer de Schauensee (1966:506); endemic; see Type Localities.

*Sporophila aurita* (Bonaparte). Variable Seedeater.

Very uncommon permanent resident in Atlantic Region in grassy openings within tropical evergreen forest northwest to a point 1 mi southwest of Valle Nacional and south in Isthmus to a point 24 road mi north of Matías Romero and perhaps (del Toro Avilés) Escuilapa. Ridgway (1901:572) misquotes Lawrence (1876:20) as listing this species from Guichicovi. *Elevation*: 300 ft.

*Breeding* (all data): range, habitat, and dates.

All previously published records (e.g., Miller et al. 1957:343) are based on the types of *corvina* from Playa Vicente, which is in Veracruz (see Gazetteer), or on del Toro Avilés localities (Tutla, Palomares, and Escuilapa), which are unreliable. I examined three valid specimens: male (LSUMZ 24997, 11.2 g, moderately fat, testes 4 × 3 mm) taken by Binford at 300 ft elevation 1 mi southwest of Valle Nacional on 1 March 1961; males taken by K. Wolfe on 29 December 1960 (LSUMZ 42352) and by Rook on 4 February 1961 (WFVZ-HC 4727) 24 road mi north of Matías Romero.

*Subspecies: corvina* (Sclater); see Type Localities.

*Sporophila torqueola* (Bonaparte). White-collared Seedeater.

*S. t. torqueola*. —Locally a fairly common permanent resident in moist savanna, cultivated land, and brushy areas near water where these habitats occur within general ranges of tropical deciduous forest, arid tropical scrub, and arid subtropical scrub, recorded in the Interior north and east to Santiago Miltepec, Guelatao, Capulalpan, a point 12 road mi east of Oaxaca City, and perhaps (del Toro Avilés) Totontepec, the southeasternmost localities in entire range of the *torqueola* group, and in Pacific Region from Minitán and Putla de Guerrero east to a point 6 road mi east-southeast of Puerto Escondido. Sight records of "*Spermophila torqueola*

Bp." for "Tehuantepec" (Lawrence 1874b:276 and subsequent authors) probably pertain to *S. t. morelleti* or *S. minuta*. *Elevations*: sea level to 6,300 ft. *Breeding* (all data): range, habitat, and dates.

*S. t. morelleti*.—Common permanent resident in habitats similar to those of *S. t. torqueola*, occurring within general ranges of tropical evergreen forest and adjacent extreme lower reaches of cloud forest along entire length of Atlantic Region south and west to Vista Hermosa and a point 15 mi north of Matías Romero and perhaps (del Toro Avilés) San Miguel Soyaltepec, Moctum, Tutla, and Escuilapa. Should be sought in Pacific Region east of Isthmus. *Elevations*: 100 to 4,900 ft. *Breeding* (all data summarized): 13 to 28 March 1961, seven specimens with enlarged testes (largest  $7 \times 6$  mm, Wolf, LSUMZ 24993, 8.6 g, little fat; all seven 1 mi southwest of Valle Nacional, 300 ft, LSUMZ); 20 July 1961, nest with two eggs (18 mi north of Matías Romero, Rowley [1984:191–192], WFWZ 32257).

*Subspecies*: *torqueola* (Bonaparte); *morelleti* (Bonaparte); see ranges above. The Oaxaca populations of *S. t. torqueola* may be an unrecognized race, for which the name *albitorquis* (Sharpe 1888:120), currently considered a synonym of *S. t. torqueola*, is available (see Type Localities).

I am not convinced that *torqueola* and *morelleti* are conspecific, because I have neither read accounts of, nor seen specimens of, definite intergrades between these morphologically distinct forms. Although the known ranges indicate allopatry, a thorough study should be made in the possible areas of overlap in the regions of Capulalpan and perhaps Totontepec, Oaxaca, and between Atilixco and Huauchinango, Puebla; apparently, neither form occurs on the Pacific side of the Isthmus of Tehuantepec.

*Sporophila minuta* (Linnaeus). Ruddy-breasted Seedeater.

Locally a fairly common permanent resident in Pacific Region in moist savanna, cultivated land, and brush at edges of coastal lagoons (freshwater only?); recorded only at Tapanatepec, Tehuantepec City, and mouth of Río Tonameca but to be expected elsewhere in lowlands of Pacific Region. *Elevations*: sea level to 100 ft.

*Breeding* (all data): 14 May 1961, enlarged testes ( $6 \times 4$  mm, 2 mi north of Tehuantepec City, Binford, LSUMZ 24998, 8.2 g, little fat).

*Subspecies*: *parva* (Lawrence); see Type Localities.

*Oryzoborus funereus* Sclater. Thick-billed Seed-Finch.

Rare permanent resident in openings within tropical evergreen forest. Only three records, all for Atlantic Region: adult male (type of *funereus*, presumably in BMNH) taken by Boucard in April 1859 at an unknown elevation at Suchapam (Sclater 1859b:378); one specimen (sex?, ARPC 5442) secured by Schaldach on 12 December 1959 (at about 300 ft elevation) at a point 26 road mi north of Matías Romero; and male and female (Museum of Natural History, Leiden, 35082–35083) collected by O. Epping on 23 September 1963 (at about 100 ft elevation) at Rancho Las Vegas, near Loma Bonita (Mees 1970:244).

*Breeding* (all data): range, habitat, and dates.

*Subspecies*: *funereus* Sclater; see Type Localities.

*Amaurospiza concolor* Cabanis. Blue Seedeater.

No reliable specimen examined; two unpublished specimen records. Status uncertain; recorded in humid pine-oak or cloud forest of Pacific and perhaps

Atlantic (Moctum) Regions west of Isthmus. Should be sought in the Interior. Only two valid records: females collected in Pacific Region by A. R. Phillips (in litt.), one (ARPC 8004, little fat, ovary well-defined, no molt) on 1 December 1964 at kilometer marker 183 (elevation about 6,000 ft) near La Cima, and the other (ARPC 8141, very little fat, ovary very small but appearing adult, skull completely ossified, no molt) on 9 December 1964 at a point 0.9 km [0.6 mi] farther north. Data on a female (MLZ 34086) taken by del Toro Avilés supposedly on 13 December 1941 in Atlantic Region at Moctum (Miller et al. 1957:343) are questionable.

*Subspecies: relict* (Griscom), according to A. R. Phillips (in litt.).

*Tiaris olivacea* (Linnaeus). Yellow-faced Grassquit.

Uncommon and apparently local permanent resident in guamil, cultivated land, and grazed land, occurring in Atlantic Region within general range of tropical evergreen forest from a point 1 mi southwest of Valle Nacional southeast to Totontepec (Boucard) and in the Interior within general range of arid tropical scrub in valley of San Juan Bautista Cuicatlán (Teotitlán del Camino; near and 2 mi south of San Juan Bautista Cuicatlán; Santiago Domingullo; and Guelatao). Should be sought elsewhere in Atlantic Region. *Elevations*: 300 to 6,300 ft.

*Breeding* (all data): 29 April 1961, moderately enlarged testes (right 3 × 3 mm, left 6 × 4, Guelatao, Binford, LSUMZ 24986, 10.1 g, little fat).

*Subspecies: pusilla* Swainson.

*Diglossa baritula* Wagler. Cinnamon-bellied Flowerpiercer.

Fairly common permanent resident in humid pine-oak and cloud forests throughout state. Presence in winter at low elevation in Atlantic Region, based on del Toro Avilés specimens (San Miguel Soyaltepec, "600 meters," MLZ), is questionable. *Elevations*: 4,100 to 9,300 ft.

*Breeding*: 1 April 1964, enlarged testes (7 × 4 mm, 12 mi north-northeast of Zanatepec, 4,900 ft, Binford, LSUMZ 33374, 9.0 g, moderately fat), to 30 August 1954, enlarged testes (5 mm, La Cumbre near Cerro San Felipe, 9,000 ft, L. L. Short, Jr., CU 29344, 9.3 g).

*Subspecies: baritula* Wagler, west of Isthmus; *montana* Dearborn, east of Isthmus.

*Aimophila mystacalis* (Hartlaub). Bridled Sparrow.

Common permanent resident in the Interior, primarily in arid subtropical scrub but also in adjacent oak scrub and adjacent arid tropical scrub, recorded from Teotitlán del Camino and points 34 road mi north-northeast of Huajuapán de León (3 mi northeast of Santiago Chazumba) and 4.5 road mi west-northwest of Tamazulapán del Progreso southwest through San Juan Bautista Cuicatlán and San Pablo Villa de Mitla to San Juan del Río, Santa María Coyotepec, and a point 1.3 mi northwest of Lajarcia, the southeasternmost localities in entire range of species. Specimen (Nelson and Goldman, female, USNM 135981) from San Juan Bautista Cuicatlán perhaps taken in arid tropical scrub, although original field notes (USNM) state "dry hillslopes at the border of the valley." Wolf (1977: 35) considers this an arid tropical species, but I believe it is primarily arid subtropical in range. *Elevations*: -3,000 to 6,100 ft.

*Breeding* (all data): 6 May 1961, enlarged testes (9 × 5 mm, 6 road mi east of

Santa María del Tule, Binford, LSUMZ 25028, 22.5 g, little fat); 10 May 1961, enlarged testes (8 × 4 mm, 3 mi east of San Pablo Villa de Mitla, Wolf, LSUMZ 25029, 21.9 g, slightly fat); 5 July 1962, enlarged follicle (9 mm, near Santa María Coyotepec, Rowley, AMNH 766627); 6 July 1963, pair attending prejuvenile (near Santa María Coyotepec, Rowley [1984:188] observation); 28 July 1967, nest with three young (16 mi south of Santiago Matatlán, 4,000 ft, Rowley [1984:188] observation).

*Aimophila humeralis* (Cabanis). Black-chested Sparrow.

Common presumptive permanent resident in Pacific Region in arid tropical scrub, interspersed with savanna, at edges of tropical deciduous forest at a point at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande, where Morony and Binford recorded 3 to 12 birds daily from 13 through 20 February 1964. Female (LSUMZ 33561, 21.9 g, little fat, follicles not enlarged) taken by Binford on 14 February is the only specimen for the state. Although Davis (1972: 233) included "n. Oaxaca" in the range of this species, he later (in litt.) could not remember his data source. Wolf (1977:Fig. 2, p.12) shows the range extending into Oaxaca but gives no details; probably he is referring to my records. Oaxaca localities are southeasternmost in entire range of species.

*Breeding* (all data): range, habitat, and dates.

*Aimophila ruficauda* (Bonaparte). Stripe-headed Sparrow.

Permanent resident in arid tropical scrub in two parts of Pacific Region, common in Isthmus from Pacific coast north to Santa Efigenia and (marginally into Atlantic Region) to a point 3 mi north of Matías Romero, west to Tehuantepec City, and east to Chiapas border, and (disjunctly) uncommon in western part of Pacific Region from Guerrero border east to a point 16 road mi northwest of Puerto Escondido. Should be sought between Puerto Escondido and Tehuantepec City and in upper portion of Río Tehuantepec basin. *Elevations*: sea level to 800 ft. See *Aimophila sumichrasti*.

*Breeding*: 19 May 1966, nest with two sparrow eggs and one of *Molothrus aeneus* (Rancho Sol y Luna, Rowley [1984:189], WFVZ 21544), to 25 June 1966, nest with two eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 20751).

*Subspecies*: *lawrencii* (Salvin and Godman), Isthmus region; see Type Localities. The population in the western Pacific Region, known from Binford sight records only, probably is *acuminata* (Salvin and Godman), as indicated on a map presented by Wolf (1977:8).

*Aimophila sumichrasti* (Lawrence). Cinnamon-tailed Sparrow.

Common permanent resident on Pacific side of Isthmus in arid tropical scrub and openings within adjacent tropical deciduous forest, recorded east to Santa Efigenia, west to Las Tejas and through Río Tehuantepec basin to Rancho Las Animas, south to coast, and north to Ixtepec, Santo Domingo Petapa, and a point near Niltepec. Probably occurs east to Chiapas border. Endemic to Oaxaca and southwestern Chiapas. Apparently prefers somewhat more wooded habitats than *A. ruficauda* (Wolf 1977:11). *Elevations*: sea level to 3,000 ft.

*Breeding*: 3 June 1959, egg without shell in oviduct (Tequisistlán, D. A. Zimmerman and Binford, UMMZ 154654), to 25 August 1915, egg in oviduct and

two enlarged follicles (Tehuantepec City, Shufeldt field notes in UMMZ); 30 July 1961, prejuvenile (2 mi south of Tequisistlán, Rowley, male, AMNH 778574).

*Subspecies*: monotypic; see Type Localities.

*Aimophila botterii* (Sclater). Botteri's Sparrow.

Locally a fairly common permanent resident in savanna within general range of arid subtropical scrub and pine-oak forest, recorded in the Interior in Oaxaca Valley from points 5 and 10 mi southeast of Oaxaca City east to a point 3 road mi east of Santa María del Tule and disjunctly in Pacific Region at Chivela, Rancho de Cacoprieto, Tapanatepec, and a point about 2 mi north of Rancho Sol y Luna. Also, recorded by Rébouch at Putla de Guerrero (Salvin and Godman 1879–1904 [1886]:390), presumably in savanna. *Elevations*: –1,000 to 5,200 ft.

*Breeding*: 6 May 1964, enlarged testes (9 × 5 mm, 1 mi east of Santa María del Tule, 5,100 ft, Binford, LSUMZ 33566, 23.6 g, little fat), to 31 July 1952, enlarged testes (9 mm, 10 mi southeast of Oaxaca City, 5,000 ft, J. D. Webster, CAS 61584); “nest,” no date (Chivela, 1,000 ft, W. W. Brown [Webster 1959: 137]).

*Subspecies*: *botterii* (Sclater), according to Webster (1959:143). The form *A. b. petenica* (Salvin) is listed for Oaxaca by Miller et al. (1957:378) on the basis of a specimen (MLZ 52742) taken by Lamb on 18 February 1951 at 450 ft at a point 7 mi southeast of Loma Bonita. This record, however, pertains to Arroyo Claro, state of Veracruz (Lamb, original field notes and pers. comm.).

*Aimophila ruficeps* (Cassin). Rufous-crowned Sparrow.

Fairly common permanent resident, occurring usually in association with rocky substrate in arid subtropical scrub, oak scrub, and adjacent lower limits of arid pine-oak forest; found in Pacific Region at a point 11 road mi southwest of San Andrés Chicahuaxtla and throughout most of Interior east to points 3 mi south of Nejapa and 8 mi south of San Andrés Miahuatlán, the southeasternmost localities in entire range of species. *Elevations*: –4,100 to 7,200 ft.

*Breeding*: 15 June 1894, nest with two eggs (Oaxaca City, Nelson and Goldman, USNM egg collection 27706), to 25 June 1967, nest with two eggs collected (3 km [1.9 mi] east of San Pablo Villa de Mitla, Rowley [1984:190] and Galley); 12 July 1943, prejuvenile (Tamazulapan del Progreso, 6,000 ft, Lamb, male, MLZ 37915).

*Subspecies* (according to Hubbard 1975): *laybournae* Hubbard, northwestern Interior (Tamazulapan del Progreso and near Huajuapán de León); *australis* (Nelson), endemic from ridges at north end of Oaxaca Valley west to vicinity of San Andrés Chicahuaxtla and northwest to near Asunción Nochixtlán; *extima* Phillips, endemic from Oaxaca Valley eastward; see Type Localities.

*Aimophila notosticta* (Sclater and Salvin). Oaxaca Sparrow.

Very uncommon permanent resident in the Interior in oak scrub, recorded only at Ejutla de Crespo, at Tamazulapan del Progreso, on Cerro San Felipe, and at several places just east of Santiago Matatlán. Probably endemic to Oaxaca but perhaps occurring also in Puebla, from which type specimen might have come (Miller et al. 1957:373). See *Aimophila rufescens*. *Elevations*: –6,000 ft to 6,100+ ft.

*Breeding* (all data): 11 May 1961, enlarged testes (7 × 5 mm, 4 road mi east of Santiago Matatlán, 6,100 ft, Binford, LSUMZ 25000, 27.1 g, little fat).

*Aimophila rufescens* (Swainson). Rusty Sparrow.

Common permanent resident throughout most of Pacific Region (except Pacific coastal and Isthmian lowlands), then up major river basins locally into the Interior, and more or less disjunctly in lower portions of Atlantic Region. Found from 900 to at least 6,000 ft in Pacific Region west of Isthmus from Putla de Guerrero east to Santa Lucía, primarily in arid pine-oak forest but also in open oak patches and brushy clearings within extreme upper reaches of tropical deciduous forest (rarely) and within general ranges of tropical semideciduous and humid pine-oak forests. Found in Atlantic Region from 250 to 1,900 ft (records for "Moctum" and "Totontepec" much higher if correct [del Toro Avilés]), frequenting oak patches, edges of savanna, and brushy clearings as these habitats occur within tropical evergreen forest, recorded south in Isthmus at least to a point 3 mi east of Matías Romero. Also recorded in arid pine-oak forest of foothills on Pacific side of Sierra Madre de Chiapas from 5,000 ft down to approximately 500 ft, the population there probably continuous with that of Atlantic Region through low gaps at eastern end of Oaxaca portion of the Sierra and perhaps in Chiapas. Noted in Río Tehuantepec basin only at points 3 mi south of Nejapa and 4.6 mi southeast of El Camaron, presumably in arid pine-oak forest. Locally a fairly common permanent resident in the Interior in undergrowth of arid pine-oak forest of San Miguel Sola de Vega valley (points 25.5 km [15.8 mi] south and 8.4 mi north [kilometer marker 136] of San Pedro Juchatengo and at 7,000 ft on ridge above San Miguel Sola de Vega), this population probably continuous with birds in Pacific Region in Sierra de Miahuatlán. Apparently nowhere sympatric with *A. notosticta*. Elevations: 250 to 7,000 ft.

*Breeding*: 27 May 1965, prejuvenile (Río Jalatengo, 4,500 ft, Galley, female, CAS, 29.7 g, slightly fat), to 4 August 1955, prejuvenile (3 mi south of Nejapa, J. R. Alcorn, male, UK 37415).

*Subspecies*: *rufescens* (Swainson), Pacific Region west of Isthmus and Interior; *pyrgitoides* (Lafresnaye), Pacific Region east of Isthmus and Atlantic Region. I find too much individual variation in this species to separate *disjuncta* Phillips (1966:158) of the Sierra de Miahuatlán and, thus, agree with Paynter (1970:101) in treating it as a synonym of *A. r. rufescens*; see Type Localities. *A. r. cinerea* Brodkorb (1940b:549) is probably valid, being a large gray form of the arid uplands of western Chiapas, separated from *A. r. rufescens* by the population of *pyrgitoides* in southeastern Oaxaca.

*Oriturus superciliosus* (Swainson). Striped Sparrow.

Locally a fairly common permanent resident in the Interior in bunch grassland and probably other scrubby and grassy openings in or near humid pine-oak forest. Found in only two general areas, including the southeasternmost localities in entire range of species: "common in wet meadows above 9,000 ft" (original field notes of Nelson and Goldman in USNM) at a point 15 mi southwest (given incorrectly on specimen label as "west") of Oaxaca City, where a male prejuvenile (USNM 144015) taken on 12 September 1894; 4 seen by Morony and Binford on 16 May 1964 at 7,500 ft elevation 6 road mi southwest of San Andrés Chichauxtla; 1 seen on 24 May and 4 seen and two others collected on 25 May 1964 (Morony, LSUMZ 33555, 41.1 g, enlarged follicle 5 mm; Binford, LSUMZ 33556, 36.9 g, largest follicle 1 mm; both birds with little fat and completely ossified

skulls) at 8,000 ft elevation 1 mi north of San Andrés Chicahuaxtla; and one male (CAS, 41.0 g) taken by Rowley on 30 March 1965 at 8,000 ft elevation 3 mi north of San Andrés Chicahuaxtla.

*Breeding* (all data): see above.

*Subspecies: superciliosus* (Swainson).

*Spizella passerina* (Bechstein). Chipping Sparrow.

Fairly common winter resident and uncommon to locally fairly common permanent resident; breeds in arid pine-oak forest of Interior east through Isthmus mountains (Chivela north to La Ranchería, Guichicovi, and a point 4 mi north and 2 mi east of Matías Romero) to Pacific side of Sierra Madre de Chiapas; winter residents extend into Interior humid pine-oak forest (where also breeding?) and arid subtropical scrub and into Pacific Region of Sierra de Miahuatlán (down to 2,600 ft). Unrecorded in Atlantic Region west of La Ranchería. *Elevations*: -600 to 9,000 ft.

*Breeding* (all data): 16 May 1962, enlarged testes (8 × 5 mm, a point 4 mi north and 2 mi east of Matías Romero, Schaldach, AMNH 787599); 30 June 1961, enlarged testes (9 × 5 mm, Rancho Sol y Luna, Schaldach, AMNH 776540).

*Subspecies: mexicana* Nelson, permanent resident; *arizonae* Coues, winter resident and southeasternmost records for race. I follow Paynter (1970:83) in treating *repetens* Phillips (1966:154) as a synonym of *mexicana* (see Type Localities).

*Spizella pallida* (Swainson). Clay-colored Sparrow.

Very uncommon winter resident in the Interior in arid subtropical scrub, recorded only at Huajuapán de León, Guelatao, a point 6 road mi east of Santa María del Tule, points 10 and 15 mi southeast of Oaxaca City, and perhaps (del Toro Avilés; see *Pipilo fuscus*) San Pablo Villa de Mitla. *Dates*: 19 November to 6 May. *Elevations*: 5,100 to 6,300 ft.

*Spizella atrogularis* (Cabanis). Black-chinned Sparrow.

Very uncommon permanent resident in the Interior in arid subtropical scrub and steppe, recorded with certainty only at Tamazulapán del Progreso and points 34 road mi north-northeast of Huajuapán de León (about 3 mi northeast of Santiago Chazumba), 6 road mi northeast of San Pedro y San Pablo Teposcolula, and 2 road mi southeast of Asunción Nochixtlán, the latter point the southeasternmost definite locality in entire range of species. Presence at San Pablo Villa de Mitla, based on a del Toro Avilés specimen (4 June 1942, male, MLZ 34993), is questionable. *Elevations*: 6,000 to 7,300 ft.

*Breeding* (all data): range, habitat, and dates.

*Subspecies: atrogularis* (Cabanis).

*Pooecetes gramineus* (Gmelin). Vesper Sparrow.

Very uncommon winter resident in the Interior in arid subtropical scrub and adjacent savanna, recorded east to a point 3 road mi east of Santa María del Tule. *Dates*: 26 October to 8 May. *Elevations*: 5,100 to 5,600 ft.

*Subspecies: confinis* Baird.

*Chondestes grammacus* (Say). Lark Sparrow.

Found in savanna, cultivated land, and brushy clearings within general ranges of tropical deciduous forest, arid subtropical scrub, and arid tropical scrub. Winter

resident, fairly common to locally common in lower portions of Pacific Region and very uncommon in the Interior. Transient migrant, very common to abundant on Pacific side of Isthmus, common in remainder of lower portions of Pacific Region, and fairly common in the Interior. Recorded north in Isthmus only to Chivela. Only record for Atlantic Region, a female (MLZ 34954) taken by del Toro Avilés purportedly on 6 November 1941 at Moctum, is questionable. *Dates*: 22 September to 29 April. *Elevations*: sea level to 6,300 ft.

*Subspecies*: *strigatus* Swainson. Occurrence of *C. g. grammacus* (Say) at Santa Efigenia (Miller et al. 1957:370; and subsequent authors) needs substantiation because I can find neither a prior published record nor a specimen.

*Passerculus sandwichensis* (Gmelin). Savannah Sparrow.

Common winter resident in savanna of lowlands of Pacific Region from Guerrero border east to mouth of Río Tonameca. One valid record for Interior, a male taken by Boucard in October 1857 at "Parada" [= La Parada] (Sclater 1858:303). Two valid records for remainder of state, a male (USNM 59692) and a female (USNM 59691) taken by Sumichrast on 9 November 1869 on Pacific side of Isthmus at Tehuantepec City. Data on female specimen (MLZ 34990) collected by del Toro Avilés supposedly on 8 June 1942 at "Mitla" [= San Pablo Villa de Mitla] present an unlikely combination of date and locality and are questionable. Listed by Miller et al. (1957:362) and subsequent authors as breeding in Oaxaca, probably on basis of doubtful "Mitla" record, but absence of additional summer records indicates nonbreeding status. *Dates*: October; 9 November to 28 April. *Elevations*: sea level to 300 ft; about 7,900 ft (La Parada, elevation at exact point of collection unknown).

*Subspecies*: *nevadensis* Grinnell (USNM 59691), southeasternmost record for race; *brooksi* Bishop (USNM 59692). The race *brunnescens* (Butler) should be deleted from the state list because its occurrence is based on the doubtful "Mitla" record mentioned above.

*Ammodramus savannarum* (Gmelin). Grasshopper Sparrow.

Winter resident in savanna and weedy fields, common in lowlands of extreme southwestern part of Pacific Region (Minitán and a point 9 road mi west-northwest of San José Estancia Grande), fairly common in remainder of lower portions of Pacific Region and then north across Isthmus into Atlantic Region as far as Sarabia, and uncommon in the Interior (Oaxaca City, San Felipe del Agua, San Miguel Sola de Vega, and a point 3 mi south of San Bartolo Coyotepec). Not known to breed; presumed breeding based on supposed occurrence of the non-migratory race, *bimaculatus*, but see below. *Dates*: 22 October to 22 March; 21 April (1962, Sarabia, Schaldach, adult female, AMNH 778461, very fat, ovary not enlarged, "one of many seen"). *Elevations*: sea level to 5,700 ft.

*Subspecies*: *pratensis* (Vieillot); *perpallidus* (Coues); *ammolegus* Oberholser. The race *bimaculatus* Swainson has not been recorded with certainty in Oaxaca. Specimens in the BMNH taken in the Interior at "Sola" [= San Miguel Sola de Vega] and Oaxaca City are believed by van Rossem (1934a:360) to represent breeding birds of this race, but the dates of collection are not given and I question the identifications, particularly because the race *ammolegus* had not been described in 1934. The male (MLZ 26125) taken by del Toro Avilés purportedly on 15 June 1939 in the Atlantic Region at Tutla, which forms the primary basis for the

occurrence of *bimaculatus* in Oaxaca, is of questionable origin and date and should be disregarded.

*Melospiza lincolni* (Audubon). Lincoln's Sparrow.

Fairly common winter resident in all Regions in tropical evergreen forest, arid and humid pine-oak forests, tropical deciduous forest, Pacific swamp forest, and arid subtropical scrub. Recorded east to a point 18 road mi north of Matías Romero but to be expected east of Isthmus. *Dates*: 23 November to 6 May; date of 13 October 1941, based on del Toro Avilés specimen (Moctum, female, MLZ 34987), is questionable. *Elevations*: sea level to 9,700 ft.

*Subspecies*: *lincolni* (Audubon); *alticola* (Miller and McCabe).

*Junco phaeonotus* Wagler. Yellow-eyed Junco.

Permanent resident in the Interior, common in more open portions of humid pine-oak forest and uncommon in adjacent arid pine-oak forest, recorded east to Cerro Zempoaltepec, a point 6 mi east of San Pablo Villa de Mitla, and Río Molino, the southeasternmost localities in entire range of the *phaeonotus* group. *Elevations*: -6,500 to 9,300 ft.

*Breeding*: 5 May 1965, prejuvenile (Río Molino, 7,300 feet, Galley, male, WFVZ 24925), to 4 August 1966, prejuvenile (Ixtlán de Juárez, 7,200 ft, L. Baptista, male, CAS 67118).

*Subspecies*: *phaeonotus* Wagler. I tentatively follow Paynter (1970:68) in treating *australis* van Rossem from Guerrero as a synonym of nominate *phaeonotus*; however, should it prove valid (it might be larger-billed), its range probably should include the Sierras de Miahuatlán and Yucuyacua of Oaxaca.

*Agelaius phoeniceus* (Linnaeus). Red-winged Blackbird.

Locally common permanent resident in marshes west of Isthmus, recorded in Pacific Region in valley of Putla de Guerrero, in the Interior in Oaxaca Valley, and in Atlantic Region at a point 7 road mi west of Loma Bonita (100 ft, 6 June 1964, 2 seen by Binford and Morony). Also found in September at Huajuapán de León (Martin del Campo 1942:354), where perhaps only a winter visitant. Possibly a permanent resident elsewhere in state. *Elevations*: 100 to 5,250 ft.

*Breeding*: 7 May 1961, enlarged testes (11 × 8 mm, 2 mi east of Oaxaca City, Wolf, LSUMZ 24899, 78.5 g, slightly fat), to 27 June 1963, enlarged testes (left 14 × 12 mm, 2 mi south of San Bartolo Coyotepec, Rowley, AMNH, 78.2 g).

*Subspecies* (according to Dickerman 1974): *nayaritensis* Dickey and van Rossem, Pacific Region; *nelsoni* Dickerman, Interior Region. Birds from the Atlantic Region (sight records only; see above) would be expected to be *richmondi* Nelson. The race *gubernator* (Wagler) has not been reliably recorded in Oaxaca (contra Miller et al. 1957:293); 13 intergrades (MLZ) between *gubernator* and “*grandis* Nelson” [= *nelsoni*], taken by del Toro Avilés supposedly at “Mitla” [= San Pablo Villa de Mitla] in June 1942, probably were taken outside Oaxaca, perhaps in Puebla (Dickerman 1974:9–10).

*Sturnella magna* (Linnaeus). Eastern Meadowlark.

Locally fairly common permanent resident in savanna, recorded in the Interior at numerous points in the Oaxaca Valley, in Pacific Region at Minitán (24 February 1964, 2 seen by Binford and Morony), and on both Atlantic and Pacific sides of Tehuantepec region from Salina Cruz and Tapanatepec north to Santa

Efigenia, Sarabia, and perhaps (del Toro Avilés) Tutla. *Elevations*: sea level to 5,400 ft.

*Breeding*: 7 May 1961, enlarged follicle (4 mm, 2 mi east of Oaxaca City, Wolf, LSUMZ 24900, 75.1 g, little fat), to 23 May 1959, enlarged follicle (5 mm, 10 mi east of Juchitán, W. E. Lanyon, AMNH 766736, 81.1 g); 13 May 1912, nest with two eggs (San Pedro y San Pablo Etla, J. C. F. van Balen, FMNH egg collection 10291).

*Subspecies* (according to Dickerman and Phillips 1970): *mexicana* Sclater, Atlantic Region; *saundersi* Dickerman and Phillips (1970:308), endemic to Pacific Region in Isthmus from a point 9 km (5.6 mi) south of Niltepec west to a point 10 mi east of Juchitán (see Type Localities). Two males from a point 4 km (2.5 mi) south of Sarabia are considered *mexicana* but show some intergradation with *saundersi*. Birds from the Oaxaca Valley are intergrades between *saundersi* and *auropectoralis* Saunders.

*Xanthocephalus xanthocephalus* (Bonaparte). Yellow-headed Blackbird.

Rare and probably irregular winter resident on Pacific coast of Isthmus in cultivated land and at edges of aquatic habitats. Only four acceptable records: immature male (LSUMZ 27593, 82.7 g, very fat, skull very incompletely ossified, testes small) taken by Binford on 18 October 1961 at a point 12 road mi southwest of Juchitán; 1 seen by the Berretts and Binford in a large flock of *Quiscalus mexicanus* on 19 October 1961 at a point 17 road mi southwest of Juchitán; immature female (LSUMZ 27594, 47.9 g, little fat, skull not completely ossified, ovary very small) secured by Binford on 20 October 1961 near southwestern corner of Laguna Superior 19 road mi southwest of Juchitán; and 1 seen by the Berretts and Binford on 9 January 1962 at the last locality. Mounted albino specimen in USNM supposedly taken by Sumichrast on 18 December 1868 at "Tehuantepec" [= Tehuantepec region] according to data label on stand, bears same data and catalogue number (USNM 57796) as a specimen of *Archilochus colubris*. According to my reconstruction of Sumichrast's itinerary, he was working at Santa Efigenia on the date in question. Because Lawrence (1876) does not list a record of *Xanthocephalus* but does record a specimen of *Archilochus* taken at Santa Efigenia, probably in December, I believe the blackbird did not come from Oaxaca. Probably, the blackbird replaced the hummingbird on the stand, and the data label failed to be removed. *Elevations*: sea level to 50 ft.

*Dives dives* (Deppe). Melodious Blackbird.

Fairly common to locally very common permanent resident in Atlantic Region in dense brushy clearings within tropical evergreen forest south in Isthmus to town of Río Grande. Records for "Oaxaca" and "Tehuantepec" (Ridgway 1902: 254) pertain to state and region, respectively, not to cities. *Elevations*: 100 to 800 ft.

*Breeding* (all data): 17 June 1961, enlarged testes (10 × 5 mm, Sarabia, Schal-dach, AMNH 776473).

*Subspecies*: *dives* (Deppe); see Type Localities.

*Euphagus cyanocephalus* (Wagler). Brewer's Blackbird.

Casual winter resident. Recorded with no stated locality by Fenchio (adult female; Sclater 1886:391), at Oaxaca City by Deppe (October, 1825; Stresemann 1954:90), and on Pacific side of Isthmus at Tehuantepec City by Shufeldt (eight

specimens [UMMZ], 6 October and 7 November 1913, 26 October 1915, and 14 April 1917). According to Shufeldt's field notes for October 1915 (in UMMZ), species "Fairly abundant about town and in nearby pasture lots. Generally more females are seen than males." No recent records. *Elevations*: uncertain; Oaxaca City located at 5,127 ft, Tehuantepec City at 115 ft.

*Subspecies*: monotypic; see Type Localities.

*Quiscalus mexicanus* (Gmelin). Great-tailed Grackle.

Permanent resident, locally very common in Atlantic and Pacific Regions in brushy clearings, cultivated land, and grazed land where these habitats occur within general ranges of tropical evergreen and tropical deciduous forests and uncommon in the Interior in large trees of towns within general ranges of arid subtropical scrub and steppe in region of Asunción Nochixtlán and San Pedro y San Pablo Teposcolula (6,800–7,000 ft) and in Oaxaca Valley. Unrecorded, but probably present, between Puerto Angel and Tehuantepec City. *Elevations*: sea level to 5,100 ft; 6,800 to 7,000 ft. See *Xanthocephalus xanthocephalus*.

*Breeding*: 27 March 1961, nest with three eggs (Tapanatepec, R. S. Crossin, WFVZ 29729), to 3 July 1925, nest with three eggs collected and nests under construction observed (Salina Cruz, A. H. Miller, eggs WFVZ 32975); 28 April 1964, prejuvenile (mouth of Río Tonameca, Binford observation).

*Subspecies*: *mexicanus* (Gmelin). The only specimen from the western Pacific Region (Minitán, 24 February 1964, Morony, adult male, LSUMZ 33433) is *mexicanus* in size. The specimen from Escuilapa (30 March 1939, female, MLZ 26302), reported to be *obscurus* Nelson by Miller et al. (1957:279), was taken by del Toro Avilés and, hence, is best disregarded.

*Molothrus aeneus* (Wagler). Bronzed Cowbird.

Common permanent resident in Atlantic Region in tropical evergreen forest, in Pacific Region in tropical semideciduous forest, tropical deciduous forest, and arid tropical scrub, and in the Interior in arid subtropical scrub of Oaxaca Valley and region of Tamazulapan del Progreso and in arid tropical scrub of valley of San Juan Bautista Cuicatlán; uncommon permanent resident in Pacific Region up to 7,300 ft in humid pine-oak and cloud forests of Sierra de Miahuatlán. *Elevations*: sea level to 7,300 ft.

*Breeding*: brood parasite; 29 April 1962, nest of *Catharus occidentalis* with two thrush eggs and one cowbird egg (Río Molino, 7,300 ft, Rowley [1966:194], WFVZ 26705), to 27 July 1965, nest of *Pipilo albicollis* with one towhee egg and five (!) cowbird eggs (San Felipe del Agua, 5,400 ft, Rowley, WFVZ 24342); 8 July 1934, nest of *Cyanocorax yncas* with two young jays and one young cowbird (near Matías Romero, A. F. Skutch [Bent 1958:462]); see also *Thryothorus felix*, *Turdus rufopalliatu*s, *Habia rubica*, *Piranga flava*, *Aimophila ruficauda*, and *Cacicus melanicterus*.

*Subspecies*: *assimilis* (Nelson), Pacific and Interior Regions; *aeneus* (Wagler), Atlantic Region (see Type Localities).

*Molothrus ater* (Boddaert). Brown-headed Cowbird.

Winter resident along Pacific coast east to southwestern corner of Laguna Superior (19 road mi southwest of Juchitán, seven specimens, LSUMZ, collected from a flock of 200 by the Berretts and Binford on 20 October 1961); recorded

infrequently but sometimes in large flocks. Rare permanent resident in arid subtropical scrub of Interior and disjunctly in arid tropical habitat in Pacific Region east of Isthmus. Only four specific records for Interior, all of which might represent permanent residents, two from near Oaxaca City (see below), one from 2 mi northwest of Tamazulapan del Progreso (22 June 1955, A. A. Alcorn, male, UK 37371), and one from San Juan Bautista Cuicatlán (12 October 1894, Nelson and Goldman, male, USNM 144478); however, Rowley (1984:212) reports seeing winter flocks of "50 to 100 or more" in the Oaxaca Valley. Aside from nest mentioned below, there are only three nonwinter records for Pacific Region east of Isthmus: two males and one female (WFVZ-HC 16629–16631, respectively; "ovaries enlarged") taken by Rowley at El Zopilote on 8, 23, and 30 May 1966, respectively. No record for Atlantic Region. Oaxaca localities are southeasternmost in entire range of species. *Dates*: known winter residents, 20 October to 10 March. *Elevations*: sea level to about 6,000 ft.

*Breeding* (all data): brood parasite; 5 May 1966, nests of *Campylorhynchus jocosus* and *Polioptila caerulea*, the first with three host eggs, the second with one host egg, each with one cowbird egg (10 mi east of Oaxaca City, 5,200 ft, Rowley, WFVZ 20772–20773, respectively [Friedmann 1971:243, 244 and Rowley 1984: 213]); 21 May 1966, nest of *Polioptila albiloris* with two host eggs and one cowbird egg (El Zopilote, 400 ft, Rowley, WFVZ 21541 [Friedmann 1971:244–245]).

*Subspecies*: *obscurus* (Gmelin).

*Scaphidura oryzivora* (Gmelin). Giant Cowbird.

Rare presumptive permanent resident in lower portions of Atlantic Region in openings within tropical evergreen forest. Only two definite records: single males collected by Schufeldt on 4 April 1909 at "Jalahuy" [= Jalahuí] (UMMZ 139077) and 23 February 1914 at "La Trinidad" [= Trinidad] (UMMZ 139078); elevations of towns and exact points of collection unknown. Only previously published record with details (Blake 1950:414) is based on del Toro Avilés specimen (Tutla, 3 March 1941, male, FMNH 119836) and is questionable. Miller et al. (1957:277) record this species for Oaxaca, probably on basis of Tutla record, although they might have known about the UMMZ specimens.

*Breeding* (all data): brood parasite; range, habitat, and dates.

*Subspecies*: monotypic, following Wetmore et al. (1984:356–357).

*Icterus dominicensis* (Linnaeus). Black-cowled Oriole.

Uncommon permanent resident in Atlantic Region in dense brushy clearings within tropical evergreen forest northwest to a point 5 mi west of Temascal and south in Tehuantepec region to La Ranchería (erroneously given as "Santo Domingo" by Ridgway 1902:270) and a point 4 mi north and 2 mi east of Matías Romero. Only record for Pacific Region (Chihuitán, 1 December 1868, Sumichrast, male?, USNM 57593) represents a casual winter visitant. Nelson and Goldman specimen from "Totontepec" (Ridgway 1902:270) actually taken at a point 6 mi east of Totontepec. *Elevations*: 250 to 3,700 ft.

*Breeding* (all data): 2 and 26 March 1962, enlarged testes (respectively, 10 × 5 mm, AMNH 778425 and 9 × 5 mm, AMNH 778426; both Montebello, Schaldach); 27 June 1962, slightly enlarged follicle (3 mm, 4 mi north and 2 mi east of Matías Romero, Schaldach, AMNH 787604).

*Subspecies*: *prothemelas* (Strickland).

*Icterus wagleri* Sclater. Black-vented Oriole.

Fairly common permanent resident in the Interior in arid subtropical scrub and to a lesser degree in oak scrub and juniper scrub, recorded east to San Ildefonso Villa Alta and a point 2 road mi west of San Pedro Totolapan. Should be sought east of Isthmus in winter. *Elevations*: 3,200 to 7,300 ft; 10,800 ft.

*Breeding* (all data): 3 June 1956, enlarged testes (right 7 × 4 mm, left 10 × 7, 14 mi southeast of Oaxaca City, D. A. Zimmerman, UMMZ 151490, 46.2 g); 5 July 1958, enlarged testes (11 mm, Cerro Yucuyacua 8 mi south of Santa María Asunción Tlaxiaco, 10,800 ft, F. C. Sibley, CU 29037, 40.1 g).

*Subspecies*: *wagleri* Sclater.

*Icterus maculialatus* Cassin. Bar-winged Oriole.

Status uncertain; occurs in Pacific Region in tropical forest of foothills of Sierra Madre de Chiapas; although this species is believed to be resident elsewhere (A.O.U. 1983:734), the movement of other "resident" species into the southern foothills of the Sierra Madre de Chiapas (see Migration, Internal Movements) and the lack of other records from this well-known region suggest visitant status. Only two records, two adult males (WVZ-HC 12587–12588) taken by Rook at "Rancho Vicente" [= Colonia Rodolfo Figueroa; elevation of Colonia 4,500 ft] on 20 January and 3 April 1964, respectively. These specimens might have formed the basis for inclusion by Davis (1972:191) of "s. Oaxaca" in range of this species.

*Icterus spurius* (Linnaeus). Orchard Oriole.

Very common transient migrant and common winter resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical deciduous and Pacific swamp forests. Very uncommon transient migrant in the Interior in arid subtropical scrub. Late summer records for Santa Efigenia (30 July 1895, Nelson and Goldman, sex?, USNM 144433) and a point 3 mi west of San Pablo Villa de Mitla (8 August 1955, J. R. Alcorn, male, UK 37380) probably represent very early migrants. Possibly a very rare permanent resident. Roosts communally, one such roost in San Pedro Pochutla containing 79 birds on 6 October 1961 (Binford). *Dates*: 30 July; 8 August; 1 September to 28 April. *Elevations*: sea level to 6,100 ft.

*Subspecies*: *spurius* (Linnaeus). See Blake (1968:161–162) for the polytypic status of this species.

*Icterus cucullatus* Swainson. Hooded Oriole.

Rare winter resident; should be sought as a rare permanent resident. Only three valid records: male taken in September 1937 in the Interior at La Hacienda, a village at about 5,250 ft near Huajuapán de León (Martin del Campo 1942:354); adult male seen by A. R. Phillips (in litt.) on 10 December and again on 13 December 1964 in Pacific Region in tall guamil at 6,000 ft elevation at kilometer marker 183 near La Cima; and adult male taken (CAS 68861, 27.6 g, very fat, testes 2 × 1 mm, skull completely ossified) and 5 other birds seen by Binford on 11 February 1974 at edge of tropical semideciduous forest at 3,000 ft elevation 6 road mi north of Putla de Guerrero. Data on male specimen (MLZ 31487) taken by del Toro Avilés purportedly on 6 January 1944 in Atlantic Region at San Miguel Soyaltepec are questionable.

*Subspecies*: *cucullatus* Swainson ("6 January" and 11 February specimens noted above).

*Icterus chrysater* (Lesson). Yellow-backed Oriole.

Common permanent resident in arid and semiarid pine-oak forests of Pacific Region east of Isthmus, recorded northwest to La Cumbre near Rancho Sol y Luna. *Elevations*: 4,350 to 4,900 ft.

*Breeding* (all data): 28 April 1972, unshelled egg in oviduct (2 mi east-southeast of Colonia Rodolfo Figueroa, 4,900 ft, Binford, CAS 68570, moderately fat).

I examined 12 specimens (WFVZ, CAS) of this species from the following localities: Rancho Cerro Baúl; at and 2 mi east-southeast (4,900 ft) of Colonia Rodolfo Figueroa; Rancho Sol y Luna; and La Cumbre near Rancho Sol y Luna. I observed this species in Oaxaca 3 mi northwest (4,650 ft) and 7 road mi north-northwest (4,350 ft) of Ciénega, Chiapas, and near Pericos. The only previously published record is the unsupported and probably erroneous listing of Oaxaca by Blake (1953:515; in litt.).

*Subspecies*: *chrysater* (Lesson).

*Icterus mesomelas* (Wagler). Yellow-tailed Oriole.

Fairly common permanent resident in Atlantic Region in dense brushy clearings within tropical evergreen forest northwest at least to a point 1 mi southwest of Valle Nacional and perhaps (del Toro Avilés) San Miguel Soyaltepec and south in Isthmus to Guichicovi and a point 8 mi north of Matías Romero. *Elevations*: 100 to 800 ft.

*Breeding* (all data): 7 April 1961, enlarged testes (13 × 8 mm, 1 mi southwest of Valle Nacional, 300 ft, Binford, LSUMZ 24891, 45.5 g, slightly fat); nest with four eggs, either 14 June 1961 (date on eggs, WFVZ 35297) or 13 July 1961 (date on skin, female, LSUMZ 47877; 12 mi north of Matías Romero, Rook); 25 June 1895, prejuvenile (Guichicovi, Nelson and Goldman, female, USNM 144409).

*Subspecies*: *mesomelas* (Wagler).

*Icterus pustulatus* (Wagler). Streak-backed Oriole.

Permanent resident, very common in Pacific Region in tropical deciduous forest and arid tropical scrub and uncommon in the Interior in low-elevation, arid subtropical scrub near Tamazulapan del Progreso and arid tropical scrub at San Juan Bautista Cuicatlán and Teotitlán del Camino, ranging north in Isthmus to Chivela and northwest in Río Tehuantepec basin to San Juan del Río and a point at 3,200 ft elevation 2 road mi northwest of San Pedro Totolapan. The two populations in northwestern Oaxaca are continuous with each other and with Pacific coast populations through Río Balsas basin rather than Oaxaca Valley (where unrecorded); see below. Record from La Parada, an immature taken by Boucard in October 1857 (Sclater 1858:303), if correct, probably represents a migrant from farther north. *Elevations*: sea level to 6,000 ft.

*Breeding*: 8 May 1964, nest with four eggs (Rancho Sol y Luna, 800 ft, Rook, WFVZ 24334), to 13 July 1963, nest with three eggs (5 mi north of Nejapa, 4,000 ft, Rowley, WFVZ 25643).

*Subspecies*: *pustulatus* (Wagler), northwestern Interior Region; *formosus* Lawrence, Pacific Region in Río Tehuantepec basin and from Tehuantepec City eastward; see Type Localities. All male specimens (mostly LSUMZ) in the Pacific Region from Puerto de Huatulco westward are intergrades. Those west to a point 11 road mi northwest of Puerto Escondido are closest to *formosus* in back color

but have small dimensions. Those from a point 9 road mi west-northwest of San José Estancia Grande are closest to *pustulatus* in size but have broader back streaks. Therefore, the sharpest break occurs between the last two localities, the dividing line between intergrades and pure *formosus* is between Puerto de Hualtulco and Tehuantepec City, and the break between intergrades and pure *pustulatus* must be in Guerrero. Therefore, *I. pustulatus* is conspecific with the group of races sometimes known as *I. sclateri* Cassin (including *I. formosus* Lawrence).

*Icterus pectoralis* (Wagler). Spot-breasted Oriole.

Permanent resident in lower portions of Pacific Region, common in Pacific swamp forest and uncommon in tropical deciduous forest. Northern limits in Isthmus unknown. Occurrence at "Putla" [= Putla de Guerrero], based on specimen (AMNH 521930) taken by Rébouch, needs substantiation by additional field work. *Elevations*: sea level to 1,900+ ft.

*Breeding*: 20 May 1917, nest with three eggs collected (Tehuantepec City, Schuffeldt field notes in UMMZ), to 7 June 1871, nest with two eggs (Santa Efigenia, Sumichrast, eggs USNM egg collection 16398).

*Subspecies* (according to Dickerman 1981c): *guttulatus* Lafresnaye, mesic foothills of Sierra Madre de Chiapas (Rancho Sol y Luna); *pectoralis* (Wagler), Río Tehuantepec basin and Pacific lowlands from Chiapas border west at least to Tehuantepec City; population from San Pedro Pochutla west to Minitán variably intermediate between *pectoralis* and *carolynae* Dickerman (1981c:8), with some individuals referable to each. See Type Localities.

*Icterus gularis* (Wagler). Altamira Oriole.

Very common permanent resident in Pacific swamp forest, tropical deciduous forest, and arid tropical scrub, occurring in Pacific Region west at least to a point 6 road mi south of Pinotepa Nacional and northwest in Río Tehuantepec basin to a point 2 road mi northwest of San Pedro Totolapan, and extending north into Atlantic portion of Isthmus as far as Matías Romero. Very uncommon permanent resident in openings (especially savanna) within lowland tropical evergreen forest in northwestern part of Atlantic Region from Temascal east to a point 3 mi north of Loma Bonita. Should be sought in the area between Isthmus and Loma Bonita. *Elevations*: sea level to 3,200 ft.

*Breeding*: 9 May 1966, nest with five eggs (Rancho Sol y Luna, 800 ft, Rowley, WFVZ 20726), to 13 July 1934, nest with one newly hatched young and one egg (near Ixtepec, Skutch [1954:271–272]).

*Subspecies*: *tamaulipensis* Ridgway, northwestern Atlantic Region; *gularis* (Wagler), remainder of Oaxaca range (see Type Localities).

*Icterus graduacauda* Lesson. Audubon's Oriole.

Permanent resident, common from 4,200 to 6,600 ft (locally to 8,000 ft) in humid pine-oak forest and adjacent cloud forest of Pacific Region west of Isthmus, rare at unknown elevation in pine-oak forest of Interior (Cerro Zempoaltepec, Nelson and Goldman; perhaps Totontepec, del Toro Avilés), and very uncommon from 650 to 700 ft in arid pine-oak forest in Pacific Region from Lajarcia east to Chivela and then north across Isthmus into Atlantic Region to Guichicovi and three points located 17 mi south, 2 mi north and 2 mi east, and 4 mi north and

2 mi east of Matías Romero. Winters commonly down to 900 ft into tropical semideciduous forest of Pacific Region west of Isthmus. To be expected as a breeder on north side of Sierra Madre de Chiapas.

*Breeding:* 26 April 1964, enlarged testes (13 × 8 mm, 11 mi north of San Pedro Pochutla, 900 ft, Morony, LSUMZ 33436, 52.8 g, little fat), to 5 June 1965, prejuvenile (kilometer marker 183 on Puerto Escondido Road, 6,000 ft, Rowley, female, CAS, 43.2 g).

*Subspecies: graduacauda* Lesson. Tentatively, I follow Blake (1968:165) in treating all Oaxaca birds as *I. g. graduacauda*. However, this species needs revision, especially in regard to the validity of the races *dickeyae* van Rossem from Guerrero (to which southwestern Oaxaca birds might belong), *nayaritensis* van Rossem of Nayarit, and *richardsoni* Sclater of Isthmian Oaxaca (see Type Localities).

*Icterus galbula* (Linnaeus). Northern Oriole.

*I. g. galbula.* — Winter resident at low elevations in Atlantic and Pacific Regions, common in tropical evergreen forest, tropical semideciduous forest, and Pacific swamp forest and uncommon in tropical deciduous forest, wintering west in Pacific Region to Minitán. Very uncommon transient migrant in Atlantic Region in upper portions of tropical evergreen forest (up to at least 4,100 ft), in the Interior in arid subtropical scrub, and in Pacific Region in arid tropical scrub. *Dates:* 26 September to 28 April; date of 12 September 1941, based on del Toro Avilés specimen (Moctum, male, MLZ 33948), is questionable. *Elevations:* sea level to 5,250 ft.

*I. g. bullockii.* — Fairly common winter resident west of Isthmus in the Interior and in adjacent upper reaches of Pacific Region (down to 3,000 ft), frequenting arid and humid pine-oak forests, arid subtropical scrub, tropical semideciduous forest, and openings within cloud forest. Only lowland record is also only one east of Isthmus: a female (MLZ 45461) taken by Lamb on 1 February 1947 in Pacific Region at 135 ft elevation 5 mi west of Zanatepec at the Río Ostuta. Specimens (MLZ) taken by del Toro Avilés supposedly at San Pablo Villa de Mitla and Moctum are unreliable; they might have been the basis for only previously published record (Miller et al. 1957:282), although valid specimens existed in museums at that time. I examined 14 valid specimens and have many sight records. *Dates:* 24 September to 1 May. *Elevations:* 135 ft; 3,000 to 8,600 ft.

*Subspecies: galbula* (Linnaeus); *bullockii* (Swainson); see ranges above. The only records for *I. g. abeillei* (Lesson), four specimens (MLZ 35116–35119) collected by del Toro Avilés supposedly on 8 January 1943 and 15, 18, and 21 December 1942, respectively, in the Interior at “Mitla” [= San Pablo Villa de Mitla] and published by Miller et al. (1957:283), probably are erroneous (see *Agelaius phoeniceus* in Species Accounts and *Pipilo fuscus* in Type Localities). One male (Rowley no. 3347, CAS, 37.7 g) from La Cima, 1 October 1964, is an intergrade between the *galbula* and *bullockii* groups; another male (WFVZ 33730, Rook, 36.2 g, no fat) from the same locality, 2 March 1965, might also be.

*Icterus parisorum* Bonaparte. Scott’s Oriole.

Uncommon winter resident in the Interior in arid subtropical scrub, juniper scrub, oak scrub, and adjacent lower reaches of arid pine-oak forest and in Pacific Region in humid pine-oak forest of Sierra de Miahuatlán, recorded east to points 4 road mi east of Santiago Matatlán and 7 road mi south of San Miguel Suchixtepec, the southeasternmost localities in entire range of species. Probably breeds

sparingly in arid subtropical scrub throughout Interior, but only breeding data are from Rancho de las Rosas (7,000 ft, 20 July 1943, Lamb, male prejuvenile, MLZ 38282), the southeasternmost breeding locality in entire range of species. *Elevations*: 5,200 to 8,400 ft.

*Breeding* (all data): see above.

*Amblycercus holosericeus* (Deppe). Yellow-billed Cacique.

Permanent resident in Atlantic Region in dense brushy clearings within tropical evergreen forest, common below 1,900 ft to very uncommon at 4,900 ft. Uncommon and apparently local in Pacific Region in Pacific swamp forest of foothills of Sierra Madre de Chiapas (Santa Efigenia, Rancho Sol y Luna, and a point 4 mi west-northwest of Tapanatepec; May, 12 May 1964, and 27 March 1961, respectively), where status uncertain. *Elevations*: 250 to 1,900 ft; 4,900 ft (Vista Hermosa, 27 June 1962, J. B. Tulecke, UK 40837).

*Breeding* (all data): 13 June 1961, enlarged testes (7 × 5 mm, Sarabia, Schaldach, AMNH 776466); 6 August 1964, enlarged testes (11 × 7 mm, 5 km [3.1 mi] northeast of Sarabia, Schaldach, WFVZ 33547).

*Subspecies*: *holosericeus* (Deppe).

*Cacicus melanicterus* (Bonaparte). Yellow-winged Cacique.

Common permanent resident in tropical deciduous, palm, and Pacific swamp forests along entire length of Pacific Region, then northwest through Río Tehuantepec basin to Rancho Las Animas and north across Isthmus into Atlantic Region to El Barrio and a point 6 mi south of Matías Romero (Río Grande). *Elevations*: sea level to 3,000 ft.

*Breeding*: 17 April 1966, nests under construction (El Zopilote, 400 ft, Rowley field notes in CAS), to 11 June 1955, nest with four cacique eggs and one *Molothrus aeneus* egg (Tehuantepec City, T. C. Meitzen and L. Garcia [Dickerman 1960: 473]); 12 June 1963, nest with large young (Río Ranas, Rowley [1966:194]).

*Psarocolius montezuma* (Lesson). Montezuma Oropendola.

Fairly common and somewhat local permanent resident in lower portions of Atlantic Region in tropical evergreen forest northwest to a point 5 mi west of Temascal and south in Isthmus to Río Sarabia and perhaps (del Toro Avilés) Escuilapa. *Elevations*: 250 to 700 ft.

*Breeding* (all data): 12 March 1961, moderately enlarged testes (9 × 4 mm and 6 × 4, Río Sarabia, Schaldach, AMNH 776140).

Most if not all previously published records for this species are based on specimens from Playa Vicente (Sclater 1859b:380), which is in Veracruz, or Tutla (Blake 1950:414) and Escuilapa, which are del Toro Avilés localities and hence questionable. I examined 13 reliable Oaxaca specimens (LSUMZ, WFVZ, AMNH) from three localities: north of San Miguel Soyaltepec at about 700 ft elevation; 1 mi southwest of Valle Nacional, 300 ft; and Río Sarabia. I also saw 4 birds on an island 5 mi west of Temascal.

#### Family FRINGILLIDAE

*Carpodacus mexicanus* (Müller). House Finch.

Common to fairly common permanent resident throughout most of Interior, breeding primarily in arid subtropical scrub but also in adjacent arid pine-oak forest; recorded east to Guelatao, San Miguel Sola de Vega, and a point 4 road

mi east of Santiago Matatlán, the southeasternmost localities in entire range of species. *Elevations*: 2,950 to 8,000 ft.

*Breeding*: 20 March 1967, nest with four eggs (San Felipe del Agua, 5,200 ft, Rowley, WFVZ 21329), to 28 July 1961, nest with three eggs (Cuilapan de Guerrero, Rowley, WFVZ 25583); 20 July 1957, prejuvenile (2 mi west of Tamazulapan del Progreso, 6,000 ft, Lamb, female, LSUMZ 51213).

*Subspecies*: *mexicanus* (Müller). I tentatively follow Howell et al. (1968:274) in treating *roseipectus* Sharpe (see Type Localities) as a synonym of *C. m. mexicanus*; however, *roseipectus* requires a thorough reevaluation that disregards del Toro Avilés specimens (MLZ) supposedly from San Pablo Villa de Mitla.

*Loxia curvirostra* Linnaeus. Red Crossbill.

Very uncommon in humid pine-oak forest in Pacific Region in Sierra de Miahuatlán and Sierra Madre de Chiapas and in the Interior in Sierra Aloapaneca and Sierra de Cuatro Venados; presumed to be a permanent resident in each of these areas, although species elsewhere tends to be nomadic. To be expected in suitable habitat elsewhere in state. Only eight records: species seen by R. H. Long on 28 August 1954 at La Cumbre near Cerro San Felipe (L. L. Short in litt.); a juvenile female (ARPC 6147, rather little fat, ovary undeveloped, skull unossified) taken by Phillips and Rowley from flock of 4 birds at Río Jalatengo on 11 May 1962; an immature male (LSUMZ 33540, 39.8 g, little fat, testes minute) taken by Morony from flock containing 1 adult male, 1 adult female, and 4 immatures found by Morony and Binford on 14 May 1964 at 4,350 ft elevation 16 road mi north of San Gabriel Mixtepec; an adult male (ARPC 7702, little fat, left testis  $4.2 \times 3$  mm, right  $3.2 \times 3$  mm, skull completely ossified) and an adult female (ARPC 7706, ovary and oviduct not enlarged) taken by Phillips on ridge above Río Molino on 11 November 1964 (A. R. Phillips in litt.); 2 birds seen by Binford on 21 February 1974 at 6,500 ft elevation 2 mi west of San Juan Lachao Pueblo Viejo; two males (WFVZ-HC 19181–19182) collected by Rowley on 1 August 1967 at 7,200 ft near Llano Santa María Lachixio; one female (WFVZ-HC 19183; soft-shelled egg in oviduct) secured by Rowley and Juan Nava S. on 10 April 1967 at 4,500 ft elevation above Rancho Carlos Minne on Cerro Baúl; and an immature male (WFVZ-HC 13755) taken by Rook on 20 March 1964 at Colonia Rodolfo Figueroa. *Elevations*: 4,350 to 9,000 ft.

*Breeding* (all data): see above.

*Subspecies*: *stricklandi* Ridgway.

*Carduelis notata* Du Bus de Gisignies. Black-headed Siskin.

Permanent resident in all Regions, fairly common in humid pine-oak forest and uncommon in arid pine-oak forest, occurring for the most part at higher elevations but ranging down to 4,350 ft in Sierra de Miahuatlán, 3,500 ft in Sierra Madre de Chiapas, and 700 ft in Isthmus (Chivela and La Ranchería). Data on four specimens supposedly from tropical evergreen forest at San Miguel Soyaltepec (3 and 6 January and 15 and 17 February 1944, del Toro Avilés, MLZ) are questionable. *Elevations*: 700 to 9,000 ft.

*Breeding* (all data): 4 April 1966, enlarged testes (right  $5.5 \times 4.5$  mm, El Salto, 7 km [4.3 mi] north of Cerro Baúl, 3,500 ft, L. Selva, WFVZ-HC 16806).

*Subspecies*: *notata* Du Bus de Gisignies.

*Carduelis psaltria* (Say). Lesser Goldfinch.

Common permanent resident in the Interior, occurring primarily in arid subtropical scrub and associated brushy clearings, cultivated land, and grazed land but also ranging into adjacent oak scrub and extreme lower reaches of arid pine-oak forest; recorded east to points 2 road mi west of San Pedro Totolapan and 8 road mi south of San Andrés Miahuatlán. Only record for Atlantic Region, a female (MLZ 34921) from Moctum dated 12 December 1941 and probably taken by del Toro Avilés, is questionable. Two records for Pacific Region, 1 bird seen and another secured (male, LSUMZ 33539, 10.0 g, little fat, testes small, skull completely ossified) by Morony on 22 May 1964 at 2,400 ft elevation 1 mi east of Putla de Guerrero, and 1 seen by Binford on 20 February 1964 at 300 ft elevation 9 road mi west-northwest of San José Estancia Grande. *Elevations:* Pacific Region, 300 to 2,400 ft; Interior Region, 3,200 to 7,200 ft.

*Breeding* (all data): apparently breeds in fall; 26 September 1911, nest with four eggs (San Pedro y San Pablo Etla, J. C. F. van Balen, eggs USNM egg collection 35577); 18 October 1964, nest under construction (San Felipe del Agua, 5,200 ft, Rowley [1984:213] observation).

*Subspecies:* *psaltria* (Say).

*Coccothraustes abeillei* (Lesson). Hooded Grosbeak.

Rare resident in cloud forest of Sierra de Juárez; presumably a permanent resident, as it is not known to be migratory or nomadic elsewhere in its range (A.O.U. 1983:755). Only one reliable record, a male (UK, 46.6 g, largest testis 8 × 4 mm) taken by D. M. Power (no. 126) on 16 June 1964 at 1,600 m (5,249 ft) in cloud forest of Atlantic Region at Vista Hermosa. Data on male (MLZ 34098) taken by del Toro Avilés supposedly at Totontepec on 28 April 1942 (Miller et al. 1957:313) are questionable. Record from Coatepec (Lantz 1899:222), which is erroneously ascribed to Oaxaca by Ridgway (1901:45) and subsequent authors, pertains to Veracruz.

*Breeding* (all data): see above.

*Subspecies:* *abeillei* (Lesson).

*Coccothraustes vespertinus* (Cooper). Evening Grosbeak.

Only one record, a male (USNM 143714) taken by Nelson and Goldman on 29 August 1894 in humid pine-oak forest of Interior at an unknown elevation on Cerro San Felipe, the southeasternmost locality in entire range of species. Status uncertain; considered in literature (e.g., Miller et al. 1957:312) to be a permanent resident, but probably only a visitant, because the species is nomadic, has not since been recorded at this well-studied locality, and is at the edge of its range.

*Subspecies:* *montanus* (Ridgway). The proper name of the Mexican population might be *mexicanus* (Chapman); see Phillips (1963); I follow Howell et al. (1968: 302, 304) in the use of *montanus*.

## Family PASSERIDAE

*Passer domesticus* (Linnaeus). House Sparrow.

Common permanent resident in towns and nearby cultivated fields within general ranges of arid subtropical scrub of Interior and arid tropical scrub and tropical deciduous forest of Pacific Region and Isthmus portion of Atlantic Region, oc-

curring north in Isthmus to Matías Romero. Recorded at Juchitán, Matías Romero, Oaxaca City, Puerto Escondido, Putla de Guerrero, San Andrés Miahuatlán, San Pedro Pochutla, San Pedro y San Pablo Teposcolula, Santa María Asunción Tlaxiaco, Santiago Pinotepa Nacional, Santiago Yolomecatl, Tapanatepec, and Tehuantepec City, and at points 2 road mi east of Oaxaca City, 1 mi south of Tehuantepec City, and northeast of Santiago Yolomecatl. Should be sought in remainder of Atlantic Region. First found in state on 10 April 1961 in Oaxaca City (Binford observation); year of original invasion unknown. *Elevations*: sea level to 7,900 ft.

*Breeding* (all data): 17 March 1964, adult female carrying presumed nest material (Oaxaca City, Binford); 7 May 1961, egg without shell in oviduct (20 × 16 mm, 2 mi east of Oaxaca City, Binford, LSUMZ 24868, 30.9 g, moderately fat); 21 June 1966, adults feeding “fully-fledged young” and nest under construction (Oaxaca City, Rowley [1984:214]).

*Subspecies*: *domesticus* (Linnaeus).

#### HYPOTHETICAL LIST

Thirty-nine species and one hybrid have been reported from Oaxaca on evidence I consider unacceptable for various reasons. All but two, which are based on unpublished specimen records, have been published.

*Oceanodroma leucorhoa* (Vieillot). Leach's Storm-Petrel.

Jehl (1974b:684, 690) believes he saw a dark-rumped individual on 8 April 1973 between points about 24 mi southwest of the mouth of the Río Verde and 9 mi southwest of the mouth of the Río Tonameca. The label of a specimen (San Diego Natural History Museum 38480) taken by Jehl supposedly off Oaxaca on the night of 7 April 1973 bears the coordinates 17°04'N, 100°53'W, which is off central Guerrero. Crossin (1974:167, 168) includes Oaxaca in the range of *O. l. beali* Emerson but cites no specific records. Although Jehl's identification probably was correct, the difficulties of identifying dark-rumped birds in the field prompt me to relegate this species to the Hypothetical List until a specimen or additional corroborating sight records are obtained.

*Oceanodroma tethys* (Bonaparte). Wedge-rumped Storm-Petrel.

Crossin (1974:181) maps the range of *O. tethys* as including the entire Pacific coast from central Mexico to Colombia but cites no specific Oaxaca record.

*Phaethon aethereus* Linnaeus. Red-billed Tropicbird.

On 20 April 1964 about 3 mi off Puerto Angel, Morony and I observed a tropicbird identified at the time as *P. aethereus*. However, it might have been one of the other two less likely species, *P. lepturus* Daudin or *P. rubricauda* Boddaert. On a cruise along the length of Pacific southern Mexico, Jehl (1974b:684) saw this species sparingly on 7 and 10 April 1973. Although he spent part of each day off Oaxaca, his single bird on the former date might have been off Guerrero, and those on the latter date probably were in Chiapas.

*Sula nebouxii* Milne-Edwards. Blue-footed Booby.

Jehl (1974b:691; in litt.) saw a bird believed to be this species on 8 April 1973 near the coast of Oaxaca. Despite careful searching I have failed to find this species

on 15 ocean trips off Oaxaca, including several to a well-populated roost of Brown Boobies near Puerto Angel. In the absence of a specimen, and in view of the difficulty of distinguishing *S. nebouxii* from immature *S. leucogaster*, I question this record.

*Agamia agami* (Gmelin). Chestnut-bellied Heron.

Beristain and Laurencio (1894:212) state that the Chestnut-bellied Heron occurs in the "Estados de Veracruz y Oaxaca." The absence of supporting data and the inclusion of several obvious errors concerning other species render this publication untrustworthy.

*Anser albifrons* (Scopoli). Greater White-fronted Goose.

Most Oaxaca references to this species stem from Sumichrast's (1881:233–234) listing of "Anser? Gambeli? Hartl." and his statement that "Innumerables bandadas de gansas que *con alguna duda* [with some doubt; italics mine] refiero á esta especie, permanecen desde Octubre hasta Mayo en los llanos de Nopalapam, etc., (Veracruz) y de Santa María del Mar, cerca de Tehuantepec." Salvin and Godman (1897–1904 [1902]:202), citing Sumichrast's statement, list Nopalapam, Veracruz, and Santa María del Mar, Oaxaca, as *definite* localities for *Anser gambeli*. Subsequent authors apparently have copied Salvin and Godman. Because Sumichrast himself questioned not only the species but also the genus of goose involved, his record must be disregarded. The only other reference to the Greater White-fronted Goose in this region is made by Leopold (1959:152), who states that "some cross the Isthmus of Tehuantepec to the Pacific shore of Chiapas." Although implying that birds entering Chiapas via the Isthmus pass through or over Oaxaca, Leopold does not specifically mention the latter state.

*Chen caerulescens* (Linnaeus). Snow Goose.

Friedmann et al. (1950:37) and Blake (1953:44) list the state of Oaxaca in the range of the white morph, but I can find no specific data to support their claims. Leopold (1959:129) states: "A few snow geese, with scattered blue geese mixed in, follow the Gulf coast to the Isthmus of Tehuantepec and occasionally cross the isthmus to Chiapas." Although birds following such a route must pass through Oaxaca, such a statement is not sufficient to warrant inclusion of this species on the main list.

*Anas cyanoptera* Vieillot. Cinnamon Teal.

Friedmann et al. (1950:41) claim that this species is "recorded from all Mexican states except Durango, Querétaro, Campeche, Yucatán, and Quintana Roo," but I am unable to find any Oaxaca specimen or published record prior to 1950. Rojas (1954:Map 6, p.119) presents a range map on which the shaded area of general distribution barely touches Oaxaca in the vicinity of Cosolapa but gives no specific record. Leopold (1959:Table 4, p. 137), reporting on the results of an aerial waterfowl census taken in January 1952, under the heading "Blue-winged teals (*Anas cyanoptera* and *A. discors*)," lists Pacific coast records extending from Laguna de Alotengo to Mar Muerto. Although his use of the word "and" implies the presence of both teal species, he might have meant they were unidentifiable to species; in any event, mere implication is not adequate.

*Aythya valisineria* (Wilson). Canvasback.

The A.O.U. (1983:83) lists this species for Oaxaca, but I can find no specific record, and B. L. Monroe, Jr. (in litt.) can find no reference accounting for its inclusion by the A.O.U.

*Aythya americana* (Eyton). Redhead.

Rojas (1955) states that "algunos cuantos se han observado hasta Oaxaca" (p. 130) and on Map 4 (p. 131) shows the range of this species extending over all but the extreme eastern portion of the state. However, he gives no specific record.

*Oxyura dominica* (Linnaeus). Masked Duck.

Rojas (1955:Map 12, p. 153) includes the entire Pacific Region of Oaxaca in the general range of this species but gives no supporting data.

*Ictinia mississippiensis* (Wilson). Mississippi Kite.

Mere listing of the state of Oaxaca by Beristain and Laurencio (1894:223) and by Friedmann et al. (1950:50) is not, in my opinion, sufficient basis for inclusion of this species on the main list, even though it might be expected during migration. Friedmann (1950:123) cites Beristain and Laurencio in the synonymy of this species but does not specifically mention Oaxaca in the range. The paper by Beristain and Laurencio contains enough obvious errors concerning other species to cast serious doubt on all their records.

*Spizaetus tyrannus* (Wied). Black Hawk-Eagle.

The only record, a female (MLZ 31342) collected by del Toro Avilés purportedly on 3 December 1943 in the Atlantic Region at "600 meters" (1,968 ft) elevation at San Miguel Soyaltepec, is questionable in view of known errors in regard to other del Toro Avilés specimens. All previously published Oaxaca accounts are based on this questionable specimen.

*Falco mexicanus* Schlegel. Prairie Falcon.

In the published minutes of a meeting of the Deutsche ornithologische Gesellschaft zu Berlin held on 6 November 1871 is the statement that Cabanis (1872: 156) brought from the Berlin Museum a specimen of "*F. mexicanus* Licht. von Tehuantepec." This reference was brought to light and accepted by Hellmayr and Conover (1949:294-295), who then extended the range of this species to "southern Mexico." Subsequent authors have incorrectly extended the range to "Oaxaca." The term "Tehuantepec" was not restricted by Cabanis to Oaxaca and could, in my opinion, refer to the Isthmus of Tehuantepec, a region that includes portions of both Oaxaca and Veracruz. Additional doubt is cast by the fact that the Prairie Falcon is otherwise unknown south of the state of Hidalgo (Friedmann et al. 1950: 65).

*Oreophasis derbianus* Gray. Horned Guan.

MacDougall (pers. comm.; 1971:97; in Andrie 1967:93, 99) says that natives have seen the "faisan de cuerno rojo" in cloud forest at high elevation at the western end of the Sierra Madre de Chiapas, probably on Picacho Prieto. Certainly the presence of the Horned Guan in this area might be expected, because the habitat appears equivalent to that occupied by the species in Chiapas. I failed to find *Oreophasis* in the cloud forest at a point 12 mi north-northeast of Zanatepec; the highest elevation at that point, however, was less than 5,200 ft, slightly below the lowest elevation (1,600 m or 5,248 ft) from which this species has been reported

in Chiapas (Andrle 1967:107). A search for this species should be made on the higher slopes of Picacho Prieto.

*Meleagris gallopavo* Linnaeus. Wild Turkey.

I can find no unquestionable Oaxaca record for the Wild Turkey. Sumichrast (1881:229) and Beristain and Laurencio (1894:219) list the state of Oaxaca in the range of this species but give no details. More recent authors (e.g., A.O.U. 1957:148; Edwards 1972:48; Friedmann et al. 1950:81) have simply followed suit, without citing additional data. MacDougall (1971:98; in litt.) believes he saw a pair of turkeys in oaks at the foot of Cerro Baúl in the Sierra Madre de Chiapas and says that the inhabitants of this area claim to have seen others near the headwaters of the Río Ostuta in June 1964. A. R. Phillips (in litt.) was told by hunters that turkeys occur near San Miguel Suchixtepec. A specimen is needed to substantiate these records and to determine if the birds are of wild or domestic stock. Leopold (1948:393–395) made an exhaustive study of turkeys in Mexico and found no reliable evidence that wild birds occur south of the Río Balsas valley.

*Bartramia longicauda* (Bechstein). Upland Sandpiper.

Although Sumichrast (1881:232) lists Rancho de Cacoprieto and Tapanatepec as localities for this species, he fails to present substantiating data. Salvin and Godman (1897–1904 [1903]:381) cite Sumichrast's paper, and Friedmann et al. (1950:93) list the state of Oaxaca without citation. Lawrence (1876), who records most of the specimens taken by Sumichrast in Oaxaca, fails to mention the Upland Sandpiper. Because I have been unable to locate a specimen or literature reference to one, I must assume that Sumichrast's records are based on observations alone and therefore might involve misidentification. Figueroa (1973), who summarized distribution in Mexico, gives no Oaxaca records.

*Larus californicus* Lawrence. California Gull.

Lawrence (1876:51) records a specimen taken by Sumichrast at "San Mateo" [= San Mateo del Mar] in February 1869. Later Sumichrast (1881:234) states that he collected the California Gull on the Gulf of Tehuantepec. Subsequent authors have followed Lawrence and Sumichrast. In a search of the collection of the National Museum of Natural History, I found a badly worn immature *L. delawarensis* (sex?, USNM 58953) taken by Sumichrast at "San Mateo" on 21 February 1869, which on the label at one time in the past had been identified as *L. californicus*. Whether or not this is the specimen on which Lawrence based his Oaxaca record of *californicus* cannot be determined, because both species were supposedly taken by Sumichrast at "San Mateo" in February 1869. In addition to the question raised by the *delawarensis* specimen, the difficulty of separating immature specimens of *californicus* and *delawarensis* (if the Oaxaca specimen was an immature), Lawrence's known misidentification of other members of the Laridae (see *Sterna hirundo*), and the absence of other Pacific coast records southeast of Colima cast considerable doubt on the Oaxaca record for *californicus*.

*Sterna dougallii* Montagu. Roseate Tern.

Lawrence (1876:51) records a Sumichrast specimen supposed to be *S. dougallii* taken at "Ventosa Bay" [= Bahía Ventosa], and Sumichrast (1881:234) states that he collected this species on the coast of the Gulf of Tehuantepec. I have been unable to locate any specimen of this species from Oaxaca, even though I have searched the collection of the National Museum of Natural History where the

bird in question probably was deposited at one time. The identity of this specimen, if indeed any specimen ever existed, must be questioned because of Lawrence's misidentification of other terns (see *Sterna hirundo*). Friedmann et al. (1950) do not list this species for Mexico.

*Columba leucocephala* Linnaeus. White-crowned Pigeon.

The only supposed record for the White-crowned Pigeon apparently stems from Bent (1932:376), who gives "Oaxaca (Salina Cruz)" as a locality. Friedmann et al. (1950:114) state that it is "Accidental on the Pacific side of the Isthmus of Tehuantepec (Salina Cruz, F)." The letter "F" without an additional letter "d" indicates that the record came from the Museum of Comparative Zoology and that the authors were not informed as to what type of data formed the basis for it. R. A. Paynter (in litt. to G. H. Lowery, Jr.) says he could find no indication that any Oaxaca specimen of *Columba leucocephala* was ever in that museum. Blake (1953:179) and the A.O.U. (1957:258; but questioned in 1983:252), presumably following Friedmann et al. (1950) or Bent (1932), also list Salina Cruz. This species ranges no closer to Oaxaca than Quintana Roo (A.O.U. 1983:252).

*Ectopistes migratorius* (Linnaeus). Passenger Pigeon.

Castillo (1872:255) states: "Su aparición por Zacapoaxtla y su diseminación hacia Jalapa, Real del Monte, Morelia y Oaxaca, según las últimas noticias de los periódicos, marcan una marcha progresiva al S.E., y esto confirma su emigración de Norte-América." The Passenger Pigeon is believed to have wandered south to Veracruz, Tabasco, and Puebla (Friedmann et al. 1950:116) and thus might well have wintered in Oaxaca. However, because Castillo's information was based solely on newspaper reports, I prefer to relegate this extinct species to the Hypothetical List until a more trustworthy source of data is known.

*Rhynchopsitta pachyrhyncha* (Swainson). Thick-billed Parrot.

Beristain and Laurencio (1894:230) give the following range for this species: "Desde el Istmo de Tehuantepec hasta el Valle de México á todas alturas." This untrustworthy publication, however, fails to mention Oaxaca or give substantiating data.

*Bolborhynchus lineola* (Cassin). Barred Parakeet.

The A.O.U. (1983:274) lists this species for Oaxaca, but I can find no evidence that it has been recorded, and B. L. Monroe, Jr. (in litt.) can find no reference accounting for its inclusion by the A.O.U.

*Otus flammeolus* (Kaup). Flammulated Owl.

A map presented by Hasbrouck (1893:260) includes Oaxaca in the range of this species, but no specific record is mentioned. L. L. Short (in litt.) informs me that C. G. Sibley, H. E. Childs, and J. B. Bowers saw one and heard at least two others on 2 April 1948 at 9,000 ft at La Cumbre near Cerro San Felipe. Two of these birds were calling "boop," and the third gave a "bootle-ooop-poop." Although the La Cumbre record sounds convincing, I prefer to await the acquisition of a specimen.

*Micrathene whitneyi* (Cooper). Elf Owl.

Ligon (1968) says that the winter range of this species "appears to extend east to northern Oaxaca" (p. 9) and "east probably into Oaxaca" (p. 66); his range map (p. 10) shows a large spot on the Oaxaca-Puebla border. Ely and Crossin

(1972:215) cite Ligon but extend the *definite* winter range "east to northern Oaxaca." The A.O.U. (1983:300) apparently followed one of these authors (B. L. Monroe, Jr., in litt.). Ligon (in litt.) informs me that his record, although very close to the Oaxaca state line, was in Puebla.

*Strix fulvescens* (Sclater and Salvin). Fulvous Owl.

Four specimens were taken by del Toro Avilés purportedly at Totontepec in 1942: two adult females on 11 and 5 May and one adult male and one prejuvenile male on 14 May (MLZ 33799–33802, respectively). These are the only records for Mexico west of the Isthmus of Tehuantepec and form the basis for all Oaxaca literature references, including those by Friedmann et al. (1950:148) and the A.O.U. (1983:303). Although this species might occur in Oaxaca *east* of the Isthmus, the unusual locality and known unreliability of the collector cast serious doubts on these records.

*Aegolius ridgwayi* (Alfaro). Unspotted Saw-whet Owl.

Briggs (1954:180) described the race *A. acadicus brodkorbi* from a single juvenile male (USNM 462871) taken by del Toro Avilés purportedly on 12 May 1949 at 2,100 m (6,888 ft) at Amatepec in the Sierra de Zempoaltepec of Oaxaca. Because this specimen appeared to Briggs to be intermediate between juveniles of *A. a. acadicus* to the north and *A. ridgwayi tacanensis* Moore to the south, she merged the two species. The A.O.U. (1983:307), however, recognized two species, a position with which I concur for the present, and considered *brodkorbi* a race of *ridgwayi*, a treatment I question. The A.O.U. correctly notes the absence of other *A. ridgwayi* records from west of the Isthmus of Tehuantepec.

Because of known errors in localities and dates on other del Toro Avilés specimen labels, I consider the "Amatepec" locality very doubtful. I suspect that *brodkorbi* will prove to fall within the individual variation of Oaxaca *acadicus* or some population of *ridgwayi* occurring *east* of the Isthmus. Until additional comparative material is forthcoming, I believe the best course is to disregard the Amatepec locality and consider the taxonomic affinities of *brodkorbi* unknown, while retaining two species and relegating *A. ridgwayi* to the Oaxaca Hypothetical List. See Type Localities.

*Phalaenoptilus nuttallii* (Audubon). Common Poorwill.

Davis (1972:68) extends the range of this species "south to Oaxaca and Puebla." In response to my query, he (in litt.) states that "Dick Herbert picked up a N. Poorwill (d.o.r.) one time when I was driving him through Oaxaca—I think it was between Huajuapán de León and Yanhuitlán but merely called it Oaxaca in our notes." In addition, he says he has tape recordings of this species "made only a mile or so from the state line but inside Puebla." In the absence of a specimen or more specific data, I question this record. The species has not otherwise been reported south of Jalisco and Guanajuato (Friedmann et al. 1950:155).

*Campylopterus excellens* (Wetmore). Long-tailed Sabrewing.

I tentatively refer to this "species" a male (FMNH 119477) taken by del Toro Avilés purportedly on 14 April 1941 at Tutla. This specimen measures as follows (mm): wing chord 69.0, tail 59.2, exposed culmen 28.3. Blake (1950:402) lists this specimen under *Campylopterus curvipennis* and does not note its large size. I do not, however, accept *excellens* as a valid member of the Oaxaca avifauna,

because errors on other del Toro Avilés labels cast considerable doubt on the locality.

*Atthis ellioti* Ridgway. Wine-throated Hummingbird.

Boucard (1895:13) mentions "several specimens of this variety collected by me in Oaxaca (Mexico) and in Guatemala." Boucard is not known to have collected east of the Isthmus, the only place in Oaxaca where this species is likely to occur. He did collect *A. heloisa* west of the Isthmus. Despite the fact that most of Boucard's bird records from Oaxaca have been published, no other author has mentioned *A. ellioti*. Until Boucard's specimens are located, I regard his statement as erroneous. See *A. heloisa* in Species Accounts.

*Selasphorus floresii* Gould.

The type locality of *Selasphorus floresii*, a presumed hybrid between *Calypte anna* (Lesson) and *Selasphorus sasin* (Lesson), is sometimes given as Bolaños, Oaxaca, but should be Bolaños, Jalisco (Ridgway 1909:440).

*Electron carinatum* (Du Bus de Gisignies). Keel-billed Motmot.

Two specimens in the American Museum of Natural History are labeled "Tolosa, Mexico." One (AMNH 74634) is a female taken by A. E. Colburn and P. W. Shufeldt (original number 446) on 21 December 190? (date obscured but probably 1900), and the other (AMNH 74635) is a male bearing no data other than sex and locality. Ridgway (1914:475) lists Tolosa, Veracruz, as a locality for *Electron* but fails to cite any reference; presumably he is referring to the present specimens. Although each state embraces a town called Tolosa, F. W. Loetscher (in litt.) believes that the present specimens probably were taken in Oaxaca, a hypothesis with which I tentatively concur but cannot prove.

*Tachycineta bicolor* (Vieillot). Tree Swallow.

Records from "Cacoprieto" [= Rancho de Cacoprieto] (Sumichrast 1881:243) and the state of Oaxaca (Miller et al. 1957:114) lack specific details and probably are not based on specimens. The observation of a single bird in the Interior at Monte Albán on 16 May 1957 (Coffey 1960:294) is doubtful because of the unusual date and locality. Because of the possibility of confusing *T. bicolor* with *T. albilinea* and *T. thalassina* in the field, I treat these reports of *bicolor* as hypothetical.

*Polioptila nigriceps* Baird. Black-capped Gnatcatcher.

Numerous authors, apparently beginning with Lawrence (1876:12), have listed *P. nigriceps* for Oaxaca. All such records are based on misidentifications of *P. albiloris vanrossemi*. *P. nigriceps* occurs no closer to Oaxaca than Colima (van Rossem 1931).

*Catharus fuscescens* (Stephens). Veery.

Graber and Graber (1959:75) state that they observed this species on three days in December 1957 in tropical evergreen forest on the Atlantic side of the Isthmus of Tehuantepec either at a point 1 mi south of Loseta or at Rancho Boca del Río Sarabia. Since publication of their paper, the Grabers have informed me (in litt.) that they now consider their thrush records doubtful.

*Dendroica chrysoparia* Sclater and Salvin. Golden-cheeked Warbler.

Sclater (1862:19) mistakenly referred to this species several Boucard specimens from La Parada. Later (1865:87-89) he corrected the identification to *D. occidentalis*.

*Dendroica castanea* (Wilson). Bay-breasted Warbler.

Supposed occurrence of the Bay-breasted Warbler in Oaxaca is based on a misidentification by Lawrence (1876:15) of a specimen of *D. striata* (female?, USNM 59595) taken by Sumichrast at Tehuantepec City on 19 October 1869.

*Piranga olivacea* (Gmelin). Scarlet Tanager.

Lenna (1963:8; in litt.) believes that he and L. F. Kibler saw a "male still in winter plumage" on 29 April 1963 in the Pacific Region at Tapanatepec. Absence of a specimen and the paucity of other Mexican records cast doubt on this identification.

*Pipilo chlorurus* (Audubon). Green-tailed Towhee.

Miller et al. (1957:351) extend the range of this species to Oaxaca on the basis of three specimens taken by del Toro Avilés supposedly at "Mitla" [= San Pablo Villa de Mitla] on 5 (male, MLZ 35029), 6 (female, MLZ 35030), and 23 January 1943 (female, MLZ 35031). Erroneous locality data on other del Toro Avilés specimens labeled "Mitla" (e.g., see *Agelaius phoeniceus* and *Pipilo fuscus*) and the absence of additional records southeast of the states of Hidalgo and Morelos cast considerable doubt on the Oaxaca records.

*Sturnella neglecta* Audubon. Western Meadowlark.

Brigham (1963) heard what he believed to be the song of a Western Meadowlark on 13 August 1953 near Oaxaca City. He suggests that the bird was either *S. neglecta* out of its normal range or an example of *S. magna* that had learned the song of *neglecta*. Probably what Brigham heard, however, was the song of resident *S. magna*, which is somewhat more elaborate than the typical song of northern *S. m. magna* and to some ears might seem similar to that of *neglecta*.

## ANALYSIS OF THE BREEDING AVIFAUNA

In the Species Accounts, 465 species are accepted as breeding in Oaxaca. Here I analyze their current breeding distributions in relation to major habitats, believing that the habitat—the types and their geographic distributions—is the most important factor controlling present ranges. The physiography, climate, and habitats of Oaxaca have been discussed in previous chapters; information pertinent to this analysis will be reiterated briefly under each habitat. For an understanding of this analysis, the reader will benefit from frequent reference to the maps of habitat (Fig. 1) and physiography (Fig. 31).

I attempt to place each breeding species (and some subspecies) in the single habitat which it occupies most abundantly and extensively. Some species defy such classification and are treated separately. Primary attention is given to present barriers and corridors, especially in regard to the Isthmus of Tehuantepec. Where barriers have caused fragmentation of a habitat (e.g., in cloud forests), I deal necessarily with the *absence* of species; the *presence* of species is largely a function of historical, especially climatic, events that allowed dispersal across bridges of suitable habitat. Historical events are not a major subject of this analysis, but a thorough knowledge of the current distributions of both habitats and birds is a prerequisite to understanding them.

Most terrestrial birds nest and feed in the same major habitat. Many aquatic-feeding species, however, nest in terrestrial habitats unrelated (except by prox-

imity) to aquatic environments (e.g., *Mycteria americana* nesting on large cacti in arid tropical scrub); these species are analyzed according to their presence and abundance within their primary feeding habitats. Most analyses of this nature place the wide-ranging, aerial-feeding, cave-or-cavity-nesting swifts in a separate "aerial" category, but do not do the same for swallows. I attempt to allocate the species of both groups to major terrestrial habitats, basing my determinations partly on known or presumed nest site and partly on the habitat over which they feed most commonly.

The distributional patterns advanced in this analysis are based on *natural* habitats as they probably occurred before the inroads of modern civilization. Despite widespread "humanization," the *gross* patterns of both the habitats and the birds have remained much the same. I also treat man-made habitats, to which no native birds are confined.

This analysis cannot be complete because of our still fragmentary knowledge of the composition and distribution of habitats and the ranges and racial taxonomy of their avian inhabitants, especially those that migrate. Species that only "possibly" or "probably" breed in the state are not included among the 465 breeding species. Doubtless, when more data are available, some forms will need to be placed in other habitats or moved to other categories within specific habitats, but such changes will not, I believe, greatly alter any of the basic distributional patterns discussed in this analysis.

In order to understand the current distributions of Oaxaca birds, it is necessary to consider adjacent states and countries. For this information I have relied on the *Distributional Check-list of the Birds of Mexico* (Friedmann et al. 1950; Miller et al. 1957), *A Field Guide to the Birds of Mexico* (Edwards 1972), *Birds of Guatemala* (Land 1970), *A Distributional Survey of the Birds of Honduras* (Monroe 1968), *Las Aves de Chiapas* (Alvarez del Toro 1971), and the *Check-list of North American Birds* (A.O.U. 1983). Taxonomy follows the Species Accounts for Oaxaca forms and the above works, especially the first, for non-Oaxaca forms.

Letter abbreviations after bird names in the tabular lists refer to Interior Region valleys where species have been recorded: Oaxaca Valley (O); San Miguel Sola de Vega valley (SMSV); Huajuapán de León region, including the Tamazulapán del Progreso and Santiago Chazumba areas (HL); San Juan Bautista Cuicatlán valley (SJBC); and Hidalgo Yalalag valley (HY). Other abbreviations and symbols are explained under each habitat.

#### NATURAL TERRESTRIAL HABITATS

##### WIDESPREAD, UBIQUITOUS

Two species exhibit such a wide tolerance for environmental conditions that they are virtually ubiquitous, occurring in or over almost all terrestrial habitats from sea level to near the tops of the highest peaks:

*Coragyps atratus*

*Cathartes aura*

##### WIDESPREAD, HUMID AND ARID TROPICAL HABITATS

Forty-nine species are widespread in humid and arid tropical regions of both slopes of Mexico, including Oaxaca, and cannot be placed satisfactorily in a single habitat. In Oaxaca they inhabit principally tropical evergreen, tropical semide-

ciduous, tropical deciduous, and Pacific swamp forests and arid tropical scrub. Some range into adjacent cloud forest and arid subtropical scrub and a very few marginally into palm forest, pine-oak forest, savanna, steppe, and towns. Over half are associated largely with modified terrestrial habitats, especially openings. Although these 49 are for the most part coastally oriented, 23 enter the arid Interior valleys. These 49 species can be divided into three categories according to their Oaxaca ranges.

(1) Forty species are more or less widespread in the Atlantic and Pacific Regions both east and west of the Isthmus:

<i>Buteogallus anthracinus</i>	<i>M. tyrannulus</i> (O, SMSV)
<i>B. urubitinga</i>	<i>Pitangus sulphuratus</i> (O)
<i>Buteo nitidus</i> (HY)	<i>Megarynchus pitangua</i>
<i>B. magnirostris</i>	<i>Myiozetetes similis</i>
<i>Herpetotheres cachinnans</i>	<i>Myiodynastes luteiventris</i> (SMSV)
<i>Falco rufigularis</i>	<i>Tyrannus melancholicus</i> (SJBC)
<i>Colinus virginianus</i>	<i>Pachyramphus aglaiae</i> (SMSV, SJBC)
<i>Columba flavirostris</i>	<i>Tityra semifasciata</i>
<i>Leptotila verreauxi</i> (SMSV, HL, SJBC)	<i>Progne chalybea</i>
<i>Piaya cayana</i> (SMSV, HL)	<i>Stelgidopteryx serripennis</i> (O, SMSV, HL, SJBC)
<i>Crotophaga sulcirostris</i> (O, HL)	<i>Vireo flavoviridis</i>
<i>Glaucidium brasilianum</i> (SJBC)	<i>Geothlypis poliocephala</i>
<i>Ciccaba virgata</i> (SMSV)	<i>Euphonia affinis</i>
<i>Nyctidromus albicollis</i> (SJBC)	<i>Saltator coerulescens</i>
<i>Chlorostilbon canivetii</i> (SMSV)	<i>Cyanocompsa parcellina</i>
<i>Dryocopus lineatus</i> (SMSV)	<i>Volatinia jacarina</i> (O)
<i>Campephilus guatemalensis</i>	<i>Quiscalus mexicanus</i> (O)
<i>Xiphorhynchus flavigaster</i> (SMSV)	<i>Molothrus aeneus</i> (O, HL, SJBC)
<i>Pyrocephalus rubinus</i> (O, SMSV, HL, SJBC)	<i>Icterus gularis</i>
<i>Attila spadiceus</i> (SMSV)	
<i>Myiarchus tuberculifer</i> (O, SMSV, HL, SJBC, HY)	

(2) Three species inhabit the Pacific Region east of the Isthmus and at least portions of the Atlantic Region but are absent from Pacific Oaxaca west of the Isthmus, although two (†) reappear farther northwest in Mexico:

† <i>Crypturellus cinnamomeus</i>	<i>Melanerpes aurifrons</i> (also ranges into the Río Tehuantepec basin)
† <i>Nyctibius griseus</i>	

(3) Six species breed in the Pacific Region west of the Isthmus and disjunctly in the Atlantic Region; none has been recorded in the Pacific Region in or east of the Isthmus, although three (\*) reappear on the Pacific coast of Chiapas:

* <i>Columbina talpacoti</i>	<i>Cardinalis cardinalis</i>
<i>Glaucidium minutissimum</i>	<i>Arremonops rufivirgatus</i>
* <i>Parula pitayumi</i>	* <i>Sporophila torqueola</i> (O, HL, SJBC)

Some of these 49 widespread species, although characteristic primarily of tropical habitats, range into the lower reaches of subtropical cloud forest or its associated openings (*Glaucidium minutissimum*, *G. brasilianum*, *Ciccaba virgata*, *Xiphorhynchus flavigaster*, *Pachyramphus aglaiae*, *Tityra semifasciata*, and *Cyanocompsa parcellina*), up to between 5,000 and 7,300 ft in arid subtropical habitats (marked O or HL on lists), or into both (*Leptotila verreauxi*, *Myiarchus tuberculifer*, *Stelgidopteryx serripennis*, *Sporophila torqueola*, and *Molothrus aeneus*).

The extensive subtropical and temperate habitats (cloud forest, humid and arid pine-oak forests, arid subtropical scrub, and steppe) of the Mesa del Sur and Sierra Madre de Chiapas pose a major barrier to dispersal of all 49 species on a north-south axis. Only at the Isthmus of Tehuantepec do the tropical habitats of the two coastal areas meet and direct exchange of their avifaunas occur. Dispersal through this gap might be expected to be unobstructed, but such is not the case. Twenty-one (42.9%) of the 49 are racially differentiated, many strongly so, between the two areas, as follows: *Crypturellus cinnamomeus* (*sallaei*, Atlantic Region; *soconuscensis*, Pacific Region), *Buteo magnirostris* (*griseocauda*; *xantusi* and *petersi*), *Colinus virginianus* (*thayeri*; *coyolcos* and *harrisoni*), *Columbina talpacoti* (*rufipennis*; *eluta*), *Glaucidium minutissimum* (*occultum*; ssp. [undescribed?]), *G. brasilianum* (*ridgwayi*; *\*intermedium*), *Nyctidromus albicollis* (*yucatanensis*; *\*nelsoni*), *Melanerpes aurifrons* (*grateloupensis*; *polygrammus*), *Xiphorhynchus flavigaster* (*ascensor*; *\*flavigaster* and *eburneirostris*), *Pyrocephalus rubinus* (*mexicanus* × *blatteus*; *\*mexicanus*), *Myiozetetes similis* (*texensis*; *hesperis*), *Stelgidopteryx serripennis* (*fulvipennis*; *\*psammochrous* and *stuarti*), *Parula pitiayumi* (*nigrilora*; *pulchra*), *Geothlypis poliocephala* (*palpebralis*; *poliocephala* and *caninucha*), *Euphonia affinis* (*olmecorum*; *affinis*), *Cardinalis cardinalis* (*coccineus* and *littoralis*; *carneus*), *Cyanocompsa parellina* (*parellina*; *indigotica*), *Arremonops rufivirgatus* (*crassirostris*; *sumichrasti*), *Sporophila torqueola* (*morelleti*; *\*torqueola*), *Molothrus aeneus* (*aeneus*; *\*assimilis*), and *Icterus gularis* (*tamaulipensis*; *gularis*). Although each of these species occupies both humid and arid habitats, each race is adapted to only one and thus cannot fully penetrate the other; intergradation, if any (some populations are allopatric), takes place over a narrow zone, and gene flow is limited.

The Isthmus is also a barrier on an east-west axis. Three species (list 2) occupy the Pacific Region to the east of the Isthmus but not (in Oaxaca) to the west, while six others (list 3) have the opposite distribution. In addition, of the 40 species (list 1) inhabiting the entire Pacific Region, 16 (40.0%) are racially differentiated east-west across the Isthmus, with the western subspecies being endemic to western Mexico: *Piaya cayana* (*thermophila*, east side; *\*mexicana*, west side), *Chlorostilbon canivetii* (*canivetii*; *\*auriceps*), *Dryocopus lineatus* (*similis*; *\*scapularis*), *Campephilus guatemalensis* (*guatemalensis*; *nelsoni*), *Attila spadiceus* (*flammulatus*; *\*pacificus*), *Myiarchus tuberculifer* (*lawrencei*; *\*querulus*), *M. tyrannulus* (*cooperi*; *\*magister*), *Pitangus sulphuratus* (*guatemalensis*; *\*derbianus*), *Pachyramphus aglaiae* (*sumichrasti*; *\*aglaiae*), *Tityra semifasciata* (*personata*; *griseiceps*), *Saltator coerulescens* (*grandis*; *richardsoni*); *Buteo magnirostris* (*petersi*; *xantusi*), *Colinus virginianus* (*coyolcos*; *harrisoni*), *Xiphorhynchus flavigaster* (*eburneirostris*; *flavigaster*), *Stelgidopteryx serripennis* (*stuarti*; *\*psammochrous*), and *Geothlypis poliocephala* (*caninucha*; *poliocephala*). For the first 11 of these species, the race inhabiting the east side is the same as that in the Atlantic Region, a distribution paralleling that of the species on list 2 here and on list 2 under tropical evergreen-tropical semideciduous forests; these species apparently use the filter barrier between the Atlantic Region and the Sierra Madre de Chiapas, as described in that section of this analysis; that their Atlantic races are able to exist on the Pacific slope is due to the presence of tropical semideciduous forest and Pacific swamp forest on the coastal versant of the Sierra Madre de Chiapas. In addition to the 16 species above, the following races of species unrecorded in

eastern Pacific Oaxaca terminate their ranges on the west side of the Isthmus; all are endemic to western Mexico, and all (except *Cardinalis cardinalis*?) are widely disjunct from their Atlantic Region counterparts: *Columbina talpacoti eluta*, *Glauucidium minutissimum* ssp. (undescribed?), *Parula pitiayumi pulchra*, *Cardinalis cardinalis carneus*, *Arremonops rufivirgatus sumichrasti*, and *Sporophila torqueola torqueola*. Finally, *Crypturellus cinnamomeus soconuscensis* is found only east of the Isthmus.

Most of the species mentioned in the above paragraph require forests, forest undergrowth, or at least large riparian trees and are unable to penetrate fully the extensive arid tropical scrub and savanna in the Plains of Tehuantepec and lower Río Tehuantepec basin; those species that cross are scarce within the barrier and hence experience restricted gene flow. For the open-country birds, the picture is less clear, but I think the heavy tropical deciduous forest between Tehuantepec City and Puerto Angel prevents free eastward dispersal of their western races, a situation similar to that in *Mimus gilvus*, *Aimophila sumichrasti*, and *A. ruficauda lawrencii* among the tropical deciduous forest-arid tropical scrub avifauna, which approach this barrier from the opposite direction. In fact, *Columbina talpacoti*, *Geothlypis poliocephala*, and *Sporophila torqueola* have not been recorded east of at least Puerto Angel; their Atlantic-eastern Pacific subspecies are adapted to a much more humid environment than is available in the arid Pacific lowlands of the Isthmus and hence cannot spread west to meet their western races. The nesting banks required by *Stelgidopteryx serripennis* perhaps were not available until recently (irrigation ditches) in the flat Plains of Tehuantepec, and the species may not breed there in any event. *Colinus virginianus* occupies the entire Pacific Region, where it might be expected to be monotypic; that three races occur there is, I think, the result of the independent evolution of *C. v. atriceps* in the Putla de Guerrero area and *C. v. coyolcos* somewhere in the Isthmus region, with the same tropical deciduous forest barrier in between. The quail races, however, have been able to spread, probably only recently as the result of man's clearing, meeting to produce the variable population of intergrades known as *C. v. harrisoni*. *Cardinalis cardinalis carneus* reaches Tehuantepec City; its absence in the rest of the Pacific Isthmus, where the habitat seems suitable, is inexplicable to me.

The situation on the Atlantic side of the Isthmus is quite different. Tropical evergreen forest is continuous on an east-west axis; no obvious barrier to dispersal is known. As a result, no widespread species terminate their ranges here (but see tropical evergreen forest in this analysis), and only three exhibit racial differentiation: *Campephilus guatemalensis* (*guatemalensis*, east side; *regius*, west side), *Pyrocephalus rubinus* (*blatteus*; *mexicanus*), and *Cardinalis cardinalis* (*littoralis*; *coccineus*). These terminations number fewer than at some other localities on the Atlantic slope of Mexico and hence might be coincidental in regard to the Isthmus. This low level of racial differentiation is similar to that observed for tropical evergreen-tropical semideciduous forest birds.

From the above analysis, five primary subspecific patterns emerge (slash divides different races): race the same throughout state (16 species); Pacific Region east of Isthmus and entire Atlantic Region/Pacific Region west of Isthmus (10); entire Atlantic Region/entire Pacific Region (8); entire Atlantic Region/Pacific Region east/Pacific Region west (5); entire Atlantic Region/Pacific Region west (5; these species are absent from eastern Pacific Oaxaca); miscellaneous (5).

Four races are endemic to Oaxaca: *Colinus virginianus thayeri*, *C. v. harrisoni*, *C. v. atriceps*, and *Glaucidium minutissimum* ssp. (undescribed?). All belong to plastic species in which small isolated populations evolve quickly. *C. v. thayeri* and *C. v. harrisoni* appear to be nothing more than local groups of variable intergrades between populations that probably evolved independently. *G. minutissimum* ssp. might represent the end of a cline. *C. v. atriceps* probably evolved in isolation in the Putla de Guerrero region.

As noted, the extensive temperate and subtropical habitats of the Mesa del Sur pose a major barrier to the 49 widespread species. However, 23 of these (initialed on lists 1–3) penetrate the Interior along major river systems, approaching largely from the Pacific side via the Río Verde and Río Balsas basins rather than from the Atlantic through the Río Santo Domingo and Río Cajones basins. Fifteen of the 23 are represented by different races in the Atlantic and Pacific Regions. In all 15 the race occupying the Interior is that of the Pacific side; these subspecies are marked with asterisks (\*) in the paragraphs above. Any form entering the Interior must be adapted to arid scrub or to riparian situations in otherwise arid country; the Pacific subspecies are so adapted, but the Atlantic ones require more humid conditions; 14 (87.5%; all but *Piaya cayana* and *Volatinia jacarina*) of the 16 species that range the farthest and highest in Oaxaca (O, HL, SJBC on lists 1 and 3) extend also into the arid subtropical regions of southwestern United States. For further discussion of these 23 species, see the section on tropical deciduous forest-arid tropical scrub in this analysis.

#### TROPICAL EVERGREEN FOREST AND TROPICAL SEMIDECIDUOUS FOREST

Tropical evergreen forest forms a continuous strip along the Atlantic slope from southern Tamaulipas south through Central America into South America; in Oaxaca it is confined to the Atlantic Region. Tropical semideciduous forest occurs in pockets from northwestern Mexico south at least to Chiapas; in Oaxaca it is restricted to the Pacific Region in three isolated patches in the Sierra Madre de Chiapas, Sierra de Miahuatlán, and Sierra de Yucuyacua.

I employ the term “tropical semideciduous forest” primarily for convenience in describing bird distribution and do not wish to imply any *great* differences, other than geographic, from tropical evergreen forest. Nevertheless, tropical semideciduous forest does exhibit average differences that apparently result in reduced avian species diversity. It is somewhat drier and more deciduous, especially during the dry season, and probably supports fewer plant species. Being restricted to mountains, it is more sloped and cooler than lowland tropical evergreen forest, and in some localities is restricted to riparian situations. Compared to the “lower montane rain forest” on the mountain slopes of the Atlantic Region of Oaxaca, it is considerably less lush. Despite these differences, tropical semideciduous forest supports no endemic bird species, its avifauna being derived from that of tropical evergreen forest, and for this reason here I analyze the two habitats together.

In the next four lists, species followed by a locality in parentheses have been recorded in the Atlantic Region from eastern Oaxaca northwest to the stated place. These terminations correspond approximately to those in Veracruz. The remainder of the species range throughout the length of the Atlantic Region of Oaxaca (or at least to San Miguel Soyaltepec, the Temascal area, or Monte Alto, the northernmost collecting localities) and to at least Puebla and in many cases to

northeastern Mexico. The "Valle Nacional area" as used here includes San Juan Bautista Tuxtepec. Similarly, the species that reach the northwestern extremity of their total ranges in Pacific Oaxaca west of the Isthmus have the pertinent localities enclosed in brackets; all other species that reach that area extend beyond Oaxaca to at least Guerrero. The species marked with asterisks (\*) breed in the humid tropical forests on the Pacific slope of Chiapas and/or Guatemala but not of Oaxaca. Species marked with a dagger (†) breed in the tropical semideciduous forests west of the Isthmus beyond, but apparently not in, Oaxaca.

Tropical evergreen forest and tropical semideciduous forest (together with their associated, modified terrestrial habitats, i.e., fincas and openings) support the largest assemblage of bird species of any habitat in Oaxaca. One hundred and thirty-eight species are confined largely to these habitats, although 15 of them (listed beyond) extend also into low-elevation cloud forest. In Oaxaca, all 138 inhabit tropical evergreen forest, 92 (66.7%) are restricted to that habitat, and 46 (33.3%) are shared with tropical semideciduous forest. None is confined to tropical semideciduous forest either east or west of the Isthmus, and none is shared by those two areas without also breeding in tropical evergreen forest of Atlantic Oaxaca. The 138 species may be divided among four categories according to their Oaxaca distributions.

(1) The 92 species restricted to tropical evergreen forest of the Atlantic Region are:

<i>Tinamus major</i>	<i>Xenops minutus</i>
<i>Crypturellus soui</i>	<i>Sclerurus guatemalensis</i> (Trans-Isthmian Highway)
* <i>Accipiter bicolor</i> (Valle Nacional area)	<i>Dendrocincla anabatina</i> (Valle Nacional area)
* <i>Leucopternis albigollis</i>	<i>Glyphorhynchus spirurus</i>
<i>Ortalis vetula</i>	<i>Taraba major</i>
<i>Columba speciosa</i> (Valle Nacional area)	<i>Thamnistes anabatinus</i> (Trans-Isthmian Highway)
<i>C. nigrirostris</i> (Lalana)	<i>Microrhopias quixensis</i>
* <i>Claravis pretiosa</i>	<i>Cercomacra tyrannina</i>
<i>Leptotila rufaxilla</i>	<i>Formicarius analis</i>
<i>Aratinga nana</i>	<i>Ornithion semiflavum</i>
<i>Pionopsitta haematotis</i> (Valle Nacional area)	* <i>Elaenia flavogaster</i> (Valle Nacional area)
<i>Pionus senilis</i>	* <i>Mionectes oleagineus</i>
<i>Amazona autumnalis</i>	<i>Leptopogon amaurocephalus</i>
<i>A. farinosa</i> (Trans-Isthmian Highway)	<i>Todirostrum sylvia</i>
<i>Asio clamator</i> (Trans-Isthmian Highway)	* <i>T. cinereum</i>
<i>Phaethornis longuemareus</i>	<i>Myiobius sulphureipygius</i>
<i>Campylopterus curvipennis</i>	* <i>Contopus cinereus</i> (Valle Nacional area)
<i>Florisuga mellivora</i>	<i>Laniocera rufescens</i> (El Jobal)
* <i>Anthracothorax prevostii</i>	<i>Rhytipterna holerythra</i> (Valle Nacional area)
<i>Lophornis helenae</i> (Valle Nacional area)	<i>Myiodynastes maculatus</i>
* <i>Amazilia candida</i>	<i>Legatus leucophaeus</i>
* <i>A. tzacatl</i>	<i>Pachyrhamphus cinnamomeus</i>
<i>Trogon melanocephalus</i>	<i>Tityra inquisitor</i>
<i>T. massena</i>	<i>Lipaugus unirufus</i> (Valle Nacional area)
* <i>Hylomanes momotula</i>	<i>Cotinga amabilis</i> (Valle Nacional area)
<i>Galbula ruficauda</i>	<i>Schiffornis turdinus</i> (Trans-Isthmian Highway; perhaps Tutla, del Toro Avilés)
<i>Ramphastos sulfuratus</i>	<i>Manacus candei</i>
<i>Melanerpes pucherani</i>	<i>Pipra mentalis</i>
†* <i>Veniliornis fumigatus</i>	<i>Cyanocorax morio</i>
<i>Celeus castaneus</i>	
* <i>Synallaxis erythrothorax</i>	
<i>Automolus ochrolaemus</i>	

<i>Hylorchilus sumichrasti</i>	<i>Lanio aurantius</i>
† <i>Uropsila leucogastra</i>	* <i>Habia fuscicauda</i>
* <i>Ramphocaenus melanurus</i>	<i>Ramphocelus sanguinolentus</i>
<i>Polioptila plumbea</i> (Trans-Isthmian Highway)	<i>Saltator maximus</i>
<i>Hylophilus ochraceiceps</i> (Trans-Isthmian Highway; perhaps Tutla, del Toro Avilés)	<i>Caryothraustes poliogaster</i>
* <i>Vireolanius pulchellus</i>	<i>Cyanocompsa cyanoides</i>
* <i>Cyclarhis gujanensis</i>	<i>Arremon aurantirostris</i>
<i>Granatellus sallaei</i>	<i>Sporophila schistacea</i> (isolated population just east of Trans-Isthmian Highway)
<i>Coereba flaveola</i>	<i>S. aurita</i> (Valle Nacional area)
<i>Tangara larvata</i> (Valle Nacional area)	<i>Oryzoborus funereus</i> (Loma Bonita area)
* <i>Euphonia hirundinacea</i>	<i>Tiaris olivacea</i>
<i>E. gouldi</i>	<i>Dives dives</i>
* <i>Thraupis episcopus</i>	<i>Scaphidura oryzivora</i> (Jalahuí)
* <i>T. abbas</i>	<i>Icterus dominicensis</i>
<i>Eucometis penicillata</i> (Trans-Isthmian Highway)	<i>I. mesomelas</i>
	<i>Psarocolius montezuma</i>

(2) Twenty-six species inhabit tropical evergreen forest and also tropical semideciduous forest on the Pacific side of the Sierra Madre de Chiapas of Oaxaca:

<i>Crypturellus boucardi</i>	<i>Pteroglossus torquatus</i>
† <i>Sarcoramphus papa</i>	<i>Piculus rubiginosus</i>
† <i>Harpagus bidentatus</i> (Valle Nacional area)	<i>Thamnophilus doliatus</i>
† <i>Spizaetus ornatus</i>	<i>Oncostoma cinereigulare</i>
<i>Crax rubra</i>	<i>Tolmomyias sulphurescens</i>
<i>Odontophorus guttatus</i> (Teotalcingo)	<i>Platyrinchus cancrinus</i>
<i>Tapera naevia</i>	<i>Onychorhynchus coronatus</i>
<i>Lophotrix cristata</i> (San Ildefonso Villa Alta)	<i>Campylorhynchus zonatus</i>
<i>Pulsatrix perspicillata</i>	<i>Thryothorus maculipectus</i>
<i>Ciccaba nigrolineata</i>	<i>Henicorhina leucosticta</i>
<i>Trogon violaceus</i>	<i>Turdus grayi</i>
<i>Momotus momota</i>	<i>Hylophilus decurtatus</i>
<i>Bucco macrorhynchos</i>	<i>Amblycercus holosericeus</i>

(3) Another element consists of species inhabiting tropical evergreen forest of the Atlantic Region and disjunctly the tropical semideciduous forests west of the Isthmus in the Sierra de Miahuatlán and/or Sierra de Yucuyacua. These are not known to breed in the Sierra Madre de Chiapas of Oaxaca, although they might be found there in the future, as three (\*) occur on the Pacific slope southeast of Oaxaca. These six birds are:

* <i>Ictinia plumbea</i> [Puerto Escondido area]	* <i>Lepidocolaptes souleyetii</i>
<i>Otus guatemalae</i>	* <i>Habia rubica</i>
<i>Phaethornis superciliosus</i>	
<i>Dendrocolaptes certhia</i> [San Gabriel Mixtepec area]	

(4) A final 14 species breed in tropical evergreen forest of the Atlantic Region and in the tropical semideciduous forests of both the Sierra Madre de Chiapas of Oaxaca and the Pacific Region west of the Isthmus in the Sierra de Yucuyacua and/or Sierra de Miahuatlán:

<i>Micrastur ruficollis</i> [San Gabriel Mixtepec area]	<i>M. semitorquatus</i>
	<i>Penelope purpurascens</i>

<i>Geotrygon montana</i>	<i>Myiopagis viridicata</i>
<i>Dromococcyx phasianellus</i> [Putla de Guerrero area]	<i>Cyanocorax yncas</i>
<i>Chaetura vauxi</i>	<i>Euthlypis lachrymosa</i>
<i>Heliomaster longirostris</i> [Putla de Guerrero area]	<i>Basileuterus culicivorus</i>
<i>Sittasomus griseicapillus</i>	<i>Cyanerpes cyaneus</i> [San Gabriel Mixtepec area]
	<i>Saltator atriceps</i>

Fifteen of the 138 species listed above, although here considered primarily inhabitants of tropical semideciduous and tropical evergreen forests and having distributions similar to species restricted to those habitats, also range at least locally into the lower reaches of cloud forest, as follows: *Pionopsitta haematotis*, *Amazilia candida*, *Formicarius analis*, *Mionectes oleagineus*, *Vireolanius pulchellus*, and *Thraupis abbas* extend up to between 4,850 and 5,250 ft in the Atlantic Region, to which, in Oaxaca, they are restricted; *Dromococcyx phasianellus*, *Heliomaster longirostris*, *Sittasomus griseicapillus*, and *Cyanocorax yncas* reach 4,800 to 4,850 ft in the Atlantic Region and 5,200 to 6,000 ft in the Pacific Region; *Micrastur ruficollis*, *Odontophorus guttatus*, *Phaethornis superciliosus*, and *Basileuterus culicivorus* apparently do not enter cloud forest of the Atlantic Region but reach, respectively, 8,600, about 5,500, 6,000, and 7,300 ft in the Pacific Region; and *Penelope purpurascens* is rather widespread in cloud forests up to 7,200 ft in the Atlantic Region and 10,000 ft in the Pacific Region (allocation to tropical evergreen-tropical semideciduous forests is thus arbitrary).

Tropical evergreen forest occupies a virtually continuous belt through the lowlands and adjacent mountain slopes from Central America north through Oaxaca to southern Tamaulipas and thus is an important route of dispersal. I can detect no major barriers within this area, even at the Isthmus of Tehuantepec. The rivers are too narrow, the few ranges of hills and mountains too isolated or too low to support other habitats, and the pockets of marsh, savanna, arid scrub, and arid forest too small to pose more than a temporary pause in dispersal. Only at the limits of tropical evergreen forest, in Tamaulipas and the northern part of the Yucatan Peninsula, do arid habitats present barriers.

Despite this seeming continuity, many bird species fail to occupy the entire tropical evergreen forest zone of Atlantic Mexico or even Oaxaca. Of the 138 species, at least 28 (21.0%) apparently reach the northern limits of their total ranges in Oaxaca and adjacent Veracruz: 9 stop in or near the Isthmus, 13 in the Valle Nacional area, and the remaining 6 in six different localities in between. An additional 52 species probably range little farther than the Temascal-San Miguel Soyaltepec-Monte Alto area in extreme northern Oaxaca, but I cannot be certain because I lack detailed data from adjacent Puebla and Veracruz; also, many of these records are based on specimens taken by the unreliable del Toro Avilés. No species reaches its southern limits in Oaxaca, all but three ranging eastward through the Atlantic lowlands of Chiapas and Guatemala; *Sporophila schistacea* has not been found in these two areas but occurs farther south; *Hylorchilus sumichrasti* is endemic to Oaxaca, Veracruz, and Chiapas; and *Euthlypis lachrymosa* is absent from the Atlantic slope south of extreme northern Oaxaca.

These northern range terminations might be historical in nature, being the result of different rates of dispersal from a southern origin, or may be a response to the progressive south-to-north degeneration of the humid tropical habitats as they

approach the colder drier climate of northeastern Mexico—the forest loses plant species and becomes shorter, drier, and more open. I favor the latter hypothesis.

The degree of avian endemism in the tropical evergreen forests of the Atlantic lowlands of Mexico is very low. No species and only one race, *Sporophila schistacea subconcolor*, are endemic to Oaxaca. This subspecies represents an isolated population of a species otherwise unknown closer than northern Honduras. This low level of endemism is a reflection of the continuity of the tropical evergreen forests, both today and apparently in at least the recent past, that has prevented the formation or long-term retention of the isolated pockets of habitat necessary for evolution. A few other subspecies terminate their ranges in or adjacent to Oaxaca, but no pattern is discernible. Even the Isthmus is no barrier now; perhaps it was historically, and the races affected by it have since spread beyond its borders. Most subspecific variation in Mexico is in response to the aridity of the northeast or the Yucatan Peninsula.

Of the 138 tropical evergreen forest species, 40 (29.0%; lists 2, 4) extend from the Atlantic lowlands into the tropical semideciduous forest of the Sierra Madre de Chiapas of Oaxaca. These two regions are separated by an extensive area of open, arid pine-oak forest in the upper Río Coatzacoalcos basin and by belts of cloud forest and humid pine-oak at higher elevations in the Sierra Madre de Chiapas. These habitats would pose a total barrier to dispersal were it not for riparian strips of tropical evergreen and tropical semideciduous forest that transect the arid pine-oak and extend through low mountain passes. These strips act as mesic highways along which 40 humid forest birds can disperse but 98 evidently cannot. On the racial level, 36 of the 40 (90.0%) are taxonomically identical in the two areas. The exceptions are *Piculus rubiginosus (yucatanensis)*, Atlantic; *maximus*, Pacific), *Thryothorus maculipectus (umbrinus; varians)*, *Turdus grayi (lanyoni; linnaei)*, and *Saltator atriceps (atriceps; peeti)*. All four species are rather plastic and probably owe their differentiation either to a time when the forests were even more isolated or to restricted gene flow across the filter barrier. The 98 species that do not reach southeastern Oaxaca apparently cannot tolerate the more arid tropical semideciduous forests of the barrier and mountains or the constriction of the forests within the barrier.

Of these 98 species, 23 (marked with asterisks on lists 1 and 3) breed in the more luxuriant “montane rain forest” and “lower montane rain forest” (Breedlove 1973) on the Pacific versant of the mountains of southeastern Chiapas and southern Guatemala, 6 in the latter region but evidently not the former (*Accipiter bicolor*, *Amazilia candida*, *Elaenia flavogaster*, *Contopus cinereus*, *Vireolanius pulchellus*, and *Cyclarhis gujanensis*) and the remaining 17 in both areas. None occurs in Pacific Chiapas without also ranging into Guatemala. The Sierra Madre de Chiapas of Oaxaca has been too well explored for the absence of all 23 species to be an artifact of incomplete coverage. I know of no present direct connection between the humid forests of the Atlantic and Pacific slopes within Chiapas (Breedlove 1973), Guatemala (Land 1970), or Honduras (Monroe 1968). Thus the Pacific populations of these 23 are today isolated from those of the Atlantic lowlands, and as a result, 6 have evolved endemic races from southeastern Chiapas southward: *Amazilia candida pacifica*, *Synallaxis erythrothorax pacifica*, *Lepidocolaptes souleyetii compressus*, *Cyclarhis gujanensis nicaraguae*, *Habia rubica confinis*, and

*Habia fuscicauda wetmorei*. In addition, a number of races of the 40 species that do breed in southeastern Oaxaca are endemic to the same region. No species is endemic to this area. That the 23 species have not spread northwest along the Pacific to occupy southeastern Oaxaca and 6 of these do not reach even Pacific Chiapas probably is a result of the rather abrupt change, because of decreased rainfall (temperatures are much the same), from the lush humid tropical forests they inhabit in Guatemala and southeastern Chiapas to the drier tropical semideciduous forests of southwestern Chiapas and southeastern Oaxaca in which they cannot survive. The latter forests, unlike those between the Atlantic Region and the Sierra Madre de Chiapas of Oaxaca, appear to be continuous enough to present little barrier (but see below), so that if these 23 species could breed in this habitat, at least some, probably all, would have invaded it long ago. That historical factors have not allowed enough time for expansion seems to be ruled out by the presence of the endemic subspecies.

More than simply a habitat change, however, might be involved. Because the 40 species that reach the Sierra Madre de Chiapas of Oaxaca are adapted to the more arid conditions of semideciduous forest, it is not surprising that 35 of them range through Pacific Chiapas to Guatemala. This fact illustrates the relative continuity of the tropical semideciduous forests of this region. Five of the 40, however, do not seem to bridge this gap: *Crypturellus boucardi*, *Harpagus bidentatus*, and *Odontophorus guttatus* do not extend southeast of Oaxaca, whereas *Spizaetus ornatus* and *Lophostrix cristata* occur in Pacific Oaxaca and Guatemala but not Chiapas. These might well be found in the future, but in the meantime they indicate a weak filter barrier here, probably caused by the unsuitable habitats (pine-oak forest, tropical deciduous forest, and arid tropical scrub) that in a few places, such as along the Oaxaca-Chiapas border and in the upper reaches of the Río Soyalteco and Río Cintalapa of southwestern Chiapas, narrowly interrupt the tropical semideciduous forests of the mountains.

Only 25 (18.1%) of the 138 species that breed in the tropical evergreen forest of Oaxaca reach the tropical semideciduous forests of the Pacific slope of Mexico west of the Isthmus, 20 of them actually in Oaxaca (lists 3, 4) and the remaining 5 († on lists 1, 2) farther northwest only. These are today completely isolated from the semideciduous forest of the Sierra Madre de Chiapas and from the tropical evergreen forest of the Atlantic Region by intervening arid habitats (savanna, arid tropical scrub, tropical deciduous forest, and arid pine-oak forest) in the Plains of Tehuantepec and the Río Tehuantepec basin and by the highland habitats in the Mesa del Sur. That none is endemic to western Mexico demonstrates the close similarity of the two habitats and indicates a fairly recent historical connection. Of the 25, only 4 (*Otus guatemalae*, *Phaethornis superciliosus*, *Dendrocolaptes certhia*, and *Uropsila leucogastra*) share the Atlantic Region and the Pacific slope west of the Isthmus without also occupying the Pacific slope east of the Isthmus. No species shares the Pacific slope both east and west of the Isthmus without also breeding in the Atlantic Region, and no species is endemic to the Pacific slope of Oaxaca east of the Isthmus (but note the racial endemicity discussed above).

Although isolation of the west-Mexican tropical semideciduous forests has failed to produce endemic species, it has resulted in considerable racial evolution. Of

the 20 species (lists 3, 4) that reach southwestern Oaxaca, 13 (65.0%) are represented there by races endemic to western Mexico, 5 of them (\*) to Oaxaca: *Micrastur ruficollis oaxacae*, *Otus guatemalae hastatus*, *Chaetura vauxi warneri*, *Phaethornis superciliosus mexicanus*, *\*Heliomaster longirostris masculinus*, *Sittasomus griseicapillus jaliscensis*, *\*Dendrocolaptes certhia sheffleri*, *Lepidocolaptes souleyetii guerrerensis*, *Myiopagis viridicata jaliscensis*, *Cyanocorax yncas vivida*, *\*Basileuterus culicivorus ridgwayi*, *\*Habia rubica affinis*, and *Saltator atriceps flavicrissus*. The seven species that have not evolved endemic races here are primarily large and/or non-plastic.

The tropical semideciduous forests of the Sierra de Miahuatlán and Sierra de Yucuyacua are separated from those of south central Guerrero (e.g., Chilpancingo) by arid habitats in the Río Papagayo basin in Guerrero; whether or not there is a similar break between the humid forests of the Sierra de Yucuyacua and southeastern Guerrero, I do not know. The Papagayo barrier apparently prevents *Dromococcyx phasianellus*, *Heliomaster longirostris* (endemic race *masculinus*), *Basileuterus culicivorus ridgwayi* (endemic), and *Habia rubica affinis* (endemic, but *affinis* and *rosea* are somewhat clinal), all of which occur in the Sierra de Yucuyacua, from ranging farther northwest into Guerrero and *Harpagus bidentatus*, *Uropsila leucogastra*, and *Habia rubica rosea* from extending southeast into Oaxaca.

The tropical semideciduous forests of the Sierra de Miahuatlán and Sierra de Yucuyacua are separated from each other by some 40 mi of arid tropical scrub, tropical deciduous forest, and arid pine-oak forest in the Río Verde basin. This barrier confines *Micrastur ruficollis* (endemic race *oaxacae*), *Dendrocolaptes certhia* (endemic race *sheffleri*), apparently *Ictinia plumbea* and *Cyanerpes cyaneus*, and perhaps *Micrastur semitorquatus*, *Penelope purpurascens*, and *Sittasomus griseicapillus* (the last three, however, reappear northwest of Oaxaca) to the Sierra de Miahuatlán and *Lepidocolaptes souleyetii* to the Sierra de Yucuyacua; future collecting probably will show that some of these six inhabit both mountain ranges, and *C. cyaneus* and *I. plumbea* might prove to be migrants only. That 12 species (lists 3, 4, minus the eight in this paragraph), in each case the same race, occupy both ranges appears to be a consequence of a direct historical connection plus variation in evolutionary rates rather than a present-day filter barrier.

At least *Turdus grayi* and *Tiaris olivacea* range into the arid habitats of the San Juan Bautista Cuicatlán valley via the mountain gap afforded by the canyon of the Río Santo Domingo.

Finally, a word should be said about the 71 species (51.5%; unmarked on list 1) that are, throughout Mexico, confined to tropical evergreen forest of the Atlantic lowlands and adjacent mountain slopes. These birds are widely separated by arid habitats from the Sierra de Miahuatlán. Either they cannot bridge the filter barrier leading to the Sierra Madre de Chiapas or cannot survive there; the latter hypothesis is more likely, especially in view of the many "winter" records there of species thought to breed only in the Atlantic Region (see Migration, Local Migrants). Neither have the 71 reached the Pacific slope of Guatemala or Chiapas. As might be expected, most of these (e.g., *Amazona farinosa*, *Celeus castaneus*, and *Sclerurus guatemalensis*) are among the most stringently adapted, least tolerant, of all tropical evergreen forest birds. Most are sedentary, and over 70% are inhabitants of the interior of mature forest below about 2,000 ft elevation.

## CLOUD FOREST

The broadleaf cloud forests of Mexico are found only on the humid subtropical, seaward versants and low-elevation crests of the high mountains bordering the Atlantic and Pacific lowlands. They extend from San Luis Potosí and Tamaulipas in the northeast and Sinaloa in the northwest south along both slopes of Oaxaca, Chiapas, and Guatemala to South America. Throughout Mexico and Guatemala they are restricted to patches isolated by low valleys supporting other habitats. In Oaxaca they are found only in the Atlantic and Pacific Regions in six mountain ranges: the Sierras de Huautla, Juárez, and Zempoaltepec (the last here including the Sierra de los Mijes) on the Atlantic slope west of the Isthmus; the Sierras de Yucuyacua and Miahuatlán on the Pacific side west of the Isthmus; and the Sierra Madre de Chiapas east of the Isthmus, where cloud forest covers the crests and extends down onto both versants but is basically associated with the Pacific slope. Cloud forest might also be present in the Atlantic Region east of the Isthmus in the unexplored mountains near the Veracruz border; if so, it probably would be related to the Atlantic slope. The Sierra Aloapaneca (containing Cerro San Felipe) and Sierra de Cuatro Venados of the Interior Region support humid pine-oak forest but no broadleaf cloud forest; none of the 36 cloud forest birds occurs there.

On the next five tabular lists, the following symbols indicate regions where a species occurs outside, but not in, the state: Pacific slope of Mexico northwest of Oaxaca (†); Pacific slope southeast of Oaxaca in Chiapas, Guatemala, or both (\*); Atlantic slope of Mexico northwest of Oaxaca (+).

The cloud forests of Oaxaca support 36 characteristic species. Many of these breed also in adjacent tropical semideciduous forest and a few in high-elevation tropical evergreen forest (see lists beyond). An additional 19 species are about equally abundant in humid pine-oak forest and hence are listed separately after pine-oak forests. The 36 species can be divided into seven groups according to their distributions in Oaxaca.

(1) Eleven species are restricted to the cloud forests east of the Isthmus in the Sierra Madre de Chiapas, where seven (unmarked) reach the extreme northwestern limits of their entire breeding ranges:

<i>Penelopina nigra</i>	<i>Aspatha gularis</i>
†+ <i>Dactylortyx thoracicus</i>	+ <i>Empidonax flavescens</i>
<i>Campylopterus rufus</i>	<i>Catharus dryas</i>
+ <i>Abeillia abeillei</i>	<i>Turdus plebejus</i>
<i>Lampornis viridipallens</i>	+ <i>Vireo leucophrys</i>
<i>Pharomachrus mocinno</i>	

(2) Nine species breed in the Sierra Madre de Chiapas and also in the Atlantic Region west of the Isthmus:

<i>Eupherusa eximia</i>	<i>Myadestes unicolor</i>
<i>Sclerurus mexicanus</i>	<i>Catharus mexicanus</i>
<i>Dendrocicla homochroa</i>	<i>Chlorophonia occipitalis</i>
† <i>Xiphorhynchus erythropygius</i>	<i>Piranga leucoptera</i>
<i>Cyanolyca cucullata</i>	

(3) Nine species occur in the Sierra Madre de Chiapas and on both slopes west of the Isthmus:

<i>Geotrygon albifacies</i>	<i>Aulacorhynchus prasinus</i>
<i>Trogon collaris</i>	<i>Anabacerthia variegaticeps</i>

*Rhynchocyclus brevirostris*  
*Pachyrampus major*  
*Turdus assimilis*

*Piranga bidentata*  
*Chlorospingus ophthalmicus*

(4) Three species have been recorded in Oaxaca only in the Atlantic Region west of the Isthmus:

†\**Campylopterus hemileucurus*  
 †\**Aphelocoma unicolor*

\**Atlapetes albinucha*

(5) One species has been found on both slopes west of the Isthmus but not in the Sierra Madre de Chiapas:

\**Automolus rubiginosus*

(6) Two species are endemic to the Pacific slope west of the Isthmus:

*Eupherusa cyanophrys*

*E. poliocerca*

(7) One species occurs in the Pacific Region both east and west of the Isthmus but nowhere in Atlantic Mexico:

*Panyptila sanctihieronymi*

Although 36 species are here considered typical of cloud forest, 14 breed down into the upper reaches of tropical semideciduous forest of the Pacific Region (*Penelopina nigra*, *Dactylortyx thoracicus*, *Geotrygon albifacies*, *Panyptila sanctihieronymi*, *Campylopterus rufus*, *Abeillia abeillei*, *Eupherusa cyanophrys*, *E. poliocerca*, *Aulacorhynchus prasinus*, *Automolus rubiginosus*, *Sclerurus mexicanus*, *Rhynchocyclus brevirostris*, *Catharus mexicanus*, and *Piranga bidentata*), 3 into upper tropical evergreen forest of the Atlantic Region (*Campylopterus hemileucurus*, *Xiphorhynchus erythropygius*, and *Myadestes unicolor*), and 6 into both (*Eupherusa eximia*, *Trogon collaris*, *Dendrocincla homochroa*, *Pachyrampus major*, *Turdus assimilis*, and *Piranga leucoptera*).

Within the Sierra Madre de Chiapas, the cloud forests of Oaxaca are narrowly isolated from those of Chiapas by relatively arid, low-elevation habitats (tropical semideciduous forest, tropical deciduous forest, arid tropical scrub, and perhaps pine-oak forests) at the Oaxaca-Chiapas border and along the tributaries of the Río Cintalapa and especially the Río Soyaltenco of Chiapas. This isolation has resulted in the evolution in eastern Oaxaca of the endemic races *Lampornis viridipallens amadoni*, *Catharus dryas harrisoni*, and *Vireo leucophrys bulli*, and probably an undescribed subspecies of *Chlorospingus ophthalmicus*. That all are rather weakly differentiated probably stems from the historical recency of the isolation but may in part reflect a certain amount of gene flow across the barrier. No species is restricted to this area, all 34 (all lists but 6) ranging southeast to at least Chiapas and Guatemala. Some of the cloud forest species that occur only to the east of Oaxaca (e.g., *Melanotis hypoleucus*) might also be affected by this barrier.

*Campylopterus rufus* is absent from the Atlantic slope of Guatemala and *Catharus dryas* and *Turdus plebejus* from the Atlantic side of Chiapas, but all occur on the Pacific slope. This suggests a Pacific connection with the Sierra Madre de Chiapas of Oaxaca. On the other hand, *Myadestes unicolor* and *Vireo leucophrys* have not been found on the Pacific side of Guatemala or *Eupherusa eximia* and

*Catharus mexicanus* on the Pacific side of either Guatemala or Chiapas, whereas all occur on the Atlantic slope of both areas. This suggests an Atlantic connection with Oaxaca. These bridges must have been historical, because the Oaxaca forests are now isolated from those of Chiapas by the barriers mentioned above.

Between the Sierra Madre de Chiapas and the cloud forests west of the Isthmus are some 60 mi of tropical habitats (tropical evergreen, tropical deciduous, and arid pine-oak forests, arid tropical scrub, and savanna) in the Isthmus itself and in the Río Tehuantepec basin. The isthmus mountains are too low to provide the relief necessary to produce the subtropical temperatures, heavy rains, and clouds needed by cloud forest. Westward from the Sierra Madre de Chiapas, the width and strength (in terms of aridity of the habitats) of this barrier are greater toward the Pacific Region than toward the Atlantic. These habitats today pose a total barrier to dispersal of all 36 cloud forest species except, probably, *Panyptila sanctihieronymi* (see below). Considering Oaxaca species only, 11 (list 1) are confined to the east side and 6 (lists 4, 5, 6) to the west side of the Isthmus. Among the latter, three (list 4) occupy only the Atlantic Region, two (list 6) only the Pacific Region, and one (list 5) both Regions.

The Isthmus is an effective barrier also on the subspecific level. Of the 19 species (lists 2, 3, 7) that occur on both sides of the Isthmus within Oaxaca, 9 (47.4%) are represented by different races. Two of these differ between the Sierra Madre de Chiapas and the Atlantic Region west of the Isthmus, to which areas they are confined: *Catharus mexicanus* (*cantator*, east; *mexicanus*, west) and *Cyanolyca cucullata* (*guatemalae*; *mitrata*). Four other species have the same race in the Sierra Madre de Chiapas and the Atlantic Region west of the Isthmus but are represented by other races in the western Pacific Region: *Rhynchocyclus brevirostris* (*brevirostris*, Sierra Madre de Chiapas and Atlantic west; *pallidus*, Pacific west), *Aulacorhynchus prasinus* (*prasinus*; *wagleri*), *Geotrygon albifacies* (*albifacies*; *rubida*), and *Trogon collaris* (*xalapensis*; "puella," see Species Account). Finally, three species have different races in all three areas: *Chlorospingus ophthalmicus* (probably an undescribed race, Sierra Madre de Chiapas; *ophthalmicus*, Atlantic west; *albifrons*, Pacific west), *Pachyramphus major* (possibly *matudai*; *major*; *uropygialis*), and *Turdus assimilis* (*leucauchen*; *assimilis* and intermediates; *oaxacae*). The remaining 10 of the 19 species are monotypic in Oaxaca. In addition, the Isthmus is a barrier to five of the nine species (marked on lists) that range in Mexico both east and west of the Isthmus but approach it closely on only one side. Thus, *Dactylortyx thoracicus chiapensis*, *Empidonax flavescens salvini*, and *Vireo leucophrys bulli* abruptly terminate their ranges on the east side of the Isthmus, *Aphelocoma unicolor oaxacae* on the west Atlantic side, and *Automolus rubiginosus guerrerensis* on the west Pacific side.

Thirty-two species reach the cloud forests of Mexico west of the Isthmus (lists 2–7, those marked + on list 1, and *Dendrortyx barbatus*, *Claravis mondetoura*, and *Geotrygon lawrencii*). Only three (9.4%) of these are endemic to that area: *Eupherusa cyanophrys*, *E. poliocerca*, and *Dendrortyx barbatus*. No great significance should be attached to the endemism of the two hummingbirds, because in my opinion they probably are less differentiated genetically than are a number of well-marked races (e.g., *Aulacorhynchus prasinus wagleri*) endemic to the same area. On the subspecific level, however, endemism is high. In addition to the six Atlantic and eight Pacific Region subspecies mentioned above for Oaxaca, Mexico

farther north supports, by my count, seven endemic races on the Atlantic slope and five on the Pacific. Thus, 16 (50.0%) of the 32 species have evolved a total of 26 endemic races. The low level of species endemism is surprising, considering the isolation of the forests, and is interestingly (significantly?) similar to that observed for the tropical evergreen-tropical semideciduous forest avifauna. This low endemism might be a reflection of a weakness in the barriers that allows restricted gene flow between the cloud forest patches, but such does not appear to be the case, especially in reference to the strong Isthmus barrier. Many of the species (e.g., *Sclerurus mexicanus*, *Geotrygon albifacies*) inhabiting both sides are too sedentary to have crossed as migrants (e.g., vertical migration) or vagrants. Rather, I believe that the evidence points to historical factors that either periodically produced corridors between the pockets, swamping incipient species, or caused nearly total elimination of the forest and its avifauna. The high level of racial endemism and the rather great phenotypic divergence of many of the subspecies (especially on the Pacific slope) suggest that the last connection across the Isthmus occurred long ago. That seven species (unmarked on list 1) did not cross from east to west suggests that the connection was a filter barrier.

Only one species, *Panyptila sanctihieronymi*, inhabits the Sierra Madre de Chiapas and the Pacific Region west of the Isthmus without also occurring on the Atlantic slope to the west. This, I suspect, is a very special case of a wide-ranging species that has only recently invaded western Mexico; it might be migratory and perhaps arrived by "overshooting" from the east. That no other species shares a similar distribution supports the theory of an historically (and presently) stronger barrier between the Sierra Madre de Chiapas and the southwest.

Of the 22 species (lists 2–5) found in the Atlantic Region west of the Isthmus, all have been recorded in the well-explored cloud forest of the Sierra de Juárez. The cloud forest of the Sierra de Zempoaltepec has received much less attention aside from the efforts of the unreliable collector del Toro Avilés at Moctum and Totontepec; 10 of the 22 species have been recorded reliably, 7 are based on del Toro Avilés specimens, and 5 have not yet been found (*Catharus mexicanus*, *Sclerurus mexicanus*, *Piranga bidentata*, *Rhynchocyclus brevirostris*, and *Trogon collaris*). None of the 17 exhibits racial variation between the two ranges. I believe all 22 will be found in the Sierra de Zempoaltepec and either the cloud forests of the two ranges were connected in the very recent past or (less likely) the unsuitable habitats that separate them in the valley of the Río Cajones today pose only a filter barrier. Because the cloud forests of these two ranges are so close together, some birds could migrate downslope in the nonbreeding season and return to the adjacent range; 9 of the 22 birds inhabiting these ranges undertake vertical migration (see Migration, Vertical Migrants). Such interchange is also possible between the Sierra de Juárez and Sierra de Huautla but is very unlikely elsewhere in or adjacent to Oaxaca.

The Sierra de Huautla is ornithologically unexplored. It extends northwestward to connect with the highlands surrounding Mount Orizaba and is narrowly isolated from the Sierra de Juárez by tropical evergreen forest and arid tropical scrub in the deep canyon of the Río Santo Domingo. This barrier apparently separates *Aphelocoma unicolor concolor* of Puebla from *A. u. oaxacae*, which is endemic to the Sierras de Juárez and Zempoaltepec, and probably prevents *Dendrortyx barbatus* and possibly *Claravis mondetoura ochoterna* from ranging farther south-

east; the latter two forms may well be found in the Sierra de Huautla of Oaxaca (see also, pine-oak forests in this analysis).

The cloud forests of the Atlantic and Pacific Regions west of the Isthmus are well separated from each other by arid tropical habitats in the Río Tehuantepec basin and by extensive pine-oak forest, arid subtropical scrub, and steppe in the Mesa del Sur, a severe barrier that confines 12 species (lists 2, 4) to the Atlantic side and 3 (lists 6, 7) to the Pacific. As noted above 7 (70.0%) of the 10 species (lists 3, 5) inhabiting both areas are subspecifically differentiated. The only species (*Automolus rubiginosus*) shared by both areas but not the Sierra Madre de Chiapas of Oaxaca reaches Pacific Chiapas and probably will be found in eastern Oaxaca.

The cloud forests of the Sierra de Miahuatlán and Sierra de Yucuyacua are separated from each other by some 40 mi of arid habitats (tropical deciduous forest, arid tropical scrub, and arid pine-oak forest) in the basin of the Río Verde. Among the 13 species (lists 3, 5–7) in the Pacific Region west of the Isthmus, *Geotrygon albifacies*, *Anabacerthia variegaticeps*, and *Pachyramphus major* have been found only in the Sierra de Miahuatlán but are expected in the Sierra de Yucuyacua, as they occur in Guerrero. The only real difference between the two ranges is in the distribution of *Eupherusa cyanophrys*, endemic to the Sierra de Miahuatlán, and *E. poliocerca*, restricted to the Sierra de Yucuyacua and adjacent Guerrero. The other eight species are found in both ranges. In all 13, the race involved is the same. This close similarity is apparently the result of a recent historical connection. Interchange through vertical migration probably can be ruled out, since none of these species has been recorded in the arid habitats below the cloud forests.

The cloud forest in the Sierra de Yucuyacua is isolated from that of south central Guerrero (e.g., Chilpancingo) by arid habitats in the Río Papagayo basin. This barrier accounts for the presence of *Dactylortyx thoracicus*, *Campylopterus hemileucurus*, *Xiphorhynchus erythropygius*, *Aphelocoma unicolor*, and perhaps *Piranga bidentata bidentata* (see Species Account) in Guerrero but apparently not southwestern Oaxaca and the restriction of *Rhynchocyclus brevirostris* (endemic race *pallidus*) and perhaps *Piranga bidentata sanguinolenta* to Oaxaca. The other 11 species (lists 3, 5, 6, 7, minus *Rhynchocyclus brevirostris* and *Eupherusa cyanophrys*) inhabit both states and are racially undifferentiated.

#### TYPICAL HUMID AND ARID PINE-OAK FORESTS

The pine-oak forests of the Sierra Madre Occidental and Sierra Madre Oriental merge in the Sierra Volcanica Transversal of central Mexico. Just to the south, pine-oak distribution is largely interrupted by tropical deciduous forest, arid tropical scrub, and arid subtropical scrub in the low Río Balsas basin, which nearly bisects the country. Only in eastern Puebla and westcentral Veracruz can pine-oak forest skirt this basin to connect with the extensive forests of the Mesa del Sur of Oaxaca and eventually the Sierra Madre del Sur of Guerrero. Another lowland barrier intervenes at the Isthmus of Tehuantepec, whence this habitat extends southeast through Chiapas to Nicaragua.

In Oaxaca, pine-oak forest is most extensive in the temperate portions of the Interior Region, occurring from the upper limits of arid subtropical scrub to the tops of the highest peaks. Typical arid pine-oak, which is extensive and continuous in the Interior, gives way at higher elevations, through an ecotone of semiarid

pine-oak, to humid pine-oak forest, which forms isolated patches on all seven of the highest mountain ranges west of the Isthmus: the Sierra Aloapaneca and Sierras de Huautla, Juárez, and Zempoaltepec in the north and the Sierras de Miahuatlán, Yucuyacua, and Cuatro Venados in the south. The crests of the highest Interior peaks support highland pine forest.

In the mountains ringing the Mesa del Sur and in the Sierra Madre de Chiapas, pine-oak forest extends well down into the Atlantic and Pacific Regions, where it exists under subtropical and tropical climates and intermingles with cloud and tropical semideciduous forests and to some extent with tropical evergreen and tropical deciduous forests. Arid pine-oak also covers much of the Isthmus mountains down to about 800 ft elevation and thus forms a bridge between the Interior and the Sierra Madre de Chiapas.

Because habitat preferences for many of the birds are not well enough known to allow allocation of all species to the various subdivisions of pine-oak forest, I treat "typical" humid pine-oak and "typical" arid pine-oak together; I have, however, marked with an "H" the 27 species seemingly confined to humid pine-oak forest, thus demonstrating that this association is not merely "coniferous cloud forest." The smaller subdivisions of pine-oak forest are treated separately beyond.

On the following lists, asterisks (\*) indicate the 23 species that "skip" eastern Oaxaca (Sierra Madre de Chiapas) but breed farther east in Chiapas or (*Trogon elegans* only) Guatemala. The distributions of another 24 species are so poorly known (many are rare, difficult to detect, or have transient migrant subspecies clouding resident distributions) that their allocation among the following lists is tentative; these are marked with question marks (?). When data are more complete, some species probably will prove to belong to different categories. Neither are all the mountain ranges equally well known; the Sierra Aloapaneca, Sierra de Miahuatlán, and Sierra Madre de Chiapas (south side only) have received the most attention, whereas the Sierra de Huautla is ornithologically untouched.

The avifauna of Oaxaca pine-oak forests is second only to that of tropical evergreen-tropical semideciduous forests in number of species. Excluding the 19 species also inhabiting cloud forest (listed beyond), 78 species are here considered characteristic of typical arid and/or humid pine-oak forests, together with their associated openings (see also, the 4 species listed under bunch grassland and oak scrub). These 78 can be divided into eight categories according to their Oaxaca distributions.

(1) The largest group consists of species that are widely distributed in temperate and subtropical pine-oak of the Interior and adjacent upper slopes of the Atlantic and Pacific Regions but have not been recorded in the Sierra Madre de Chiapas of Oaxaca; 21 of these (\*) occur disjunctly east of the state in Guatemala (*Trogon elegans* only) or Chiapas, while the remaining 23 are endemic to North America west of the Isthmus. These 44 species are:

*Dendrortyx macroura* (H)  
*Cyrtonyx montezumae* (?)  
 \**Ara militaris* (?)  
 \**Otus trichopsis* (?)  
 \**Glaucidium gnoma* (H)  
*Strix varia* (?)  
*Aegolius acadicus* (?) (H)

\**Cypseloides niger* (?)  
 \**Lampornis clemenciae* (?) (H)  
*Atthis heloisa* (H)  
 \**Trogon mexicanus*  
 \**T. elegans* (?)  
 \**Colaptes auratus*  
*Lepidocolaptes leucogaster* (?)

\**Mitrephanes phaeocercus*  
*Empidonax affinis* (?) (H)  
*E. difficilis* (?) (H)  
 \**E. fulvifrons* (?)  
 \**Cyanocitta stelleri*  
*Aphelocoma coerulescens*  
*Parus sclateri* (?) (H)  
*P. wollweberi*  
 \**Psaltriparus minimus*  
*Sitta carolinensis* (?)  
 \**Certhia americana* (H)  
 \**Sialia sialis*  
*Catharus occidentalis* (H)  
*Turdus migratorius*  
*Ridgwayia pinicola* (?) (H)

*Melanotis caerulescens*  
 \**Ptilogonys cinereus*  
 \**Vireo huttoni*  
*V. gilvus* (?)  
 \**Vireolanius melitophrys* (?) (H)  
 \**Parula superciliosa*  
*Geothlypis nelsoni* (H)  
*Ergaticus ruber*  
 \**Peucedramus taeniatus*  
*Piranga erythrocephala* (H)  
*Pheucticus melanocephalus*  
*Atlapetes pileatus* (H)  
*Pipilo ocai* (H)  
 \**P. erythrophthalmus*  
 \**Junco phaeonotus*

(2) Another 13 species breed in all three Regions west of the Isthmus and disjunctly in the Sierra Madre de Chiapas of Oaxaca:

*Accipiter striatus* (?)  
*Buteo jamaicensis*  
*Falco sparverius*  
*Columba fasciata*  
*Caprimulgus vociferus*  
*Hylocharis leucotis*  
*Amazilia beryllina*

*Picoides villosus*  
*Contopus pertinax*  
*Myadestes occidentalis*  
*Vireo solitarius* (?)  
*Myioborus pictus*  
*Loxia curvirostra* (?) (H)

(3) Nine species are more or less widespread west of the Isthmus and range east through the tropical pine-oak forests of the Isthmus mountains into the Sierra Madre de Chiapas:

*Bubo virginianus* (?)  
*Melanerpes formicivorus*  
*Contopus sordidulus* (?)  
*Basileuterus rufifrons*  
*Piranga flava*

*Aimophila rufescens*  
*Spizella passerina* (?)  
*Icterus graduacauda* (?)  
*Carduelis notata*

(4) Three species are confined to the mountains northwest of the Isthmus in the Sierra Aloapaneca, Sierra de Juárez, and Sierra de Zempoaltepec; the last two species are endemic to Mexico west of the Isthmus:

\**Xiphocolaptes promeropirhynchus* (H)  
*Cyanolyca nana* (H)

*Campylorhynchus megalopterus* (H)

(5) Five species are restricted to the mountains southwest of the Isthmus in the Sierras de Miahuatlán and Yucuyacua; all but *Tilmatura dupontii* are endemic to Mexico west of the Isthmus:

*Amazona finschi* (H)  
*Nyctiphrynus mcleodii* (H)  
 \**Tilmatura dupontii* (H)

*Piculus auricularis* (H)  
*Cyanolyca mirabilis* (H)

(6) One unusual species inhabits low-elevation, humid pine-oak forest in association with tropical evergreen and tropical semideciduous forests, ranging along the lower Atlantic Region slopes of the Sierra de Juárez and Zempoaltepec, through the Isthmus mountains, into the Sierra Madre de Chiapas:

*Amazilia cyanocephala* (H)

(7) Another species has a similar distribution in the Pacific Region, extending from the Sierras de Yucuyacua and Miahuatlán east through the Isthmus mountains into the Sierra Madre de Chiapas:

*Dendroica graciae*

(8) A final two species inhabit only the Sierra Madre de Chiapas (although *Icterus chrysater* is said to range into southern Veracruz):

*Cyrtonyx ocellatus*

*Icterus chrysater*

Six of the above species have been recorded in Oaxaca only in the Sierra Aloapaneca and the Sierras de Yucuyacua, Miahuatlán, and Cuatro Venados: *Cyrtonyx montezumae*, *Otus trichopsis*, *Lampornis clemenciae*, *Lepidocolaptes leucogaster*, *Sitta carolinensis*, *Ridgwayia pinicola*, and *Vireolanus melitophrys*. Such a pattern implies a barrier between these mountains and the Sierras de Juárez and Zempoaltepec. Perhaps these distributions are real and constitute a ninth category, but I think that they are probably an artifact of incomplete data and that these species eventually will be found in the latter ranges.

The primary barrier to dispersal of pine-oak birds in Oaxaca, and indeed in Mexico, is the Isthmus of Tehuantepec, most of which supports only tropical evergreen forest, tropical deciduous forest, arid tropical scrub, and savanna. Thus, 29 of the 78 pine-oak birds (37.2%; unmarked by \* on lists 1, 4, 5) are endemic to North America west of the Isthmus, and 2 (list 8) are endemic to the east side. In addition, the Isthmus today is a total barrier to the 36 species that occur in the Interior and disjunctly either in the Sierra Madre de Chiapas of Oaxaca (13 species, list 2) or farther east (23 species, marked \*). None of these 67 has been recorded anywhere in the Isthmus lowlands or even the Isthmus mountains. This range attains a maximum elevation of only 2,500 ft and hence is too low to intercept the moisture (from the Pacific Ocean and Gulf of Mexico) needed to support humid, semiarid, or even dense arid pine-oak forest. Neither can it provide the temperate or subtropical climate to which most pine-oak birds seem to be adapted. Of the 67 species, only 4 have been recorded as low as the 2,500-ft maximum of this range (*Cyrtonyx ocellatus*, 1,200 ft; *Trogon elegans*, 2,350; *Piculus auricularis*, 2,400; *Melanotis caerulescens*, 2,400).

Above 800 ft, however, are rather extensive stands of open, tropical, arid pine-oak woodland and pine savanna, which 11 species (lists 3, 6, 7) can inhabit, presumably because they are adapted to tropical (as well as subtropical and temperate) conditions and to such open arid woodland. The populations of the Interior and Sierra Madre de Chiapas are thus directly linked. The 36 species that occupy both sides but not the Isthmus lowlands apparently crossed during an historical period when the Isthmus mountains were cooler and clothed in more luxuriant forest; in general these birds breed at lower minimum elevations than do the 31 restricted to one side or the other.

The Isthmus also acts as a barrier to subspecies. Of the 36 species that occur disjunctly on both sides (list 2 and those marked \*), 13 (36.1%) are represented by the same race, whereas 23 (63.9%) exhibit racial differentiation in the Sierra Madre de Chiapas of Oaxaca, Chiapas (marked \* below), or Guatemala (*Trogon elegans* only), as follows: *Accipiter striatus* (*madrensis*, west; *chionogaster*, east),

*Buteo jamaicensis* (*hadropus*; *kemsiesi*), *Otus trichopsis* (*trichopsis*; probably *\*mes-americanus*), *Caprimulgus vociferus* (*oaxacae*; probably *chiapensis*), *Amazilia beryllina* (*beryllina*; *devillei*), *Trogon elegans* (*ambiguus*; *elegans*), *Picoides villosus* (*jardinii*; *sanctorum*), *Colaptes auratus* (*mexicanus*; *\*mexicanoides*), *Xiphocolaptes promeropirhynchus* (*sclateri*; *\*emigrans*), *Mitrephanes phaeocercus* (*phaeocercus* and *burleighi*; *\*nicaraguae*), *Empidonax fulvifrons* (*brodkorbi*; *\*fusci-ceps*), *Cyanocitta stelleri* (*coronata*; *\*ridgwayi*), *Certhia americana* (*alticola*; *\*pernigra*), *Sialia sialis* (*fulva*; *\*guatemalae*), *Myadestes occidentalis* (*occidentalis* and spp. [formerly *obscurus*]; *oberholseri*), *Ptilogonys cinereus* (*cinereus*; *\*molybdophanes*), *Vireo solitarius* (*repetens*; *notius*), *V. huttoni* (*mexicanus* and *pacificus*; *\*vulcani*), *Parula superciliosa* (*mexicana*; *\*superciliosa*), *Myioborus pictus* (*pictus*; probably *guatemalae*), *Peucedramus taeniatus* (*georgei*; *\*taeniatus*), *Pipilo erythrophthalmus* (*oaxacae*; *\*chiapensis*), and *Junco phaeonotus* (*phaeonotus*; *\*fulvescens*). For those races recorded above for Chiapas but not eastern Oaxaca, the Isthmus is not the only barrier. Elevations in the Sierra Madre de Chiapas and much of western Chiapas are too low to support highland species of pine-oak birds, although others probably will be found when the pine-oak forest on the north side of the Sierra is better explored (when that happens, list 1 will decrease in favor of list 2). A few other species (e.g., *Turdus rufitorques*, *Ergaticus versicolor*, and *Carduelis atriceps*) are restricted to the highlands on the east side of this barrier.

Contrarily, of the 11 species (lists 3, 6, 7) that cross the low gap of the Isthmus, 9 (81.8%) are represented by the same race, while only two appear to vary subspecifically: *Bubo virginianus* (probably *pallascens*, west; *mesembrinus*, east) and *Melanerpes formicivorus* (*formicivorus*; *lineatus* and *\*albeolus*). Three of the nine, however, have additional races endemic to the west side: *Basileuterus rufifrons dugesi*, *Piranga flava hepatica*, and *Aimophila rufescens rufescens*. Only one form, *Falco sparverius tropicalis*, ranges from east of Oaxaca to terminate its range west of the Isthmus, a situation that perhaps reflects the mobility of this species; or it may yet be recorded in the Isthmus mountains.

Oaxaca has another important barrier to pine-oak birds. An extensive area of steppe, arid subtropical scrub, and arid tropical scrub runs along and to the southwest of a line through the San Juan Bautista Cuicatlán valley, the northern part of the Oaxaca Valley, and the upper Río Tehuantepec basin. This barrier separates the Sierra Aloapaneca, Sierra de Juárez, and Sierra de Zempoaltepec to the northeast from the Sierras de Yucuyacua, Miahuatlán, and Cuatro Venados to the southwest. In Oaxaca, the only major penetrations of this barrier by pine-oak forest are where the northwestern arm of the Oaxaca Valley nearly reaches the southeastern arm of the San Juan Bautista Cuicatlán valley (at about 6,900 ft elevation in the region of Rancho de las Rosas, Llano Verde, and San Francisco Telixtlahuaca) and possibly on the east side of the Oaxaca Valley. Importantly, both penetrations consist of *arid to semiarid* pine-oak forest. This barrier restricts three species (list 4) to the northeastern mountain ranges and five species (list 5) to the southwestern ranges. All eight are confined to *humid* pine-oak, and the three on the Atlantic side to elevations above 8,200 ft.

Subspecific differentiation also occurs across this barrier. Of the 66 species (lists 1–3) inhabiting both sides, 10 (15.2%) vary geographically, as follows: *Dendrotyx macroura* (*oaxacae*, northeast; *inesperatus*, southwest), *Cyrtonyx montezumae*

(perhaps *sallei*; *rowleyi*), *Mitrephanes phaeocercus* (*phaeocercus*; *burleighi*), *Aphelocoma coerulescens* (*sumichrasti*; *sumichrasti* × *remota*), *Myadestes occidentalis* (spp. [formerly *obscurus*]; *occidentalis*), *Vireo huttoni* (*mexicanus*; *pacificus*), *Ergaticus ruber* (*ruber*; *rowleyi*), *Basileuterus rufifrons* (*rufifrons*; *dugesii*), *Peucedramus taeniatus* (intermediates similar to *taeniatus*?; *georgei*), and *Piranga flava* (*dextra*; *hepatica*). All but *Dendrortyx macroura* breed in arid to semiarid forests, and while they thus can cross the barrier, they obviously experience restricted gene flow. Most of the remaining 56 also inhabit arid or semiarid forests and hence can cross. Paradoxically, however, 18 of the 27 species (marked H on lists 1, 2) seemingly restricted to humid pine-oak occupy both sides, but only one, the very plastic *Dendrortyx macroura*, is racially differentiated. Neither is any of these 27 definitely confined to only one of the disjunct patches of humid pine-oak west of the Isthmus, and all but *D. macroura* are monotypic within Oaxaca. *Accipiter striatus madrensis*, *Ara militaris*, *Strix varia*, *Aegolius acadicus*, and *Nyctiphrynus mcleodii* have been recorded in only a single range, but all are rare and almost certainly are more widespread.

This barrier continues north through Tehuacán, Puebla, and then separates the mountains of extreme eastern Puebla and westcentral Veracruz from those of central Mexico (e.g., Morelos, western México state), although exactly where I do not know. Thus, in general, forms in the northeastern mountains of Oaxaca are more closely related to those in the former region, while forms in the southwestern mountains are more similar to those in central Mexico and/or Guerrero.

The canyon of the Río Santo Domingo, with its tropical evergreen forests and arid tropical scrub, might separate populations of pine-oak birds in the Sierra de Juárez from those of the Sierra de Huautla, eastern Puebla, and west central Veracruz, although this gorge can be circumvented by most species via the Sierra Aloapaneca and the San Francisco Telixtlahuaca "connection" discussed above and perhaps through low-elevation pine-oak on the coastal versants of these ranges (if pine-oak occurs low enough there). Collecting in the ornithologically unexplored Sierra de Huautla might answer this question. Species that seem to exhibit racial differentiation across this barrier are as follows: *Dendrortyx macroura* (*oaxacae*, Oaxaca; *macroura*, eastern Puebla and west central Veracruz), *Parus wollweberi* (*caliginosus*; *wollweberi*), *Catharus occidentalis* (*occidentalis*; *lambi* Phillips 1969: 612), *Geothlypis nelsoni* (*karlenae*; *nelsoni*), and *Pipilo erythrophthalmus* (*oaxacae*; *maculatus*). Many other species are subspecifically undifferentiated across this gap.

No pine-oak species are endemic to Oaxaca, whereas seven races seem to be: *Dendrortyx macroura* *oaxacae*, *D. m. inesperatus*, *Cyrtonyx montezumae* *rowleyi*, *Empidonax fulvifrons* *brodkorbi*, *Cyanolyca mirabilis* *hardyi*, *Catharus occidentalis* *occidentalis*, and *Pipilo erythrophthalmus* *oaxacae*. *D. m. inesperatus*, *C. m. rowleyi*, *C. m. hardyi*, and perhaps *E. f. brodkorbi*, are restricted to the Sierras de Yucuyacua and/or Miahuatlán, which are thus a very minor region of subspecific endemicity for pine-oak birds; the first two belong to rather plastic species, and the last two are weakly differentiated. *D. m. oaxacae* is confined to northern Oaxaca. The remaining two range throughout the state west of the Isthmus.

The basin of the Río Verde might be a barrier between the Sierra de Miahuatlán and Sierra de Yucuyacua, but data from the latter range are too fragmentary to make a definite judgment; for all species recorded in both ranges, the race is the

same, and all species (except *Cypseloides niger*?) that breed in the Sierra de Miahuatlán range into Guerrero. Probably a more important barrier is posed by the arid tropical habitats in the Río Papagayo basin of Guerrero, which seems to separate the following races: *Dendrortyx macroura* (\**inesperatus*, Oaxaca; *striatus*, Guerrero), *Cyrtonyx montezumae* (*rowleyi*; *sallaei*), *Amazilia beryllina* (\**beryllina*; *viola*), *Xiphocolaptes promeropirhynchus* (not in southern Oaxaca; *omiltemensis*), *Empidonax fulvifrons* (\**brodkorbi*; *rubicundus*), *Cyanocitta stelleri* (*coronata*; *teotepecensis*), *Cyanolyca mirabilis* (*hardyi*; *mirabilis*), *Parus sclateri* (*sclateri*; *rayi*), *Catharus occidentalis* (\**occidentalis*; *fulvescens*), *Ptilogonys cinereus* (*cinereus*; *pallescens*), *Parula superciliosa* (\**mexicana*; *palliata*), *Pipilo ocai* (*ocai*; *guerrerensis*), *P. erythrophthalmus* (\**oaxacae*; subspecies?), *Icterus graduacauda* (probably *graduacauda*; *dickeyae*), and *Carduelis notata* (\**notata*; *ferrerii*). Because the Río Balsas appears to be a much older and stronger barrier than the Río Papagayo, I suspect that some or all of the races marked above with asterisks (\*) will be found, upon further investigation, to range throughout Guerrero south of the Río Balsas and the forms here listed for Guerrero to be confined to the northern part.

Farther west of Oaxaca, arid tropical habitats in the Río Balsas basin pose a formidable barrier to dispersal of pine-oak birds. Among Oaxaca forms only (other races are endemic to Guerrero or regions farther north), this barrier apparently prevents the following from ranging directly into Michoacán: *Accipiter striatus madrensis*, *Cyrtonyx montezumae sallaei* (if it occurs in Oaxaca), *Xiphocolaptes promeropirhynchus*, *Cyanolyca mirabilis*, *Aphelocoma coerulescens remota*, *Parus wollweberi caliginosus*, *Sitta carolinensis kinneari*, *Dendroica graciae remota*, *Ergaticus ruber rowleyi*, *Peucedramus taeniatus georgei*, *Icterus graduacauda*, and possibly those races marked by asterisks in the paragraph above. Most (all?) other pine-oak species probably also respond to this barrier, their populations in Oaxaca and southern Guerrero connecting with those of central and western Mexico only east of the extreme upper end of the Balsas basin. Lack of appreciation for this semicircular distribution has, I believe, led to confusion in understanding the racial taxonomy and distribution of some pine-oak birds. All species that reach the mountains of northern Oaxaca, on the other hand, range well up the Atlantic slope, the most confined, *Cyanolyca nana*, to west central Veracruz.

*Dendroica graciae* and *Amazilia cyanocephala* are uniquely restricted to humid tropical and subtropical pine-oak forests. Hence, they cannot (except marginally) penetrate the largely arid temperate forests of the Interior. *Aimophila rufescens pyrgitoides* and *Basileuterus rufifrons flavigaster* have adaptations and distributions similar to *A. cyanocephala*, and *Aimophila rufescens rufescens* to *D. graciae*.

#### BUNCH GRASSLAND

This habitat forms a few small pockets at very high elevations within humid pine-oak forest of at least the Sierras de Yucuyacua and Cuatro Venados. It supports one characteristic species:

*Oriturus superciliosus*

This species is endemic to Mexico west of the Isthmus and is monotypic in Oaxaca. If included with the typical pine-oak forest avifauna, it might be placed on list 5, as it has been recorded only in the southwestern mountain ranges.

However, I believe it will be discovered in other ranges when the habitat is and thus would be placed on list 1 (and be marked “?” and “H”). The extreme disjunction of the habitat undoubtedly prevents dispersal of this sedentary bird. The only other species known to use this habitat in Oaxaca is *Geothlypis nelsoni*.

#### OAK SCRUB

Oak scrub forms a narrow but widespread elevational belt below arid pine-oak forest, of which it is a subdivision, and above arid subtropical scrub in the Interior Region, to which it is confined. It supports three characteristic species, all of which are monotypic in Oaxaca and endemic to Mexico west of the Isthmus:

*Toxostoma ocellatum*  
*Vireo brevipennis*

*Aimophila notosticta*

*A. notosticta*, which might be endemic to Oaxaca, seems to be confined to oak scrub, whereas the others inhabit adjacent pine-oak forest and (*T. ocellatum*) arid subtropical scrub. All, however, seem to be most regular and abundant in oak scrub and probably evolved there. Although all are uncommon to rare and hence are poorly known, their distributional patterns align them with list 1 (marked “?”) and the hypothetical “list 9” discussed under typical pine-oak forests, to which the reader is referred.

#### FIR FOREST, CYPRESS FOREST, JUNIPER SCRUB, AND HIGHLAND PINE FOREST

No birds seem to be restricted to these habitats, which, however, are very local and poorly known ornithologically. Possibly, *Regulus satrapa* (not known to breed in the state) and *Aegolius acadicus* will prove to be characteristic of fir forest, which they inhabit elsewhere. Cypress forest is unexplored. The few species known from juniper scrub are characteristic of arid pine-oak forest (e.g., *Ptilogonys cinereus* and *Piranga flava*), arid subtropical scrub, and oak scrub. Highland pine forest supports only those pine-oak birds able to tolerate the boreal climate, open canopy, and absence of oaks and dense brush, among them *Cyrtonyx montezumae*, *Colaptes auratus*, *Parus sclateri*, and *Sialia sialis*; interestingly, the last three are hole-nesters.

#### HUMID PINE-OAK FOREST AND CLOUD FOREST

Nineteen species are about equally abundant and widespread in humid pine-oak forest and cloud forest and hence cannot be allocated to one or the other. These two habitats have very similar distributions, adjoining each other in almost the same isolated pockets (see descriptions under separate headings in this analysis). The major distributional difference is that *high-elevation, temperate* pine-oak forest is extensive in the Sierra Aloapaneca and Sierra de Cuatro Venados but absent from the Sierra Madre de Chiapas, while cloud forest has the opposite range.

The 19 species may be divided into two categories according to their Oaxaca distributions. Three species (marked ?) are so poorly known that allocation among the lists below is tentative.

(1) Four species are widespread in all three Regions west of the Isthmus but have not been recorded in the Sierra Madre de Chiapas of Oaxaca; all occur in Chiapas (\*):

\**Colibri thalassinus*  
 \**Lampornis amethystinus*

\**Lamprolaima rhami*  
 \**Coccothraustes abeillei* (?)

(2) The remaining 15 species inhabit all Regions west of the Isthmus and disjunctly the Sierra Madre de Chiapas of Oaxaca:

*Cypseloides rutilus* (?)  
*Streptoprocne zonaris* (?)  
*Eugenes fulgens*  
*Lepidocolaptes affinis*  
*Grallaria guatemalensis*  
*Troglodytes aedon*  
*Henicorhina leucophrys*  
*Catharus aurantirostris*

*C. frantzii*  
*Turdus infuscatus*  
*Myioborus miniatus*  
*Basileuterus belli*  
*Euphonia elegantissima*  
*Atlapetes brunneinucha*  
*Diglossa baritula*

The distributional patterns exhibited by these 19 species and their subspecies closely resemble those of typical pine-oak forest; lists 1 and 2 here match 1 and 2 there. None of the 19 is endemic to the east side of the Isthmus (compared to 19.4% for cloud forest and 2.5% for typical pine-oak forest), and all but *Coccothraustes abeillei* have been recorded in the Sierra de Cuatro Venados and/or Sierra Aloapaneca (compared to none for cloud forest and at least 81.8% for pine-oak).

The Isthmus is a major barrier to east–west dispersal of these 19 species, because it supports neither humid pine-oak nor cloud forest; populations west of the Isthmus are widely disjunct from those to the east, with none of the 19 occupying the intervening arid tropical and humid tropical habitats or even breeding as low as the 2,500-ft maximum elevation of the Isthmus mountains. This disjunction is reflected by the four species on list 1 (but all breed farther east in Chiapas) and on the subspecific level. Twelve (63.2%) of the 19 species exhibit racial differentiation, either in the Sierra Madre de Chiapas of Oaxaca or in Chiapas (\* below), as follows: *Cypseloides rutilus* (*griseifrons*, west; probably *nubicola*, east), *Lampornis amethystinus* (*amethystinus*, *margaritae*, and *circumventus*; \**salvini*), *Eugenes fulgens* (*fulgens*; *viridiceps*), *Grallaria guatemalensis* (*mexicana* and *ochraceiventris*; *guatemalensis*), *Troglodytes aedon* (*brunneicollis*; *intermedius*, which also occurs west of the Isthmus), *Henicorhina leucophrys* (*mexicana* and *festiva*; *capitalis*), *Catharus frantzii* (*nelsoni* and *omiltemensis*; *chiapensis*), *Myioborus miniatus* (*miniatus*; *intermedius*), *Basileuterus belli* (*belli* and *clarus*; *scitulus*), *Atlapetes brunneinucha* (*suttoni* and *brunneinucha*; *nigrilatera*), *Diglossa baritula* (*baritula*; *montana*), and *Coccothraustes abeillei* (*abeillei*; \**cobanensis*). The arid habitats in western Chiapas probably play a role in isolating *L. a. salvini* and *C. a. cobanensis*.

The same arid habitat barrier that runs northwest–southeast through central Oaxaca and separates forms of pine-oak birds also divides northeastern from southwestern populations of the 19 present species, all of which occur on both sides and none of which breeds regularly in arid pine-oak forest. Seven species (36.8%) are polytypic, as follows: *Lampornis amethystinus* (*amethystinus*, northeast; *margaritae* and *circumventus*, southwest), *Grallaria guatemalensis* (*mexicana*; *ochraceiventris*), *Troglodytes aedon* (*intermedius*; *brunneicollis*, which also occurs on the northeast side), *Henicorhina leucophrys* (*mexicana*; *festiva*), *Catharus frantzii* (*nelsoni*; *omiltemensis*), *Basileuterus belli* (*belli*; *clarus*), and *At-*

*lapetes brunneinucha* (*brunneinucha*; *suttoni*). *G. guatemalensis* and *A. brunneinucha* perhaps should not be listed above, because the major break between their races seems to come between the Sierras de Juárez and Zempoaltepec on the northeast and the Sierra Aloapaneca on the southwest, a pattern that matches the hypothetical "list 9" of typical pine-oak forest. The above percentage is between those of cloud forest (80.0%) and typical pine-oak forest (all pine-oak, 15.4%; humid pine-oak only, 5.6%). There is no taxonomic evidence that the Río Santo Domingo canyon, separating the Sierra de Juárez from the Sierra de Huautla, is a barrier for these 19 species.

None of the 19 species is endemic to Oaxaca (or even to Mexico). One race, *Lampornis amethystinus circumventus*, belonging to a rather plastic species, appears to be endemic to the Sierra de Miahuatlán, but see below. This low level of subspecific endemism is similar to that in pine-oak forest and opposed to the high level in cloud forest.

Possibly, the arid tropical habitats in the Río Verde basin present a minor barrier, as discussed under typical pine-oak forest. *Lampornis amethystinus circumventus* and *Lamprolaima rhami rhami* have been recorded in the Sierra de Miahuatlán but not the Sierra de Yucuyacua, while *L. r. occidentalis* occurs in Guerrero and *L. a. circumventus* is unknown there. More likely, however, the separation for these forms and the following comes at the Río Papagayo basin in Guerrero: *Troglodytes aedon* (*brunneicollis*, Oaxaca; *guerrerensis*, Guerrero) and possibly *Catharus aurantiirostris* (*melpomene*; *clarus*; on zoogeographical grounds, however, I suspect that *melpomene*, not *clarus*, will prove to inhabit all of southern Guerrero).

The Río Balsas barrier discussed under typical pine-oak forest apparently prevents the following Oaxaca forms from ranging from Guerrero into Michoacán (additional races are endemic to Guerrero or range south to Michoacán): *Lepidocolaptes affinis*, *Henicorhina leucophrys festiva*, *Turdus infuscatus*, *Basileuterus belli*, *Atlapetes brunneinucha suttoni*, and possibly *Lampornis amethystinus margaritae* (one Michoacán record?).

The 19 species also possess some of the characteristics of the cloud forest avifauna. For example, none is endemic to the west side of the Isthmus (compared to 5.5% of purely cloud forest birds and 37.7% of purely pine-oak species). Also, 15 (79.0%) of the 19 have been recorded in the Sierra Madre de Chiapas of Oaxaca (compared to 83.3% for cloud forest and 32.5% for pine-oak); this, of course, is simply a function of the presence of extensive cloud forest and lack of high-elevation, humid pine-oak forest in that range. Finally, as noted, none of the 19 inhabits the Isthmus mountains (compared to none for cloud forest and 13.0% for pine-oak), because no cloud forest exists there, although arid pine-oak does.

#### TROPICAL DECIDUOUS FOREST AND ARID TROPICAL SCRUB

The two major arid tropical habitats in the state, tropical deciduous forest and arid tropical scrub, occur in a nearly continuous strip along the Pacific coast from Sonora to Costa Rica, as large patches in northeastern Mexico and the Yucatan Peninsula and as small isolated pockets between the last two regions (Leopold 1959). In Oaxaca both habitats extend throughout the lowlands and adjacent foothills of the Pacific Region and north across the Isthmus a short distance into the Atlantic Region. Arid tropical scrub also clothes parts of the low-elevation valleys of the Interior Region.

On the next three lists, the following symbols indicate the major areas of Mexico where species breed outside but not in Oaxaca: Pacific slope of northwestern Mexico (†); Atlantic slope of Mexico west of the Isthmus (+); and the Yucatan Peninsula (°). Species that in Oaxaca reach the terminus of their entire breeding ranges have the pertinent localities listed; all others extend beyond the state to at least Chiapas and Guerrero.

Forty-nine species are here considered characteristic of tropical deciduous forest, arid tropical scrub, and related openings, although 22 are shared to some extent with tropical semideciduous and/or Pacific swamp forests, and 14 range into the lower portions of arid subtropical scrub (see lists beyond). For most species, data are as yet too fragmentary to determine preferences between forest and scrub. Eighteen species occur in the arid valleys of the Interior Region, as indicated by letter abbreviations (see introduction to this analysis). These 49 species may be divided into three major categories according to their Oaxaca distributions.

(1) Twenty-nine species are widespread in the Pacific Region both east and west of the Isthmus and range at least as far as Chiapas and Guerrero:

+° <i>Buteo brachyurus</i>	<i>Momotus mexicanus</i> (SMSV, HL, SJBC)
+° <i>Polyborus plancus</i> (O)	+° <i>Camptostoma imberbe</i> (O, HL)
<i>Ortalis poliocephala</i>	<i>Myiarchus nuttingi</i> (HL, SJBC)
+° <i>Zenaidra asiatica</i> (O, SMSV, HL, SJBC)	<i>Deltarhynchus flammulatus</i>
+ <i>Columbina inca</i> (O, HL, SJBC)	<i>Calocitta formosa</i> (SMSV)
+° <i>C. passerina</i> (O, HL, SJBC)	+ <i>Campylorhynchus rufinucha</i>
<i>Aratinga canicularis</i>	<i>Thryothorus pleurostictus</i> (SMSV)
° <i>Amazona albifrons</i>	° <i>Polioptila albiloris</i> (HL, SJBC)
<i>Morococcyx erythropygus</i>	<i>Granatellus venustus</i>
<i>Caprimulgus ridgwayi</i>	<i>Passerina leclancherii</i>
+ <i>Cyananthus latirostris</i>	<i>Aimophila ruficauda</i>
° <i>Amazilia rutila</i>	<i>Icterus pustulatus</i> (HL, SJBC)
<i>A. viridifrons</i> (SMSV)	<i>I. pectoralis</i>
<i>Heliomaster constantii</i> (SMSV)	<i>Cacicus melanicterus</i>
<i>Trogon citreolus</i>	

(2) Thirteen species are associated primarily with the Isthmus and areas to the east and are absent from most or all of the Pacific Region to the west:

†+ <i>Parabuteo unicinctus</i> (O, HL)	†+° <i>Chordeiles acutipennis</i>
† <i>Harpyhaliaetus solitarius</i>	<i>Chiroxiphia linearis</i> [Chivela]
†+° <i>Buteo albicaudatus</i> (O, HL, HY)	<i>Thryothorus modestus</i> [Zanatepec area]
†+ <i>Aratinga holochlora</i>	° <i>Mimus gilvus</i> [Tehuantepec City]
† <i>Brotogeris jugularis</i>	<i>Passerina rositae</i> [Chivela]
†+° <i>Coccyzus minor</i>	<i>Aimophila sumichrasti</i> [Rancho Las Animas]
<i>Otus cooperi</i> [Rancho Las Animas and Puerto Angel]	

(3) A final seven species are endemic to North America west of the Isthmus:

<i>Melanerpes chrysogenys</i> [Bahía Santa Cruz]	<i>Vireo hypochryseus</i> (SMSV, HL, SJBC) [Rancho Las Animas]
<i>Tyrannus crassirostris</i> (SMSV, HL) [San Pedro Juchatengo area]	<i>Aimophila humeralis</i> [San José Estancia Grande area]
<i>Thryothorus sinaloa</i> [Putla de Guerrero area]	
<i>T. felix</i> [Puerto Angel area]	
<i>Turdus rufopalliatus</i> (HL, SJBC) [Tehuantepec City]	

Almost half of the 49 species considered characteristic of arid tropical habitats demonstrate a wide tolerance for humidity, ranging to a greater or lesser extent into adjacent tropical semideciduous forest (marked TSF below) and/or Pacific swamp forest (PSF). Most prefer forest rather than scrub, and none can be considered a purely arid tropical scrub species. These 22 are: *Ortalis poliocephala* (TSF), *Aratinga holochlora* (TSF, PSF), *A. canicularis* (TSF, PSF), *Brotogeris jugularis* (PSF), *Coccyzus minor* (PSF), *Otus cooperi* (PSF), *Amazilia rutila* (TSF), *A. viridifrons* (TSF), *Trogon citreolus* (TSF, PSF), *Momotus mexicanus* (TSF, PSF), *Chiroxiphia linearis* (TSF, PSF), *Calocitta formosa* (TSF), *Thryothorus sinaloa* (TSF), *T. pleurostictus* (TSF), *T. felix* (TSF), *T. modestus* (TSF), *Turdus rufopalliatatus* (PSF), *Vireo hypochryseus* (TSF), *Granatellus venustus* (PSF), *Passerina rositae* (PSF), *Icterus pectoralis* (PSF), and *Cacicus melanicterus* (PSF).

Fourteen of the 49 species have a rather wide temperature tolerance, ranging up to between 6,000 and 6,500 ft into arid subtropical scrub of the Interior valleys. These are the species on the lists noted for the Oaxaca Valley (O) and Huajuapán de León area (HL). All 14 prefer scrub or openings or can tolerate riparian situations; none is a true forest species. These are the very attributes needed to occupy the Interior valleys. See also, widespread species in this analysis.

Forming much of the heart of the arid Pacific avifaunal element are 30 species (unmarked on lists) that in Mexico are restricted to the Pacific slope (a few range marginally onto the Atlantic slope of Central America). These are so strongly adapted to arid tropical habitats that they cannot penetrate the arid subtropics of northern Mexico or the tropical evergreen forests on the Atlantic side of the Isthmus of Tehuantepec. Only two of these (*Caprimulgus ridgwayi* and *Tyrannus crassirostris*) breed as far north as the United States. As noted in a previous section, the birds of the tropical evergreen forests of Atlantic Mexico drop out progressively toward the north; endemism is low. The situation in the arid tropics of Mexico is the reverse. Western Mexico from Sinaloa to the Isthmus of Tehuantepec is the center of species diversity, and species drop out progressively to the south. Endemism, especially on the subspecific level, is high, although only three races are confined to Oaxaca: *Morococcyx erythropygus mexicanus*, *Otus cooperi lambi*, and *Amazilia viridifrons wagneri*. These three share a similar range—the Pacific coast west of the Isthmus and the Río Tehuantepec basin. Because *A. v. wagneri* is bracketed by two disjunct populations of nominate *viridifrons*, it (and probably the other two races) likely evolved in the Río Tehuantepec basin.

Twenty-nine species (list 1) inhabit the entire Pacific Region of Oaxaca (although *Aimophila ruficauda* is absent from the middle of this stretch). Most are common and conspicuous. Nineteen of these experience no detectible geographic restriction to dispersal on an east–west axis, even at the Isthmus. Ten, however, vary geographically across the Isthmus (see below).

The only apparent barrier to dispersal along an east–west axis through the Pacific Region is at the Isthmus of Tehuantepec, where 13 species (list 2) are confined to the east side and 7 (list 3) to the west side. However, 7 (marked †) of the 13 have disjunct populations in western Mexico (see below). For the six that do not, the habitats in the Isthmus present a total barrier. *Chiroxiphia linearis*, *Thryothorus modestus*, *Passerina rositae*, and the race *Aratinga holochlora strenua* are, in Oaxaca, adapted to forests (tropical deciduous, tropical semideciduous, and Pacific swamp) and cannot occupy either the extensive arid tropical scrub and savanna

of the Plains of Tehuantepec or the arid tropical scrub of the lower Río Tehuantepec basin; thus they are confined to the central and eastern sides of the Isthmus. On the other hand, *Mimus gilvus* and *Aimophila sumichrasti*, as well as the race *Aimophila ruficauda lawrencii*, are adapted to the very same arid tropical scrub savanna that restricts the other three species and cannot penetrate the tropical deciduous forest that becomes extensive in the foothills just west of Tehuantepec City. *Otus cooperi*, the species most tolerant of varying ecological conditions, ranges the farthest, entering the Río Tehuantepec basin and extending along the Pacific coast to Puerto Angel. Even this species, however, experiences restricted movement across the Isthmus, as evidenced by its racial differentiation on the two sides, *O. c. lambi* on the west and *O. c. cooperi* on the east.

Ten of the 29 wide-ranging species (list 1) vary geographically across the Isthmus: *Zenaida asiatica* (*collina*, east side; probably *palustris*, west side), *Aratinga canicularis* (*canicularis*; *canicularis* × *eburnirostrum*), *Morococcyx erythropygus* (*erythropygus*; *mexicanus*), *Amazilia viridifrons* (*viridifrons*; *wagneri*), *Trogon citreolus* (*sumichrasti*; *sumichrasti* × *citreolus*), *Myiarchus nuttingi* (*nuttingi* and *flavidior*; *inquietus*), *Calocitta formosa* (*formosa* × *azurea*; *formosa*), *Thryothorus pleurostictus* (*oaxacae* > *acaciarum*; *oaxacae*), *Icterus pustulatus* (*formosus*; *formosus* × *pustulatus*), and *I. pectoralis* (*guttulatus* and *pectoralis*; *pectoralis* × *carolynae*). For these 10 (except *Zenaida asiatica*?) and *Otus cooperi*, the steepest intergradation occurs in the hills east of the Isthmus near the Chiapas border, a fact that again labels the scrub and savanna of the Plains of Tehuantepec as the major restrictive force.

Seven species (list 3) are endemic to western Mexico. *Thryothorus sinaloa* and *Aimophila humeralis* do not range beyond extreme southwestern Oaxaca, nor does *Aimophila ruficauda acuminata*. Range-limiting factors for these three forms might be historical, being simply a function of the time needed to spread from their northwestern regions of origin. However, both sparrows are somewhat colonial and might require scrub associated with savanna (certainly this is the case in Oaxaca) and hence cannot penetrate the tropical deciduous forests of the remainder of the Pacific Region. The other five species, like those six confined to the east side of the Isthmus, seem to require tropical deciduous forest or at least dense riparian growth and thus cannot colonize the open habitats of the lower Río Tehuantepec basin and the Plains of Tehuantepec.

Because some species cannot cross the Isthmus, others experience racial variation, and still others apparently cross with impunity, the Isthmus, on an east-west axis is a filter barrier for arid tropical birds.

The remaining seven species on list 2 have not been found in the Pacific Region of Oaxaca west of the Isthmus but breed farther northwest in Mexico. *Parabuteo unicinctus* and *Buteo albicaudatus* seem to prefer large expanses of savanna and perhaps cannot penetrate the tropical deciduous forest west of Tehuantepec City. *Chordeiles acutipennis* and the secretive *Coccyzus minor* probably will be found breeding in this area and then would be moved to list 1. The absence of *Harpypaliaetus solitarius*, *Aratinga holochlora*, and *Brotogeris jugularis*, although somewhat of a mystery, parallels the spotty distributions of many arid tropical species and especially subspecies and probably is the result of historical factors.

On a north-south axis, the Isthmus presents a nearly total barrier to arid tropical birds because of the extensive (at least formerly!) tropical evergreen forest and

related humid habitats on the north side, beginning just north of Matías Romero. Fifteen of the 49 arid tropical species range marginally onto the Atlantic side of the Isthmus, where the habitats are similar to, and continuous with, those of the Pacific lowlands. Two species, *Polyborus plancus* and *Columbina inca*, have been found once each in extreme northern Oaxaca at, respectively, Temascal and Amapan, where they are peripheral to an arid tropical pocket in adjacent Veracruz.

As noted, the Isthmus is the major barrier to both species and subspecies, and southwestern Oaxaca supports two species and one race. Five races not already mentioned terminate their ranges elsewhere in Oaxaca. *Zenaida asiatica monticola*, *Momotus mexicanus mexicanus*, and *Icterus pustulatus pustulatus* enter the Interior valleys of northern Oaxaca via the arid scrub along tributaries of the Río Balsas. Finally, *Momotus mexicanus saturatus* extends from the east to extreme southwestern Oaxaca (and perhaps into Guerrero).

Ten of the 49 species range from the northwest to terminate their ranges in southwestern Chiapas: *Ortalis poliocephala*, *Cynanthus latirostris*, *Amazilia viridifrons*, *Trogon citreolus*, *Deltarhynchus flammulatus*, *Granatellus venustus*, *Passerina rositae*, *P. leclancherii*, *Aimophila sumichrasti*, and *Cacicus melanicterus*. *P. rositae* and *A. sumichrasti* are endemic to southeastern Oaxaca and southwestern Chiapas and presumably evolved there, whereas the other eight have their distributional centers farther northwest. The habitats in the Pacific lowlands of southwestern Chiapas are today much like those in adjacent Oaxaca. The lowlands of southeastern Chiapas, however, are considerably more hilly, humid, and forested and thus present a barrier to all 10 species.

The major river systems that penetrate the mountains ringing the Mesa del Sur produce low-elevation Interior valleys occupied at least in part by arid tropical scrub (the Oaxaca Valley supports mostly arid subtropical scrub). Eighteen of the 49 arid tropical birds and 23 of the 48 widespread tropical species (discussed here to avoid repetition) occur in one or more of these valleys, and although these valleys are still poorly known, some basic distributional patterns are apparent. Most of the species mentioned here range also into the upper Río Tehuantepec basin, which I do not consider an Interior valley.

The Río Atoyac, which is the major tributary of the Río Verde and has carved the Oaxaca Valley (marked O on lists) and the San Miguel Sola de Vega valley (SMSV), drains to the Pacific Ocean through the lowlands of southwestern Oaxaca. Eight arid tropical and 13 widespread species are known to extend into the latter valley. Only 5 of these 21 reach the Oaxaca Valley, which, however, supports 12 other species. This lack of concordance is in part a reflection of the inability of some of the San Miguel Sola de Vega birds (especially *Chlorostilbon canivetii*, *Amazilia viridifrons*, *Heliomaster constantii*, and *Calocitta formosa*) to tolerate the subtropical conditions in the Oaxaca Valley. The 12 that seem to avoid the San Miguel Sola de Vega valley perhaps reach the Oaxaca Valley through the low passes that connect its east side with the upper Río Tehuantepec basin, from which all but *Sporophila torqueola* are known. These 12 are among the most common, widespread, and tolerant of all arid tropical species.

The arid Río Balsas basin, which drains into the Pacific Ocean at the border of Guerrero and Michoacán, is responsible for numerous arid tropical and widespread tropical species reaching far into the interior of central Mexico to such states as Morelos, Puebla, and extreme western Veracruz. So extensive is this

basin that it even supports endemic subspecies of arid tropical birds. It also reaches Oaxaca, sending small tributaries of the Río Mixteco as far as Huajuapán de León and Tamazulapán del Progreso and an arm of the Río Acatlán to Santiago Chazumba. Thirteen arid tropical and eight widespread species (marked HL on lists) reach this part of Oaxaca. Several lines of evidence demonstrate that most of these species enter northwestern Oaxaca from the Río Balsas. First, all 21 occur in the Río Balsas basin outside Oaxaca. Second, only *Pyrocephalus rubinus* and *Myiarchus tuberculifer* have been recorded in the unsuitable habitats of the highlands between there and the Oaxaca and San Miguel Sola de Vega valleys. Third, 4 of the 19 species have never been found in those two valleys. Finally, and most telling, 2 of the 19 are represented in northwestern Oaxaca by subspecies found nowhere else (in pure form) in the state: *Momotus mexicanus mexicanus* and *Icterus pustulatus pustulatus*.

In the northern part of the Interior is the deep wide valley of San Juan Bautista Cuicatlán, formed by tributaries of the Río Santo Domingo, which drains through the Atlantic lowlands into the Gulf of Mexico. That this valley is home to any arid tropical birds is perhaps surprising, because it is on the Atlantic slope far removed from the Pacific lowlands. Nevertheless, it supports 9 arid tropical and 10 widespread species (marked SJBC on lists). Three of the arid tropical birds (*Zenaida asiatica*, *Columbina inca*, and *C. passerina*) and three of the widespread species (*Glaucidium brasilianum*, *Leptotila verreauxi*, and *Tyrannus melancholicus*) could have penetrated this valley from the Atlantic lowlands. The other six arid tropical birds, however, do not occur there, and the other seven widespread species are represented by Pacific Region, not Atlantic Region, subspecies. These 13 apparently spread from the Río Balsas basin, probably via the low arid passes in the uplands of Puebla between the valley and the region of Huajuapán de León; all 9 arid tropical species and 6 of the 10 widespread birds have been recorded near that town. In only three days of observation, I found *Zenaida asiatica*, *Columbina inca*, *C. passerina*, *Pyrocephalus rubinus*, *Myiarchus nuttingi*, and *Polioptila albiloris* near Santiago Chazumba, which is situated near the pass most likely to allow interchange. The six birds that occur in the Huajuapán de León area but not in the San Juan Bautista Cuicatlán valley, *Parabuteo unicinctus*, *Buteo albicaudatus*, *Piaya cayana*, *Crotophaga sulcirostris*, *Camptostoma imberbe*, and *Tyrannus crassirostris*, will, I suspect, eventually be discovered; I have seen *Parabuteo* and *Camptostoma* near Santiago Chazumba. That some or all of the 19 species could have reached the San Juan Bautista Cuicatlán valley from the upper Río Tehuantepec basin, where most occur, via the Hidalgo Yalalag valley, is a remote possibility.

The Hidalgo Yalalag valley (HY), formed by the Río Cajones, which drains to the Gulf of Mexico, is ornithologically virtually unexplored. Only *Buteo nitidus*, *B. albicaudatus*, and *Myiarchus tuberculifer* have been collected there, but other species almost certainly occur, entering from the Oaxaca and San Juan Bautista Cuicatlán valleys, the Río Tehuantepec basin, or the Atlantic lowlands.

Although in Oaxaca the 49 arid tropical species are confined largely to the Pacific Region, 17 (+ and ° on lists) range widely onto the Atlantic slope elsewhere in Mexico. Some of these, especially *Buteo brachyurus*, *Aratinga holochlora*, *Coccyzus minor*, and *Chordeiles acutipennis*, would perhaps best be placed with those species that I treat as widespread in both the arid and humid tropics. These four,

however, breed in *Oaxaca* only in arid tropical habitats, and the other 13, throughout Mexico, seem to me to be primarily arid country birds. In my opinion, all 13, and perhaps all 17, owe their Atlantic distributions to the presence of extensive arid tropical scrub and tropical deciduous forest in northeastern Mexico and disjunctly in the Yucatan Peninsula and to the scattered pockets of semiarid tropical habitats in between. These pockets are, I believe, "humidified" relicts from a past time when tropical deciduous forest, arid tropical scrub, and savanna were widespread in the Atlantic lowlands. The arid tropical birds present there today have been able to adapt to the more mesic conditions, often accompanied by racial differentiation, whereas other arid tropical species have become extirpated (or never occurred). A classic, though extreme, example of this phenomenon is *Campylorhynchus rufinucha*, which is widespread in Pacific Mexico and has an isolated well-marked race, *C. r. rufinucha*, endemic to a small pocket in the Atlantic lowlands of Veracruz.

Twelve (marked °) of the 17 Atlantic-ranging species reach the Yucatan Peninsula, and 13 (+) occur in Atlantic Mexico west of the Isthmus. Five of these 13 (*Buteo brachyurus*, *B. albicaudatus*, *Polyborus plancus*, *Columbina inca*, and *C. passerina*) are monotypic in Mexico; in 6 of the remaining 8, the Atlantic race is distinct from that in Pacific Mexico, including Oaxaca. This fact attests to the isolation of the arid tropical elements of the two slopes and aligns Oaxaca with the Pacific. Should any of these six polytypic species be discovered in the Atlantic Region of Oaxaca west of the Isthmus, it likely will be the Atlantic race. The other two of the eight, *Parabuteo unicinctus* and *Camptostoma imberbe*, have subspecies endemic to northwestern Mexico, but the one inhabiting Oaxaca is the same as on the Atlantic slope; these two apparently have considerable gene flow from the Atlantic to Pacific through the Río Balsas basin, probably via the San Juan Bautista Cuicatlán valley (both have been recorded near Santiago Chazumba but not yet in the valley itself).

Of the 12 species (marked °) reaching the Yucatan Peninsula, four are monotypic (as above, minus *C. inca*, strangely absent from the Yucatan), and the races of *Coccyzus minor* and *Camptostoma imberbe* are the same as in the remainder of Atlantic Mexico. The subspecies of *Amazilia rutila* is the same as in Oaxaca, despite the isolation of the two populations. The remaining five species have races endemic to the tip of the Yucatan Peninsula: *Zenaida asiatica peninsulae* Saunders (1968:5), *Amazona albifrons nana*, *Chordeiles acutipennis micromeris*, *Polioptila albiloris albiventris*, and *Mimus gilvus leucophaeus*. *P. a. albiventris* is completely isolated from *P. a. vanrossemi* of Oaxaca, whereas *A. albifrons*, *M. gilvus*, and perhaps *C. acutipennis* and *Z. asiatica*, connect through a filter barrier consisting of scattered semiarid habitats in northeastern Oaxaca, southern Veracruz, and Tabasco, as evidenced in part by the intermediacy of some Oaxaca (Isthmus) specimens of *A. albifrons*. These pockets consist largely of savanna bordered by scrub and narrow strips of semiarid forest.

#### ARID SUBTROPICAL SCRUB

Arid subtropical scrub extends from the southwestern United States to at least Guatemala and probably Nicaragua. In Oaxaca it is restricted to the Interior Region, where it occupies an elevational belt above arid tropical scrub and below oak scrub and arid pine-oak forest. It is most extensive where the terrain is

relatively flat—in the extreme northwest and (at least formerly) the Oaxaca Valley. It extends east into the upper Río Tehuantepec basin, skips the Isthmus and eastern Oaxaca, and reappears again, in somewhat modified form, some 110 mi away on the arid Central Plateau of Chiapas.

Thirty-six species are, in Oaxaca, characteristic of this habitat, although some range marginally into oak scrub, juniper scrub, and open arid pine-oak forest, and a few into steppe, savanna, and cultivated land. Some species breed also in arid tropical habitats, five in the Isthmus (list 2) and four in the San Juan Bautista Cuicatlán valley (see below). Some of the 36, especially *Geococcyx velox* and *Picoides scalaris*, occupy a variety of habitats in Oaxaca and are placed in this habitat rather tentatively. The 36 species can be divided into three categories according to their Oaxaca ranges.

(1) Twenty-four species are widespread in the Interior Region but do not breed in the state in or east of the Isthmus. Ten of these (\*) occur disjunctly in arid habitats elsewhere in Middle America southeast of Oaxaca, whereas the other 14 are endemic to North America west of the Isthmus. These 24 species are:

* <i>Zenaida macroura</i>	<i>Thryomanes bewickii</i>
* <i>Aeronautes saxatalis</i>	* <i>Polioptila caerulea</i>
<i>Cyananthus sordidus</i>	<i>Mimus polyglottos</i>
* <i>Calothorax pulcher</i>	<i>Toxostoma curvirostre</i>
<i>Melanerpes hypopolius</i>	<i>Lanius ludovicianus</i>
* <i>Picoides scalaris</i>	* <i>Passerina versicolor</i>
<i>Xenotriccus mexicanus</i>	<i>Pipilo albicollis</i>
* <i>Empidonax albigularis</i>	<i>Aimophila mystacalis</i>
<i>Tyrannus vociferans</i>	<i>A. ruficeps</i>
<i>Hirundo pyrrhonota</i>	* <i>Icterus wagleri</i>
<i>Campylorhynchus jocosus</i>	<i>Carpodacus mexicanus</i>
* <i>Salpinctes obsoletus</i>	* <i>Carduelis psaltria</i>

(2) Five species inhabit both arid subtropical scrub of the Interior and arid tropical habitats of the Pacific Region in and/or east of the Isthmus; none breeds in the tropical Pacific lowlands of Oaxaca west of the Isthmus:

<i>Geococcyx velox</i>	<i>Guiraca caerulea</i>
<i>Corvus corax</i>	<i>Molothrus ater</i>
<i>Catherpes mexicanus</i>	

(3) A final seven species are restricted to extreme northwestern Oaxaca, none reaching the Oaxaca Valley; all are endemic to North America west of the Isthmus:

<i>Amazilia violiceps</i>	<i>Pipilo fuscus</i>
<i>Sayornis saya</i>	<i>Spizella atrogularis</i>
<i>Vireo nelsoni</i>	<i>Icterus parisorum</i>
<i>Melospiza kieneri</i>	

The Isthmus of Tehuantepec supports only tropical habitats—primarily tropical evergreen forest, tropical deciduous forest, arid tropical scrub, and savanna in the lowlands and arid pine-oak woodland above 800 ft in the Isthmus mountains. This range is too low to foster the cool climate required by arid subtropical scrub. Hence, the Isthmus presents a barrier to the east–west dispersal of most arid subtropical scrub birds. It is a total barrier for 24 (list 1) of the 36 species. Of these, 14 (unmarked by asterisks) are endemic to North America west of the

Isthmus. Of the remaining 10 (\*)—those reappearing disjunctly east of the Isthmus beyond Oaxaca—the following six are represented by races that also terminate their breeding ranges in Oaxaca just west of the Isthmus: *Zenaida macroura marginella*, *Aeronautes saxatalis saxatalis*, *Picoides scalaris lambi* or *P. s. "azelus"* (see Species Account), *Salpinctes obsoletus obsoletus*, *Passerina versicolor versicolor*, and *Carduelis psaltria psaltria* (see also, *Guiraca caerulea eurhyncha* below). In all six species, the race to the east is widely isolated by the tropical habitats of the Isthmus lowlands and the tropical semideciduous, cloud, and pine-oak forests of the Sierra Madre de Chiapas. These are *Z. m. turturilla*, which ranges no closer than Costa Rica, and *A. s. nigrior*, *P. s. percus* (the one eastern Oaxaca record is judged to be a visitant), *S. o. sollicitus*, *P. v. purpurascens*, and *C. p. colombianus*, all of which occupy the arid interior of Chiapas. The same disjunction occurs between racially undifferentiated populations of the remaining four species, *Calothorax pulcher* (monotypic), *Empidonax albigularis albigularis*, *Polioptila caerulea nelsoni*, and *Icterus wagleri wagleri*.

Almost all arid subtropical scrub species probably evolved in North America west of the Isthmus. The one obvious exception, *Melozone biarcuatum*, is endemic to Middle America east of the Isthmus and does not reach Oaxaca. South of the state, the 14 species (list 2 and unmarked species on list 1, minus *Molothrus*) drop out progressively, as follows (number represents species present): Chiapas 14, Guatemala 11, Honduras 10, Nicaragua 9, Costa Rica 5, Panama 3, and South America 1. Those species that are most adaptable and hence are able to invade other habitats go the farthest. The more stringently adapted species do not extend beyond Chiapas (*Calothorax pulcher* and *Catherpes mexicanus*) or Guatemala (*Passerina versicolor* and probably *Polioptila caerulea*).

Five species (list 2) breed not only in the Interior but also in the Pacific Region in and/or east of the Isthmus. *Geococcyx velox*, which needs only open ground, has a continuous distribution through the Río Tehuantepec basin and Pacific lowlands of the Isthmus into Chiapas. The other four seem to have disjunct populations; *Corvus corax* and *Catherpes mexicanus*, which require open rocky hills, avoid the flat Plains of Tehuantepec; *Guiraca caerulea* has not been recorded in the seemingly suitable habitat of the lower Río Tehuantepec basin; and *Molothrus ater* skips both areas, perhaps because it might have colonized eastern Oaxaca from its large winter resident population there. None of the five inhabits the lowlands or adjacent lower slopes of the Pacific Region west of the Isthmus, which are more heavily forested, and, of course, none can penetrate the humid forests of the Atlantic Isthmus. *Guiraca caerulea* is the only one of the five that is polytypic within Oaxaca; *G. c. eurhyncha* is confined to the Oaxaca Valley and *G. c. chiapensis* to the Isthmus, with the Río Tehuantepec basin in between. This is also the only species with a race ranging from the east to terminate in Oaxaca, a fact resulting merely from the inability of other eastern highland races to reach Oaxaca and from the lack of racial differentiation in southern populations of *Corvus* and *Catherpes*; only *Geococcyx velox* could theoretically fit the same category. *Molothrus ater* breeds no farther southeast than eastern Oaxaca and hence is essentially endemic to the "west" side.

Seven species (list 3) extend from at least central Mexico to northwestern Oaxaca, where their total breeding ranges end. The Isthmus might be said to be a barrier to these birds, as they are endemic to North America west of the Isthmus.

They do not, however, breed far enough east for the Isthmus to come into play, being isolated from the Oaxaca Valley and Río Tehuantepec basin by an extensive highland region supporting principally pine-oak forest and steppe. This same barrier separates *Pipilo albicollis marshalli* and *Aimophila ruficeps laybournae* of northwestern Oaxaca from *P. a. albicollis* and *A. r. australis* of the Oaxaca Valley. The last two races are the only ones in this habitat endemic to Oaxaca.

The only form not already mentioned, *Aimophila ruficeps extima*, ranges from Guerrero through the southern Oaxaca Valley to the upper Río Tehuantepec basin; apparently, gene flow between it and *A. r. australis* is restricted by distance within the Valley and by the pine-oak in the mountains bordering the east side of the Valley.

*Campylorhynchus jocosus*, *Toxostoma curvirostre*, *Melospiza kieneri*, and *Aimophila mystacalis* breed locally in arid tropical scrub in the vicinity of San Juan Bautista Cuicatlán, where "owing to invasion much of the fauna is the same or very similar to that of adjoining Lower Austral areas" (Goldman 1951:212).

#### STEPPE

Steppe is found only in the Interior Region in the Oaxaca Valley, where it is the result of long-term cultivation and overgrazing, and in the north central part of the state, where it is produced by lime soil and scant rainfall. It supports very few birds of any kind and none that is restricted to it. Its avifauna is derived from adjacent open habitats such as savanna (e.g., *Eremophila alpestris*) and arid subtropical scrub (e.g., *Salpinctes obsoletus* and *Spizella atrogularis*). Its primary importance to bird distribution is as a barrier to dispersal of pine-oak and arid subtropical scrub birds (which see).

#### SAVANNA

The savannas of Oaxaca, which consist of grassland with scattered trees and shrubs, occur as isolated patches below 6,000 ft in the tropical and subtropical portions of all three Regions. Eleven species are restricted largely to this habitat, although a few also use steppe and such openings as cultivated and grazed land. These 11 species are:

*Cathartes burrovianus*  
*Burhinus bistriatus*  
*Columbina minuta*  
*Amazona oratrix*  
*A. auropalliata*  
*Chordeiles minor*

*Caprimulgus maculicaudus*  
*Eremophila alpestris*  
*Sporophila minuta*  
*Aimophila botterii*  
*Sturnella magna*

The fragmentation of savannas and our incomplete knowledge of their individual avifaunas make analysis difficult. Nevertheless, certain observations can be made concerning Oaxaca distributions. *Burhinus bistriatus*, *Amazona oratrix*, *A. auropalliata*, and *Sporophila minuta* are restricted to the Pacific Region, *Caprimulgus maculicaudus* to the Atlantic Region, and *Cathartes burrovianus*, *Columbina minuta*, and *Chordeiles minor* (here hedging a bit by considering the San Miguel Sola de Vega valley as an extension of the Pacific Region) to both. Only *Eremophila alpestris*, *Sturnella magna*, and *Aimophila botterii* breed in the highlands of the Interior Region; all three occur also in the Pacific Region, with *Sturnella magna* ranging north onto the Atlantic side of the Isthmus. Distributions

elsewhere in Mexico are similar, except that *Burhinus bistriatus* has disjunct populations in the Atlantic lowlands from Veracruz eastward and in the interior of Chiapas, and *Amazona oratrix magna* (unrecorded in Oaxaca), *Eremophila alpestris*, and *Aimophila botterii* occur widely on the Atlantic slope; all four might well be discovered in the Atlantic Region of Oaxaca.

Five species range from the southeast to terminate their entire breeding ranges, or portions thereof, in or near Oaxaca: *Cathartes burrovianus* (terminates its Pacific slope range near Minitán), *Burhinus bistriatus* (Pacific range near Isthmus at Rancho Las Animas), *Columbina minuta* (Atlantic range in Isthmus at Donají and in adjacent Veracruz), *Amazona auropalliata* (entire range in Pacific Isthmus at Niltepec), and *Caprimulgus maculicaudus* (entire range in Atlantic Region northwest of Loma Bonita and in adjacent Veracruz). Two other forms range from the north and stop in Oaxaca: *Amazona oratrix oratrix* (entire range near Isthmus at El Barrio) and *Eremophila alpestris* (entire North American range in Isthmus at Santa María del Mar). In addition, two races are endemic to the state: *Eremophila alpestris oaxacae* of the Interior and Pacific Isthmus, and *Sturnella magna saundersi* of the Pacific Isthmus.

That five terminations and two endemic races are associated with the Isthmus probably has no significance today other than it contains savanna extensive enough to support populations that cannot exist in the small pockets elsewhere. Probably, these distributions are related to historical factors in which the Isthmus played an important role.

Only one of the 11 species is polytypic in Oaxaca: *Sturnella magna (mexicana*, Atlantic Region; *saundersi*, Pacific Region). In Mexico as a whole, however, 5 of the 11 are polytypic. This high level of subspecific differentiation is a function of the fragmentation of the habitat, which has provided the isolation needed for evolution.

Between the pockets of savanna, acting as barriers to dispersal, are expanses of forest and scrub too numerous and varied to detail here. There are no unbroken corridors; only in the Oaxaca Valley, on the Pacific side of the Isthmus, and perhaps in the extreme southwest are patches close enough together (or interconnected) to allow easy dispersal from one to another. Possibly, some interchange, via intervening pockets, occurs between the north and south sides of the Isthmus and between the Isthmus and the Oaxaca Valley, as evidenced by the intermediacy of *Sturnella magna* populations (*mexicana* > *saundersi* on the Atlantic side of the Isthmus and *saundersi* × *auropectoralis* in the Oaxaca Valley) and the presence of only one race (*oaxacae*) of the very plastic *Eremophila alpestris* in the Isthmus and Oaxaca Valley. Probably all the savannas of Oaxaca (and most of Mexico) were coalescent historically, with today's pockets and their avifaunas little more than relicts. However, migration might also have played a role in the distributions of some species. *Chordeiles minor* is believed to be only a summer resident in the state, and *Caprimulgus maculicaudus* and *Columbina minuta*, although probably permanent residents, have been recorded only at that season. *Cathartes burrovianus*, although perhaps overlooked in the past, might be expanding its range northward and might be only a summer resident; in any event, it is a wide-ranging mobile species. And *Eremophila alpestris*, *Sturnella magna*, and *Aimophila botterii*, although sedentary in Oaxaca, are migratory in other parts of their

ranges. Thus, at least some of the range disjunctions in Oaxaca might be a result of colonization by displaced migrants.

### MODIFIED TERRESTRIAL HABITATS

#### STRUCTURES

Two species are restricted to towns, where they nest on buildings and other structures and feed off the leavings of civilization; both are widespread in the Interior and Pacific Regions of Oaxaca and are expected in the Atlantic Region:

*Columba livia*

*Passer domesticus*

Both were introduced into North America from Europe, but whether they arrived in Oaxaca on their own from neighboring states or were directly introduced is unknown. The country between towns, especially in mountainous areas, certainly slows the unaided dispersal of both species; probably, the Rock Dove spreads through reintroductions as pets, but the House Sparrow does not.

No native birds have evolved in this habitat. *Aeronautes saxatalis* and *Progne chalybea*, although most common in towns, nest also in natural cliffs; their use of buildings for nest sites probably is a phenomenon occurring after Europeans arrived and constructed buildings, one that has certainly allowed range expansion. Oaxaca awaits the arrival of the European Starling (*Sturnus vulgaris*).

#### FINCAS, CULTIVATED LAND, AND GRAZED LAND

No birds are restricted to these habitats. The breeding birds of coffee fincas are left over from the tropical evergreen, tropical semideciduous, or cloud forests from which the fincas were made. Most of the natural undergrowth is removed to make way for the coffee plants, but the canopy is usually left intact for shade; the avifauna reflects this change, although poor maintenance usually provides habitat for a few undergrowth birds.

Cultivated land and grazed land, with their associated weeds, hedgerows, and isolated trees, occur throughout the state but are most extensive in the Oaxaca Valley, where they are partially irrigated and hence semihumid. They are populated by widespread tropical species (e.g., *Colinus virginianus*, *Columbina talpacoti*, \**Crotophaga sulcirostris*, *Pyrocephalus rubinus*, \**Pitangus sulphuratus*, \**Tyrannus melancholicus*, \**Volatinia jacarina*, *Sporophila torqueola*, and \**Quiscalus mexicanus*), savanna species (e.g., *Sporophila minuta*), and birds of adjacent arid tropical scrub (e.g., *Polyborus plancus*), arid subtropical scrub (e.g., *Lanius ludovicianus* and *Carduelis psaltria*), and guamil (\**Tiaris olivacea*). The existence of these habitats allows "preadapted" birds to disperse more easily and widely than would otherwise be the case and probably is the sole reason why some species (marked by asterisks above) have been able to invade the arid Interior of Oaxaca.

#### OPENINGS

Openings in the form of brushy clearings, successional stages, and edge situations are scattered throughout all forest habitats. They are natural or man-made. I have no doubt that many bird species are adapted to and in fact evolved in such habitats. My attempt to define their avifaunas, however, met with frustration, partly because

avian habitat preferences are not well enough known and partly because of the multiplicity of habitat variations, which do not allow simple classification. I could not, for example, tell "climax" arid tropical scrub from openings in tropical deciduous forest, nor could I distinguish between physiognomically similar openings within different forest habitats (e.g., guamil in tropical evergreen forest and tropical deciduous forest). Many birds, however, make this distinction, some for instance being confined to guamil only within tropical evergreen forest.

I, therefore, elected to treat openings as part of the natural forest habitats with which they are associated. I see little difference, when one is dealing with large-scale habitats, between considering as belonging to one habitat either the birds of openings and the forest itself or the birds of the forest undergrowth (e.g., *Formicarius analis*) and the highest canopy (e.g., *Vireolanius pulchellus*). I suspect that opening species evolved not in openings *per se* but rather in natural climax scrub habitats or in openings associated with major forest types. Such an approach has resulted in the detection of distributional patterns that make sense, and I think that when enough botanical and ornithological data become available to allow analysis of "opening birds" alone, the basic patterns will be the same.

#### OPEN AQUATIC HABITATS

##### LAKES, PONDS, RESERVOIRS, COASTAL BAYS, HARBORS, LAGOONS, RIVERS, AND CREEKS

The 21 species here considered characteristic of these habitats can be divided into three categories according to the salinity of the waters in which they feed in Oaxaca.

(1) Ten species feed in deep or shallow waters of all or most of these habitats, be they saline, brackish, or freshwater:

*Phalacrocorax olivaceus*  
*Anhinga anhinga*  
*Casmerodius albus*  
*Egretta thula*  
*Butorides striatus*

*Himantopus mexicanus*  
*Sterna antillarum*  
*Ceryle torquata*  
*Chloroceryle americana*  
*Tachycineta albilinea*

In Oaxaca all but *Chloroceryle americana* have their breeding ranges restricted to the lowlands below about 1,000 ft. *Himantopus mexicanus* and *Sterna antillarum* are found widely (if locally) in the Pacific Region but are unrecorded in the Atlantic Region, whereas the other eight species are widespread in both Regions. *Chloroceryle americana* breeds also in the arid Interior valleys up to 5,800 ft.

(2) Four species are restricted to fresh water, the first two feeding (and nesting) principally in marsh-edged ponds and lakes and the last two also along the edges of reservoirs and streams:

*Tachybaptus dominicus*  
*Podilymbus podiceps*

*Chloroceryle amazona*  
*Sayornis nigricans*

The first three are inhabitants primarily of the coastal lowlands. *Chloroceryle amazona* ranges throughout the Atlantic Region but in the Pacific Region has been recorded only in and east of the Isthmus. *Sayornis nigricans* occurs throughout most of Oaxaca but probably does not breed in the extreme lower portions of the Pacific Region.

(3) Seven species are found for the most part in saline and brackish bays, harbors, and lagoons and therefore are restricted to the immediate Pacific coast:

*Fregata magnificens*  
*Egretta tricolor*  
*E. rufescens*  
*Eudocimus albus*

*Ajaia ajaja*  
*Mycteria americana*  
*Rynchops niger*

#### RIVERS AND CREEKS

Most of the 21 species listed above feed along streams but are not restricted to them. One species, however, is confined to permanent mountain streams in montane, humid pine-oak forest:

*Cinclus mexicanus*

In Oaxaca the American Dipper occurs with certainty only in the Sierra de Miahuatlán. Dispersal from this mountain range presumably is curtailed by the scarcity of permanent streams in the surrounding arid habitats.

#### MARSHES

Five species are confined largely to freshwater marshes (no saline marshes occur in Oaxaca):

*Laterallus ruber*  
*Pardirallus maculatus*  
*Porphyryla martinica*

*Jacana spinosa*  
*Agelaius phoeniceus*

*Laterallus ruber*, *Porphyryla martinica*, and *Jacana spinosa* breed at lower elevations in the Atlantic Region and more or less disjunctly in the Pacific Region. Although *Pardirallus maculatus* has been recorded only in the Pacific Region, it seems to be undergoing rapid expansion (Parkes et al. 1978) and probably will be found in Atlantic Oaxaca. *Agelaius phoeniceus* breeds disjunctly in all three Regions of the state.

#### SAND BEACHES AND RIVER BARS

One species occurs primarily on sand beaches and sandy river bars, although it also breeds on the drier portions of coastal mud flats:

*Charadrius collaris*

This monotypic species has been found only in the Pacific lowlands but is to be expected along the large rivers of the Atlantic Region.

#### MUD FLATS

One species is restricted to extensive saline mud flats along the Pacific coast of the Isthmus:

*Charadrius alexandrinus*

#### OPEN OCEAN, ROCKY SEASHORES, AND SAND DUNES

No breeding species are restricted to these habitats, although *Fregata magnificens* and *Sterna antillarum* use inshore ocean waters in addition to coastal bays,

harbors, and lagoons. No truly pelagic birds are known to breed in Oaxaca, probably because there are no suitable offshore islands.

#### FORESTED AQUATIC HABITATS

##### MANGROVE SWAMP AND SWAMP FOREST

Twelve species feed primarily in permanently inundated swamps, although some also inhabit palm forest, Pacific swamp forest, or forest-edged aquatic habitats. No species is restricted to mangrove swamp; the aquatic birds that feed there are found also in freshwater swamp forests and/or the forested edges of other aquatic habitats, and the few landbirds are characteristic of adjacent terrestrial habitats (*Dendroica petechia rhizophorae* is restricted to mangroves elsewhere and might be found breeding in Oaxaca). *Leptodon cayanensis* and the last four listed species are confined largely to freshwater swamp, with *Aramus guarauna* occurring in open brushy swamps and the other four in swamp forest and small canopied ponds within tropical evergreen forest. The remaining seven feed also in mangrove swamp. The 12 swamp species are:

*Tigrisoma mexicanum*  
*Cochlearius cochlearius*  
*Dendrocygna autumnalis*  
*Cairina moschata*  
*Leptodon cayanensis*  
*Chondrohierax uncinatus*

*Geranospiza caerulescens*  
*Aramides cajanea*  
*Amaurolimnas concolor*  
*Heliornis fulica*  
*Aramus guarauna*  
*Chloroceryle aenea*

The first four species and *Aramides cajanea* occur in the Atlantic lowlands and both east and west of the Isthmus in the Pacific Region; *Amaurolimnas concolor*, *Heliornis fulica*, and *Chloroceryle aenea* are confined to the Atlantic Region; *Leptodon cayanensis* breeds there and also in the Pacific Region east of the Isthmus; and *Aramus guarauna* is restricted to the last area. *Chondrohierax uncinatus* and *Geranospiza caerulescens* have been recorded only in the Pacific lowlands, where they frequent mangrove swamp and Pacific swamp forest, but both are expected also in the Atlantic Region. The Oaxaca population of *Amaurolimnas concolor* is disjunct from the main population of Belize southward.

Pacific swamp forest is not a true aquatic habitat, because it is only rarely flooded. It survives on a high water table and closely resembles tropical evergreen and tropical semideciduous forests. It occurs in isolated patches amid tropical deciduous forest only along the immediate Pacific coast and in adjacent foothills and is most extensive along the Chiapas border. Because it is not permanently inundated, it harbors no truly aquatic birds, although the three species of swamp hawks do occur there. Neither does it support any characteristic species, instead deriving its abundant avifauna primarily from widespread tropical species and those inhabiting tropical deciduous forest (see list in that section) and to a lesser degree tropical semideciduous forest.

Pacific swamp forests are important as coastal reservoirs for humid forest species that otherwise would be restricted to tropical evergreen forest of the Atlantic Region and tropical semideciduous forest of the Pacific mountains; among these are *Myiopagis viridicata*, *Euthlypis lachrymosa*, *Habia rubica*, and *Saltator atriceps*; the Pacific ranges of *Ictinia plumbea* and *Micrastur semitorquatus* seem to be restricted to Pacific swamp forest. In addition some tropical deciduous forest

birds (e.g., *Vireo hypochryseus*, *Granatellus venustus*, and *Chiroxiphia linearis*) and the Pacific Region populations of some widespread tropical species (e.g., *Glauucidium minutissimum*, *Euphonia affinis*, and *Saltator coerulescens*) are perhaps most abundant in Pacific swamp and tropical semideciduous forests.

Pacific swamp forest also provides suitable habitat for wintering tropical semideciduous and cloud forest birds (e.g., *Rhynchocyclus brevirostris*) and for tropical deciduous forest species when the leaves have fallen (e.g., *Attila spadiceus*). Although patches of this habitat are isolated from each other, they might, together with palm forests, aid east–west coastal dispersal of some humid forest birds. In the Sierra Madre de Chiapas and Sierra de Miahuatlán, riparian fingers of Pacific swamp forest extend upslope through arid country to connect with montane tropical semideciduous forest, providing mesic highways along which such birds as *Pteroglossus torquatus* and *Oncostoma cinereigulare* descend to occupy the Pacific coastal foothills nearly to sea level.

#### PALM FOREST

Palm forests, which form small pockets on high water tables along the immediate Pacific coast, are ornithologically poorly-explored, but in my experience harbor no characteristic birds. The avifauna appears to consist primarily of widespread tropical species (e.g., *Ciccaba virgata*, *Dryocopus lineatus*, *Pitangus sulphuratus*, and *Myiozetetes similis*) and inhabitants of adjacent tropical deciduous forest but probably also includes most of the species listed under Pacific swamp forest. Like Pacific swamp forest, with which it is closely associated, palm forest probably provides a reservoir, winter refuge, and avenue of dispersal for some humid tropical forest birds.

Most of the 41 aquatic species above are widespread on the Atlantic and Pacific coasts of Mexico and Central America, and some extend even farther north and south. Between the two coastal areas, however, intervene the highlands of northern Central America, the Mesa del Sur of Oaxaca, the central plateau of Mexico, and the arid expanse of the southwestern United States, areas where most aquatic species are principally visitants or are absent altogether. The only place north of Nicaragua where they can cross rather easily from one coast to the other is the lowland gap of the Isthmus of Tehuantepec, which poses an ecological filter barrier. The narrowest north–south width of the Isthmus is only about 135 mi, and the bisecting Isthmus mountains, while containing isolated peaks up to 2,500 ft in elevation, have passes as low as 800 ft. On the Atlantic side of this range, rivers, creeks, ponds, swamp forests, mud edges, and patches of marsh extend in a narrowly discontinuous network, with increasing size and frequency, to the Veracruz coast. South of these mountains, the Plains of Tehuantepec formerly supported extensive wetlands; although during the dry season these are today confined largely to marsh-lined ditches and a few scattered permanent ponds, they again form a narrowly discontinuous patchwork south to the shores of the large coastal lagoons, and during the rainy summer months, additional temporary ponds form. The Isthmus mountains themselves have a few creeks and periodically flooded savannas. On the other hand, saline waters, sand beaches, and extensive mud flats are restricted to the immediate coasts, and all other aquatic habitats are discontinuous.

Probably for no aquatic species is the Isthmus an insurmountable barrier, and

for most it is a fairly easy route of dispersal between the coasts. Supporting this theory is the fact that within the Isthmus many water birds occur in both lowlands and often well inland, thus greatly reducing the 135-mi distance between coasts. More importantly, eight species have subspecies confined to northwestern Mexico (and points north), whereas in all eight cases the races on *both* slopes of Oaxaca are the same as found widely on the Atlantic slope of Mexico, as follows: *Tachybaptus dominicus* (*bangsi*, northwestern Mexico; *brachypterus*, both slopes of Oaxaca), *Podilymbus podiceps* (*podiceps*; *antillarum*), *Phalacrocorax olivaceus* (*chancho*; *mexicanus*), *Egretta thula* (*brewsteri*; *thula*), *E. rufescens* (*dickeyi*; *rufescens*), *Butorides striatus* (*anthonyi*; *virescens*) *Geranospiza caerulescens* (*livens*; *nigra*), and *Chloroceryle americana* (*hachisukai*; *septentrionalis*). Even in the case of *Aramides cajanea*, which probably does not occur northwest of Oaxaca, the race inhabiting Pacific Oaxaca is the same as that in the Atlantic lowlands west of the Isthmus, rather than the one in Pacific Chiapas. Most of these nine species could have colonized Pacific Oaxaca either from the Atlantic coast via the Isthmus or from the Pacific coast farther south. Three species, however, have different races on the Pacific coast as close to Oaxaca as Chiapas or Guatemala and hence almost certainly colonized Pacific Oaxaca from the Atlantic slope: *Butorides striatus* (*maculatus*, Guatemala; *virescens*, both slopes of Oaxaca), *Aramides cajanea* (*vanrossemi*, Chiapas; *mexicana*), and *Chloroceryle americana* (*isthmica*, Guatemala; *septentrionalis*). Aside from the three polytypic species having extensive interior highland distributions (*Sayornis nigricans*, *Cinclus mexicanus*, and *Agelaius phoeniceus*), only *Sterna antillarum* (race *staebleri*) and possibly *Cochlearius cochlearius* (see Species Account) have Pacific Oaxaca subspecies distinct from those in Atlantic Mexico.

The species most seriously restricted by lack of suitable habitat in the interior of the Isthmus are the seven confined largely to saline aquatic habitats (list 3) and the one (*Charadrius alexandrinus*) found only on coastal mud flats. However, even *Fregata magnificens*, a very strongly coast-oriented, saltwater species, has been observed apparently crossing the Isthmus in Veracruz (Dalquest 1951:256), and *Ajaia ajaja* and *Mycteria americana* have been recorded once each as visitants to the Atlantic lowlands of Oaxaca. The nonbreeding *Sterna sandvicensis*, otherwise unknown from Pacific Mexico, winters on the Pacific coast of Oaxaca.

Tall-tree, freshwater swamp forests apparently do not exist on the Pacific side of the Isthmus proper. Those of the Atlantic lowlands are separated from those of the Pacific Region west of the Isthmus by the Mesa del Sur, Plains of Tehuantepec, and Río Tehuantepec basin. Only to the southeast, at the west end of the Sierra Madre de Chiapas, do the Atlantic swamps more closely approach the Pacific swamp forests, and even there they are separated by the arid conditions in the Isthmus mountains. Nowhere west of the Isthmus on the Pacific side of Oaxaca are there permanently inundated, tall-tree, freshwater swamps. Thus, three of the four species restricted to this habitat, *Amaurolimnas concolor*, *Heliornis fulica*, and *Chloroceryle aenea*, could not exist there even if they traversed the arid barrier. *Leptodon cayanensis*, on the other hand, not needing permanent water, can survive in the Pacific swamp forest of southeastern Oaxaca, and perhaps even bridge the barrier between there and the Atlantic Region, but cannot spread northwest because of the intervening arid habitats. *Aramus guaranauna*, which requires uncanopied, brushy, freshwater swamp, finds no such environment in

the Atlantic Region of Oaxaca or in the Pacific lowlands of Mexico west of the Isthmus; thus it is confined to Pacific Oaxaca east of the Isthmus and to the Atlantic lowlands beyond Oaxaca. The remaining seven swamp species inhabit both freshwater and mangrove swamps and hence can occupy the lowlands of both coasts. Although for these seven, movement between the two coastal lowlands must be restricted, the distance between the northernmost mangroves and southernmost Atlantic swamp forests is only about 45 mi, so that periodic vagrancy probably occurs. That *Chondrohierax uncinatus* and *Geranospiza caerulescens* are unrecorded in the Atlantic lowlands of Oaxaca is, I suspect, a function of incomplete coverage, although both are specialized feeders and perhaps do not find the appropriate microhabitat.

To marsh birds, the Isthmus presents less of a barrier than to swamp species, because marsh is more continuous, especially in the otherwise arid Plains of Tehuantepec. Only the very plastic *Agelaius phoeniceus*, which does not reach the Atlantic Isthmus, is racially differentiated in Oaxaca (*nayaritensis*, Pacific Region; *nelsoni*, Interior; probably *richmondi*, northern Atlantic).

In summary, the north-south axis of the Isthmus is a filter barrier, but more of a corridor than a barrier, allowing most aquatic birds to move from one lowland to the other. Even for those species that find no adequate feeding habitat in the interior of the Isthmus, the low passes in the mountains and the short distance between coasts provide a convenient pathway for dispersal.

On an east-west axis, neither the Pacific lowlands within the Isthmus nor those to the east in Chiapas present much of a barrier, all aquatic habitats except freshwater swamp being only narrowly discontinuous. The Pacific lowlands to the west of the Isthmus, on the other hand, are more imposing. During the dry season, most streams and ponds dry up; marshes are few and far between; lakes, reservoirs, and permanently inundated, tall-tree swamps do not exist. As noted previously, the five species restricted to freshwater swamps, therefore, are necessarily absent from this area. The scarcity, small size, and perhaps vegetative character of the marshes have prevented *Laterallus ruber* from occupying the coast northwest of Guerrero. That *Pardirallus maculatus* has spread farther northwest probably stems from the explosive mobility that has resulted in its recent colonization of Mexico (Parkes et al. 1978). *Porphyryla martinica* and *Jacana spinosa* can breed farther northwest because they inhabit the floating mats of vegetation present along the margins of some coastal lagoons, a microhabitat that is more common than grass or sedge marsh and is not suitable for the two rails. The four species (list 2) restricted to open freshwater habitats are scarce in this area; *Tachybaptus dominicus* is very local; *Podilymbus podiceps* is suspected of breeding in only one locality; *Chloroceryle amazona* has not been recorded (but is expected); and *Sayornis nigricans* might not breed in the lowlands but only along permanent streams on the adjacent mountain slopes. The 17 species (lists 1, 3) that inhabit brackish or saline waters are widespread and in most cases common. Nevertheless, their habitats, the coastal lagoons and bays, with their associated mud flats and mangroves, although fairly numerous, are separated by long stretches of cliffs and sand beaches where the mountains meet the sea; thus, dispersal for even these species must be slightly restricted.

The high mountains ringing the Mesa del Sur of Oaxaca would seem an imposing barrier to the dispersal of aquatic birds from the Atlantic and Pacific lowlands

into the Interior Region, where only four of the 41 aquatic species are known to breed. That other species have not colonized the Interior is, I believe, due more to the absence or paucity of suitable feeding and nesting habitats there than to the presence of any barrier. The six large river systems that drain the Interior have carved low-elevation gaps between the major ranges. These gaps are doors open to dispersal, especially in view of the mobility of birds and the propensity of even some "sedentary" species to wander, and the rivers appear to provide suitable feeding habitat for most of the species inhabiting freshwater aquatic habitats. As evidence for this assertion, consider that 15 aquatic species that in Mexico are inhabitants primarily of the coastal lowlands and do not breed in the Interior of Oaxaca are said to extend their breeding ranges (at least formerly) well into the interior of central Mexico (Friedmann et al. 1950), as follows: *Tachybaptus dominicus*, *Podilymbus podiceps*, *Phalacrocorax olivaceus*, *Casmerodius albus*, *Egretta thula*, *E. tricolor*, *Butorides striatus*, *Eudocimus albus*, *Ajaia ajaja*, *Mycateria americana*, *Dendrocygna autumnalis*, *Aramides cajanea*, *Porphyryla martinica*, *Himantopus mexicanus*, and *Jacana spinosa*. There they find suitable habitats in the wetlands of such states as México, Morelos, and Guanajuato. All but *Aramides cajanea* have extensive ranges along the Pacific coast of Mexico and almost certainly have reached the interior via the basins of the Río Santiago and Río Balsas. That the same species, and others, could have colonized the Interior Region of Oaxaca via the major rivers that penetrate the Mesa del Sur is evidenced by the six species recorded there as visitants: *Tachybaptus dominicus* (two records), *Phalacrocorax olivaceus* (one), *Casmerodius albus* (one), *Egretta rufescens* (one, but a migrant from the north), *Chondrohierax uncinatus* (one), and *Tachycineta albilinea* (one).

The Interior of Oaxaca, however, differs significantly from central Mexico in lacking extensive wetlands. No saline waters, swamps, extensive mud flats, sand beaches, or riverine sand bars exist, thus preventing colonization by visitants of the 21 species restricted to those habitats. Marsh vegetation in my experience is confined today to one tiny pond near Santa María Coyotepec and to a few drainage ditches and hence is too restricted and probably of too poor quality to hold five of the six marsh species. Lakes do not exist; the few permanent ponds are small, treeless, and islandless; the upper reaches of the rivers are swift, narrow, and shallow, especially during the winter dry season; and the creeks, except those in humid pine-oak forest, desiccate during the dry season. *Phalacrocorax olivaceus*, *Anhinga anhinga*, *Sterna antillarum*, *Ceryle torquata*, and *Chloroceryle amazona* need deeper waters in which to feed, and at least the last two require adjacent woody vegetation on which to perch; hence, none finds the proper habitat in the Interior. *Butorides striatus* and *Tachycineta albilinea* nest in woody vegetation adjacent to permanent water, a combination absent from all but the highest, forested parts of the Interior. *Casmerodius albus* and *Egretta thula* need extensive wetlands in order to find enough food for themselves and their young, and these together with *Anhinga anhinga*, *Phalacrocorax olivaceus*, and *Himantopus mexicanus* prefer predator-safe swamps or islands for nesting and roosting.

Thus, only six aquatic species are left that could breed in the Interior of Oaxaca. Four of them do so: *Cinclus mexicanus* is resident in permanent mountain streams at high elevations within humid pine-oak forest; *Chloroceryle americana* and *Sayornis nigricans* feed along the edges of creeks and small ponds; and *Agelaius*

*phoeniceus* uses irrigated fields and small patches of marsh along roadside ditches. The final two, *Tachybaptus dominicus* and *Podilymbus podiceps*, can use small marshy ponds and might eventually be discovered breeding in the Interior (although *Podilymbus podiceps* is a very local breeder in Mexico). The other 35 of the 41 aquatic species, when they arrive as visitants or vagrants, find no feeding and/or nesting habitat that will support colonization and must leave.

### MIGRATION

The previous chapter treats habitat distribution of the 465 breeding species. All other Oaxaca species are given in the columnar lists in this chapter; 28 are of uncertain status and 187 are migrants, bringing the total state list to 680.

The exact status of 28 species is uncertain; many are either winter residents or transient migrants, whereas 15 (marked PR) seem to be visitants but might be rare permanent residents:

<i>Puffinus creatopus</i>	<i>Caprimulgus salvini</i> (PR)
<i>Oceanites oceanicus</i>	<i>Panyptila cayennensis</i> (PR)
<i>Ixobrychus exilis</i>	<i>Amazilia yucatanensis</i> (PR)
<i>Elanoides forficatus</i>	<i>Tyrannus couchii</i> (PR)
<i>Busarellus nigricollis</i> (PR)	<i>T. savana</i> (PR)
<i>Spizastur melanoleucus</i> (PR)	<i>Regulus satrapa</i> (PR)
<i>Rallus limicola</i> (PR)	<i>Vermivora pinus</i>
<i>Calidris alpina</i>	<i>V. chrysoptera</i>
<i>Phalaropus fulicaria</i>	<i>Dendroica dominica</i>
<i>Stercorarius parasiticus</i>	<i>Chlorophanes spiza</i> (PR)
<i>Sterna fuscata</i>	<i>Pheucticus chrysopheplus</i> (PR)
<i>Tyto alba</i> (PR)	<i>Amaurospiza concolor</i> (PR)
<i>Asio otus</i>	<i>Icterus maculialatus</i> (PR)
<i>A. flammeus</i>	<i>Coccothraustes vespertinus</i> (PR)

### EXTERNAL MIGRATIONS

In this section I treat all species, as well as races of breeding species, that migrate into, through, or out of the state and are essentially absent during one or more entire seasons. These forms are divided, according to their mode and season of occurrence, into winter residents, transient migrants, visitants, vagrants, and summer (breeding) residents. With one exception, trinomials are used only for breeding species that have nonbreeding races as winter residents or transient migrants. The exception is *Catharus ustulatus*, which seems to be the only nonbreeding species with different wintering and transient migrant subspecies.

### WINTER RESIDENTS

*From north.*—Forms of 172 species are winter residents from breeding grounds to the north. Most winter south of Oaxaca as well, and many are known to be more common during spring and/or fall migration periods than in winter. Twenty-one wintering species are in or very near their overall breeding ranges and might be found nesting in the state, in which case they would become permanent residents (21 species marked PR). The winter residents are:

<i>Podilymbus podiceps podiceps</i>	* <i>P. auricularis</i>
<i>Podiceps nigricollis</i>	<i>Oceanodroma melania</i>
<i>Puffinus pacificus</i>	<i>O. microsoma</i>

- Sula dactylatra*  
*S. leucogaster*  
*S. sula*  
*Pelecanus erythrorhynchos*  
*P. occidentalis*  
*Botaurus lentiginosus*  
*Ardea herodias* (PR)  
*Egretta caerulea* (PR)  
*Bubulcus ibis* (PR)  
*Butorides striatus anthonyi*  
*Nycticorax nycticorax* (PR)  
*N. violaceus* (PR)  
*Plegadis chihi*  
*Dendrocygna bicolor*  
*Anas crecca*  
*A. acuta*  
*A. discors*  
*A. clypeata*  
*A. strepera*  
*A. americana*  
*Aythya collaris*  
*A. affinis*  
*Oxyura jamaicensis*  
*Cathartes aura meridionalis*  
*Pandion haliaetus*  
*Elanus caeruleus* (PR) (W)  
*Circus cyaneus*  
*Accipiter striatus velox*  
*A. cooperii*  
*Buteo platypterus* (E)  
*B. swainsoni* (W)  
*B. albonotatus* (PR) (W)  
*B. jamaicensis calurus*  
*Falco sparverius sparverius*  
*F. columbarius*  
*F. femoralis* (PR) (W)  
*F. peregrinus*  
*Porzana carolina*  
*Gallinula chloropus* (PR)  
*Fulica americana* (PR)  
*Phuvalis squatarola*  
*Charadrius wilsonia* (PR)  
*C. semipalmatus*  
*C. vociferus*  
*Haematopus palliatus* (PR)  
*Recurvirostra americana*  
*Tringa melanoleuca*  
*T. flavipes*  
*Catoptrophorus semipalmatus*  
*Heteroscelus incanus*  
*Actitis macularia*  
*Numenius phaeopus*  
*N. americanus*  
*Limosa fedoa*  
*Calidris alba*  
*C. mauri*  
*C. minutilla*
- Limnodromus griseus*  
*L. scolopaceus*  
*Gallinago gallinago*  
*Stercorarius pomarinus*  
*Larus atricilla*  
*L. delawarensis*  
*Sterna nilotica* (PR)  
*S. caspia*  
*S. maxima*  
*S. sandvicensis*  
*S. hirundo*  
*S. forsteri*  
*Chlidonias niger*  
*Zenaida asiatica asiatica, Z. a. mearsi* (W)  
*Z. macroura carolinensis*  
*Athene cucularia* (W)  
*Chordeiles acutipennis texensis* (W)  
*Caprimulgus vociferus vociferus*  
*Chaetura vauxi vauxi* (W)  
*Calothorax lucifer* (W)  
*Archilochus colubris* (E)  
*\*Stellula calliope* (W)  
*Selasphorus platycercus* (PR) (W)  
*\*S. rufus* (W)  
*Ceryle alcyon*  
*Sphyrapicus varius*  
*Contopus pertinax pallidiventris* (W)  
*Empidonax flaviventris* (E)  
*E. albigularis timidus* (W, Mexican)  
*E. minimus* (E)  
*E. hammondii* (W)  
*E. oberholseri* (W)  
*\*E. wrightii* (W)  
*\*E. difficilis difficilis* (W)  
*Sayornis phoebe* (E)  
*Myiarchus cinerascens* (PR) (W)  
*M. crinitus* (E)  
*Tyrannus verticalis* (W)  
*T. forficatus* (W)  
*\*Eremophila alpestris diaphora*  
*Tachycineta thalassina* (PR) (W)  
*Troglodytes aedon aedon, T. a. parkmanii*  
*\*Cistothorus palustris*  
*Regulus calendula*  
*Polioptila caerulea caerulea, P. c. deppei*  
*Catharus ustulatus ustulatus, C. u. oedicus*  
*C. guttatus*  
*Hylocichla mustelina* (E)  
*Turdus migratorius propinquus*  
*Dumetella carolinensis* (E)  
*Anthus spinoletta*  
*Bombycilla cedrorum*  
*\*Phainopepla nitens* (W)  
*\*Lanius ludovicianus excubitorides* (one Guatemala record)  
*Vireo griseus* (E)  
*V. bellii*

- \**V. atricapillus* (W)  
*V. solitarius solitarius*, *V. s. cassinii*, *V. s. plumbeus*  
*V. flavifrons* (E)  
*V. gilvus gilvus*, *V. g. swainsonii*, *V. g. brewsteri*  
*Vermivora peregrina* (E)  
*V. celata*  
*V. ruficapilla*  
 \**V. virginiae* (W)  
*Parula americana* (E)  
*Dendroica petechia* (PR)  
*D. pensylvanica* (E)  
*D. magnolia* (E)  
*D. coronata*  
 \**D. nigrescens* (one Guatemala record) (W)  
*D. townsendi* (W)  
*D. occidentalis* (W)  
*D. virens* (E)  
*D. graciae graciae* (W)  
*D. discolor* (E)  
*D. palmarum* (E)  
*Mniotilta varia* (E)  
*Setophaga ruticilla* (E)  
*Helmitheros vermivorus* (E)  
*Seiurus aurocapillus* (E)  
*S. noveboracensis* (E)  
*S. motacilla* (E)
- Oporornis formosus* (E)  
*O. tolmiei* (W)  
*Geothlypis trichas* (PR)  
*Wilsonia citrina* (E)  
*W. pusilla*  
*Cardellina rubrifrons* (W)  
*Icteria virens*  
*Piranga rubra*  
*P. ludoviciana* (W)  
*Pheucticus ludovicianus* (E)  
 \**P. melanocephalus maculatus* (W)  
*Guiraca caerulea caerulea*, *G. c. salicaria*,  
*G. c. interfusa*  
*Passerina cyanea* (E)  
*P. ciris* (E)  
*Spiza americana* (E)  
*Spizella passerina arizonae*  
 \**S. pallida* (one Guatemala record) (W)  
*Poocetes gramineus*  
*Chondestes grammacus*  
*Passerculus sandwichensis* (PR)  
*Ammodramus savaannarum* (PR)  
*Melospiza lincolni*  
*Xanthocephalus xanthocephalus* (W)  
*Euphagus cyanocephalus* (W)  
*Icterus spurius* (E)  
*I. cucullatus* (PR) (W)  
*I. galbula*

In addition, the breeding populations of at least *Egretta rufescens*, *Tyrannus crassirostris*, \**Mimus polyglottos*, \**Molothrus ater*, and \**Icterus parisorum* are augmented by winter resident individuals of the same race from the north. Interestingly, for these five species and those 25 listed as trinomials above (excluding the nonbreeding *Catharus ustulatus*), the breeding races are all (except *Chordeiles acutipennis*?), permanent, not summer, residents (see Transient Migrants).

Seventeen species reach essentially the southernmost limits of their entire North American ranges in Oaxaca (species, not just races, marked above by asterisks [\*]). Twelve of these (asterisked species marked W, plus *Puffinus auricularis* and *Icterus parisorum*) are primarily western North American in their breeding distributions; none is strictly eastern; and five are widespread in the east and west but are represented in Oaxaca by western races (*Cistothorus palustris laingi*, *Mimus polyglottos leucopterus*, *Lanius ludovicianus excubitorides*, and *Molothrus ater obscurus*) or Mexican races (*Eremophila alpestris diaphora* and *E. a. oaxacae*). Except for *Puffinus auricularis* (ocean), *Eremophila alpestris* (savanna), *Cistothorus palustris* (marsh), and *Vireo atricapillus* (tropical semideciduous forest), all winter primarily in the Interior Region in various high-elevation pine-oak habitats or arid subtropical scrub. These habitats are grossly similar to those on their breeding grounds, especially in relation to physiognomy and climate. Both habitats are discontinuous across the Isthmus of Tehuantepec, and arid subtropical scrub is scarce to the east. Possibly the Isthmus, at least historically, played some role in shaping the winter distributions of these species.

An examination of the 109 landbird species listed in the column above reveals

some interesting facts. Forty-two (species not marked E or W) have breeding distributions that encompass much of both eastern and western North America north of Mexico and will not be discussed further. Thirty (binomials marked E) that do not breed in Oaxaca are principally eastern North American in their nesting distributions (although some, e.g., *Mniotilta varia*, range far to the northwest). In Oaxaca all but two (*Archilochus colubris* and *Empidonax minimus*) avoid the Interior, wintering almost exclusively in the lowlands and adjacent lower mountain slopes of the Atlantic and Pacific Regions, primarily in humid forests and related habitats. The forest species that reach the Pacific Region are most abundant in tropical semideciduous and Pacific swamp forests rather than more arid habitats. Ten of the 30 appear to be restricted to specific areas: *Wilsonia citrina*, Atlantic Region; *Hylocichla mustelina* and *Vireo griseus*, Pacific Region east of the Isthmus and Atlantic Region; *Sayornis phoebe* and *Myiarchus crinitus*, Pacific Region east of the Isthmus (but *S. phoebe* probably occurs throughout the state); *Buteo platypterus* and *Vermivora peregrina*, throughout the Pacific Region (but they probably winter in the Atlantic Region as well); and *Dendroica discolor*, *D. palmarum*, and *Spiza americana*, Pacific Region west of the Isthmus (*D. discolor* winters elsewhere in Mexico only in Quintana Roo). The remaining 20 species winter throughout the lower portions of both the Atlantic and Pacific Regions, but most are more common in the former area. The commonest species in the Pacific Region west of the Isthmus (*Mniotilta varia*, *Setophaga ruticilla*, *Seiurus noveboracensis*, *Passerina cyanea*, *P. ciris*, and *Icterus spurius*) are also the commonest in northwestern Mexico. Only *Empidonax flaviventris*, *Myiarchus crinitus*, and *Dendroica discolor* seem not to have been recorded in Pacific Mexico northwest of Oaxaca, although a number of others are rare there.

Twenty-nine other landbirds (binomials marked W) that do not breed in Oaxaca are primarily western North American in their breeding distributions. These exhibit quite a different pattern. All but *Oporornis tolmiei* and *Piranga ludoviciana*, which are rather widespread in the lowlands and highlands throughout the state, and *Elanus caeruleus*, which is regular in the Atlantic lowlands, winter almost exclusively in the Pacific and/or Interior Regions, where they occupy habitats resembling, at least broadly, those on their breeding grounds. *Buteo swainsoni*, *B. albonotatus*, *Falco femoralis*, *Athene cunicularia*, *Tyrannus verticalis*, *T. forficatus*, and *Xanthocephalus xanthocephalus* winter almost entirely in open habitats of the Pacific lowlands, *Vireo atricapillus* in the adjacent lower mountain slopes (where, strangely, it inhabits tropical semideciduous forest), and *Myiarchus cinerascens* (arid scrub) and *Euphagus cyanocephalus* (openings) in the Pacific lowlands and Interior. The remaining 16 occur principally in the Interior (a few ranging down into the uppermost montane limits of the Atlantic and Pacific Regions), where all but one (*Icterus cucullatus*) occupy various pine-oak habitats and arid subtropical scrub.

Finally, among the 23 landbird species that breed in Oaxaca (trinomials, excluding *Catharus ustulatus*), 8 (trinomials marked W) have their affinities with western North America and none with the east. This, together with the fact that none of the 30 purely eastern birds breeds in the state, reflects the difference in habitats, eastern North America having extensive, temperate, broad-leaved deciduous forest and mixed forest, habitats absent in Oaxaca, and western North

America supporting extensive pine-oak and arid scrub habitats similar to those in Oaxaca.

The only systematic study involving winter residents in Oaxaca was conducted by Graber and Graber (1959) during December 1957 on the Atlantic side of the Isthmus. They found that 21% of the low understory avifauna and 23% of all the avifauna were northern migrants (numbers approximate because of some mis-identifications).

*From "south."*—Three winter residents are believed to come from breeding grounds near or south of Oaxaca:

*Puffinus lherminieri* (race *subalaris* from the Galapagos)

*Ara macao* (from Veracruz?)

*Hylocharis eliciae* (from Chiapas or Veracruz?)

*Oceanites oceanicus* must also come from the south, but all other pelagic birds are known to, or are more likely to, represent northern breeding populations.

#### TRANSIENT MIGRANTS

Forms of 37 species are primarily transient migrants that breed north and winter south of Oaxaca. A few of these have been recorded once or twice in winter; species most likely to be found wintering regularly, judging from their extralimital ranges, are marked Wi. About half of the 37 have been recorded only during spring, which I believe is a result of inadequate fall coverage; only *Calidris fuscicollis* has migration routes that might preclude regular fall occurrence. No transient migrants breed south and winter north of Oaxaca. The transient migrants are:

*Pluvialis dominica*

*Tringa solitaria* (Wi)

*Limosa haemastica*

*Arenaria interpres* (Wi)

*Calidris canutus* (Wi)

*C. pusilla*

*C. fuscicollis*

*C. bairdii*

*C. melanotos*

*C. himantopus* (Wi)

*Phalaropus tricolor*

*P. lobatus*

*Stercorarius longicaudus*

*Larus pipixcan*

*Xema sabini*

*Sterna elegans* (Wi)

*Coccyzus erythrophthalmus* (E)

*C. americanus*

*Caprimulgus carolinensis* (Wi) (E)

*Chaetura pelagica* (E)

*Contopus borealis* (Wi)

*C. sordidulus peninsulae*

*C. virens* (E)

*Empidonax virescens* (E)

*E. traillii* (Wi)

*Tyrannus tyrannus* (E)

*Progne subis*

*Riparia riparia*

*Hirundo pyrrhonota tachina*

*H. rustica* (Wi)

*Catharus ustulatus swainsoni*

*Vireo philadelphicus* (E)

*V. olivaceus* (E)

*V. flavoviridis forreri*

*Dendroica fusca* (E)

*Oporornis philadelphia* (E)

*Wilsonia canadensis* (E)

Interestingly, the breeding races of *Contopus sordidulus*, *Hirundo pyrrhonota*, and *Vireo flavoviridis* are only summer residents, a situation that contrasts with that of winter residents, noted previously, for which the breeding forms are all (but one?) permanent residents.

The above columnar list includes 21 species of landbirds. Excluding the 3

breeding and 1 wintering species (all listed as trinomials), 11 (marked E) are primarily eastern North American in their breeding distributions, 6 both eastern and western, and *none* strictly western. Only 1 of the 11 eastern birds (*Coccyzus erythrophthalmus*, two records) occurs in the Pacific Region west of the Isthmus, and all but *Chaetura pelagica* and *Empidonax virescens* have been recorded in Pacific Guatemala. All six of the eastern–western species are widespread in Pacific Oaxaca. Thus, it is clear that in spring some individuals of these eastern birds migrate north along the Pacific slope of Central America, pass through the low gap afforded by the Isthmus of Tehuantepec, and continue across the Gulf of Mexico or up the Gulf coast. Presumably, these birds follow the same route in fall, but the data are too fragmentary to assess.

The same Isthmus route is followed by at least one other transient migrant (*Larus pipixcan*) and a number of winter residents. A light “fallout” on 3 April 1964 at my collecting station in cloud forest at 4,900 ft elevation 12 mi north-northeast of Zanatepec produced 1 *Hylocichla mustelina*, 2 *Vermivora peregrina*, 7 *V. ruficapilla*, and 10 *Dendroica virens*. Phillips (1962a:310) has seen “great flocks” of *Spiza americana* on the Pacific side of the Isthmus passing to the southeast in August.

*Larus pipixcan* crosses the Isthmus at least in spring. In the Pacific Region on the west side of the Isthmus, Coffey (1960:293) saw 110 at Tehuantepec City on 22 May 1953; Lenna (1963) saw two flocks of about 100 each at Tehuantepec City on 27 April 1963; A. R. Phillips (in litt.) observed 150 drifting north on a strong wind near Juchitán during 20 min on 19 April 1960; and I noted 60 flying north at Juchitán on 16 May 1961, 80 birds 10 mi east of Tehuantepec City on 17 May 1961, 20 flying north 6 mi east of Tehuantepec City on 18 May 1961, a flock of 38 at the same city on 3 June 1959, and a flock of 260 flying north at La Ventosa on 19 May 1961. In the Pacific Region east of the Isthmus (on the south side of the Sierra Madre de Chiapas), I saw 5 gulls 13.6 mi west of Niltepec on 29 May 1959 and a flock of 75 birds 1.7 mi west of Niltepec on 3 June 1959. At Palomares in the Atlantic Region on the north side of the Isthmus, I observed a flock of 35 on 29 May 1959. My only fall sighting is of a swirling flock of 200 on 23 October 1961 at La Ventosa; although these appeared to be flying north, they might simply have been searching out a nearby thermal.

Raptors also use this flyway, at least in spring (19 March–19 April). On 19 March 1964 at Zanatepec, I witnessed what I believe to have been a migration of *Cathartes aura*. During the few minutes in which I watched, two single vultures and two loose groups of 7 and 8 coasted west along the foothills of the Sierra Madre de Chiapas; they flew in a direct line and were so high as to be barely perceptible to the unaided eye. Two unidentified hawks exhibited the same behavior. A. R. Phillips (in litt.; hours and bird numbers approximate) observed migrating raptors in the Isthmus region in 1960. On the Atlantic side at and near Matías Romero, he saw the following: 22 March, 1300 to 1315 h, 75 *Cathartes aura*, 200 *Accipiter striatus*; 28 March, 1110 and again 1155 h, 150 *C. aura*, 150 *A. striatus*, “40 *Buteo (swainsoni?)*”; and 31 March, 1020 h, 70 *C. aura*, 140 *A. striatus*. In the Pacific Region east of the Isthmus 11 mi “north” of Tapanatepec, he saw 45 *C. aura* and 205 *A. striatus* from 1015 to 1020 h on 1 April. Farther west, near Juchitán, he noted 10+ *C. aura*, 20+ *A. striatus*, and some *Buteo swainsoni* and *Falco sparverius* on 19 April. The directions of movement were

north, northwest, west-northwest, and west near Matías Romero; southwest near Tapanatepec; and north, northwest, and west-northwest near Juchitán. My Zanatepec birds were flying west. Thus, one major flyway for raptors seems to be from the foothills on the south side of the Sierra Madre de Chiapas, north across the Isthmus, and thence northwest in the Atlantic Region.

#### VISITANTS

One species has been recorded only as a nonbreeding spring and summer visitant, perhaps from breeding grounds in nearby Atlantic Mexico:

*Rostrhamus sociabilis*

Some pelagic species might prove to be winter visitants.

#### VAGRANTS

Three species are outside their normal ranges and have been recorded so infrequently that they can only be vagrants to Oaxaca:

*Harpia harpyja*

*Dendroica striata*

*Eumomota superciliosa*

Vagrant lists for most (all?) well known regions of North America are quite large in relation to other categories, and it is safe to say that in Oaxaca this is the one most likely to be greatly increased by future field work.

#### SUMMER RESIDENTS

Forms of 11 species are only summer residents in Oaxaca, arriving from mid-February to May, breeding, and then leaving to winter south of the state: *Ictinia plumbea*, *Sterna antillarum*, *Chordeiles minor*, *Cypseloides rutilus*, *Elaenia flavogaster*, *Contopus sordidulus sordidulus*, *Myiodynastes maculatus*, *M. luteiventris*, *Legatus leucophaius*, *Hirundo pyrrhonota swainsoni*, and *Vireo flavoviridis flavoviridis*.

An additional 22 breeding species are virtually unrecorded in winter but are presumed to be permanent residents, the lack of winter dates probably being an artifact of incomplete coverage. Five of these are particularly suspected of being only summer residents: *Cathartes burrovianus*, *Amaurolimnas concolor*, *Caprimulgus maculicaudus*, *Cypseloides niger*, and *Panyptila sanctihieronymi*. Forms that are summer residents in only part of Oaxaca are treated under Internal Movements.

Some species that are primarily winter residents or transient migrants in Oaxaca have been recorded as nonbreeding summer residents (or visitants?): *Anas discors*, *A. clypeata*, *A. americana*, *Aythya affinis*, *Pandion haliaetus*, and *Empidonax traillii*. Doubtless many others, especially pelagics, ducks, and shorebirds, will be added to this list in the future.

#### INTERNAL MOVEMENTS

The breeding birds of Oaxaca exhibit a variety of local movements within the state; some are true short-distance migrations, in the sense that they are annual and the birds presumably return to their places of origin, and others are irregular wanderings of uncertain nature.

### VERTICAL MIGRANTS

At least 20 breeding species undertake annual winter movements from the highlands into the adjacent lowlands. No species seems to leave the breeding grounds entirely, although I suspect some might vacate the highest elevations. These 20 are: *Amazona finschi* (HPOF), *Campylopterus curvipennis* (TEF), *C. hemileucurus* (CF), *Amazilia beryllina* (POF), *Eupherusa eximia* (CF), *Trogon collaris* (CF), *Rhynchocyclus brevirostris* (CF), *Mitrephanes phaeocercus* (POF), *Empidonax albigularis albigularis* (ASS), *Pachyramphus major* (CF), *Myadestes unicolor* (CF), *Catharus aurantiirostris* (CF-HPOF), *Turdus assimilis* (CF), *Melanotis caerulescens* (POF), *Ptilogonys cinereus* (POF), *Myioborus miniatus* (CF-HPOF), *Basileuterus culicivorus* (TEF), *Piranga leucoptera* (CF), *Chlorospingus ophthalmicus* (CF), and *Icterus graduacauda* (POF).

Vertical migration in low latitudes is an accepted phenomenon, despite the paucity of documentation. In Oaxaca, however, it is not a truly tropical phenomenon, instead involving six species that inhabit temperate pine-oak forests (POF and HPOF on lists), nine subtropical cloud forest (CF), and two cloud forest plus humid pine-oak forest (CF-HPOF). Even the two species that breed in tropical evergreen forest (TEF) are largely confined to the marginally subtropical montane portions of that habitat. The final species, *Empidonax albigularis*, seems to breed mostly in arid subtropical scrub (ASS) of the Interior.

Vertical migration in Oaxaca is correlated with the Northern Hemisphere winter rather than the tropical dry season. From mid-November to mid-March cold *nortes* sweep southward off the Gulf of Mexico, bringing rain, strong winds, and appreciably lower temperatures to the highlands (and even lowlands), especially the Atlantic versant of the Sierras de Juárez and Zempoaltepec. The dry season covers approximately the same period, mid-May to mid-October. Although the wintering dates for vertical migrants are too few to discern any correlation, the difference in spring timing of the two phenomena seems significant. Breeding in most of the 20 species begins in mid-March or early April, just after the *nortes* end, and is in full swing by early May. This is the driest period of the year, when vertical migrants, if responding to dryness, should still be in winter quarters. Further, individuals of 17 of the 20 species are known to leave the Sierras de Juárez and Zempoaltepec, the very areas most affected by *nortes*, whereas the Pacific mountains west of the Isthmus are much less affected, as are the birds, only 5 of the 20 moving.

As noted above, 17 (85.0%) of the 20 species breed in temperate pine-oak forest, subtropical cloud forest, or both. Humid pine-oak and cloud forest, however, remain moist even during the dry season; only the temperature drops. Because these highland habitats are already cool in summer, perhaps any further decrease makes them less than optimally habitable. This might be especially true for subtropical birds, which might be adapted to a narrow range of temperatures and thus be more affected by variation; significantly, 25.0% of all cloud forest birds, but only 7.7% of pine-oak species, undertake vertical migration.

### LOCAL MIGRANTS

Perhaps the most interesting phenomenon in this analysis concerns local migration of supposedly permanent residents from the Atlantic Region to the Pacific

Region, especially to the Pacific versant of the Sierra Madre de Chiapas. This area, encompassing such localities as Santa Efigenia, Tapanatepec, Rancho de Cacoprieto, and Cerro Baúl, has been worked intensively by Lamb, Rook, Rowley, Schaldach, Sumichrast, and my own field parties and is as well known as any place in Oaxaca. Thus the pattern described here appears real.

Four species that in Oaxaca are believed to breed only in the Atlantic Region are winter residents in the Sierra Madre de Chiapas (extreme dates of record in parentheses): *Campylopterus hemileucurus* (22 November–23 February), *Anthracothorax prevostii* (1 October; 5 December–1 February), *Amazilia candida* (2 December–7 February), and *Euphonia hirundinacea* (24 January–13 February; 2, 4 May). *Ara macao* (21 December–14 February), never known to breed in the state and now largely extirpated, formerly wintered in this area (as well as west of the Isthmus), presumably from breeding grounds in Atlantic Mexico. *Hylocharis eliciae* (6 November–9 December) is not known from Atlantic Oaxaca but breeds in the Sierra Madre de Chiapas of Chiapas and is said to occur in Veracruz (Friedmann et al. 1950:169).

Another 13 species thought to breed only in the Atlantic Region or (*H. leucotis*) in the mountains west of the Isthmus are only casual visitants to the Sierra Madre de Chiapas of Oaxaca. Four (marked \*) do not breed on the Pacific slope of Chiapas or Guatemala and thus must come from the Atlantic slope. These 13 are *Accipiter bicolor* (December, immature), \**Pionus senilis* (14 April), \**Phaethornis superciliosus* (1 February, Atlantic race *veraecrucis*), *Hylocharis leucotis* (22 November), *Amazilia tzacatl* (13 April), *Hylomanes momotula* (25 April), *Chloroceryle aenea* (19 April), *Mionectes oleagineus* (30 November), \**Rhytipterna hole-rythra* (31 January), \**Tityra inquisitor* (18 January), *Vireolanius pulchellus* (29 November), *Thraupis abbas* (two birds on 7 April), and *Habia fuscicauda* (12 February). Finally, *Myiarchus tyrannulus* breeds in the Sierra Madre de Chiapas of Oaxaca but seems to be more common there in winter than in summer.

At the same time of year when these 20 species occur in the Sierra Madre de Chiapas, at least six are less common or absent on their breeding grounds in the Atlantic Region of Oaxaca. *Campylopterus hemileucurus* (which is also a vertical migrant) is unrecorded from 22 November to 30 January, *Anthracothorax prevostii* from 16 August to 2 March, and *Amazilia candida* from 22 November to 12 February (and is less common from mid-July through mid-November). *Pionus senilis* was absent near Valle Nacional from at least 14 February to 25 March 1961 but fairly common thereafter. *Myiarchus tyrannulus* is unrecorded from 16 June to 2 March, and near Valle Nacional was missing from at least 14 February to 19 March 1961 but fairly common thereafter. *Euphonia hirundinacea* is generally less common in winter and near Valle Nacional in 1961 was more abundant after 5 March.

Four other species might fit the same pattern, but data are less conclusive. *Cyanerpes cyaneus* currently is known only as a presumptive breeder in the Sierra Madre de Chiapas and Sierra de Miahuatlán. However, in the Atlantic Region it is common from February or March to July but generally very uncommon or locally absent from August to January; it was unrecorded near Valle Nacional from 14 February to 8 March 1961 but common thereafter (males arrived 9 March, females 25 March). *Amazilia beryllina*, *Icterus maculialatus*, and *Amblycercus holosericeus* are not known to breed in the Sierra Madre de Chiapas, the first

having been recorded only in its nonbreeding season (12 April, 19 January–23 February), the second time (20 January, 3 April), and the last three times (27 March, 12 May, and “May”).

The Pacific Region west of the Isthmus seems to receive many fewer such dispersants. Four tropical evergreen forest birds have been recorded: *Ara macao* at a point 16 mi south of Matías Romero (19 January) and at Puerto de Huatulco (9 March); *Amazilia candida* in the Sierra de Miahuatlán (24 November, 8 December) and near Chivela (7 January); *Euphonia hirundinacea* between Juchitán and Rancho Las Animas (five records, 20 October to 14 February); and *Icterus dominicensis*, which is not known from the Pacific slope of Chiapas or Guatemala, at Chihuitán (1 December). A single record for *Attila spadiceus* (Rancho Las Animas, 15 February) might also fit this category; this species breeds in the humid and arid lowlands of both slopes. *Progne chalybea* is only a summer resident in the Atlantic Region (2 March–3 July); in winter it becomes more common in the Pacific Region west of the Isthmus (where it also breeds); the lack of Oaxaca records from 25 August to 22 October probably is an artifact of incomplete coverage.

Of all the above species, *Hylocharis leucotis* breeds in highland pine-oak forest, *Campylopterus hemileucurus* primarily in cloud forest but apparently also in tropical evergreen forest of the Isthmus, and the rest in tropical regions, mostly in tropical evergreen forest.

Emigration from the Atlantic Region into the warmer drier Pacific Region correlates approximately with the height of the *nortes* season, as discussed under vertical migration. That seven of the species above, as well as three (*Campylopterus curvipennis*, *Amazilia beryllina*, *Eupherusa eximia*) that undertake vertical migration, are hummingbirds is, I suspect, no coincidence. These cold fronts could well account for the evolution of migratory behavior in birds as small and ill-adapted for cold as some tropical hummingbirds. Whether the larger species are responding to the same stimulus is less certain. Significantly, only one species characteristic of tropical deciduous forest or arid tropical scrub, *Turdus rufopalliatus* (see below), has been recorded in the Atlantic Region; the *nortes* have little effect on the Pacific Region or its birds.

#### VISITANTS

Eleven species normally restricted to the Atlantic and/or Pacific lowlands have been found as visitants to the arid Interior highlands (dates of each record in parentheses): *Tachybaptus dominicensis* (23, 27 May), *Phalacrocorax olivaceus* (25 May), *Casmerodius albus* (28 May), *Egretta rufescens* (ca. 20 October), *Chondrohierax uncinatus* (25 May), *Buteogallus anthracinus* (October, 12 February), *Falco rufigularis* (13 August, date unknown), *Tyrannus melancholicus* (7 May), *Tachycineta albilinea* (29 April), *Turdus assimilis* (13, 23 June), and *Thraupis abbas* (11 December). The seven species recorded from April to June are known to breed at that time, but not in the Interior. The ovary of the *Tyrannus melancholicus* specimen was undeveloped. The single *Egretta rufescens*, an immature banded in Texas, apparently wandered off course during migration. See also, aquatic habitats in Analysis of the Breeding Avifauna. See Local Migrants.

## MISCELLANEOUS

The wanderings of some other species cannot be classified at this time. Some aquatic birds normally restricted to the Pacific coast in Oaxaca, wander inland: *Ajaia ajaja* (19 April) and *Mycteria americana* (3 June) have been recorded once each in the Atlantic lowlands, where they might be postbreeding visitants from either the Pacific coast or from colonies in Veracruz; one *Rynchops niger* was seen on a pond 12 mi inland in southwestern Oaxaca; and one *Egretta rufescens* was taken at Tehuantepec City (28 October). *Hylocharis leucotis* (22 November), *Lampornis clemenciae* (mid-May), and *Eugenes fulgens* (hummingbirds again!) occasionally move from pine-oak forest into arid subtropical scrub at lower elevations, but whether this is true vertical migration or just local, perhaps postbreeding, wandering is unknown. Records for *Melanerpes chrysogenys* at Tehuantepec City (10 November) and *Turdus rufopalliatu*s near Matías Romero (14, 22 March), where neither breeds, probably represent irregular postbreeding dispersal to the south of their normal ranges. *Stelgidopteryx serripennis psammochrous* is said to be only a summer resident (June–October) in the San Juan Bautista Cuicatlán valley, but where it goes nobody knows. *Salpinctes obsoletus* has been recorded twice (June 1872, 6 July 1927) in the Pacific lowlands east of the Isthmus; perhaps it once bred there, but it is known to wander elsewhere in its range. Finally, records of two cloud forest species, *Grallaria guatemalensis* (21 January, 15 February, 3 June) and *Chlorophonia occipitalis* (19 February) in the Atlantic lowlands of the Isthmus might represent nonbreeding visitants or vertical migrants (*G. guatemalensis* might breed).

## TYPE LOCALITIES

This is a list of Oaxaca type localities for (1) all forms here considered taxonomically valid, (2) selected synonyms, and (3) certain forms for which the type locality was at one time but is no longer considered to be in Oaxaca. Forms in the last two categories are enclosed in brackets ([ ]); I have not made an exhaustive search for these, but most are included. Valid forms endemic to the state are unbracketed and marked with asterisks (\*); asterisks within brackets denote the 23 races that would be endemic if considered valid.

For those forms that I do not recognize, the first name is the synonym exactly as given by the original author; this is followed by the current name and a reference to a reviser. In all other cases, I give only currently recognized names. Citations to original descriptions not given here are found in Friedmann et al. (1950) or Miller et al. (1957).

Localities in quotation marks are as published by the cited authors; all other localities are mine. The first locality is that in the original published description according to (1) the original publication as cited after the name of the form or (2) other authors as cited. The locality given immediately after the last equals sign (=) is the one I consider correct; for further discussion of these place names, see my Gazetteer. In no case have I “restricted” type localities, which is the province of a “first reviser.” I do emend and further delineate them.

I have attempted to give the number of types on which names have been based, but in some cases have not been able to tell from the original description; for

some forms, subsequent authors might have designated lectotypes without my knowledge. Unless otherwise noted, I give museum specimen numbers for only those types that I have examined myself. The unreliability of data on specimens collected by Mario del Toro Avilés is discussed in the Plan of the Species Accounts.

Ninety valid forms (those not enclosed in brackets) have been described from Oaxaca. Of these, 1 species (*Eupherusa cyanophrys*) and 30 subspecies are endemic to the state (*Aimophila notosticta* might also prove to be; see Species Account). Of the 59 nonendemic valid forms, 23 are full species (including the monotypic genus *Deltarhynchus*) and 36 are races.

[*Crypturellus soui meserythrus* (Sclater 1859b:392). Two syntypes from "In statu Oaxaca reipublicae Mexicanae . . . Playa Vicente" = Playa Vicente, Veracruz (see Gazetteer and Brodkorb 1943:21).]

*Crypturellus boucardi boucardi* (Sclater 1859b:391). Two syntypes from "In statu Oaxaca reipubl. Mexicanae . . . Playa Vicente . . . and . . . Teotalcingo" = Teotalcingo, Oaxaca (Hellmayr and Conover 1942:73). Playa Vicente is in Veracruz.

[*Buteo magnirostris griseocauda* Ridgway (1873a:87–88). Fourteen syntypes from "Mexico, from the Atlantic to the Pacific, from Yucatan and Mirador to Mazatlan and Colima . . . ; Rio Seco and Tehuantepec" = "Mirador, Veracruz" (restriction by Brodkorb 1940a:1). As pointed out by Brodkorb, Río Seco is not in Oaxaca, as often stated in the literature, but in Veracruz.]

\**Micrastur ruficollis oaxacae* Phillips (1966:91). Two syntypes from "1 km. W. of San Gabriel Mixtepec, and Km. 183, near top of highest ridge to north (below San Juan Lachao, Pueblo Viejo), south-western Oaxaca (ca. lat. 16°5–13'N. long. 97°7'W.)." The "Km." means kilometer marker; "to north" means to north of San Gabriel Mixtepec (A. R. Phillips in litt.); the "5–13'" is not a range of minutes but rather the locations of the two localities, respectively. I do not place a comma between Lachao and Pueblo.

[*Ortalis vetula fulvicauda* Miller and Griscom (1921:47) = *Ortalis vetula vetula* (Wagler); see Vaurie (1965:32). Holotype from "Tolosa, Oaxaca, Mexico."]

\**Dendrortyx macroura oaxacae* Nelson (1897:43). Holotype (USNM 155565) from "Totontepec, Oaxaca, Mexico."

\**Dendrortyx macroura inesperatus* Phillips (1966:91). Holotype from "Río San Marcial below San Miguel Suchixtepec, municipio de Miahuatlán, Oaxaca (ca. lat. 16°5'N. long. 96°26'W.)."

[*Dactylortyx thoracicus ginetensis* Warner and Harrell (1957:137), new name for *Odontophorus lineolatus* Gould = *Dactylortyx thoracicus chiapensis* Nelson; see Banks (1987:3–4). Holotype (AMNH 472630) from "Gineta Mountain (near Santa Efigenia), Oaxaca-Chiapas border, Mexico" = Sierra de la Gineta, Oaxaca-Chiapas border, Mexico. The original locality given by Warner and Harrell was later in the same paper attributed to Oaxaca. However, on the original label of the type, the collector, Sumichrast, wrote only "Gineta Mounts." Because this mountain range embraces parts of both Oaxaca and Chiapas, the state must remain unknown, although it probably was Chiapas, to which Sumichrast himself attributed most of his specimens labeled Gineta Mounts. (see Sierra de la Gineta in Gazetteer).]

\**Cyrtonyx montezumae rowleyi* Phillips (1966:92). Holotype from "Río San Mar-

cial below San Miguel Suchixtepec, municipio de Miahuatlán, Oaxaca (ca. lat. 16°5'N. long. 96°26'W.)."

[*Cyrtonyx Sumichrasti* Lawrence (1877:51) = *Cyrtonyx ocellatus* (Gould); see Ridgway and Friedmann (1946:402–403). Holotype (USNM 76983) from "Mountains of Santa Efigenia, Tehuantepec" = "Sta. Efigenia" (label of type) = "Santa Efigenia . . . Oaxaca" (Deignan 1961:68).]

\**Colinus virginianus atriceps* (Ogilvie-Grant 1893:424). Four syntypes from "Putla, W. Mexico" = Putla de Guerrero, Oaxaca. This race is said to range to central Guerrero (A.O.U. 1983:145), but I can find no record for that state and therefore treat it as endemic to Oaxaca.

\**Colinus virginianus harrisoni* Orr and Webster (1968:37). Holotype (CAS 65512) from "5.1 miles SW San Gabriel Mixtepec, 1,800 ft elevation, Oaxaca, Mexico."

\**Colinus virginianus thayeri* Bangs and Peters (1928:386). Holotype from "Chivela, Oaxaca, Mexico."

*Burhinus bistriatus bistriatus* (Wagler 1829:col. 648). Holotype from "Mexico" = "San Matteo [Oaxaca]" (Stresemann 1954:89; brackets his) = San Mateo del Mar, Oaxaca. Stresemann based his restriction on a specimen (BM) collected by Deppe in November 1825. This species occurs near San Mateo del Mar.

*Columba nigrirostris* Sclater (1859b:390). Holotype from "In statu Oaxaca reipubl. Mexicanæ" = "Oaxaca, Mexico" (Friedmann 1950:116) = state of Oaxaca. This species does not occur anywhere near Oaxaca City. Possibly the type actually came from Playa Vicente, which is in Veracruz, as did many of Bouchard's specimens on which Sclater based his new forms.

*Amazona finschi finschi* (Sclater 1864:298). Holotype from "In Mexico" = "Tehuantepec, Oaxaca" (restriction by Moore 1937:528) = Tehuantepec City, Oaxaca. Moore intended to designate the city, citing a specimen from there, not the Tehuantepec region or other general areas.

*Amazona oratrix* Ridgway (1887:587), new name for *Chrysotis levaillantii* Gray. Holotype (USNM 54206) from "Petapa, Oaxaca, Mexico." This locality is based on a male taken by Sumichrast on 25 October 1868; probably this is the more important town, Santo Domingo Petapa, rather than Santa María Petapa.

\**Morococcyx erythropygus mexicanus* Ridgway (1915:105). Holotype (USNM 29235) from "Juchitán, Oaxaca, Mexico."

\**Otus cooperi lambi* Moore and Marshall (1959:224). Holotype (MLZ 54407) from "Río Tehuantepec, 3000 feet, 2 miles west of Nejapa, Oaxaca, México" = Rancho Las Animas, along the Río Tehuantepec, 3,000 ft elevation, 2 mi west of Nejapa, Oaxaca. The locality Rancho Las Animas is given on the original label of the type, a male taken by Lamb on 27 September 1952.

*Pulsatrix perspicillata saturata* Ridgway (1914:758). Holotype (USNM 155672) from "Santo Domingo, Oaxaca, Mexico" = La Ranchería, in mountains about 12 mi by trail northwest of Santo Domingo Petapa, Oaxaca. According to the original label, the type was taken by Nelson and Goldman on 18 June 1895 at "Mts. near Santo Domingo," a locality further defined by Goldman (1951:224–225) as La Ranchería.

[*Asio magellanicus melancercus* Oberholser (1904:180) = *Bubo virginianus mesembrinus* (Oberholser); see Webster and Orr (1958:140). Holotype (USNM 59497) from "Tehuantepec City, Oaxaca, Mexico."]

- Glaucidium minutissimum occultum* Moore (1947:144). Holotype (MLZ 33803) from "Moctum (Mt. Zempoaltepec), Oaxaca, Mexico." The type locality is based on a specimen taken by del Toro Avilés and thus should be viewed with caution. I used the name Cerro Zempoaltepec.
- [*Ciccaba virgata squamulata* (Bonaparte 1850:53). Type(s) from "Mexico" = "Tehuantepec City, Oaxaca" (Peters 1940:153) = "Los Cues [Puebla]" (Stresemann 1954:89; brackets his) = country of Mexico. Peters (1940:153) says that Kelso's (1933:151) restriction of the type locality to "Tehuantepec City, Oaxaca" cannot stand, because the type resembles a specimen from Sinaloa. Kelso, however, made no such restriction, noting simply that "it is . . . likely that the type came from the region of Oaxaca," meaning the state. Thus, no one has restricted the type locality to Tehuantepec City. "Los Cues," referred to Puebla by Stresemann, probably pertains to San Juan Los Cues, Oaxaca, which is along the trail most likely taken by the collector Deppe in September 1825 (Stresemann 1954:87). *C. v. squamulata*, the northwestern Mexican race, is not otherwise known from that area or Puebla (Friedmann et al. 1950:147). Pending further evidence or restriction, I suggest the type locality remain simply the country of Mexico.]
- Ciccaba virgata centralis* Griscom (1929b:159). Holotype from "Chivela, Oaxaca, Mexico."
- Ciccaba nigrolineata* Sclater (1859e:131). Type(s) from "In Mexico Meridionali" = "Oaxaca" (Kelso; see Friedmann et al. 1950:147) = state of Oaxaca. This species does not occur near Oaxaca City.
- [\**Aegolius ridgwayi brodkorbi* Briggs (1954:180). Holotype (USNM 462871) from "Amatepec, Oaxaca, Mexico" = Amatepec, Oaxaca? The origin of the type, which was collected by del Toro Avilés, is questionable, as is the race itself (see Hypothetical List).]
- Caprimulgus vociferus oaxacae* Nelson (1900:260). Holotype (USNM 154735) from "Near City of Oaxaca, Oaxaca, Mexico." The type was taken by Nelson and Goldman. This locality is almost certainly below 7,500 ft elevation on the neighboring slopes of Cerro San Felipe (see Oaxaca City in Gazetteer).
- Chaetura vauxi warneri* Phillips (1966:94). Three syntypes from "3 km. W. of San Gabriel Mixtepec, Juquila, Oaxaca." Juquila is the political District.
- Cyananthus sordidus* Gould (1859:98). Syntypes from "Oaxaca, in Western Mexico" = state of Oaxaca. Salvin and Godman (1888–1904 [1892]:261) say "This species was described by Gould from specimens obtained in the State of Oaxaca by M. Boucard in 1856."
- [*Amazilia Sumichrasti* Salvin (1891:376) = probably an intergrade between *Amazilia beryllina beryllina* (Deppe) and *A. b. devillei* (Bourcier and Mulsant); see Friedmann et al. (1950:170). Holotype from "Tehuantepec, South Mexico" = "Santa Efigenia, Tehuantepec" (Salvin and Godman 1888–1904 [1892]:299) = Santa Efigenia, Oaxaca. According to Salvin and Godman, the type was taken by Sumichrast in December 1877.]
- Amazilia violiceps violiceps* (Gould 1859:97). Syntypes from "Oaxaca, in Western Mexico" = state of Oaxaca. As pointed out by Wetmore (1947:103), some authors (e.g., A.O.U. 1983:346) erroneously give "Atlixco, Puebla" as the type locality. Gould unequivocally gave Oaxaca, as substantiated by Salvin and Hartert (1892:196) and the collector Boucard (1895:112), the latter writing "This species was discovered by me, in 1857, at Oaxaca, South Mexico."

Although Boucard used the preposition "at," I think it best to consider the locality as the state of Oaxaca, because this species has not been recorded definitely from the Oaxaca Valley.

*Amazilia viridifrons viridifrons* Elliot (1871:267). Two syntypes (AMNH 38471–38472) from "Putla, Mexico" = Putla de Guerrero, Oaxaca. The types were taken by Boucard's friend E. Rébouch.

\**Amazilia violiceps wagneri* Phillips (1964:222) = *Amazilia viridifrons wagneri* Phillips; see Species Account. Two syntypes from "lat. 16 degrees 1' N, long. 97 degrees 4' 30"W. (approximately), Oaxaca."

[*Uranomitra atricapilla* Simon (1911:129) = *Amazilia viridifrons viridifrons* (Elliot); see Phillips (1964:221–222). Holotype from "Etat de Oaxaca" = state of Oaxaca.]

\**Eupherusa cyanophrys* Rowley and Orr (1964a:82). Holotype (AMNH 788920) from "11 miles south of Juchatengo, 4700 feet, Oaxaca, México" = 11 mi south of San Pedro Juchatengo, 4,700 ft elevation, Oaxaca. This is the only species endemic to Oaxaca.

*Eupherusa poliocerca* Elliot (1871:266). Holotype (AMNH 38583) from "Putla, Mexico" = Putla de Guerrero, Oaxaca. The type was taken by Boucard's friend E. Rébouch.

\**Lampornis viridipallens amadoni* Rowley (1968:2). Holotype (WFVZ 19278) from "Cerro Baúl, Lat. 16°37'N., Long. 94°10'W., 5,200 feet altitude, Oaxaca, México" = "6 km. N R. Vicente, canyon of Cerro Baul, 5200 ft." (label of type) = 6 km north of Colonia Rodolfo Figueroa, Canyon of Cerro Baúl, 5,200 ft elevation, Oaxaca. The coordinates given by Rowley (1968:2) are those of the summit of Cerro Baúl, not the Colonia or collecting locality; compare with Rowley (1968:1).

\**Lampornis amethystinus circumventus* (Phillips 1966:103). Two syntypes from "Km. 183, near top of highest ridge to north (below San Juan Lachao, Pueblo Viejo), south-western Oaxaca (ca. lat. 16°13'N. long. 97°7'W.)." The "Km." means kilometer marker; "to north" means to north of San Gabriel Mixtepec (A. R. Phillips in litt.). I do not place a comma between Lachao and Pueblo.

[*Delattria pringlei* Nelson (1897:51) = *Lampornis amethystinus margaritae* (Salvin and Godman); see Griscom (1937:194–195). Holotype (USNM 155219) from "15 miles west of Oaxaca City, Oaxaca, Mexico" = 15 mi southwest of Oaxaca City, Oaxaca (Goldman 1951:218; see also Nevería Herrera in my Gazetteer).]

\**Heliomaster longirostris masculinus* Phillips (1966:105). Two syntypes from "San Gabriel Mixtepec, south-western Oaxaca."

*Calothorax pulcher* Gould (1859:97). Syntypes from "Oaxaca, in Western Mexico" = state of Oaxaca. Although some specimens of this species apparently were taken by Boucard (1895:15), the collector of the types, in Oaxaca City, the original designation is unclear and best interpreted as the state of Oaxaca, as indicated by Salvin and Hartert (1892:391). See Oaxaca City in Gazetteer.

[*Trogon citreolus citreolus* Gould (1835:30). Type(s): no locality given = "Colima" (restriction by Cory 1919:328) = "Tehuantepec [,Oaxaca]" (Stresemann 1954: 89; brackets his) = Colima. Stresemann's restriction is erroneous, since according to A. J. van Rossem (*in* Brodtkorb 1942a:183), the types resemble birds from Sinaloa; also, birds from the Tehuantepec region are *T. c. sumichrasti*.]

[*Trogon violaceus braccatus* (Cabanis and Heine 1863:184). Type(s) from "Mex-

- ico" = "Valle Real [Veracruz]" (Stresemann 1954:89; brackets his) = Valle Real, country of Mexico. Valle Real probably is not in Veracruz, as usually believed, but in Oaxaca (see Gazetteer). In view of this controversy, I think it best for the present to refer it simply to the country of Mexico.]
- [*Hylomanes momotula momotula* Lichtenstein (1839; see citation in A.O.U. 1983: 368). Type(s) from "Valle Real, Mexico" = Valle Real, country of Mexico. See *Trogon violaceus* above.]
- Momotus mexicanus saturatus* Nelson (1897:49). Holotype (USNM 155151) from "Tehuantepec City, Oaxaca, Mexico."
- Eumomota superciliosa bipartita* Ridgway (1912:90). Holotype (USNM 145282) from "Cacoprieto, Oaxaca" = Rancho de Cacoprieto, Oaxaca.
- [*Aulacorhynchus prasinus prasinus* (Gould 1834:78). Two syntypes from "Mexico" = "Valle Real [Veracruz] . . . Pico de Orizaba (?)" (Stresemann 1954:89; brackets and question mark his) = Valle Real, country of Mexico. See *Trogon violaceus* above.]
- Melanerpes aurifrons polygrammus* (Cabanis 1862:326). Holotype from "St. Bartolo, Mexico" = "San Bartolo [Oaxaca]" (Stresemann 1954:89; brackets his) = San Bartolo Yautepec, Oaxaca. Authors after Cabanis have listed the type locality variously as "San Bartolo," "San Bartolomé," or "San Bartolomo." The type was collected, I believe, at San Bartolo Yautepec, which is the only town of similar name within the range of the race and is in the approximate geographical position of the "San Bartolo" where Deppe, enroute from Oaxaca City to Tehuantepec City, collected the type in October 1825 (Stresemann 1954: 87).
- [*Celeus castaneus* (Wagler 1829:col. 515). Syntypes: no locality given = "Valle Real [Veracruz]" (Stresemann 1954:89; brackets his) = Valle Real, country of Mexico. See *Trogon violaceus* above.]
- [\**Automolus pectoralis* Nelson (1897:54) = *Automolus rubiginosus guerrerensis* Salvin and Godman; see Ridgway (1911:216). Holotype (USNM 154672) from "Pluma, Oaxaca, Mexico" = Pluma Hidalgo, Oaxaca.]
- Dendrocincla homochroa homochroa* (Sclater 1859b:382). Holotype from "In statu Oaxacensi reipubl. Mexicanæ . . . Teotalcingo" = Teotalcingo, Oaxaca.
- \**Dendrocolaptes certhia sheffleri* Binford (1965:1). Holotype (LSUMZ 24410) from "19 mi. N Puerto Angel, Oaxaca, México, elevation 900 feet." This is road miles.
- [*Dendroornis flavigaster megarhynchus* (Nelson 1900:265) = *Xiphorhynchus flavigaster flavigaster* Swainson; see van Rossem (1939b:15). Holotype (USNM 154633) from "Puerto Angel, Oaxaca, Mexico."]
- [*Xiphorhynchus erythropygius erythropygius* (Sclater 1859d:366). Type(s) from "In Stat. Verae Crucis et Oaxaca reipubl. Mexicanæ" = "Jalapa, Vera Cruz" (Ridgway 1911:255) = Jalapa, Veracruz.]
- Microrhopias quixensis boucardi* (Sclater 1858:300). Type(s) from "Oaxaca . . . Acatepec." I have been unable to locate any Acatepec in Oaxaca (see Gazetteer) but think it should be referred to the state, as it was by Salvin and Godman (1888-1904 [1892]:216-217), until proven otherwise.
- Todirostrum sylvia schistaceiceps* Sclater (1859c:444). Holotype from "In Statu Oaxaca, reipubl. Mexicanæ" = state of Oaxaca. The type, collected by Boucard, almost certainly came from Playa Vicente, Veracruz, a locality consistently

- placed in Oaxaca by Sclater and given by him elsewhere (1859b:384) as the locality for a specimen of *T. s. schistaceiceps* taken by Boucard.
- \**Rhynchocyclus brevirostris pallidus* Binford (1965:5). Holotype (LSUMZ 33238) from "Minitán, 22 road mi. S Pinotepa Nacional, Oaxaca, México, at sea level." This is Santiago Pinotepa Nacional.
- Tolmomyias sulphurescens cinereiceps* (Sclater 1859c:443). Holotype from "In Statu Oaxaca, reipubl. Mex." = state of Oaxaca. The type was collected by Boucard, probably at Playa Vicente, Veracruz, a locality for *cinereiceps* later mentioned by Sclater (1859b:384) and considered by him to be in Oaxaca.
- Mitrephanes phaeocercus burleighi* Phillips (1966:110). Two syntypes from "Río Molino (ca. lat. 16°5'N. long. 96°29'W.) and its head near San Miguel Suchixtepec, southern Oaxaca."
- Empidonax affinis bairdi* Sclater (1858:301). Type(s) from "Oaxaca" = "La Parada, Oaxaca" (van Rossem 1934b:393–394).
- Empidonax difficilis occidentalis* Nelson (1897:53). Holotype (USNM 154599) from "Pluma, Oaxaca, Mexico" = Pluma Hidalgo, Oaxaca.
- [\**Empidonax difficilis annectens* Phillips (1966:109) = *Empidonax difficilis occidentalis* Nelson; see Traylor (1979a:143). Holotype from "km. 183, near top of highest ridge to north (below San Juan Lachao, Pueblo Viejo), south-western Oaxaca (ca. lat. 16°13'N. long. 97°7'W.)." The "km." means kilometer marker; "to north" means to north of San Gabriel Mixtepec (A. R. Phillips in litt.). I do not place a comma between Lachao and Pueblo.]
- [*Empidonax bairdi perplexus* Nelson (1900:263) = *Empidonax difficilis difficilis* Baird; see Moore (1940:369). Holotype (USNM 154569) from "Puerto Angel, Oaxaca, Mexico."]
- \**Empidonax fulvifrons brodkorbi* Phillips (1966:108). Holotype from "Río Molino (ca. lat. 16°5'N. long. 96°29'W.), southern Oaxaca."
- Myiarchus tuberculifer olivascens* Ridgway (1884:91). Holotype (USNM 57655) from "Sta. Efigenia, Tehuantepec" = "Santa Efigenia, Oaxaca" (Nelson 1904:48). The type was taken by Sumichrast on 25 December 1868 (Merry Christmas!).
- [*Myiarchus nuttingi nuttingi* Ridgway (in Nutting 1882:394). Six syntypes from "southwestern Mexico (Tehuantepec) to Costa Rica (Pacific side)" = "La Palma de Nicoya, W. Costa Rica" (Ridgway 1907:630) = "Hacienda La Palma, Golfo de Nicoya, western Costa Rica" (Traylor 1979a:202).]
- [*Myiarchus tyrannulus magister* Ridgway (1884:90). Two syntypes (the one from Mexico, USNM 57640) from "Camp Lowell, Arizona" and "Tehuantepec, Mexico" = "Camp Lowell, Arizona" (Nelson 1904:33). The only locality on the type from Mexico is "Tehuantepec," which refers to the Tehuantepec region; this specimen was taken by Sumichrast on 16 December 1868, on which date, according to my reconstruction of his itinerary, he collected specimens of other species at both Tapanatepec and Santa Efigenia, Oaxaca.]
- Deltarhynchus flammulatus* (Lawrence 1875:71). Holotype (USNM 91879) from "Mexico, 'Tehuantepec, Cacoprieto'" = Rancho de Cacoprieto, Oaxaca.
- [*Lipaugus unirufus unirufus* (Sclater 1859b:385). Type(s) from "In statu Oaxacensi Mex. Merid. . . in rep. Guatemalensi . . . Playa Vicente . . . Vera Paz . . . Coban" = "Playa Vicente, Veracruz" (Salvin and Godman 1888–1904 [1891]:130.)

- Eremophila alpestris oaxacae* (Nelson 1897:54). Holotype (USNM 145003) from "San Mateo del Mar, Oaxaca."
- Chiroxiphia linearis linearis* (Bonaparte 1838:113). Syntypes from "Mexico" = Santa Efigenia, Oaxaca (J. T. Zimmer, *in* Snow 1979:267).
- Hirundo pyrrhonota swainsoni* (Sclater 1858:296). Holotype from "Oaxaca" = "val. Oaxaca" (Phillips 1986:35) = Oaxaca Valley, Oaxaca.
- [\**Cyanocitta stelleri restricta* Phillips (1966:110) = *Cyanocitta stelleri coronata* (Swainson); see Species Account. Two syntypes from "Río Molino (*ca.* lat. 16°5'N. long. 96°29'W.), southern Oaxaca."]
- Cyanocorax yncas vivida* (Ridgway 1900:28). Holotype (USNM 144810) from "Pluma, Oaxaca" = Pluma Hidalgo, Oaxaca.
- \**Cyanolyca mirabilis hardyi* Phillips (1966:111). Two syntypes from "Río Molino (*ca.* lat. 16°5'N. long. 96°29'W.), southern Oaxaca."
- \**Aphelocoma unicolor oaxacae* Pitelka (1946:44). Holotype (MLZ 39121) from "Moctum, Oaxaca." The type was taken by del Toro Avilés, and hence its origin could be questioned; the race, however, appears to be valid on the basis of specimens taken by other collectors elsewhere in northern Oaxaca.
- Certhia americana alticola* Miller (1895:186), new name for *Certhia mexicana* Gloger. Type(s): no locality given = "Las Vigas, Veracruz" (Miller and Griscom 1925:7) = "Mountains near Oaxaca [,Oaxaca]" (Stresemann 1954:90; brackets his) = mountains near Oaxaca City, Oaxaca. Stresemann made his restriction on the basis of a specimen collected by Deppe in September 1825; this takes precedence over the earlier restriction to Las Vigas.
- [\**Certhia americana molinensis* Phillips (1966:125) = *Certhia americana alticola* Miller; see Webster (1986:201). Six syntypes from "Río Molino (*ca.* lat. 16°5'N. long. 96°29'W.), southern Oaxaca.]
- [\**Campylorhynchus zonatus impudens* (Bangs and Peters 1928:398) = *Campylorhynchus zonatus restrictus* (Nelson); see Selander (1964:153) and Species Account. Holotype from "Chivela, Oaxaca (600 feet)."]
- [\**Campylorhynchus zonatus vonbloekeri* Rowley (1968:3) = *Campylorhynchus zonatus restrictus* (Nelson); see Species Account. Holotype (WFWZ 19283) from "Rancho Minne, Cerro Baúl, Lat. 16°37'N., Long. 94°10'W., 3900 feet altitude, Oaxaca, México" = Rancho Carlos Minne, Cerro Baúl, 3,900 ft elevation, Oaxaca. The locality on the original label is "R. Carlos Minne, near Cerro Baul." The coordinates given by Rowley (1968:3) are those of the summit of Cerro Baúl, not the Rancho or collecting locality; compare with Rowley (1968: 1).]
- Campylorhynchus jocosus* (Sclater 1859b:371). Two syntypes from "In statu Oaxaca reipubl. Mexicanae . . . at Oaxaca" = Oaxaca City, Oaxaca. The type locality is usually given as the "State of Oaxaca" (e.g., A.O.U. 1983:523). However, the specimens, according to Sclater, were collected by Boucard "at Oaxaca" in March 1858; my reconstruction of Boucard's itinerary clearly places him in Oaxaca City in that month; hence my interpretation of the type locality as Oaxaca City, a position also taken by Selander (1964:235).
- Thryothorus pleurostictus oaxacae* Brodtkorb (1942b:7). Holotype (UMMZ 95726) from "Santa Cruz Bay, Oaxaca" = Bahía Santa Cruz, Oaxaca.
- Thryothorus felix felix* Sclater (1859b:371). Holotype from "In statu Oaxaca,

- reipubl. Mexicanæ . . . Juquila" = Santa Catarina Juquila, Oaxaca. The type was taken by Boucard in May 1858.
- [*Thryothorus bairdi* Salvin and Godman (1879–1904 [1880]:95) = *Thryomanes bewickii mexicanus* (Deppe); see Paynter (1960:399). Type(s) from "Oaxaca, Mexico" = "Oaxaca City, Oaxaca, s. w. Mexico" (Ridgway 1904:560) = state of Oaxaca. In citing Salvin and Godman's description, Ridgway inexplicably lists Oaxaca City.]
- Troglodytes aedon brunneicollis* Sclater (1858:297). Type(s) from "Parada, Oaxaca, Mexico" = La Parada, Oaxaca. The type(s) was taken by Boucard in December 1857.
- [\**Troglodytes brunneicollis nitidus* Nelson (1903:158) = *Troglodytes aedon brunneicollis* Sclater; see van Rossem (1939c:13). Holotype (USNM 143058) from "Mt. Zempoaltepec, Oaxaca, Mexico" = west slope of Cerro Zempoaltepec, Oaxaca (Goldman 1951:209).]
- [*Troglodytes hypædon* Sclater (1861:128) = *Troglodytes aedon intermedius* Cabanis; see Hellmayr (1934:222–223). Syntypes from "In Mexico meridionali et Guatemala" = "Totontepec and Capulalpam" (Sclater 1862:18) = Totontepec and Capulalpam, Oaxaca.]
- [*Cyphorinus pusillus* Sclater (1859b:372) = *Uropsila leucogastra leucogastra* (Gould); see Deignan (1961:406). Four syntypes (USNM 22386 said to be one of these) from "In statu Oaxaca, reipubl. Mexicanæ . . . Playa Vicente" = Playa Vicente, Veracruz.]
- Cinclus mexicanus dickermani* Phillips (1966:126). Four syntypes from "Rio Molino (ca. lat. 16°5'N. long. 96°29'W.), southern Oaxaca."
- Polioptila caerulea nelsoni* Ridgway (1903b:109). Holotype (USNM 142695) from "Oaxaca City, Oaxaca."
- [*Culicivora mexicana* Bonaparte (1850:316) = *Polioptila caerulea caerulea* (Linnaeus); see van Rossem (1934b:402). Type(s) from "Mexic" = "Oaxaca [, Oaxaca]" (Stresemann 1954:90; brackets his) = Oaxaca City, Oaxaca. According to Stresemann, this name is based on a specimen taken by Deppe in October 1825; see Species Account.]
- Polioptila albiloris vanrossemi* Brodkorb (1944:312). Holotype (USNM 54441) from "Quiotepec, District of Cuicatlán, Oaxaca" = San Juan Quiotepec, Oaxaca.
- [\**Myadestes obscurus deignani* Phillips (1966:128) = *Myadestes occidentalis occidentalis* Stejneger; see Species Account. Three syntypes from "km. 181–183.8, near top of highest ridge to north (below San Juan Lachao, Pueblo Viejo), southwestern Oaxaca (ca. lat. 16°13'N. long. 97°7'W.)." The "km." means kilometer markers; "to north" means to north of San Gabriel Mixtepec (A. R. Phillips in litt.). I do not place a comma between Lachao and Pueblo.]
- \**Catharus occidentalis occidentalis* Sclater (1859a:323). Four syntypes from "Western Mexico, Oaxaca, Totontepec" = Totontepec, Oaxaca. Totontepec is not in "Western" Mexico.
- Catharus frantzii nelsoni* Phillips (1969:618). Holotype (USNM 142446) from "Mt. Zempoaltepec, eastern Oaxaca" = west side of Cerro Zempoaltepec, Oaxaca (Goldman 1951:209). The type was taken by Nelson and Goldman on 8 July 1894.
- \**Catharus dryas harrisoni* Phillips and Rook (1965:4). Holotype (WFVZ 11037)

from "‘Arroyo de los Pajareros’, below ‘La Cumbre’, Rancho Sol y Luna, west-northwest of Tapanatepec, Oaxaca."

*Turdus assimilis oaxacae* Orr and Webster (1968:38). Holotype (CAS 65513) from "Jamaica Junction, 4 miles N San Gabriel Mixtepec, 2,400 ft. elevation, Oaxaca, Mexico."

[\**Mimus gilvus lawrencei* Ridgway (1882:11) = *Mimus gilvus gracilis* Cabanis; see Hellmayr (1934:320–321). Two syntypes (USNM 59677–59678) from "Isthmus of Tehuantepec . . . Tehuantepec City" = Tehuantepec City, Oaxaca.]

*Toxostoma ocellatum* (Sclater 1862:18). Holotype from "In Mex. merid., prov. Oaxaca . . . at Oaxaca" = Oaxaca City, Oaxaca. The type locality is often cited simply as "Oaxaca," which could mean the state; I interpret Sclater's statement that the type "was procured at Oaxaca by M. Boucard in November 1860" to mean the city. This might be important in light of the description of *T. o. villai* Phillips (1986:189).

[\**Ptilogonys cinereus schistaceus* Phillips (1966:129) = *Ptilogonys cinereus cinereus* Swainson; see Species Account. Two syntypes from "Río Molino (ca. lat. 16°5'N. long. 96°29'W.), southern Oaxaca."]

\**Vireo gilvus bulli* Rowley (1968:5) = *Vireo leucophrys bulli* Rowley; see Species Account. Holotype (WFVZ 19594) from "Cerro Baúl, above Rancho Vicente, Lat. 16°37'N., Long. 94°10'W., 4,500 feet altitude, Oaxaca, Mexico" = above Colonia Rodolfo Figueroa, Cerro Baúl, 5,000 ft elevation, Oaxaca (see Gazetteer and Species Account). The coordinates given by Rowley (1968:5) are those of the summit of Cerro Baúl, not the Colonia or collecting locality; compare with Rowley (1968:1).

[*Hylophilus ochraceiceps ochraceiceps* Sclater (1859b:375). Two syntypes from "In statu Oaxaca reipubl. Mexicanæ . . . Playa Vicente" = Playa Vicente, Veracruz.]

*Geothlypis nelsoni karlenae* Moore (1946:99). Holotype (MLZ 38391) from "Tontotepec, Mt. Zempoaltepec, Oaxaca, Mexico." The type (21 April 1942, male) was taken by del Toro Avilés and hence is of somewhat questionable origin and date. The elevation of "about 6,500 feet" given by del Toro Avilés (*in* Moore 1946:99) is very low for this species and is as doubtful as his other data. I use the name Cerro Zempoaltepec.

*Ergaticus ruber rowleyi* Orr and Webster (1968:39). Holotype (CAS 65514) from "30 km E Lachao Nuevo, 8,600 ft. elevation, Oaxaca, Mexico" = 30 km east of San Juan Lachao Pueblo Nuevo, 8,600 ft elevation, Oaxaca.

\**Basileuterus culicivorus ridgwayi* Phillips (1966:130). Four syntypes from "above=just NNW. and . . . north of San Gabriel Mixtepec, Oaxaca (ca. lat. 16°5'N. long. 97°7'W.)."

[*Icteria virens auricollis* (Deppe 1830:2). Two syntypes from "Mexico" = "Mexico City" (Stresemann 1954:90; designation of lectotype). According to Stresemann, a syntype, but not the lectotype, was taken by Deppe at "Tehuantepec [,Mexico], November, 1825" (brackets his), meaning Tehuantepec City, Oaxaca.]

[*Peucedramus taeniatus taeniatus* (Du Bus de Gisignies 1847; see citation in A.O.U. 1983:640). Type(s) from "le Mexique" = "Mexico m. S. Pedro, Oxaca [sic]" (Bonaparte 1850:309; restriction by Zimmer 1948:126–127) = "Chiapas" (van Rossem 1948:598 and A.O.U. 1983:640).]

- Peucedramus taeniatus georgei* Phillips (1966:128). Two syntypes from "Río Molino (ca. lat. 16°5'N. long. 96°29'W.), southern Oaxaca."
- [*Cyanerpes cyaneus carneipes* (Sclater 1859b:376). Syntypes from "Oaxaca . . . In rep. Mexicana . . . Playa Vicente" = Playa Vicente, Veracruz.]
- Euphonia hirundinacea caribbaea* Phillips (1966:149). Two syntypes from "38 km. north of Matías Romero, Oaxaca (=Monte Bello, north of Palomares)." I use the spelling Montebello.
- [*Thraupis abbas* (Deppe 1830:2). Two syntypes from "Mexico" = "at Oaxaca" (restriction by van Rossem 1934b:419) = "Jalapa, V.C." (Stresemann 1954: 91) = Jalapa, Veracruz. Although the syntypes are said by van Rossem to be numbers 5710 (male) and 5711 (female) in the Berlin Museum and to have been collected by Deppe "at Oaxaca," Stresemann has shown that one syntype was sold and the other is from Jalapa. *Thraupis abbas* is unknown from the Oaxaca Valley.]
- \**Habia rubica affinis* (Nelson 1897:66). Holotype (USNM 143571) from "Pino-tepa, Oaxaca, Mexico" = Santiago Pinotepa Nacional, Oaxaca.
- [\**Piranga flava intensa* Phillips (1966:151) = *Piranga flava hepatica* Swainson; see Storer (1970:302–303) and Species Account. Three syntypes from "vicinity of San Miguel Suchixtepec (above Río Molino), municipio de Miahuatlán, Oaxaca."]
- [\**Piranga bidentata alvarezii* Phillips (1966:151) = *Piranga bidentata sanguinolenta* Lafresnaye; see Storer (1970:302) and Species Account. Three syntypes from "km. 183, near top of highest ridge to north (below San Juan Lachao, Pueblo Viejo), south-western Oaxaca (ca. lat. 16°13'N. long. 97°7'W.)." The "km." means kilometer marker; "to north" means to north of San Gabriel Mixtepec (A. R. Phillips in litt.). I do not place a comma between Lachao and Pueblo.]
- [\**Chlorospingus ophthalmicus persimilis* Phillips (1966:152) = *Chlorospingus ophthalmicus albifrons* Salvin and Godman; see Storer (1970:254) and Species Account. Three syntypes from "Río Guajolote, 2,000 metres altitude, south-west of San Miguel Suchixtepec, municipio de Miahuatlán, southern Oaxaca."]
- [*Cardinalis cardinalis coccineus* Ridgway (1873b:39). Three syntypes from "Atlantic coast of middle America, from Xalapa to Honduras; Yucatan" = "Playa Vicente, Oaxaca" (Ridgway 1901:651) = "Hacienda 'Mirador' (near Vera Cruz)" (lectotype according to Deignan 1961:595–596) = Mirador, Veracruz. Playa Vicente is in Veracruz.]
- [*Cyanocompsa cyanoides concreta* (Du Bus de Gisignies 1855:299). Holotype from "Playa-Vicenti in Mexico" = "Oaxaca . . . Playa Vicente" (Sclater 1859b:378) = Playa Vicente, Veracruz.]
- [\**Cyanocompsa parellina sumichrasti* Ridgway (1887:447) = *Cyanocompsa parellina indigotica* (Ridgway); see Todd (1923:68–69). Holotype (USNM 59683) from "Tehuantepec City, Oaxaca."]
- Passerina rositae* (Lawrence 1874a:397). Holotype (USNM 135002) from "Mexico, Tehuantepec" = "Tehuantepec (Cacoprieto)" (Lawrence 1876:20) = Rancho de Cacoprieto, Oaxaca.
- Passerina leclancherii grandior* Griscom (1934:420). Holotype from "Chivela, Oaxaca."

- Atlapetes brunneinucha suttoni* Parkes (1954:132). Holotype (MVZ 115581) from "La Cumbre (9000 feet), 5 miles northeast of Cerro San Felipe, Oaxaca, Mexico."
- \**Atlapetes brunneinucha nigrilatera* Rowley (1968:7). Holotype (WFVZ 19258) from "Cerro Baúl, above Rancho Vicente, Lat. 16°37'N., Long. 94°10'W., 4,500 feet altitude, Oaxaca, México" = above Colonia Rodolfo Figueroa, Cerro Baúl, 4,500 ft elevation, Oaxaca. The coordinates given by Rowley (1968:7) are those of the summit of Cerro Baúl, not the Colonia or collecting locality; compare with Rowley (1968:1). The original label does not give the word "above," and since the Colonia is at 4,500 ft, I wonder how far "above" the bird was taken; nevertheless, the type was taken by Rowley himself (and Juan Nava S. according to the type's label), so I reluctantly accept his emendation.
- Arremonops rufivirgatus sumichrasti* (Sharpe 1888:762). Holotype from "Huamela, Tehuantepec, Mexico" = Huamelula, Oaxaca. The type was taken by Sumichrast.
- [\**Melozone kieneri obscurior* Phillips (1966:154) = *Melozone kieneri rubricatum* (Cabanis); see Species Account. Holotype from "near crossroads in juniper-lava association, 1740 metres alt., ca. lat. 16°28'N. long. 97°2'W., south-west of Sola de Vega, south-western Oaxaca." This is San Miguel Sola de Vega.]
- [\**Pipilo torquatus brunnescens* van Rossem (1938:131) = *Pipilo ocai ocai* (Lawrence); see Phillips (1966:153–154) and Species Account. Holotypes from "Tontotepec, Oaxaca, Mexico."]
- [\**Pipilo erythrophthalmus sympatricus* Phillips (1966:153) = *Pipilo ocai ocai* (Lawrence); see Species account. Two syntypes from "Río Guajolote, 2,000 m., south-west of San Miguel Suchixtepec, municipio de Miahuatlán, southern Oaxaca."]
- \**Pipilo erythrophthalmus oaxacae* Sibley (1950:134). Holotype (MVZ 115141) from "La Cumbre, 9,000 feet, 5 miles northeast of Cerro San Felipe, Oaxaca, Mexico."
- [*Pipilo chlorosoma* Baird (in Baird, Brewer, and Ridgway 1874:105) = *Pipilo erythrophthalmus macronyx* Swainson; see Sibley (1950:142). Holotype (USNM 50235) from "Oaxaca" = country of Mexico (see Species Account).]
- [*Tanagra rutila* Deppe (1830:2) = *Pipilo fuscus* Swainson; see Stresemann (1954:91). Holotype from "Mexico" = "state of Veracruz" (Stresemann 1954:90). The determination that *T. rutila* is based on a specimen of Brown Towhee makes *Pipilo albicollis* Sclater, rather than *Pipilo rutilus* (Deppe), the proper name of the White-throated Towhee. However, designation of the type locality of *T. rutila* as the "state of Veracruz" makes it an earlier name for *P. fuscus toroi* Moore, which see. Stresemann says that the paratypes are from "Cimapan [Mexico] . . . and at Oaxaca [Oaxaca]" (brackets his) but "It now proves to have been a technical mistake to select the Oaxaca specimen as the type of *Tanagra rutila*." The specimen he refers to is no. 6231 in the Berlin Museum, according to van Rossem (1934b:423); Davis (1951:109) further restricted the "type locality" to Oaxaca City.]
- [*Pipilo fuscus toroi* Moore (1942:46). Holotype (MLZ 30927) from "Mitla, Oaxaca, Mexico" = "Tepeaca, Puebla" (Marshall 1964:353). According to the collector, del Toro Avilés (in litt. to Marshall), 24 specimens (MLZ), including the type, that he collected in 1942 and 1943 and labeled "Mitla" (= San Pablo Villa de Mitla) actually came from Tepeaca, Puebla. The name *toroi* appears to be a

- synonym of *Tanagra rutila* Deppe (1830:2), the type of which is missing but believed by Stresemann (1954:90–91) to have come from Veracruz and be a synonym of *Pipilo fuscus* (K. C. Parkes in litt.). Until some official action can be taken on this matter, I prefer to retain the name *toroi*.]
- \**Pipilo albicollis albicollis* Sclater (1858:304). Holotype from “San Miguel de las Peras, Oaxaca” = probably San Miguel Peras, Oaxaca (see Gazetteer).
- [\**Pipilo rutilus parvirostris* Davis (1951:84) = *Pipilo albicollis albicollis* Sclater; see Parkes (1974:458). Holotype (MLZ 31121) from “Moctum, Oaxaca, Mexico.”]
- \**Sporophila schistacea subconcolor* Berlioz (1959:41). Holotype from “Mexique méridional, forêts de Palomarès (Oaxaca) . . . au confluent du Rio Coatzacoalcos et du Rio Sarabia . . . 150 mètres” = confluence of the Río Coatzacoalcos and Río Sarabia, about 200 ft elevation, about 9 mi east-northeast of Palomares, Oaxaca. This form was originally described by Berlioz as “*Sporophila (?schistacea) subconcolor*” and relegated to subspecific rank by Meyer de Schauensee (1966:506). The elevation probably is closer to 200 ft. The only known specimens of this race were taken by the unreliable del Toro Avilés, and thus their origin could be questioned (see Species Account).
- [*Sporophila aurita corvina* (Sclater 1859b:379). Three syntypes from “In statu Oaxaca reipubl. Mexicanæ, et in rep. Honduras . . . Playa Vicente” = “Oaxaca, Mexico” (Sharpe 1888:137) = Playa Vicente, Veracruz. Sharpe listed only one type (BMNH), collected by Boucard in April 1859 at Playa Vicente.]
- [\**Spermophila albitorquis* Sharpe (1888:120) = *Sporophila torqueola torqueola* (Bonaparte); see Miller et al. (1957:341). Two syntypes from “Mexico” and “Capulalpam, S. Mexico” = “Capulalpam, Oaxaca” (lectotype, BMNH 85.12.14.402, designated by Phillips 1971:19) = Capulalpam, Oaxaca. For further information on *albitorquis*, see Species Account, Ridgway (1901:578), and Griscom (1934:412).]
- Sporophila minuta parva* (Lawrence 1883:382). Holotype (USNM 59694) from “Mexico, Tehuantepec City” = Tehuantepec City, Oaxaca (label of type; 12 November 1869, Sumichrast, unsexed [= female]).
- Oryzoborus funereus funereus* Sclater (1859b:378). Holotype from “In Statu Oaxaca, reipubl. Mexicanæ . . . Suchapam” = Suchapam, Oaxaca. The exact location of Suchapam is unknown.
- Aimophila ruficauda lawrencii* (Salvin and Godman 1879–1904 [1886]:397). Holotype from “Juchitan, near Tehuantepec, Oaxaca” = Juchitán, Oaxaca.
- Aimophila sumichrasti* (Lawrence 1871:6). Holotype (USNM 54139) from “Tuchitan, Tehuantepec, Mexico” = Juchitán, Oaxaca. “Tuchitan” is a misspelling doubtless resulting from misinterpretation of Sumichrast’s handwriting on the original label of the type.
- \**Aimophila ruficeps australis* (Nelson 1897:63). Holotype (USNM 136131) from “City of Oaxaca, Oaxaca” = “Cerro San Felipe, Oaxaca” (restriction by Hubbard 1975:15).
- \**Aimophila ruficeps extima* Phillips (1966:155). Holotype from “2 km. northwest of Portillo Nejapa (ca. lat. 16°34’N. long. 95°57’W.),=106 km. by road west-north-west of Tehuantepec, Oaxaca” = 2 km northwest of Lajarcia (ca. 16°34’N, 95°57’W), Oaxaca.
- [\**Aimophila rufescens disjuncta* Phillips (1966:158) = *Aimophila rufescens rufes-*

- cens* (Swainson); see Paynter (1970:101) and Species Account. Three syntypes from "San Gabriel Mixtepec, Oaxaca."]
- [*Spizella passerina repetens* Phillips (1966:154) = *Spizella passerina mexicana* Nelson; see Paynter (1970:83). Two syntypes from "Río Molino, southern Oaxaca."]
- \**Sturnella magna saundersi* Dickerman and Phillips (1970:308). Eleven syntypes from "9 km S of Niltepec, Oaxaca, at an elevation of 5–25 m."
- [*Dives dives dives* (Deppe 1830:1). Holotype from "Mexico" = "state of Veracruz" (Stresemann 1954:90). According to Stresemann (1954:91), the "type" was sold, and the locality for the "cotype" is Valle Real. This locality might not be in Veracruz, as usually believed, but in Oaxaca (see *Trogon violaceus* above).]
- [*Euphagus cyanocephalus* (Wagler 1829:col. 758). Type(s) from "Mexico" = "Temascaltepec [,Mexico]" (lectotype designated by Stresemann 1954:90; brackets his). According to Stresemann, a syntype, but not the lectotype, was collected by Deppe in October 1825 at "Oaxaca [,Oaxaca]" (brackets his), meaning Oaxaca City.]
- [*Molothrus aeneus aeneus* (Wagler 1829:col. 758). Type(s) from "Mexico" = "Oaxaca [,Oaxaca]" (Stresemann 1954:89; brackets his; erroneous designation of lectotype) = "Mexico City" (Stresemann letter quoted by Parkes and Blake 1965:209).]
- Icterus pustulatus pustulatus* (Wagler 1829:col. 757). Syntypes from "Mexico" = "San Matteo [,Oaxaca]" (lectotype designated by Stresemann 1954:90; brackets his) = San Mateo del Mar, Oaxaca. If, as Stresemann states, the lectotype (BM; collected by Deppe in November 1825) is properly identified and labeled as to locality, it would have to be a vagrant or migrant from the northwest (see Species Account); under these conditions, shifting the name *pustulatus* to the taxon now known as *formosus*, as suggested by Blake (1968:156), would not be necessary. However, Stresemann also lists a "cotype" (paralectotype) of this race, collected by Deppe in September 1825, from "Huantepec [,Oaxaca]" (brackets his), a locality that I cannot find, and another from "Cuernavaca [,Morelos]." The racial identity of the types needs to be reevaluated. The best solution might be to designate as the lectotype the specimen from Cuernavaca, Morelos.
- Icterus pustulatus formosus* Lawrence (1872:184). Type(s) from "Tehuantepec (Tuchitan)" = "Santa Efigenia, Oaxaca" (Deignan 1961:569). There is considerable confusion here, which I cannot alleviate. Lawrence listed the holotype as an "adult male" from "Tuchitan." In the same paper he mentioned an adult female and an immature male as having been in the type series. Deignan, however, listed only two "types" (USNM 90164 and 57594), both collected by Sumichrast at "Santa Efigenia (not 'Tuchitan')." He further states that Lawrence wrote "Type" on the label of each of these specimens. I have seen these birds and they are as advertised by Deignan. There are no specimens in the USNM labeled as from "Tuchitan," which is a misspelling of Juchitán resulting from misinterpretation of Sumichrast's handwriting. Until a third "type," an adult male from "Tuchitan," can be produced, I accept Deignan's assessment.
- Icterus pectoralis* (Wagler 1829:col. 755). Type(s) from "Mexico" = "Totulapa [,Oaxaca]" (Stresemann 1954:90; brackets his) = "Totolapan, Oaxaca" (type label according to A. R. Phillips in litt.) = San Pedro Totolapan, Oaxaca. The

type (BM) was taken by Deppe in October 1825. There are no other records of *I. pectoralis* from San Pedro Totolapan, Oaxaca, and the habitat there now is too arid for this species; presumably, in 1825 the riparian vegetation was lush enough to support it. Deppe did not leave Oaxaca state in October 1825, and in the latter part of that month traveled from Oaxaca City to Tehuantepec City (Stresemann 1954), when he could easily have passed through San Pedro Totolapan.

*Icterus gularis gularis* (Wagler 1829:col. 754). Type(s) from "Mexico" = "Tehuantepec [,Oaxaca]" (Stresemann 1954:90; brackets his) = Tehuantepec City, Oaxaca. The type was taken by Deppe in November 1825.

[\**Icterus graduacauda richardsoni* Sclater (1939:141) = *Icterus graduacauda graduacauda* Lesson; see Blake (1968:165). Holotype from "Chimalapa, Territory of Tehuantepec, Oaxaca [sic], Mexico, 9,000 ft." = Chimalapa, Oaxaca. This might be either San Miguel Chimalapa (as Sclater thought) or more likely Santa María Chimalapa; in either case, the elevation is incorrect, being far too high for any locality in eastern Oaxaca.]

[\**Carpodacus mexicanus roseipectus* Sharpe (1888:424) = *Carpodacus mexicanus mexicanus* (Müller); see Howell et al. (1968:274) and Species Account. Type(s) from "Oaxaca, W. Mexico" = "Oaxaca City, Oaxaca" (Moore 1939:201-202).]

#### GAZETTEER

The few maps available for the state of Oaxaca are very poor. Often the scale is so small that only a limited number of towns and physiographic features can be shown. The only large scale maps are known to be inaccurate in some respects. When the maps are compared with one another and with the few gazetteers and other sources of geographical data, so many discrepancies come to light that one is forced to question all the information presented. The data in the following Gazetteer of Oaxaca localities represents a composite derived from the sources I consider most reliable and can be only as accurate as those sources.

In the present gazetteer, I have attempted to list all Oaxaca localities mentioned in the ornithological literature or noted on bird specimen labels, including those outside Oaxaca erroneously referred to the state. Although I have succeeded in tracing most localities, the location of some still remains in doubt; for these I have supplied all the pertinent information of which I am aware.

Names of localities and the information presented for each are based primarily on the "Millionth Maps" (scale, 1:1,000,000) of the American Geographical Society, map numbers NE-14, NE-15, and ND-15, and on the "Comision Maps" (scale, 1:500,000), a series dated 1958 and published by the Comision Intersecretarial Coordinadora del Levantamiento de la Carta de la Republica Mexicana, map numbers 14Q-VI, 14Q-VIII, 14P-II, 15Q-V, 15Q-VII, and 15P-I. Because of its more accurate contours and larger scale, the latter series was used as the base map in preparation of Figures 1, 30, and 31. Certain information has also been taken from the series (scale, 1:1,000,000) prepared by the Secretaria de Agricultura y Ganaderia, Direccion General de Geografia y Meteorologia, from the map entitled "Landforms of México," prepared by Erwin Raisz for the Geography Branch of the Office of Naval Research, and from the World Aeronautical Charts (scale, 1:1,000,000), numbers 643, 644, and 711.

The gazetteer prepared by the United States Board on Geographical Names

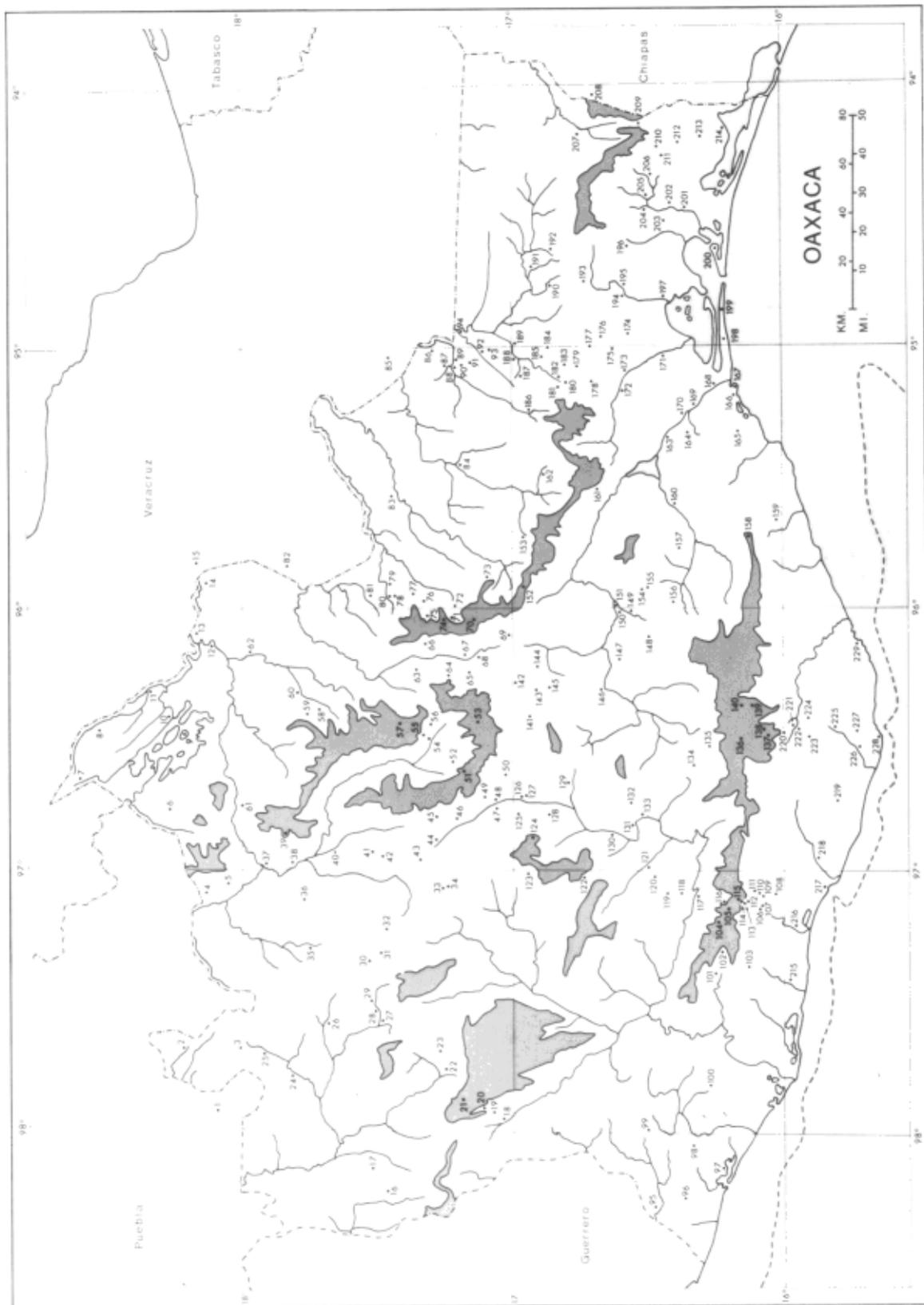


FIG. 30. Map of selected localities in and near Oaxaca. Numbered localities are: Monte Albán (47); Almoloya (179); Alotepec Mixes (73); Amapan (11); Amatepec (74); Arroyo Claro, Veracruz (15); Asunción Nochistlán (32); El Barrio (180); Los Bichones (147); El Camaron (149); Candelaria Loxicha (223); Capulápan (56); Catahuña (6); Chacalapa (225); Chahuítes (213); Chicapa de Castro (197); Chihuitán (172); Chivela (177); Choapan (77); Ciénega, Chiapas (208); Cieneguilla (42); La Cieneguilla (140); La Cima (114); Coatlán (162); Colonia Rodolfo Figueroa (209); La Compañía (131); Copalita (222); Cosolapa (7); Río Coyul (collecting locality: 154); Cuajimoloya (53); Cullapan de Guerrero (125); La Cumbre (51; see text); Cycad Camp (108); Donaji (87); Ejutla de Crespo (132); Escullapa (190); Finca Jamaica (110); Finca Sinai (107); La Gloria (192); Río Guajolote (collecting locality: 220); El Guamol (204); Guelatao (54); Guichicovi (187); Guichilona (178); Hidalgo Yalalag (67); Huajuapán de León (24); Huamelula (159); Huiloitepec (168); Ingenio Santo Domingo (195); Ixhuatán (201); Ixtepec (173); Ixtlán de Juárez (55); Río Jalatengo (collecting locality: 221); Jamaica Junction (110); Jesús Carranza, Veracruz (85); El Jicaro Lachixola (81); Juniper Camp (119); Km. 70 (22); Km. 123 (20); Km. 135 (19); Km. 136 (118); Km. 183 (115); Km. 195 (112); Lachiguiri (161); Lachixola (81); Lacova (80); Lagunas (183); Lajarcia (155); Lalana (79); Llano de las Flores (57); Llano Grande (95); Llano Verde (34; see text); Loma Bonita (14); Loseta (88); La Mata (175); Matías Romero (185); Mezahuite (176); Minitán (97); Mococtum (72); Mogoñé (188); Río Molino (collecting locality: 137); Montebello (90); Nejiapa (151); Nilitpec (196); Oaxaca City (48); Ocotlán de Morelos (129); Ostuta (205); Palomares (91); Papaloapan (13); La Parada (52); Pericos (207); Petalcingo, Puebla (1); Piedra Blanca (189); Playa Vicente, Veracruz (82); Pluma Hidalgo (224); Puerto Angel (228); Puerto de Huatulco (229); Puerto Escondido (217); Punta Paloma (214); Putla de Guerrero (18); Río Ranas (collecting locality: 111); La Ranchería (186); Rancho Boca del Río Sarabia (94); Rancho de las Rosas (33); Rancho Las Animas (150); Rancho Sol y Luna (210); Reforma (202); Rincón (165); Río Grande (184; see text); Río Grande (211; see text); Salazar (163); Salina Cruz (166); San Agustín Amatengo (133); San Andrés Chichahuatla (21); San Andrés Miahuatlán (134); San Bartolo Coyotepec (127); San Bartolo Yautepec (156); San Carlos Yautepec (148); San Felipe del Agua (49); San Felipe Ixtapa (28); San Francisco Cozoaltepec (219); San Francisco del Mar (200); San Francisco Telixtlahuaca (44); San Francisco Tlapancingo (16); San Gabriel Mixtepec (109); San Idelfonso Villa Alta (66); San José Chiltepec (62); San José del Pacífico (136); San José Estancia Grande (96); San José Maniáltepec (216); San Juan Bautista Coixtlahuaca (35); San Juan Bautista Cuicatlán (38); San Juan Bautista Tuxtepec (12); San Juan Comaltepec (76); San José Maniáltepec (16); San Juan Bautista Coixtlahuaca (35); San Juan Mixes (152); San Juan Lachao Pueblo Viejo (105); San Juan Los Cues (5); San Juan Quiotepec (37); San Lucas Comotlán (153); San Marcos Zacatepec (103); San Martín Lachilá (130); San Mateo del Mar (198); San Mateo Yetla (59); San Mateo Yucucuy (31); San Miguel Albarradas (142); San Miguel Chimalapa (193); San Miguel Huautla Nochistlán (36); San Miguel Panixtlahuaca (101); San Miguel Peras (123); San Miguel Sola de Vega (121); San Miguel Soyaltepec (9); San Miguel Suchixtepec (138); San Miguel Talea de Castro (63); San Pablo Villa de Mitla (143); San Pablo Yaganiza (68); San Pedro Atoyac (99); San Pedro Cajones (65); San Pedro Juchatengo (117); San Pedro Pochutla (227); San Pedro Teutila (61); San Pedro Totolapan (146); San Pedro y San Pablo Ayutla (69); San Pedro y San Pablo Etla (46); San Pedro y San Pablo Teposcolula (29); Santa Catarina Juquila (102); Santa Catarina Roatina (135); Santa Efigenia (210); Santa Inéz del Monte (124); Santa María Asunción Tlaxiaco (23); Santa María Camotlán (25); Santa María Chimalapa (191); Santa María Colotepec (218); Santa María Coyotepec (126); Santa María del Mar (199); Santa María del Tule (50); Santa María Lachixio (122); Santa María Mixtequilla (170); Santa María Ozolotepec (139); Santa María Petapa (182); Santa María Tonameca (226); Santiago Chazumba (2); Santiago Domingullo (40); Santiago Jamiltepec (100); Santiago Matatlán (145); Santiago Miltepec (3); Santiago Nacaltepec (41); Santiago Pinotepa Nacional (98); Santiago Yolomécatl (27); Santo Domingo Petapa (181); Santos Reyes Nopala (106); Santos Reyes Pápalo (39); Sarabia (93); Río Sarabia (collecting locality: 92); Soreech Owl Camp (116); Las Sedas (43); Silcayoapan (17); Barranca Sin Nombre (113); Tamazulapán del Progreso (26); Tapanatepec (212); Tehuantepec City (169); Las Tejas (164); Temascal (10); Teotacalingo (78); Teotitlán del Camino (4); Tequisistlán (160); Terpetine Ridge (collecting locality: 120); Tetela (8); Tlacolula de Matamoros (141); Toluca (89); Tonagua (75); Totontepec (71); Trinidad (83); Tutla (84); Uvero (86); Las Vacas (157); Valle Nacional (60); La Venta (194); Ventosa (167); La Ventosa (174); Vista Hermosa (58); Yacochoi (70); Yalina (64); Yanhuatlán (30); Yolotepec (104); Zanatepec (206); Zapotitlán (158); Zimatlán de Alvarez (128); El Zopilote (203).



(1956, No. 15) was used as a source of some coordinates but most were determined directly from the Comision Maps. Gazetteers by Duellman (1960), Goodwin (1969), Selander and Vaurie (1962), and Rowley (1966, 1984) were also helpful. Finally, much pertinent information was obtained from my field notes and those of other collectors, through correspondence with interested parties, and from itineraries reconstructed by me from information on specimen labels.

In the present gazetteer and in the text, preferred names are presented in their Spanish form except for countries (Mexico, Panama), large geographic features (e.g., Gulf of Tehuantepec, Isthmus of Tehuantepec, Oaxaca Valley), districts, and well-known towns (Oaxaca City, Tehuantepec City) or where there are no Spanish names (e.g., Screech Owl Camp, Puerto Angel Road).

In indexing, I have employed a slightly modified version of the system used in the index to the American Geographical Society maps. This plan consists of indexing all natural geographic features (whether in Spanish or English form) beginning with *arroyo* (creek), *bahía* (bay), *barranca* (ravine), *cañon* (canyon), *cerro* (mountain), *cumbre* (summit), *golfo* (gulf), *isla* (island), *istmo* (isthmus), *lago* (lake), *laguna* (lagoon), *llano* (plain), *mar* (sea), *mesa* (mesa), *meseta* (plateau), *montaña* (forested mountain), *monte* (mount, mountain), *picacho* (sharp peak), *río* (river), *sierra* (jagged mountain range), *valle* (valley), and *volcán* (volcano) according to the second part of the name (e.g., the river "Río Cajones" is to be found under "Cajones, Río"). Names beginning with an article (*el, la, los, las*) as well as the names of the districts of the state are also indexed by the second part of the name (e.g., "Los Bichones" may be found under "Bichones, Los").

All other names are indexed according to the first part of the name, including localities beginning with terms denoting a natural geographic feature but which are actually towns or other man-made entities. Such terms include many of those noted above as well as *loma* (hill), *piedra* (rock), *playa* (shore), and *punte* (point); for example, the towns of "Río Grande," "Punta Paloma," and "Valle Nacional" are indexed under "Río," "Punta," and "Valle," respectively. Also indexed under the first part of the name are names beginning with such terms as *campamento* (camp), *ciudad* (city), *colonia* (colony), *estancia* (country dwelling), *finca* (plantation), *hacienda* (a large farm or the owner's house), *km.* (kilometer marker), *portillo* (narrow pass), *presa* (a dam and its empounded waters), *pueblo* (town, village), *puente* (bridge), *puerto* (including *pto.*; port), *ranchería*, *rancho* (usually a small farm), *route*, *san, santa* (including *sta.*), *santo* (including *sto.* and *st.*), and *villa* (town, villa). Contrary to the procedure employed by the American Geographical Society, articles and prepositions in the middle of a name are used in alphabetization.

Incorrect or alternate names and spellings are listed in parentheses following the preferred name. Omission or incorrect usage of an accent is not considered sufficient reason for making a separate listing. With the exception of the word

←

FIG. 31. Map of physiographic features of Oaxaca. Abbreviations are as follows: (C.) Cerro; (L.) Laguna; (R.) Río; (S.) Sierra; (V.) Valley. Mountain ranges (dark shading) are delimited by selected habitats, and hence are not comparable in extent, as follows: Sierra de Choapan, arid pine-oak forest; Sierra de los Mijes, cloud forest; Sierra Madre de Chiapas, cloud and tropical semideciduous forests; all others, high-elevation humid pine-oak forest (plus enclosed highland pine-oak forest).

“Río,” which is always accented herein, accenting of unaccepted names follows the original usage. If two incorrect or alternate names are identical except for their accents, only the incorrect usage with respect to accent is listed herein. On the other hand, absence or erroneous usage of a tilde (˜) results in a separate entry.

An unaccepted name is cross-indexed only if it would not appear next to the preferred name and is followed by a colon, the word “see,” and the preferred name, in that order. Two or more unaccepted names that would appear adjacent to one another but apart from the preferred name are listed in one entry.

Each locality outside Oaxaca has the name of its state enclosed in brackets immediately following the preferred name. In the entry for each accepted name is a brief phrase describing the nature of the place and its location in reference to a large or well-known town or landmark. Distances are given in airline miles unless otherwise noted. Important errors and other discussion are presented.

If they are known, the latitude north, longitude west, and elevation (unless previously noted) are given in brackets, usually near the end of the entry. Elevations are in feet unless otherwise noted. Coordinates are accurate to about one degree and are for finding purposes only. The word “about” applied to the coordinates or elevation denotes an approximation, which may be close to reality or may deviate greatly; such information is presented only to give the reader a rough idea of location or elevation. For museum abbreviations and full names of people mentioned in the Gazetteer, see the Plan of the Species Accounts. Selected localities are shown in Figure 30 and major physiographic features in Figure 31. On the following list, locality numbers used in Figure 30 and reference to physiographic features named in Figure 31 are given last in parentheses.

#### LIST OF LOCALITIES

- Acatepec.—Location unknown; presumably in the Atlantic Region in tropical evergreen forest, since Boucard took *Microrhopias quixensis* and other humid forest species there in March and April 1857.
- Acatlán, Picachos de.—A ridge projecting northeastward from the Sierra de los Mijes between the upper tributaries of the Río Trinidad on the west and of the Río Jaltepec on the east. Possibly synonymous with the Sierra Santa Margarita.
- Albán, Monte.—A hill 3 mi west of Oaxaca City; site of the Zapotec ruins of the same name. [17°03', 96°46'] (47)
- Almoloya (Almaloya, Amloloya, Amolóya).—Apparently the small town 6 mi northwest of Chivela, not the station of the same name located on the railroad about 1 mi to the southeast. A collecting locality for Sumichrast in October 1868 and for W. W. Brown in May 1927. Erroneously listed by Friedmann (1950:434) as “Almaloya, Veracruz.” [16°45', 95°04'; 754 ft] (179)
- Aloapaneca, Sierra (Sierra San Felipe).—The first mountain range encountered due north from Oaxaca City, extending from about Cuajimaloya northeast to a point about 10 mi east of Santiago Dominiguillo. Highest peak is Cerro San Felipe at 10,204 ft. See Sierra Madre de Oaxaca. “Sierra San Felipe” has also been used to denote Cerro San Felipe. (Fig. 31)
- Alotengo, Laguna de (Lake Alotengo).—A large saline lagoon paralleling the Pacific Ocean about 10 mi southwest of Santiago Pinotepa Nacional. [16°12', 98°07'; sea level] (Fig. 31)
- Alotepec Mixes.—A village 14 mi southeast of Totontepec. [17°05', 95°53'; 7,875 ft] (73)
- Altos de Maguellar.—A rancho on the “south” end of Cerro Atravesado in the Sierra Madre de Chiapas. Visited by MacDougall (1971:95). [About 16°38', 94°21'; about 1,400 ft]
- Amapan.—A border village located where the road to Temascal crosses the Río Amapa 20 mi northwest of San Juan Bautista Tuxtepec. [18°20', 96°18'; 82 ft] (11)
- Amatepec.—A village 8 mi north-northwest of the summit of Cerro Zempoaltepec. Briggs (1953:157) and all del Toro Avilés specimen labels give elevation as 2,100 m (6,888 ft), but Moore and Medina (1956:442) list elevation as 1,690 m (5,543 ft); specimens probably taken at a variety of elevations in vicinity of town. [17°15', 96°02'; about 6,900 ft] (74)

- Amates, Las: see Rizo de Oro [state of Chiapas].
- Amatingo: see San Agustín Amatengo.
- Amloloya, Amolóya: see Almoloya.
- Amula [state of Guerrero?].—A town apparently in the state of Guerrero, although I have not found it on maps. Under *Trogon elegans*, Bent (1940:110) erroneously lists it as in Oaxaca; later (1940:429) he refers it to Guerrero, as does Ridgway (1911:772).
- Angeles Harbor: see Puerto Angel.
- Anhuiñlan: see Yanhuiñlan.
- Animas, Las: see Rancho Las Animas.
- Arenal, Cerro (Cerro de Arenal).—A ridge with its highest point located at 3,034 ft elevation 20 mi west of Tehuantepec City. [Highest point at about 16°18', 95°32']
- Arroyo Claro [state of Veracruz].—A railroad station in the state of Veracruz 6 mi east-northeast of Loma Bonita, Oaxaca. Lamb specimen labels give "Arroyo Claro, 7 mi. SE Loma Bonita, Oax." and either fail to mention Veracruz or do so in handwriting difficult to decipher. Erroneously listed by Miller et al. (1957:e.g., p. 378) as in Oaxaca; Howell (1965:460) refers the same record to Oaxaca but without giving an exact locality. [18°09', 95°49'; 131 ft] (15)
- Asunción Nochixtlán (Nochistlan, Nochixtlán).—A town on the Pan-American Highway 28 mi south-east of Tamazulapan del Progreso. [17°28', 97°13'; 7,216 ft] (32)
- Atlixco [state of Puebla] (Atlixco).—A large town in the state of Puebla 19 mi southwest of Puebla de Zaragoza. Erroneously listed by Ridgway (1904:336) as in Oaxaca. [18°54', 98°26'; 6,002 ft]
- Atoyac [state of Veracruz].—A railroad station in the state of Veracruz 11 mi east of Córdoba. Ridgway (1916:173) erroneously quotes Salvadori (1891:193) as referring this locality to Oaxaca. *Picus rubiginosus aeruginosus* is recorded by Miller et al. (1957:28) from "Oaxaca (western mountains)" and "Guerrero (Atoyac, intermediate)." The latter record is based on a specimen of *aeruginosus* taken by Mrs. H. H. Smith at "Atoyac" and listed by Salvin and Godman (1888–1904 [1895]:406) without state and erroneously as an intermediate between *aeruginosus* and *rubiginosus*. That this Atoyac record, however, definitely pertains to Atoyac, Veracruz, is indicated by the statements made by Salvin and Godman (1888–1904 [1892]:233) that "Mr. and Mrs. Herbert H. Smith spent some time . . . at Atoyac, on the railway between Vera Cruz and Mexico city" and found *Formicarius* "at Atoyac, near the foot of the mountains between Vera Cruz and the plateau." Further, of the eight additional species listed by Salvin and Godman as having been taken at Atoyac, all occur in the lowlands of Veracruz, and six are not known to occur on the Pacific slope of Mexico west of the Isthmus of Tehuantepec. Reference to the "western mountains" of Oaxaca is erroneous and probably stems from the allocation of the Atoyac specimen to San Pedro Atoyac, Oaxaca, a small town in the extreme southwestern corner of the state. [18°54', 96°46'; 1,512 ft]
- Atoyac, Río.—A large river originating near San Francisco Telixtlahuaca, coursing south through the Oaxaca Valley, and then turning west to join with the Río Sordo to form the Río Verde at a point 24 mi northeast of Santiago Jamiltepec. (Fig. 31)
- Atavesado, Cerro.—One of the higher peaks in the Oaxaca portion of the Sierra Madre de Chiapas, with its summit, according to the Comision Maps, located at about 6,600 ft elevation 18 mi slightly west of north of Zanatepec and just east of Picacho Prieto. According to MacDougall (1971:95) and contrary to the Comision Maps, the mesa forming the crest is located "at nearly 5,000 feet," runs north-south, and is located south of Picacho Prieto. According to Goodwin (1969:257), the maximum elevation is about 4,750 ft. I cannot resolve these discrepancies. Contours on the Millionth Map are grossly inaccurate for this part of Oaxaca. [Comision Map: summit at 16°45', 94°22'] (Fig. 31)
- Ayutla: see San Pedro y San Pablo Ayutla.
- Azul, Cerro: see Picacho Prieto.
- Barrio, El (Barrio).—A small town in the Isthmus of Tehuantepec 9 mi southwest of Matías Romero. Sumichrast locality in January 1862 and September and October 1868. [16°48', 95°08'; 1,030 ft] (180)
- Baúl, Canyon of Cerro (Cerro Baul Canyon).—A canyon said on Galley specimen labels (WVZ) to be at 5,200 ft elevation "6 km. [3.7 miles] N R. Vicente" [= Colonia Rodolfo Figueroa], and hence on the west slope of Cerro Baúl.
- Baúl, Cerro (Sierra Baul).—A high mountain in the Sierra Madre de Chiapas, its summit located at 6,750 ft elevation 14 mi northeast of Zanatepec. [Summit at 16°35', 94°11'] (Fig. 31)
- Benito Juárez.—A national park covering 6,672 acres near Oaxaca City. Exact location unknown.
- Bichones, Los.—A ranch on what was formerly the main trail between Oaxaca City and Tehuantepec City, situated about halfway between San Pedro Totolapan and San Carlos Yautepec. Nelson and

- Goldman specimens taken here were labeled "Near Totolapa." [16°37', 96°12'; 4,000 ft (Goldman 1951:228)] (147)
- Birds, Island of the: see Isla de los Pajaros.
- Boca Río Serabia: see Rancho Boca del Río Serabia.
- Bolaños [state of Jalisco] (Bolanos).—A town in the state of Jalisco. Bendire (1895:209) and Taylor (1909:291) erroneously list a specimen of *Selasphorus floresii* from "Bolanos, Oaxaca."
- Cabeza del Novillero (Cabeza de el Novillero, head of El Novillero, El Novillero).—See discussion under La Cumbre (near Rancho Sol y Luna). Should not be confused with the Novillero closer to Tapanatepec.
- Cacoprieto, Cacoprieto Ranch: see Rancho de Cacoprieto.
- Cafetal Sinai: see Finca Sinai.
- Cajones, Río.—A large river on the Atlantic drainage slope running north from near San Pablo Yaganiza to the Veracruz border, where it joins with a smaller river to form the Río Playa Vicente. (Fig. 31)
- Cameron, El.—A village on the Pan-American Highway 4 mi southwest of Nejapa. [16°35', 96°01'; about 1,850 ft] (149)
- Camotlán: see San Lucas Camotlán and Santa María Camotlán.
- Campamento La Cima: see La Cima.
- Campamento Vista Hermosa: see Vista Hermosa.
- Candelaria Loxicha (Candelaria, La Candelaria).—A small town on the Puerto Angel Road 13 mi (about 19.4 road mi) north of San Pedro Pochutla. [15°55', 96°29'; 1,350 ft by my altimeter] (223)
- Capulpan (Capulpan, Cayuilpanam [?]).—A village 3 mi southeast of Ixtlán de Juárez on the road to San Ildefonso Villa Alta. Boucard collecting locality. Reference by Salvin and Godman (1879–1904 [1880]:58) to a Sallé record for *Psaltriparus minimus* from "Cayuilpanam" might pertain to Capulpan, Oaxaca. [17°18', 96°27'; 6,494 ft] (56)
- Cardón, Arroyo.—The arroyo on the north end and west sides of Cerro Baúl formed by the Río Mono Blanco. Also the name used by T. MacDougall for his collecting locality in the former District of Juchitán, Oaxaca, "slightly south of west from Cintalapa," Chiapas (T. MacDougall in litt.). T. MacDougall specimens taken between 2,000 and 4,000 ft elevation. These specimens (AMNH) erroneously ascribed to F. A. Pitelka on labels.
- Carrizal, El.—A collecting station for Rowley above Díaz Ordaz, presumably on the road from Tlacolula de Matamoros to Hidalgo Yalalag. Not the same as the El Carrizal southeast of San Gabriel Mixtepec. [About 16°58', 96°26' (Díaz Ordaz); 8,500 ft (Rowley specimen labels)]
- Carrizal, El.—A ranch about 7 mi southeast of San Gabriel Mixtepec. See preceding entry. [16°03', 97°01']
- Cataluña.—A small town in the mountains 24 mi west of Temascal and just west of Presa Miguel Alemán. [18°16', 96°45'; 3,280 ft] (6)
- Cayuilpan: see Capulpan.
- Chacahua, Laguna de.—A large lagoon near the Pacific coast in southwestern Oaxaca about 6 mi east of the mouth of the Río Verde. Site of a national park known as Lagunas de Chacahua. [15°59', 97°43'; near sea level] (Fig. 31)
- Chacahua, Lagunas de.—A national park situated at Laguna de Chacahua, established in 1937 and 35,056 acres in area. [15°59', 97°42'; near sea level]
- Chacalapa.—A small town on the Puerto Angel Road 5 mi (about 6.8 road mi) north of San Pedro Pochutla. [15°49', 96°28'; 800 ft by my altimeter] (225)
- Chahuities.—A town located on a railroad at a point 6 mi south of Tapanatepec. [16°18', 94°12'; 52 ft] (213)
- Chicahuaxtla: see San Andrés Chicahuaxtla.
- Chicapa de Castro (Chicapa).—A small town 15 mi east of Juchitán near the northern end of Laguna Superior. [16°26', 94°49'; 295 ft] (197)
- Chicapa, Río (Chicapa River).—One of the more important rivers draining the Pacific slope of the Isthmus of Tehuantepec, originating near San Miguel Chimalapa and emptying into Laguna Superior near Chicapa de Castro. (Fig. 31)
- Chihuitán (Chihintan, Chihuatan).—A small town in the Isthmus of Tehuantepec 14 mi northwest of Juchitán. [16°36', 95°10'] (172)
- Chiltepec: see San José Chiltepec.
- Chimalapa, Chimalapas: see Santa María Chimalapa.
- Chimalapa, Sierra de.—A local name for the mountains at the western end of the Sierra Madre de

- Chiapas. Exact eastern limits of application of this name unknown but apparently extend at least as far as Santa Efigenia (Sumichrast, *in* Lawrence 1876:6, 11).
- Chimalapilla.—An abandoned town, possibly pre-Columbian in origin, on the Río Chimalapilla about 10 mi east-northeast of Santa María Chimalapa. Visited by MacDougall (1971:89). [About 16°57', 94°32']
- Chimalapilla, Río.—A short river draining west-southwest to enter the Río Coatzacoalcos 4 mi east-northeast of Santa María Chimalapa. [Mouth at 16°56', 94°33']
- Chimalopa, Chimalpa, Chimilapa: see Santa María Chimalapa.
- Chima Wilderness.—Name applied by MacDougall (1971:87) to the region claimed by the Chima Indians, bounded on the north by Veracruz, on the south by the Plains of Tehuantepec, on the east by Chiapas, and on the west by the Isthmus of Tehuantepec.
- Chinantla.—Mentioned by Berlioz (1937:173) and Miller et al. (1957:235) as a Oaxaca locality for a specimen of *Chlorophanes spiza* and by Boucard (1895:170) as a locality for *Eupherusa poliocerca*. Location unknown and probably not in Oaxaca. I can find only one Chinantla in Mexico, a village at 18°12', 98°15', in southern Puebla in an arid habitat unsuitable for either *Chlorophanes* or *Eupherusa*. These species are not known to occur together in Oaxaca.
- Chinela, plateau of: see Plains of Chivela.
- Chivela (Chivelas).—A village on the Trans-Isthmian Railroad 19 mi north of Juchitán. [16°42', 95°00'; 689 ft] (177)
- Chivela, Plains of (plateau of Chinela).—A rather flat area of palm savanna in the southcentral portion of the Isthmus of Tehuantepec, extending eastward for about 10 mi from the town of Chivela and bordered on the south by a range of hills that descend abruptly to the Pacific coastal plain. Average elevation about 650 ft.
- Chivelas: see Chivela.
- Choapam: see next entry and Sierra de Choapan.
- Choapan (Choapam, Coapám, Santiago Choapan).—A mountain village in the former District of Choapan on the Atlantic side of the Sierra de Zempoaltepec 37 mi east of Ixtlán de Juárez. Visited by Boucard in February and March 1859. Erroneously listed by Ridgway (1911:409) as in the state of Veracruz. See District of Choapan. [17°22', 95°57'; 2,887 ft] (77)
- Choapan, District of (Choapan, Coapam).—A former major political subdivision of the state, which was located northeast of Oaxaca City along the Veracruz border and included the villages of Choapan and Trinidad. The unmodified names "Choapan" or "Coapam," indicating the district, were frequently written in conjunction with a town name.
- Choapan, Sierra de (Sierra de Choapam).—A small range of mountains bordering the western side of the Isthmus of Tehuantepec, with its northern end west of Palomares and its southern end west of Chivela and connected with the Sierra de los Mijes. (Fig. 31)
- Chonchilitos: see discussion under Isla de los Pajaros.
- Chualapa: see Santa María Chimalapa.
- Ciénega [state of Chiapas].—A lumber town in Chiapas 1.2 mi (2.4 road mi) from the Oaxaca border, 14 mi (17.8 road mi) northwest of the Pan-American Highway near Las Cruces, Chiapas, and 20 mi slightly south of west of Cintalapa, Chiapas. Used by Binford as the reference point to localities in Oaxaca (3 mi northwest, 4,650 ft; 7 road mi north-northwest, 4,350 ft). [16°42', 94°02'; 4,300 ft] (208)
- Cienega, La.—A small grassy and marshy clearing above Jamaica Junction. Phillips collecting locality. [About 16°09', 97°06' (coordinates of Jamaica Junction)]
- Cieneguilla (Cienguilla).—A village 13 mi south of Santiago Dominguillo on the old trail from Oaxaca City to San Juan Bautista Cuicatlán. [17°29', 96°57'; about 7,500 ft] (42)
- Cieneguilla, La.—A ranch 3 mi north of Santa María Ozolotepec. Nelson and Goldman specimens taken here labeled "Mts. near Ozolotepec." [16°10', 96°22'; about 10,000 ft] (140)
- Cienguilla: see Cieneguilla.
- Cima, La (Campamento La Cima, La Cima Camp, Km. 184).—A major collecting station for Rowley and others at kilometer marker 184, 3.4 road mi below (south of) a divide on the Puerto Escondido Road and about 6 mi (about 21.3 road mi) north of San Gabriel Mixtepec. Location given variously on specimen labels as 9, 10, or 11 [airline] mi south or southwest of San Pedro Juchatengo; by my measurements, it is about 11 airline mi and 23.6 road mi south of that town. See Km. 184.5. See description and photographs in Rowley (1966:110, 115, 116). [About 16°12', 97°07'; 5,800 ft] (114)
- Cinco Señores (Cinco Senores; Hacienda Cinco Señores?).—A hacienda 7 mi southeast of Ixtlán de

- Juárez, according to a map (ca. 1848) in my possession. A Boucard locality in October 1857. That this is the proper location is indicated by its proximity to La Parada, which Boucard visited in August, October, and November 1857, and to another Boucard locality, Capulalpan. Goodwin (1969:259) says "Hacienda Cinco Señores" is 20 mi west of Tehuantepec City, which, if Boucard's locality, is incorrect. Boucard is not known to have visited the Tehuantepec region. Also, the maximum elevation at Goodwin's location is only about 5,200 ft, below that preferred by *Certhia americana*, *Sitta carolinensis*, and especially *Aegolius acadicus*, all of which Boucard collected, whereas my location seems to be over 6,600 ft. [About 17°14', 96°25']
- City of Oaxaca, Ciudad Oaxaca: see Oaxaca City.
- City of Tehuantepec, Ciudad Tehuantepec: see Tehuantepec City.
- Coapám: see Choapan and District of Choapan.
- Coatepec [state of Veracruz].—A large town in the state of Veracruz 5 mi southwest of Jalapa. All literature references to "Coatepec, Oaxaca" pertain to this town. [19°27', 96°58'; 4,107 ft]
- Coatlán.—A small town in the mountains 28 mi west of Matías Romero. [16°53', 95°28'] (162)
- Coatzacoalcos, Río (Río Coatzacoalcos, Río del Corte, Río Goatzacoalcos).—A large river in the states of Oaxaca and Veracruz, which together with its tributaries drains the entire northern side of the Isthmus of Tehuantepec and empties into the Gulf of Mexico at Coatzacoalcos, Veracruz. "Río del Corte" was used by MacDougall (1971) for the upper reaches of the Río Coatzacoalcos east of Santa María Chimalapa. (Fig. 31)
- Cocoprieto: see Rancho de Cocoprieto.
- Cofradía, La.—A meadow and collecting locality for Rowley and Arnold, located in the Sierra de Cuatro Venados at kilometer marker 40 on the Río de la Y Road and along the Río de la Y above Santa María Lachixio and about 30 road mi north-northwest of San Miguel Sola de Vega. See Río de la Y. [8,900 ft]
- Coicoyán, Río.—An upper tributary of the Río Balsas, located in northwestern Oaxaca, draining the northwestern slopes of the Sierra de Yucuyacua, and passing into Guerrero northwest of San Francisco Tlapancingo. (Fig. 31)
- Coixtlahuaca: see San Juan Bautista Coixtlahuaca.
- Colonia Rodolfo Figueroa (Colonia, Colonia R. F., Colonia R. Figueroa, Colonia Rudolfo Figueroa, Colonia Rudolfa Figueroa, Colonia Rudolfa Figueroa, Colonia Rudolfo Figaroa, Rancho Bacente, Rancho Vicente, R. Vicente).—A *colonia* 12 mi northeast of Tapanatepec and 5 mi southeast of the summit of Cerro Baúl. Reached by driving 13.7 road mi north-northwest from Rizo de Oro, Chiapas. Used as a reference point for collecting localities by Rowley (1968:2), Binford (camp 2 mi east-southeast, observations from 4,700 to 5,700 ft), Rook, Galley, and others. See Rancho Cerro Baúl. [16°32', 94°08'; 4,500 ft] (209)
- Colonia Solchmilco (Col. Solchmilco).—A Galley locality, presumably on the outskirts of Oaxaca City, as his specimen labels say "Col. Solchmilco, Oax., Oax., Mexico."
- Colotepec: see Santa María Colotepec.
- Colotepec, Río.—A short river draining the Sierra de Miahuatlán and emptying into the Pacific Ocean 4 mi southeast of Puerto Escondido. (Fig. 31)
- Col. Solchmilco: see Colonia Solchmilco.
- Comaltepec: see San Juan Comaltepec.
- Compañía, La (La Compania).—A village in the Oaxaca Valley 6 mi west of Ejutla de Crespo. A. S. Leopold specimens give an elevation of 4,000 ft. [16°34', 96°50'; 4,789 ft] (131)
- Copalita (Portillo de Copalita).—A small settlement on the Puerto Angel Road 3 mi northeast of Candelaria Loxicha. [15°57', 96°28'; about 2,100 ft] (222)
- Copalita, Río (Río Copalito).—A river draining a portion of the Pacific side of the Sierra de Miahuatlán, delimiting the Sierra de Pluma on the north and east, and emptying into the Pacific Ocean 29 mi east of Puerto Angel. (Fig. 31)
- Córdoba [state of Veracruz].—A large town in the state of Veracruz about 56 mi west of the city of Veracruz. Some D. McH. Forbes specimen labels locate points in Oaxaca with reference to Córdoba, Veracruz. [18°53', 96°56'; 3,041 ft]
- Corte, Río del: see Río Coatzacoalcos.
- Cosamaloapán [state of Veracruz] (Cosamaloapam).—A city in the state of Veracruz 39 mi west-southwest of San Andrés Tuxtla. Erroneously listed by Ridgway (1904:197) as in Oaxaca. [18°22', 95°48'; 13 ft]
- Cosolapa (Cosolopa).—A village near the Veracruz border 49 mi northeast of San Juan Bautista Tuxtepec. [18°36', 96°39'; about 650 ft] (7)

Cova, La: see Lacova.

Coyul, Río.—A small river intersecting the Pan-American Highway at a road camp just northwest of Lajarcia. W. B. Davis specimens from near this road camp were labeled "Río Coyul, 70 mi. NW Tehuantepec, 2600'." [16°31', 95°56'] (Collecting locality: 154)

Cozoaltepec: see San Francisco Cozoaltepec.

Crucero de los Cedros.—A village on the Puerto Escondido Road about 7 mi (about 17 road mi) north-northeast of San Pedro Juchatengo. [About 16°26', 97°03'; about 5,600 ft]

Cuajimoloya (Guahamaloya).—A mountain village 21 mi east-northeast of Oaxaca City. Nelson and Goldman specimens taken at 9,500 ft elevation just west of village were labeled "Guahamaloya." [17°07', 96°26'; 10,335 ft] (53)

Cuatro Venados, Sierra de.—The mountain range bordering the west side of the Oaxaca Valley and delimited on all other sides by the Río Atoyac and its tributaries. Maximum elevation about 9,500 ft. (Fig. 31)

Cuchara, Río de la.—An upper tributary of the Río Verde, originating northwest of Putla de Guerrero and flowing southeastward to join with the Río Sordo. (Fig. 31)

Cues, Los: see San Juan Los Cues.

Cuicatlán: see next entry and San Juan Bautista Cuicatlán.

Cuicatlán, District of (Cuicatlán).—A former major political subdivision of the state, which encompassed a section in northern Oaxaca along the Puebla border and included the villages of San Juan Bautista Cuicatlán and San Juan Quiotepec. The unmodified name "Cuicatlán," indicating the district, was frequently written in conjunction with a town name.

Cuicuitlán: see San Juan Bautista Cuicatlán.

Cuilapan de Guerrero (Cuilapán).—A town in the Oaxaca Valley 7 mi southwest of Oaxaca City. [16°59', 96°46'; 5,202 ft] (125)

Cuitcatlán: see San Juan Bautista Cuicatlán.

Cumbre, La.—A group of houses near kilometer marker 20 on the San Juan Bautista Tuxtepec Road about 3 mi northeast of the summit of Cerro San Felipe. Used as a reference point for the localities of many collectors. Not the same as the La Cumbre above Rancho Sol y Luna (see next entry). [17°10', 96°37'; about 9,000 ft] (51)

Cumbre, La.—A summit and collecting locality for Galley, Rook, and Rowley, located 9 h walk west and north of Rancho Sol y Luna, past Lagunas Sol y Luna and the Cabeza del Novillero, on a level ridge beside a cloud forest canyon known locally as Arroyo de los Pajareros (Phillips and Rook 1965:3, 4). Possibly close to my 1964 collecting locality in cloud forest at 4,900 ft elevation "12 airline miles north-northeast of Zanatepec." Not the same as the La Cumbre near Cerro San Felipe (see entry above). [About 16°38', 94°16'; about 5,500 ft]

Cycad Camp.—A collecting station for Rowley (1966:110) along the Puerto Escondido Road about 3 mi (about 9.8 road mi) south-southeast of San Gabriel Mixtepec. [About 16°01', 97°05'; 1,900 ft] (108)

Díaz Ordaz (Diazorlaz).—A town 3 mi northeast of Tlacolula de Matamoros. [16°58', 96°26']

Dominguillo: see Santiago Dominguillo.

Donají.—A village at kilometer marker 155 on the Trans-Isthmian Highway 25 mi (31 road mi) north of Matías Romero. I disagree with Goodwin (1969:264) that Donají is synonymous with Tolosa; I believe that the latter is on the Trans-Isthmian Railroad about 2 mi south-southeast of Donají. [17°14', 95°04'; 295 ft] (87)

Dondominguello, Dondominguillo: see Santiago Dominguillo.

Durasnál (Durasnil).—Location unknown. Boucard took *Geococcyx velox* there in September 1857 (Sclater 1858:305).

Efigenia: see Santa Efigenia.

Ejutla de Crespo (Ejutla).—A town in the Oaxaca Valley on the Puerto Angel Road 35 mi south of Oaxaca City. [16°34', 96°44'; 4,723 ft] (132)

Escondida, Bahía (Escondida B., Escondido B., Escondido Bay).—The small, deep Pacific coast bay and harbor 16 mi south of San Gabriel Mixtepec, on which the town of Puerto Escondido is located. [15°51', 97°05'; sea level]

Escondido: see Puerto Escondido.

Escondido B., Escondido Bay: see Bahía Escondida.

Escuilapa (Esquilapa).—A village in the Isthmus of Tehuantepec 19 mi east of Matías Romero. Collecting locality for del Toro Avilés. [16°52', 94°46'; about 738 ft] (190)

Ecurano.—A ranch about 16 mi west-northwest of Tehuantepec City. Collecting locality for T.

- MacDougall (not F. A. Pitelka, who is erroneously given as collector on labels of some specimens in the AMNH). [16°25', 95°27'; 1,640 ft]
- Esperanza, La.—A settlement in the Sierra de Choapan 5 mi south of Coatlán on the trail to Lachiguirí and about 22 mi west of Santo Domingo Petapa. Collecting locality for T. MacDougall (in litt.) on 9 April 1952. Location given by Goodwin (1969:259) apparently incorrect. [About 16°48', 95°28'; about 5,000 ft]
- Esquilapa: see Escuilapa.
- Estancia Grande: see San José Estancia Grande.
- Etla: see San Pedro y San Pablo Etla.
- Finca Cacahuatl [state of Chiapas].—A locality on the Pan-American Highway in the extreme southwestern part of the state of Chiapas about 7.5 road mi from the Oaxaca border. Lamb specimens, labeled "Finca Cacahuatl, 15 mi. NE Tapanatepec, Oax.," do not mention Chiapas. Miller et al. (1957:28, 31) erroneously refer these Lamb specimens to Oaxaca. [16°24', 94°01'; 2,625 ft]
- Finca Jamaica.—A large coffee finca, the entrance to which is located at kilometer marker 212 along the Puerto Escondido Road 3.7 road mi north of San Gabriel Mixtepec. [About 16°07', 97°07'; 2,400 ft (Rowley 1966:110)] (110)
- Finca Mercedes.—A coffee finca on the Pacific side of the Sierra de Miahuatlán about 2 mi north of Candelaria Loxicha. [15°56', 96°28'; about 2,700 ft]
- Finca Sinai (Cafetal Sinai, Finca Sinia, Sinai).—A coffee finca 2 mi (10 km [6.2 mi] by trail) east of Santos Reyes Nopala. A collecting locality for W. Durrant, Galley, and Rook. [16°07', 97°08'; 7,200 ft] (107)
- Giengola, Cerro de: see Cerro de Quiengola.
- Gineta: see Sierra de la Gineta.
- Gineta, Cerro de la: see discussion under Sierra de la Gineta.
- Gineta, Sierra de la (Gineta, Montanas Gineta, Mount Gineta, Gineta Mountain, Gineta Mountains, Mountains of Gineta, Gineta Mounts., Gineta Mt., Gineta Mts., Sierra Gineta).—A range of low mountains in the Sierra Madre de Chiapas, located along the Oaxaca-Chiapas border northeast of Tapanatepec. Exact extent of application of this name unknown but probably very local, not reaching to the northwest of Cerro de la Gineta or southeast of the junction of the Pan-American Highway and the state border. Cerro de la Gineta is a peak with an elevation of 3,998 ft, located at 16°29', 94°08', 8 mi northeast of Tapanatepec and near the Oaxaca-Chiapas border.
- Much confusion has surrounded the various names used for the Sierra de la Gineta. Sumichrast collected in these mountains in January 1869 and again in November 1880. Specimens with the former date were listed by Lawrence (1876:16) as from "Chiapas (Gineta Mountains)," and Sumichrast (1881:237) recorded these same specimens from "Gineta, Chiapas." These specimens, therefore, must be referred to Chiapas.
- Confusion concerning the 1880 specimens stems partly from Nelson (1898b), who recorded a Sumichrast specimen of *Dactylortyx thoracicus* (USNM 116338) from "the Gineta Mt., near Santa Efigenia, Oaxaca" (p. 64) and later referred the same specimen to "Santa Efigenia, Oaxaca" (p. 66). Subsequent authors have allocated this same specimen, as well as another of the same species and with the same date (AMNH 472630, the type of *ginetensis* Warner and Harrell 1957:137), to Oaxaca. I have examined both specimens and find that originally the labels read only "Gineta Mounts." A new label affixed to the AMNH bird reads "[near Santa Efigenia, Oaxaca.]" while on the USNM specimen the statement "[near Santa Efigenia, Oaxaca]" has been added to the original label in handwriting other than that of Sumichrast. The original locality notation, "Gineta Mounts.," must be interpreted as meaning the Sierra de la Gineta rather than Cerro de la Gineta. Since Sumichrast considered his earlier birds from these mountains to be from Chiapas (Sumichrast 1881:237 and Lawrence 1876:16), the 1880 records also probably came from that state.
- Three names in the literature, Gineta Mountain, Gineta Mt., and Mount Gineta, might be interpreted to mean Cerro de la Gineta, but because they all concern the specimens of *Dactylortyx* originally labeled "Gineta Mounts.," they must be considered as synonymous with Sierra de la Gineta. Specimens taken by Lamb in 1949 and 1958 in the "Sierra Gineta" are from the Chiapas side, as correctly indicated on his labels. The exact position of the del Toro Avilés locality "Montañas Gineta, Oax." is unknown; del Toro Avilés supposedly collected here a specimen of *Atthis heloisa*, a species otherwise unknown from east of the Isthmus. (Cerro de la Gineta: Fig. 31)
- Givicia, Río.—A collecting locality for J. H. Batty in March 1906. Exact location unknown. Un-

- doubtedly located in the Atlantic Region in tropical evergreen forest, as indicated by the species of birds collected there. Probably in the Isthmus of Tehuantepec, as suggested by the collection of *Amazona farinosa*, a species unknown west of the Isthmus, and by the lack of trails or roads east of the Isthmus. Elevation given on Batty specimen labels as 800 ft.
- Gloria, La.—A settlement in the former District of Juchitán and in the northwestern foothills of the Sierra Madre de Chiapas, located about 20 mi north of Niltepec and about 7 mi south-southeast of Santa María Chimalapa toward Scarces. Collecting locality for T. MacDougall (not F. A. Pitelka, who is erroneously given as collector on labels of some specimens in the AMNH). [About 16°51', 94°38'; about 1,500 ft (T. MacDougall in litt.)] (192)
- Goatzacoalcos, Río: see Río Coatzacoalcos.
- Golán.—I can find no such locality anywhere in Mexico. Listed without state by Sclater (1857:254) as a locality for *Momotus mexicanus*, a record attributed to Delattre and referred by Ridgway (1914:466) to Oaxaca.
- Golfa, La.—A collecting locality for Rook, Galley, and others, said on specimen labels to be 3 km (1.9 mi) west or 4 km (2.5 mi) north of "R. Vicente" [= Colonia Rodolfo Figueroa] and 23 or 25 km (15.5 mi) northwest of Tapanatepec.
- Goya Vitas, Las.—See discussion under Arroyo Noche Buena.
- Grande, Río.—A large upper tributary of the Río Santo Domingo, originating near Capulalpan and flowing northwestward between the Sierra Aloapaneca and Sierra de Juárez to join with the Río Quiotepec south of San Juan Bautista Cuicatlán. Should not be confused with the Río Grande in the Río Tehuantepec basin (see next entry) or with the three towns called Río Grande. (Fig. 31)
- Grande, Río.—A large river draining the eastern slopes of the mountains on the eastern side of the Oaxaca Valley, flowing northeast to San Pedro Totolapan, thence east to Nejapa, and finally northeast again to join with the Río Tehuantepec. Should not be confused with the Río Grande in the valley of San Juan Bautista Cuicatlán (see preceding entry) or with the three towns called Río Grande. (Fig. 31)
- Guachicovi: see Guichicovi.
- Guahamaloya: see Cuajimoloya.
- Guajolote, Río (Río Guajolote).—A small tributary of the Río Jalatengo, located south of San Miguel Suchixtepec. Also the name of a collecting station for Phillips, Rowley, and others, located at an abandoned camp where the river meets the Puerto Angel Road about 5 mi (about 10.4 road mi) south of San Miguel Suchixtepec and between the localities of Río Molino and Río Jalatengo. [Camp at about 16°00', 96°28'; 6,550 ft by my altimeter] (Collecting locality: 220)
- Guamol, El (Km. Post 889).—A collecting locality on the Río Guamol at kilometer marker 889 on the Pan-American Highway 7.4 airline mi west of Zanatepec and 11.2 airline mi (about 14 by road) east of Niltepec (airline distances based on Comision Map). On the Millionth Map these airline distances are 9.5 and 8, respectively, accounting for mileages given on some specimen labels. Schaldach incorrectly used "6 mi. W Zanatepec" on his 1961 specimens. [16°30', 94°28' (Comision Map)] (204)
- Guamol, Río.—A small river crossing the Pan-American Highway at El Guamol, which see. Used as a locality name by Selander, who put "8 mi. E Niltepec" on his specimen labels, presumably based on the Millionth Map, but later (1964:71, 231) amended it to 14 mi east, presumably based on road mileage.
- Guatulco Harbor: see Puerto de Huatulco.
- Guchitan: see Juchitán.
- Guelatao.—A village on the San Juan Bautista Tuxtpec Road 1 mi southwest of Ixtlán de Juárez. [17°18', 96°29'; 5,774 ft] (54)
- Guichicovi (Guachicovi, Guichcovi, San Juan Guichicovi).—An old and ornithologically important town in the Isthmus of Tehuantepec 7 mi northwest of Matías Romero. Todd (1929:93), Hellmayr (1934:35; 1937:143), and Ridgway (1902:306) erroneously list this town as in Chiapas. [16°58', 95°06'; 817 ft] (187)
- Guichilona (Guichiloma).—A village in the Isthmus of Tehuantepec 14 mi south-southwest of Matías Romero. To my knowledge no ornithologist has visited this town. It is included here because Salvin and Godman (1897–1904 [1901]:90) and later Friedmann (1950:434, 435) apparently believed that Sumichrast collected two *Harpia harpyja* in the Isthmus, one of them at "Guichiloma." Sumichrast, however, took only one individual of this species in Oaxaca and labeled it "Almoloya." Later (1881:

236) he wrote, concerning the same specimen, that he took a Harpy Eagle "en el cerro de Guichilona." Undoubtedly he meant that he secured it south of Almoloya on the hill on which Guichilona is located, which was known to him as "el cerro de Guichilona." [16°42', 95°07'; about 2,000 ft] (178) Guichilona, Cerro de (cerro de Guichilona).—Apparently, the hill on which the village of Guichilona is located. See discussion under Guichilona.

Hacienda Cinco Señores: see Cinco Señores.

Hacienda, La.—A collecting locality for Martin del Campo (1942:351, 353, 354) and P. Roveglia during September 1937, located on the outskirts of Huajuapam de León. [About 17°48', 97°46'; 5,238 ft]

Hacienda Santa Efigenia: see Santa Efigenia.

Head of El Novillero: see Cabeza del Novillero.

Hidalgo Yalalag (Villa Hidalgo, Yalalag).—A town in the upper portion of the valley of the Río Cajones, located 23 mi northeast of Tlacolula de Matamoros. Elevation given erroneously as 3,000 ft by Goldman (1951:229). [17°10', 96°11'; 3,852 ft] (67)

Hidalgo Yalalag valley.—My term for the arid upper portion of the valley of the Río Cajones and its tributaries, extending from the region south of Hidalgo Yalalag north to a point northwest of San Miguel Talea de Castro where the river bends abruptly to the northeast. (Fig. 31)

Hoya, La.—Sumichrast took *Geococcyx velox* here on 11 August 1868. Located on what was formerly the main trail between Oaxaca City and Tehuacán, Puebla, somewhere between Santiago Dominigillo and San Francisco Telixtlahuaca and presumably near Santiago Nacaltepec, where Sumichrast collected on the same day.

Huajuapam de León (Huajualpam, Huajuapam, Huajuapam).—A large town on the Pan-American Highway 16 mi northwest of Tamazulapan del Progreso. [17°49', 97°47'; 5,238 ft] (24)

Huajuapam de León valley.—My term for the large valley formed in northwestern Oaxaca by the Río Mixteco and its tributaries and covered with arid tropical scrub. One arm of the valley reaches Huajuapam de León.

Huallaga (Huallago).—A Sumichrast locality for *Cyanocompsa parellina* and *Cacicus melanicterus*. Exact location unknown but probably synonymous with Laollago (which see), a town 2 mi west of Sumichrast's locality of Chihuitán. Sumichrast (*in* Lawrence 1876:23) states that *Cacicus* is "especially abundant near Chihuitán and Huallaga."

Huamelula (Huamela).—A town on the Pacific side of the Sierra de Miahuatlán 35 mi west-southwest of Salina Cruz. That this is the proper location for Sumichrast specimens so labeled is evidenced by the close proximity of Zapotitlán, a village about 8 mi north-northwest of Huamelula. Some Sumichrast specimens are labeled "Zapotitlan, cerca de Huamelula." [16°02', 95°40'; 295 ft] (159)

Huantepec.—Listed by Stresemann (1954:90) as the locality for a specimen (paralectotype) of *Icterus pustulatus* taken by Deppe in September 1825. I can find no such locality in Mexico. Possibly synonymous with "Tehuantepec" [= region], but Deppe was not supposed to have left Oaxaca City for Tehuantepec City until 22 October (Stresemann 1954:87).

Huatulco, Huatulco B.: see Puerto de Huatulco.

Huautla, Sierra de.—The name used herein for the mountain mass in northern Oaxaca bordered on the south by the canyon of the Río Santo Domingo, on the east by the Atlantic lowlands, on the north by the Puebla border, and on the west by the Río Salado. Represents the southeasternmost extension of the Orizaba highlands. (Fig. 31)

Hueytamalco [state of Puebla] (Hueytalco).—A town in the state of Puebla near the Veracruz border 49 mi northwest of Jalapa, Veracruz. Mentioned without state under *Thamnophilus doliatus* by Ferrari-Perez (1886:156) and by Salvin and Godman (1888–1904 [1892]:202) whom Ridgway (1911:42) misquotes by listing the same species from "Hueytalco" and referring it to Oaxaca. [19°57', 97°16']

Huiloitepec (Huiltepec).—A small Indian town on the eastern shore of the Río Tehuantepec 8 mi southeast of Tehuantepec City. [16°14', 95°09'; 98 ft] (168)

Huitzo: see San Francisco Telixtlahuaca.

Hule, El.—Location unknown. Cooke (1946:254) lists a record of a banded *Ardea herodias* recovered "at El Hule, Oaxaca, México."

Ianhuiatlan, Ianhuitlan: see Yanhuitlán.

Icacoprieto: see Rancho de Cacoprieto.

Inferior, Laguna.—A very large saline lagoon on the Pacific coast of the Isthmus of Tehuantepec southeast of Juchitán. Erroneously listed by Leopold (1959:137, 141) as in Chiapas. [16°20', 94°40'; sea level] (Fig. 31)

- Ingenio Santo Domingo.—A village on the Pan-American Highway 10 mi west of Nilttepec. [16°35', 94°46'; 295 ft] (195)
- Ishuatán, Ishuatlan: see Ixhuatán.
- Isthmus: see Isthmus of Tehuantepec.
- Isthmus mountains.—My term for the chain of low mountains and hills, containing the continental divide, stretching for about 35 mi between the foothills of the Sierra de Choapan on the west and those of the Sierra Madre de Chiapas on the east. Maximum elevation about 2,500 ft; lowest passes about 800 ft. (Fig. 31)
- Ixhuatán (Ishuatán, Ishuatlan, Ixhuatlan).—A small town 12 mi southwest of Zanatepec. [16°22', 94°29'; about 75 ft] (201)
- Ixtaltepec.—A town on a railroad 6 mi north of Juchitán. [16°35', 95°03'; 105 ft]
- Ixtepec (Ixtapec, San Gerónimo, San Gerónimo Ixtepec, San Geronomo, San Jerónimo Ixtepec).—A town on the Trans-Isthmian Railroad 11 mi north-northwest of Juchitán. Should not be confused with San Gerónimo, Guatemala. [16°34', 95°06'; 187 ft] (173)
- Ixtlán de Juárez (Ixtlán).—A town on the San Juan Bautista Tuxtepec Road 25 mi northeast of Oaxaca City. [17°20', 96°30'; 5,576 ft] (55)
- Izucar.—A Boucard locality attributed to Oaxaca on the label of a specimen of *Momotus mexicanus* but probably synonymous with Izúcar de Matamoros, Puebla, the only "Izúcar" I can find in Mexico.
- Izúcar de Matamoros [state of Puebla].—A large town in the state of Puebla 22 mi south of Atlixco. Possibly the same as Boucard's locality "Izucar." [18°36', 98°28'; 4,294 ft]
- Jalahuí (Jalabury, Jalahey, Jalahuey, Jalahuy).—A village in the Atlantic lowlands 14 mi northeast of Choapan. [17°27', 95°46'; 820 ft]
- Jalapa.—Formerly a small town on the Río Tehuantepec 18 mi northwest of Tehuantepec City. This site no longer exists, having been inundated by the waters of Presa Benito Juárez. Town now located near the Pan-American Highway on the south side of the reservoir. T. MacDougall specimens taken in January 1952 before the town was moved. See also Jalapa, state of Veracruz. [Formerly 16°30', 95°28'; now about 16°28', 95°28'; formerly 328 ft]
- Jalapa [state of Veracruz].—A city in the state of Veracruz 43 mi north of Córdoba. The locality "Jalapa, Oaxaca" listed by Ridgway (1902:760) in the synonymy of *Ergaticus ruber* (citing Sharpe 1885:406) resulted from a typographical error and is actually Jalapa, Veracruz (the comma should have been a semicolon). See also preceding entry. [19°32', 96°55'; 4,681 ft]
- Jalatengo, Río.—A small river, a tributary of the Río Copalita, crossing the Puerto Angel Road about 8 mi (about 19.1 road mi) south of San Miguel Suchixtepec. Also, the name used by Phillips, Rowley (1966:110), and others for their collecting station at this junction of road and river. [Collecting locality: 15°58', 96°27'; 4,500 ft] (Collecting locality: 221) (River: Fig. 31)
- Jaltepec, Río.—A large river on the Atlantic side of the Isthmus of Tehuantepec, originating in the mountains south of Tutla and joining the Río Sarabia just east of Jesús Carranza, Veracruz. Because the Oaxaca-Veracruz border intersects the Trans-Isthmian Highway 2.4 mi south of the point where this road crosses the Río Jaltepec, all records for either bank of this river must be allocated to Veracruz. Notable among records stated to be for Oaxaca because they were made on the south side of this river are those of Amadon and Eckelberry (1955). Graber and Graber (1959:66) stated that Loseta is located on the Río Jaltepec but meant the Río Jumupán. (Fig. 31)
- Jamaica Junction.—A collecting locality for Rowley and others at kilometer marker 212 at a point 4.1 road mi north of San Gabriel Mixtepec at the intersection of the Puerto Escondido Road and the road into Finca Jamaica. See description and photograph in Rowley (1966:110, 118). [About 16°07', 97°07'; 2,400 ft (Rowley 1966:110)] (110)
- Jamiltepec: see Santiago Jamiltepec.
- Janhuiatlan, Janhuitlan: see Yanhuitlán.
- Japana: see Tapanatepec.
- Jesús Carranza [state of Veracruz].—A town in the state of Veracruz located on the Trans-Isthmian Railroad just east of the Trans-Isthmian Highway and about 5 mi north of the Oaxaca border Graber and Graber (1959) specimens taken in Oaxaca 1 mi south of Loseta on the Río Jumupán were labeled "22 mi. S. Jesús Carranza." [17°26', 95°02'; 85 ft] (85)
- Jícaro, El (Jícaro).—A small settlement and collecting locality for Schaldach, Galley, and others, located on the Pan-American Highway about 5 mi northwest of Tapanatepec at a point where a trail leads off to Rancho Sol y Luna. [16°26', 94°16'; about 500 ft] (211)
- Jobal, El.—A ranch in Oaxaca very near the Veracruz border just west of Playa Vicente, Veracruz (A. R. Phillips in litt.). [About 17°52', 95°49'; about 200 ft]

- Juárez, Sierra de.—An isolated mountain range abutting on the Atlantic lowlands of northern Oaxaca and extending from near Ixtlán de Juárez northwest to the vicinity of San Juan Bautista Cuicatlán. Maximum elevation about 10,600 ft. (Fig. 31)
- Juchatenango, Juchatengo, Juchatingo, Juchetengo: see San Pedro Juchatengo.
- Juchitán (Guchitan, Juchitan, Tuchitan, Xuchitan).—A large town on the Pacific coastal plain in the Isthmus of Tehuantepec 15 mi east-northeast of Tehuantepec City. See District of Juchitán. [16°26', 95°02'; 46 ft] (171)
- Juchitán, District of (Juchitán).—A former major political subdivision of the state, which encompassed the entire section east of the Isthmus and included the towns of Juchitán, Tapanatepec, and Santa María Chimalapa. The unmodified name "Juchitán," meaning the district, was frequently written in conjunction with a town name. The record of *Lipaugus unirufus* attributed to "Juchitán" by Miller et al. (1957:60) came from La Gloria, District of Juchitán.
- Juchitán, Río (Juchitan River).—An important river on the Pacific side of the Isthmus originating in the mountains northwest of Chihuitán, coursing southeast past the city of Juchitán, and emptying into Laguna Superior. (Fig. 31)
- Juguila: see Santa Catarina Juquila.
- Jumuapán, Río (Río Tortuguero).—A river on the Atlantic side of the Isthmus of Tehuantepec, originating in the northern part of the Sierra de Choapan, crossing the Trans-Isthmian Highway 1 mi north of Tolosa, and then flowing north into Veracruz to join with the Río Coatzacoalcos. The town of Loseta is located on this river, not on the Río Jaltepec as erroneously stated by Graber and Graber (1959:66). (Fig. 31)
- Juniper Camp (Km. 124).—A collecting station for Rowley (1966:110) at kilometer marker 124 on the Puerto Escondido Road about 7 mi (about 15.8 road mi) north of San Pedro Juchatengo; some specimen labels incorrectly say "10" or "11 mi. NNW." [16°26', 97°05'; 5,000 ft] (119)
- Juquila: see next entry and Santa Catarina Juquila.
- Juquila, District of (Juquila).—A former major political subdivision of the state, which was located in southwestern Oaxaca along the Pacific coast and included the town of Santa Catarina Juquila. The unmodified name "Juquila," meaning the district, was frequently written in conjunction with a town name. See Santa Catarina Juquila.
- Juquila Mijes, Juquila Mixes: see San Juan Juquila Mixes.
- Juquilla: see Santa Catarina Juquila.
- Km. 33.—A collecting station for Rowley at kilometer marker 33 on the San Juan Bautista Tuxtepec Road about 8 road mi northeast of La Cumbre and about 20 road mi north of Oaxaca City. [About 17°13', 96°35'; 7,000 ft]
- Km. 40: see discussions under La Cofradía and Río de la Y.
- Km. 70.—A collecting station for Rowley and F. Flores at kilometer marker 70 on the Putla de Guerrero Road about 5 mi (about 8 road mi) west-southwest of Santa María Asunción Tlaxiaco. [About 17°15', 97°46'; 6,800 ft] (22)
- Km. 73.—A collecting station for Rowley at kilometer marker 73 on the Puerto Escondido Road on a ridge about 3 road mi northeast of San Miguel Sola de Vega. [5,000 ft]
- Km. 108.—A collecting station for Rowley at kilometer marker 108 on the Putla de Guerrero Road about 3 mi (about 7.9 road mi) southwest of San Andrés Chicahuaxtla and about 9 mi (about 24.6 road mi) northeast of Putla de Guerrero. [About 17°08', 97°51'; 7,100 ft]
- Km. 113.—A collecting station for Galley at kilometer marker 113 on the Puerto Angel Road about 6 mi (about 8.1 road mi) south-southeast of San Andrés Miahuatlán. [About 6,100 ft]
- Km. 114.—A collecting station for Rowley at kilometer marker 114 on the Putla de Guerrero Road about 4 mi (about 11.7 road mi) southwest of San Andrés Chicahuaxtla and about 8 mi (about 20.8 road mi) northeast of Putla de Guerrero. [About 17°06', 97°52'; 5,800 ft]
- Km. 116.—A collecting station for Galley at kilometer marker 116 on the Putla de Guerrero Road about 5 mi (about 12.9 road mi) southwest of San Andrés Chicahuaxtla and about 7 mi (about 19.6 road mi) northeast of Putla de Guerrero. See next entry. [About 17°06', 97°52'; about 5,800 ft]
- Km. 116.—A collecting station for Rowley at kilometer marker 116 on the Puerto Angel Road about 7 mi (about 10 road mi) south-southeast of San Andrés Miahuatlán. See preceding entry. [About 6,800 ft]
- Km. 117.—A collecting station for Rowley at kilometer marker 117 on the Putla de Guerrero Road about 5 mi (about 13.4 road mi) southwest of San Andrés Chicahuaxtla and about 7 mi (about 19.1 road mi) northeast of Putla de Guerrero. [About 17°06', 97°52'; 6,200 ft]

- Km. 120.—A collecting station for Rowley at kilometer marker 120 on the Putla de Guerrero Road about 6 mi (about 15.3 road mi) southwest of San Andrés Chicahuaxtla and about 6 mi (about 17.2 road mi) northeast of Putla de Guerrero. [About 17°05', 97°53'; 5,000 ft]
- Km. 123 (Km. 123 Camp).—A collecting station for Rowley, Binford, and others at kilometer marker 123 on the Putla de Guerrero Road at a creek and swift cave about 6 mi (about 17.2 road mi) southwest of San Andrés Chicahuaxtla and about 6 mi (about 15.3 road mi) northeast of Putla de Guerrero. [About 17°06', 97°55'; 4,350 ft according to my altimeter; Rowley (1966:109) gives 4,600 ft] (20)
- Km. 124: see Juniper Camp.
- Km. 125.—A collecting station for Rowley at kilometer marker 125 on the Puerto Escondido Road about 7 mi (about 15.3 road mi) north of San Pedro Juchatengo; at least one specimen label incorrectly says "10 mi. NNW." [About 16°26', 97°04']
- Km. 128.—A collecting station for Rowley at kilometer marker 128 on the Puerto Escondido Road about 6 mi (about 13.4 road mi) north of San Pedro Juchatengo. [About 16°25', 97°05'; 4,600 ft]
- Km. 134.—A collecting station for Rowley and others at kilometer marker 134 on the Putla de Guerrero Road about 9 mi (about 24.0 road mi) southwest of San Andrés Chicahuaxtla and 3 mi (about 8.5 road mi) northeast of Putla de Guerrero. [About 17°03', 97°54'; 3,300 ft]
- Km. 135 (Km. 135 Camp).—A collecting station for Rowley (1966:109) and others at kilometer marker 135 on the Putla de Guerrero Road about 9 mi (about 26.5 road mi) southwest of San Andrés Chicahuaxtla and about 3 mi (about 6.0 road mi) northeast of Putla de Guerrero. [About 17°04', 97°56'; 3,200 ft] (19)
- Km. 136 (Km. 136 Camp).—A collecting station for Rowley (1966:109) and others at kilometer marker 136 on the Puerto Escondido Road about 4 mi (about 8.4 road mi) north of San Pedro Juchatengo. [About 16°23', 97°05'; 3,500 ft] (118)
- Km. 153.—A collecting station for Rook, Galley, and others at kilometer marker 153 on the Puerto Angel Road about 2 mi southwest of San Miguel Suchixtepec. Close to and perhaps synonymous with Río Molino. [About 16°04', 96°28'; about 7,400 ft]
- Km. 154.—A collecting station for J. D. Webster at kilometer marker 154 on the Puerto Escondido Road about 2 mi (about 4.2 road mi) southwest of San Pedro Juchatengo. [About 16°19', 97°06'; 3,800 ft]
- Km. 158.—A collecting station for Arnold at a lumber camp at kilometer marker 158 on the Puerto Angel Road about 3 mi (about 4.5 road mi) southwest of San Miguel Suchixtepec. [About 7,400 ft]
- Km. 160.—A collecting station for Rowley at kilometer marker 160 on the Putla de Guerrero Road about 5 mi (about 7.6 road mi) southwest of Putla de Guerrero. [About 16°57', 97°58'; 3,000 ft]
- Km. 164.—A collecting station for Rowley at kilometer marker 164 on the Puerto Angel Road about 4 mi (about 8.2 road mi) south of San Miguel Suchixtepec.
- Km. 168.—A collecting station for Rowley at kilometer marker 168 on the Puerto Angel Road about 5 mi (about 10.7 road mi) south of San Miguel Suchixtepec. [About 6,500 ft]
- Km. 170.—A collecting station for Rowley at kilometer marker 170 on the Puerto Escondido Road about 8 mi (about 14.2 road mi) south of San Pedro Juchatengo and about 9 mi (about 30.7 road mi) north of San Gabriel Mixtepec. [About 16°15', 97°07'; 5,500 ft]
- Km. 175.—A collecting station for Rowley at kilometer marker 175 on the Puerto Escondido Road about 8 mi (about 17.0 road mi) south of San Pedro Juchatengo and about 9 mi (about 28.0 road mi) north of San Gabriel Mixtepec. [About 16°15', 97°07'; about 6,000 ft]
- Km. 176: see Screech Owl Camp.
- Km. 178.—A collecting station for Rowley and others at kilometer marker 178 on the Puerto Escondido Road about 9 mi (about 18.9 road mi) south of San Pedro Juchatengo and about 8 mi (about 26.0 road mi) north of San Gabriel Mixtepec. [About 16°14', 97°07'; 6,300 ft]
- Km. 179.5.—A collecting station for Arnold halfway between kilometer markers 179 and 180 on the Puerto Escondido Road about 10 mi (about 19.8 road mi) south of San Pedro Juchatengo and about 7 mi (about 25.1 road mi) north of San Gabriel Mixtepec. [About 16°13', 97°07'; 6,250 ft]
- Km. 180.—A collecting station for Rowley and others at kilometer marker 180 on the Puerto Escondido Road about 10 mi (about 20.2 road mi) south of San Pedro Juchatengo and about 7 mi (about 24.7 road mi) north of San Gabriel Mixtepec. [About 16°13', 97°07'; 6,350 ft]
- Km. 181.—A collecting station for Rowley, J. D. Webster, and others at kilometer marker 181 on the Puerto Escondido Road about 10 mi (about 20.8 road mi) south of San Pedro Juchatengo and about 7 mi (about 24.1 road mi) north of San Gabriel Mixtepec. [About 16°13', 97°07'; 6,100 ft]

- Km. 182.—A collecting station for Rowley at kilometer marker 182 on the Puerto Angel Road about 9 mi (about 19.8 road mi) south of San Miguel Suchixtepec and about 0.6 mi south of the Río Jalatengo. See next entry. [About 4,600 ft]
- Km. 182.—A collecting station for Rowley and others at kilometer marker 182 on the Puerto Escondido Road about 11 mi (about 21.4 road mi) south of San Pedro Juchatengo and about 7 mi (about 23.5 road mi) north of San Gabriel Mixtepec. See preceding entry. [About 16°12', 97°07'; 6,000 ft]
- Km. 183.—A collecting station for Rowley and others and the site of a National Audubon Society Breeding-bird Census taken by J. D. Webster, located at kilometer marker 183 on the Puerto Escondido Road about 11 mi (about 22.0 road mi) south of San Pedro Juchatengo and about 6 mi (about 22.9 road mi) north of San Gabriel Mixtepec. Webster (1965:598) describes this locality in detail. [About 16°12', 97°07'; 6,000 ft] (115)
- Km. 184: see La Cima.
- Km. 184.5 (Km. 184½).—A collecting station for Rowley, Arnold, and others halfway between kilometer markers 184 and 185 on the Puerto Escondido Road about 11 mi (about 23.9 road mi) south of San Pedro Juchatengo and about 6 mi (about 21.0 road mi) north of San Gabriel Mixtepec. On some specimen labels, treated as synonymous with La Cima. [About 16°12', 97°07'; 5,750 ft]
- Km. 187.—A collecting station for Rowley and others at kilometer marker 187 on the Puerto Escondido Road about 12 mi (about 25.4 road mi) south of San Pedro Juchatengo and about 5 mi (about 19.5 road mi) north of San Gabriel Mixtepec. [About 16°11', 97°07'; 5,200 ft]
- Km. 189.—A collecting station for Galley at kilometer marker 189 on the Puerto Escondido Road about 12 mi (about 26.6 road mi) south of San Pedro Juchatengo and about 5 mi (about 18.3 road mi) north of San Gabriel Mixtepec. [About 16°11', 97°07'; about 4,900 ft]
- Km. 193.—A collecting station for Rook and Galley at kilometer marker 193 on the Puerto Escondido Road about 13 mi (about 29.1 road mi) south of San Pedro Juchatengo and about 4 mi (about 15.8 road mi) north of San Gabriel Mixtepec. [About 16°10', 97°07'; 4,200 ft]
- Km. 195.—A collecting station for Rowley and others at kilometer marker 195 on the Puerto Escondido Road about 13 mi (about 30.3 road mi) south of San Pedro Juchatengo and about 4 mi (about 14.6 road mi) north of San Gabriel Mixtepec. [About 16°10', 97°07'; 4,200 ft] (112)
- Km. 201.—A collecting station for Rowley at kilometer marker 201 on the Puerto Escondido Road about 15 mi (about 34.0 road mi) south of San Pedro Juchatengo and about 2 mi (about 10.9 road mi) north of San Gabriel Mixtepec. [About 16°08', 97°07'; 3,400 ft]
- Km. 202.—A collecting station for Rowley at kilometer marker 202 on the Puerto Escondido Road about 15 mi (about 34.6 road mi) south of San Pedro Juchatengo and about 2 mi (about 10.3 road mi) north of San Gabriel Mixtepec. [About 16°08', 97°07'; about 3,400 ft]
- Km. 207.—A locality for Arnold and B. D. Parmeter at kilometer marker 207 on the Puerto Escondido Road about 15.5 mi (about 37.7 road mi) south of San Pedro Juchatengo and about 1.5 mi (about 7.2 road mi) north of San Gabriel Mixtepec. [About 16°07', 97°07']
- Km. 208.—A collecting station for Galley and F. Flores at kilometer marker 208 on the Puerto Escondido Road about 15.5 mi (about 38.3 road mi) south of San Pedro Juchatengo and about 1.5 mi (about 6.6 road mi) north of San Gabriel Mixtepec. [About 16°07', 97°07']
- Km. 210.—A collecting station at kilometer marker 210 on the Puerto Escondido Road about 15.5 mi (about 39.5 road mi) south of San Pedro Juchatengo and about 1.5 mi (about 5.4 road mi) north of San Gabriel Mixtepec. [About 16°07', 97°07']
- Km. 707.—A collecting station for Rowley at kilometer marker 707 on the Pan-American Highway about 20 mi west of Tequisistlán. [3,000 ft (Rowley specimen label)]
- Km. Post 889: see El Guamol.
- Lachao Nuevo: see San Juan Lachao Pueblo Nuevo.
- Lachiguirí.—A small town in the mountains 33 mi northwest of Tehuantepec City. [16°42', 95°33'] (161)
- Lachixola.—A village 11 mi north of Choapan. Specimens taken by del Toro Avilés in 1949 give an elevation of 500 m (1,640 ft). [17°31', 95°56'] (81)
- Lacova (La Cova).—A del Toro Avilés locality 7 mi north of Choapan; his specimen labels given an elevation of 1,000 m (3,280 ft). [17°27', 95°56'] (80)
- Lagartero, Laguna (Lake Lagartero, Laguna Manialtepec).—A large, deep saline lagoon that opens into the Pacific Ocean 12 mi west-northwest of Puerto Escondido. [15°55', 97°12'; sea level] (Fig. 31)
- Lagoons, The Lagoons: see Lagunas Sol y Luna.

Laguna Huetulacán [state of Veracruz]: see discussion under Lagunas.

Laguna, La: see Lagunas Sol y Luna.

Lagunas.—A town on the Trans-Isthmian Railroad 6 mi south-southwest of Matías Romero. Visited by W. W. Brown and by Nelson and Goldman. The “Lagunas” at which Deppe secured specimens in 1828 is Laguna Huetulacán, Veracruz (Stresemann 1954:88), not Lagunas, Oaxaca, as believed by van Rossem (1934b:474). [16°48', 95°04'; 840 ft] (183)

Lagunas, Las: see Lagunas Sol y Luna.

Lajarcia (Portillo Nejapa, S. Juan La Garcia).—A small town on the Pan-American Highway 7 mi southeast of El Camaron. [16°31', 95°56'; 3,608 ft] (155)

Lalana (Lana, La Lana).—A small town 7 mi north-northeast of Choapan. [17°28', 95°54'; about 2,300 ft] (79)

Lana, Río de la.—A river originating in the northeastern part of the Sierra de Zempoaltepec, flowing northeastward, forming a portion of the Oaxaca-Veracruz border, and joining the Río Trinidad in Veracruz to form the Río San Juan, a tributary of the Río Papaloapan. (Fig. 31)

Laollago.—A small town 17 mi north of Tehuantepec City. See Huallaga. [16°36', 95°12']

Latani.—A small town about 4 mi northeast of Choapan. A Boucard locality for *Geotrygon albifacies* in February 1859. [About 17°24', 95°54']

León, Cerro.—One of the highest mountains in Oaxaca, its summit located in the Sierra de Miahuatlán 15 mi east-northeast of San Miguel Suchixtepec. [Summit: 16°11', 96°16'; 10,296 ft] (Fig. 31)

Llano de las Flores.—A *rancho* in a large meadow along the San Juan Bautista Tuxtepec Road about 7 mi north of Ixtlán de Juárez. Although specimens could be taken at slightly higher elevations on the bordering mountain slopes, I doubt the elevation of 3,150 m (10,332 ft) given on specimens in the University of Kansas. [About 17°25', 96°26'; 9,500 ft (Goodwin 1969:260)] (57)

Llano Grande.—A village in extreme southwestern Oaxaca 18 mi northwest of Santiago Pinotepa Nacional. [16°29', 98°17'; 197 ft] (95)

Llano Santa María Lachixio: see discussion under Santa María Lachixio.

Llano Verde.—A Lamb collecting locality on the Pan-American Highway 45 road mi northwest of Oaxaca City or about 19 airline mi southeast of Asunción Nochixtlán and about 1 mi southeast of Rancho de las Rosas. Not the same as Boucard's Llano Verde or O. Epping's Llanos Verde (see next two entries). [17°15', 97°04'; about 7,000 ft] (34)

Llano Verde (Llano verde).—A Boucard locality, exact location unknown. Judging from certain species collected (*Sphyrapicus varius*, *Campephilus guatemalensis*, *Cyanolyca nana*, *Campylorhynchus megalopterus*, *Henicorhina leucosticta*, *Ergaticus ruber*, and *Basileuterus belli*), must be located on the Atlantic side of Sierra de Zempoaltepec or Sierra de Juárez and in an area where cloud forest and humid pine-oak forest approach one another, probably above 4,100 ft elevation. Could not be the same as Lamb's Llano Verde (see preceding entry), but could be synonymous with O. Epping's Llanos Verde.

Llanos Verde.—A locality at which Otto Epping collected *Parus wollweberi* on 20 May 1963. Located approximately in the vicinity of Valle Nacional, according to a rough map presented by Mees (1970: 238). I cannot find it on other maps. Could be synonymous with Boucard's, but not Lamb's, Llano Verde (see two preceding entries).

Llorón, El.—An uninhabited trail junction on a hill along the Pan-American Highway about 25 mi southeast of Asunción Nochixtlán. Phillips collecting locality.

Loma Alta.—A locality on the banks of the Río Tonto in northern Oaxaca. Exact location unknown. D. McH. Forbes specimens from this locality labeled as taken at 400 ft elevation.

Loma Bonita.—A village on a railroad 16 mi east of San Juan Bautista Tuxtepec. Lamb specimens from points 3 mi north, 4 mi south, and 6 mi south. Lamb specimens from “Arroyo Claro, 7 mi SE Loma Bonita, Oax.” were taken in Veracruz (see Arroyo Claro, state of Veracruz). [18°07', 95°53'; 89 ft] (14)

Loseta.—A Graber locality in the Isthmus of Tehuantepec near the junction of the Río Jumuapán and the Trans-Isthmian Highway about 23 mi north of Matías Romero. Graber and Graber (1959) published their records as from “1 mile south of Loseta on the Río Jaltepec” (p. 66) but labeled the specimens “22 mi. S Jesús Carranza [Veracruz].” Their published locality should have read “1 mile south of Loseta, with Loseta on the Río Jumuapán” (Graber and Graber in litt.). Possibly synonymous with Solasita or Tolosa. [17°13', 95°04'; about 300 ft] (88)

Lucapa (Lucappa).—I can find no such locality anywhere in Mexico. Listed as “Lucappa,” without

- mention of state, by Sclater (1857:254) in range of *Momotus mexicanus* and later listed under the same species and spelled "Lucapa" by Salvin and Godman (1888–1904 [1895]:460), without mention of state, and by Ridgway (1914:226), referring the locality to Oaxaca.
- Madre de Chiapas, Sierra.—A mountain range bordering the Pacific lowlands of Chiapas and extending northwest into Oaxaca as far as the Isthmus of Tehuantepec. Highest point in the Oaxaca portion of the range is Picacho Prieto at about 7,900 ft elevation. (Fig. 31)
- Madre de Oaxaca, Sierra (Oaxaca Mountains, Sierra de Oaxaca, Sierra of Oaxaca).—A term embracing all of the mountain ranges north and east of Oaxaca City from the Puebla border to the Isthmus, including the Sierra de Huautla, Sierra de Juárez, Sierra de Zempoaltepec, Sierra de los Mijes, and Sierra de Choapan.
- Madre del Sur, Sierra (Sierra del Sur).—As here defined, that portion of the southern Mexican highlands in the state of Guerrero, the Oaxaca highlands being known as the Mesa del Sur (West 1964:63). Another definition often applied includes a larger area, extending from Guerrero to include the Sierra de Yucuyacua, Sierra Aloapaneca, and Sierra de Miahuatlán.
- Madre Oriental, Sierra.—The chain of mountains bordering the eastern side of the central plateau of Mexico. Sometimes considered to extend as far as the Isthmus of Tehuantepec, in which event it would be synonymous, in its Oaxaca portion, with the Sierra Madre de Oaxaca. Here not considered to enter Oaxaca.
- Malatengo, Río (Río Malatenco).—A tributary of the Río Coatzacoalcos, originating in the Sierra de Choapan near Santo Domingo Petapa, intersecting the Trans-Isthmian Highway 8 mi (14.5 road mi) north of Matías Romero in the vicinity of Mogoñé, and joining the Río Sarabia at the Veracruz border. (Fig. 31)
- Manialtepec, Laguna: see Laguna Lagartero.
- Mapias Romero: see Matías Romero.
- Margarita, La.—Location uncertain. Directions given on labels of specimens (UK) taken by M. C. Thompson and R. F. Johnston in 1959, 20 km (12.4 mi) north and 10 km (6.2 mi) west of Ciudad Alemán, Veracruz, indicate location in the state of Veracruz.
- Masahua, Cerros de (Cerro de Mazahua).—A small and compact group of hills just east of the Trans-Isthmian Highway and 5 mi north of La Ventosa. Maximum elevation 2,275 ft. [16°39', 94°54']
- Mata, La.—A village and station on the Trans-Isthmian Railroad 13 mi north of Juchitán. [16°38', 95°01'; 243 ft] (175)
- Matatlán: see Santiago Matatlán.
- Matías Romero (Mapias Romero, Mateos Romero, Matías Romera, Rincón Antonio).—A large town on the Trans-Isthmian Railroad just west of the Trans-Isthmian Highway and 31 mi north of Juchitán. The railroad station serving Matías Romero formerly was called Rincón Antonio. [16°53', 95°02'; 659 ft] (185)
- Mazahua: see Mezahuite.
- Mazahua, Cerro de: see Cerros de Masahua.
- Mazahuito: see Mezahuite.
- Metla: see San Pablo Villa de Mitla.
- Mezahuite (Mazahua [?], Mazahuito).—A settlement near the Trans-Isthmian Highway 7 mi north of La Ventosa. "Mazahua," a J. W. and R. R. Graber locality supposed to be 11.5 mi north of Juchitán according to a specimen label, might be synonymous with Mezahuite. [16°40', 94°58'; about 600 ft (Goodwin 1969:260)] (176)
- Miahuatlán: see San Andrés Miahuatlán.
- Miahuatlán, Sierra de.—An isolated mountain range in southern Oaxaca, bounded on the south by the Pacific lowlands, on the west by the Río Verde, on the east by the Isthmus of Tehuantepec, and on the north by the Río Atoyac, Oaxaca Valley, and the headwaters of the Río Tequisistlán. Highest point is Cerro León at 10,296 ft elevation. (Fig. 31)
- Mihuatlán: see San Andrés Miahuatlán.
- Mijes, Sierra de los.—A northwest–southeast projecting mountain range located just west of the Isthmus of Tehuantepec and just north of the Río Tehuantepec and connecting the Sierra de Zempoaltepec and the Sierra de Choapan. Maximum elevation 7,623 ft. (Fig. 31)
- Milagro, Río.—A small river that according to MacDougall (1971:88) joins with the Río Negro just south of Santa María Chimalapa to enter the Río Coatzacoalcos just west of that town.
- Miltepec: see Niltepec.
- Miltepec, Río: see Río Niltepec.

Minas, Arroyo Las; Las Minas: see Puente Las Minas.

Minatitlán [state of Veracruz].—A town in the state of Veracruz 14 mi southwest of Coatzacoalcos.

Ridgway (1902:306) erroneously records a specimen of *Icterus mesomelas* from "Oaxaca (Minatitlán)." [17°59', 94°31'; 210 ft]

Minitán.—A tiny fishing and salt manufacturing village on Laguna de Alotengo 10 airline mi or 22 road mi south of Santiago Pinotepa Nacional. [16°13', 98°08'; sea level] (97)

Mitla: see San Pablo Villa de Mitla.

Mixe.—Exact identity unknown. Briggs (1954:181–182) states that "Amatepec is located in the region of Mixe, which is in the same cordillera forming the Nudo de Zempoaltepec."

Mixteco, Río.—A tributary of the Río Balsas, originating on the northwestern slopes of the Sierra de Yucuyacua and draining north into Puebla. Upper tributaries reach past Huajuapán de León, Tamazulapán del Progreso, and Santa María Asunción Tlaxiaco. (Fig. 31)

Mixtequilla: see Santa María Mixtequilla.

Moctum (San Marcos Moctun).—A village 11 mi south-southwest of Choapan. Specimens labeled "Moctum" by del Toro Avilés, to judge from the species involved, probably taken at various elevations and in a variety of habitats. [17°13', 95°00'; about 4,600 ft] (72)

Modelo, El.—The site of an abandoned rubber plantation 25 mi northeast of Matías Romero. Formerly connected by trail to Mogoñé (MacDougall 1971:86, 88). [17°07', 94°45'; about 650 ft]

Mogoñé.—A small town on the Trans-Isthmian Railroad 8 mi north of Matías Romero. [16°59', 95°03'; about 400 ft] (188)

Molino, Río (Río Molina).—A small upper tributary of the Río Copalita, crossing the Puerto Angel Road about 2 mi (about 3.5 road mi) southwest of San Miguel Suchixtepec. Also a locality name for specimens collected by Phillips, Rowley, and others at the intersection of road and stream. Rowley specimens taken between 7,300 and 8,500 ft elevation. See Rowley (1966:110, 119) for description and photograph. See Km. 153. [16°04', 96°28'; 7,300 ft] (Collecting locality: 137)

Mono Blanco, Río.—A small river draining the west side of Cerro Baúl and coursing northward to empty into the Río Porta Moneda, which flows northeastward into the Río Grijalva of Chiapas. [Junction with Río Porta Moneda: 16°42', 94°10']

Monte Alto.—A collecting locality for D. McH. Forbes, located somewhere on the Río Tonto north of San Miguel Soyaltepec. Elevation of 400 ft given on Forbes specimen label.

Montebello (Monte Bello).—A Schaldach locality on the Trans-Isthmian Highway 24 road mi (about 20 airline mi) north of Matías Romero and just north of Palomares. [16°11', 95°04'; about 300 ft] (90)

Monte Verde.—Location unknown. Noted on a specimen of *Chlorophonia occipitalis* (FMNH 27051) taken in June 1888 by an unknown collector.

Moso Rancho.—A rancho visited by MacDougall (1971:95), located north of Nilttepec and just east of Río Grande on the slopes of Cerro Atravesado. [1,800 ft]

Muerto, Mar.—A large Pacific coast lagoon some 42 mi long and 7 mi wide, located in extreme southeastern Oaxaca and adjacent Chiapas. Erroneously listed by Leopold (1959:137) as entirely within Chiapas, although more than half its length is in Oaxaca. (Fig. 31)

Nacaltepec: see Santiago Nacaltepec.

Natartiac, Isla (Natartiac Island).—The largest island in Laguna Superior, located 12 mi east-southeast of Juchitán. Visited by T. MacDougall (in litt.) in January 1970. [16°21', 94°53'] (Fig. 31)

Negro, Río.—An upper tributary of the Río Grijalva, flowing eastward to enter the Río Porta Moneda about 17 mi north-northeast of the crest of Cerro Baúl. Should not be confused with the river of the same name near Santa María Chimalapa (see next entry). [Junction with Río Porta Moneda: 16°48', 94°05'] (Fig. 31)

Negro, Río.—An upper tributary of the Río Coatzacoalcos, draining the north side of Picacho Prieto and flowing from east of La Gloria northwestward to join the Río Coatzacoalcos 3 mi west of Santa María Chimalapa. Should not be confused with the river of the same name near Cerro Baúl (see preceding entry). [Junction with Río Coatzacoalcos: 16°56', 94°47'] (Fig. 31)

Negro, Volcán.—While on the trail between San Juan Bautista Cuicatlán and Santos Reyes Pápalo, Goldman (1951:220) looked "north" and saw "... the culminating peak, known locally as Volcán Negro, although there are no traces of volcanic action near the mountain. This peak reaches an altitude of about 10,400 feet." I am unable to find a locality with this name, or indeed any mountain with such a high elevation, to the north (or west) of Santos Reyes Pápalo. Possibly Goldman was looking southeast to Cerro Pelón.

- Nejapa.—A small town about 4 mi northeast of El Camaron and the Pan-American Highway. [16°38', 95°59'; 1,870 ft] (151)
- Nevería Herrera.—A Nelson and Goldman locality on the western slope of the Sierra de Cuatro Venados 15 mi southwest of Oaxaca City. Nelson and Goldman specimens taken between 8,800 and 9,500 ft elevation and labeled "mountains 15 miles west of Oaxaca," the direction later corrected to southwest by Goldman (1951:218). [About 16°58', 96°54'; 9,300 ft (Goldman 1951:218)]
- Niltepec (Miltepec).—A small town on the Pan-American Highway 29 mi east-northeast of Juchitán. [16°34', 94°37'; 298 ft] (196)
- Niltepec, Río (Río Miltepec).—A river originating in the Sierra Madre de Chiapas north of Niltepec and flowing south to empty into the east end of Laguna Inferior. (Fig. 31)
- Noche Buena, Arroyo.—A collecting locality for Rook and others at 6,500 ft elevation in the Sierra Reten 40 km (24.9 mi) northwest of Tapanatepec. Labels on specimens taken by A. Cabrera say "Las Goya Vitas, Arroyo Noche Buena, 45 km. [28.0 miles] NW Tapanatepec."
- Nochistlan, Nochixtlan: see Asunción Nochixtlan.
- Nopala: see Santos Reyes Nopala.
- Novillero (El Novillero, Río Novillero).—A collecting locality for Rowley and Galley "about 2 mi W of Tapanatepec" (Rowley 1984:80); noted on specimen labels (WFVZ) variously as "2 mi. N, 400 ft.," "8 km. NW, 100 ft.," and "5 km. N" of Tapanatepec. Should not be confused with Cabeza del Novillero, which is much farther beyond Tapanatepec. [400 ft]
- Novillero, El: see above entry and Cabeza del Novillero.
- Novillero, Río: see Novillero.
- Nueve Puntas.—A collecting locality for L. F. Kiff along the Pan-American Highway between Santiago Matatlán and Jalapa.
- Nuevo Uvero: see Uvero.
- Oajaca: see state of Oaxaca.
- Oaxaca: see next entry and state of Oaxaca.
- Oaxaca City (City of Oaxaca, Ciudad Oaxaca, Oaxaca, Oaxaca de Juárez).—The state's capital and largest city, located in the northern part of the Oaxaca Valley. Literature and specimen records giving the locality as simply "Oaxaca" are assumed herein to pertain to the state, unless additional evidence indicates the city. Specimens taken by Sumichrast, labeled simply "Oaxaca," are from near the city. Those labeled "Oaxaca" by Nelson and Goldman were taken in the vicinity of the city, at nearby Monte Albán, and up to 7,500 ft on the neighboring slopes of Cerro San Felipe (Goldman 1951:217). Most Boucard specimens recorded by Sclater (1858, 1859b) as from "Oaxaca" probably were taken at or near the city, but because some probably were not (*Aramides cajanea* and *Jacana spinosa* [Sclater 1859b:393]), all are best referred to the state. [17°04', 96°43'; 5,127 ft] (48)
- Oaxaca Mountains, Sierra de Oaxaca, Sierra of Oaxaca: see Sierra Madre de Oaxaca.
- Oaxaca-Puerto Angel road: see Puerto Angel Road.
- Oaxaca-Puerto Escondido road: see Puerto Escondido Road.
- Oaxaca, state of (Oajaca, Oaxaca, Oaxaco, State of Oaxaco, Oaxcaca, Ozcaca).—A state in southern Mexico, bordered on the east by Chiapas, on the north by Veracruz and Puebla, on the west by Guerrero, and on the south by the Pacific Ocean. Land area 36,371 square mi, or about that of Indiana. Elevations extend from sea level to 11,138 ft. Population (1977) 2,337,000 inhabitants, ninth largest total in Mexico, or 64.3 per square mi. Capital and largest city is Oaxaca City. Contains the southern half of the Isthmus of Tehuantepec. The state border with Veracruz, where crossed by the Trans-Isthmian Highway, is about 2.4 mi south of the southern bank of the Río Jaltepec, not in the middle of this river as often erroneously indicated in the literature. Specimen and literature records from "Oaxaca" are assumed herein to refer to the state as a whole, unless evidence indicates that they apply to Oaxaca City (see Oaxaca City).
- Oaxaca Valley (Valle de Oaxaca, Valley of Oaxaca).—The large, flat to gently rolling valley extending from about San Francisco Telixtlahuaca south to San Andrés Miahuatlán and southeast to Santiago Matatlán, drained primarily by the Río Atoyac and its tributaries and in part by the headwaters of the Río Tehuantepec. Average elevation about 5,000 ft. (Fig. 31)
- Oaxaco, State of Oaxaco, Oaxcaca: see state of Oaxaca.
- Oax.-Pto. Escondido Hwy.: see Puerto Escondido Road.
- Oax.-Puerto Angel Hwy. or Rd.: see Puerto Angel Road.
- Oax.-Putla Hwy.: see Putla de Guerrero Road.

Oax.-Tuxtepec Rd.: see San Juan Bautista Tuxtepec Road.

Ocotlán de Morelos (Ocatlán).—A town and meteorological station in the Oaxaca Valley on the Puerto Angel Road 17 mi south of Oaxaca City. [16°48', 96°40'; 5,005 ft] (129)

Omealca [state of Veracruz].—A small town in the state of Veracruz 15 mi southeast of Córdoba, Veracruz. Listed by Ridgway (1914:440) as a Oaxaca locality for *Chloroceryle aenea*, erroneously citing Salvin and Godman (1888–1904 [1895]:479), who do not refer this locality to any state. [18°44', 96°47']

Omitémi [state of Guerrero] (Omiteme).—A village in the state of Guerrero 12 mi west-southwest of Chilpancingo. Erroneously referred to Oaxaca by Hellmayr (1934:85) and Bent (1940:110). [17°30', 99°40'; 7,200 ft]

Orchadia (Orchad).—A Galley locality at 3,050 ft elevation on the road between Rizo de Oro, Chiapas, and Colonia Rodolfo Figueroa.

Oriental, Laguna.—A large lagoon along the Pacific coast of the Isthmus, centered 8 mi southeast of Ixhuatán between Mar Muerto and Laguna Inferior and draining into the latter. [16°17', 94°35'; sea level]

Ostula River: see Río Ostuta.

Ostuta.—A village where the Pan-American Highway crosses the Río Ostuta 5 mi (6.3 road mi) west of Zanatepec. Lamb specimens taken here labeled "Ostuta River, 5 mi. W Zanatepec." Not the same as the station of "Ostuta" on the railroad just west of Reforma. [16°30', 94°26'; 108 ft] (205)

Ostuta, Río (Ostula River, Ostuta River).—An important river on the Pacific slope east of the Isthmus, originating in the Sierra Madre de Chiapas north of Zanatepec, intersecting the Pan-American Highway 5 mi (6.3 road mi) west of Zanatepec at the village of Ostuta, and emptying into Laguna Oriental. Lamb specimens labeled "Ostuta River, 5 mi. W Zanatepec" were taken where the river intersects the Pan-American Highway. [Intersection of river and highway: 16°31', 94°26'; about 108 ft] (Fig. 31)

Otus Camp: see Screech Owl Camp.

Ozocotepec, Ozolotepec: see Santa María Ozolotepec.

Ozxaca: see state of Oaxaca.

Pajareros, Arroyo de los.—See discussion under La Cumbre (near Rancho Sol y Luna).

Pajaros, Isla de los (Island of the Birds, Isla de las Pajaros, Isla Los Pajaros).—An island in the western half of Mar Muerto, exact location unknown. A collecting locality for Galley and site of water bird colonies. Galley's field notes in WFVZ indicate that it is about 17 or 20 km "south" of "Chonchilitos," a village I cannot find on maps; the direction probably should be east-southeast.

Palo Blanco.—A locality 1.9 mi west of San Juan Bautista Tuxtepec. [18°06', 96°08'; about 100 ft]

Palomar.—A locality for specimens of *Crax rubra* taken in 1923 by R. F. McClellan and L. E. Weyman. Location unknown. Probably synonymous with Palomares.

Palomares.—A village and railroad station, located near the junction of the Trans-Isthmian Highway and Railroad 18 mi north of Matías Romero. A collecting locality for del Toro Avilés. Palomar might be a synonym. [17°09', 95°04'; 335 ft] (91)

Pan-American Highway (Route 190).—The major highway from Mexico City southeast to the Guatemala border. Enters Oaxaca northwest of Huajuapán de León, passes through Tamazulapán del Progreso, Asunción Nochixtlán, Oaxaca City, San Pedro Totolapán, Tehuantepec City, La Ventosa, and Tapanatepec, and enters Chiapas northwest of the last town on way toward Tuxtla Gutiérrez, Chiapas. Localities on a few specimens are given as kilometer marker numbers (which see) along this road. Currently a Federal Route.

Panislahuaca, Panistlahuaca, Panixtlahuaca: see San Miguel Panixtlahuaca.

Papaloapan.—A small town on the Río Papaloapan 4 mi northeast of San Juan Bautista Tuxtepec. [18°09', 96°06'; about 82 ft] (13)

Papaloapan, Río.—A large river formed by the confluence of the Río Tonto and Río Santo Domingo just north of San Juan Bautista Tuxtepec. Makes up a short portion of the border with Veracruz and then flows northeast into the Gulf of Mexico at Alvarado, Veracruz. (Fig. 31)

Parada, La (Parada, la Parada, Le Parada).—According to Goldman (1951:215–216), this is an Indian ranch and traveler's wayside on the north slope of the Sierra Aloapaneca 6 or 8 mi northeast of Cerro San Felipe. Visited by Boucard, Nelson and Goldman, Sumichrast, and others. Direction from Cerro San Felipe given erroneously as west by Selander and Vaurie (1962:37). Elevation given erroneously as 10,000 ft by Salvin and Godman (1897–1904 [1902]:243). [About 17°13', 96°35'; 7,900 ft (Goldman 1951:215)] (52)

- Pastoria, Laguna de.—A large coastal lagoon 34 mi west of Puerto Escondido and connected with the ocean via Laguna de Chacahua. [15°59', 97°35'; sea level] (Fig. 31)
- Patanatepec: see Tapanatepec.
- Patos, Río.—A small river that crosses the Pan-American Highway 6 mi west of Tapanatepec. [Intersection of river and highway: 16°27', 94°15'; about 150 ft]
- Pelón, Cerro.—A high mountain at the western end of the Sierra de Juárez, with its summit located 9 mi east-southeast of San Juan Bautista Cuicatlán and, according to some maps, attaining an elevation of over 10,500 ft. [Summit: 17°47', 96°50'] (Fig. 31)
- Pericos.—A small town at the north end of the Cerro Baúl ridge 25 mi slightly east of north of Tapanatepec. A Binford locality in 1972. [About 16°45', 94°11'; about 3,200 ft] (207)
- Petapa: see Santo Domingo Petapa.
- Petlalcingo [state of Puebla].—A small town in the state of Puebla, located on the Pan-American Highway 22 mi northwest of Huajuapán de León, Oaxaca. Erroneously listed as in Oaxaca by Pitelka (1951:309), whose locality "18 mi. S Petlalcingo, 5000 ft." is in Oaxaca but whose point "2 mi. S Petlalcingo, 5000 ft." is in Puebla. [18°05', 97°54'; 4,346 ft] (1)
- Piedra Blanca (Piadre Blanca).—A settlement on the Trans-Isthmian Highway just south of the Río Malatengo and about 8 airline mi (about 14 road mi) north of Matías Romero. [About 16°59', 95°00'; about 300 ft] (189)
- Piedras, Valle de.—A collecting station for Galley in the Sierra Madre de Chiapas near Cerro Baúl. An elevation given on specimen labels is 6,400 ft.
- Pinotepa, Pinotepa del Estado, Pinotepa Nacional: see Santiago Pinotepa Nacional.
- Playa Vicente [state of Veracruz] (Playa Vincente).—A town in the state of Veracruz, located on the Río Playa Vicente 27 mi southeast of San Juan Bautista Tuxtepec, Oaxaca, and 2.5 mi east of the Oaxaca state border. Sclater (1859b), in his publication concerning a collection of birds made by Boucard at Playa Vicente in March, April, and May 1859, apparently considered this locality to be in Oaxaca. Subsequent authors have referred it variously to Oaxaca, Veracruz, and the country of Mexico. In my opinion and that of F. W. Loetscher (in litt.), all records from Playa Vicente, including Sclater's types, should be referred to the state of Veracruz. [17°50', 95°50'; 312 ft] (82)
- Playa Vicente, Río.—A large river beginning where the Río Cajones intersects the Oaxaca-Veracruz border, forming this border for a short distance, and then swinging east past Playa Vicente, Veracruz, to become the Río Tesechoacán in Veracruz.
- Playa Vincente: see Playa Vicente [state of Veracruz].
- Pluma Hidalgo (Pluma).—A small Indian town on the Pacific side of the Sierra de Miahuatlán 13 mi north-northeast of San Pedro Pochutla. [15°55', 96°25'; 4,428 ft] (224)
- Pluma, Sierra de.—A southeastward extension of the Sierra de Miahuatlán, bordered on the north and east by the valley of the Río Copalita and on the south by the Pacific coastal lowlands. The town of Pluma Hidalgo is located near the crest of this ridge.
- Pochutla: see San Pedro Pochutla.
- Porta Moneda, Río.—The more eastern of the two uppermost tributaries of the Río Pueblo Viejo, which border Cerro Baúl on its east and west sides; flows northward and then northeastward into the Río Grijalva in Chiapas. Also the name used by T. MacDougall for his collecting locality along this tributary. [Collecting locality: about 16°45', 94°10'; about 2,000 ft]
- Port Angeles: see Puerto Angel.
- Port Guatulco: see Puerto de Huatulco.
- Portillo de Copalita: see Copalita.
- Portillo Nejapa: see Lajarcia.
- Potrero.—A village on the Pacific coast in extreme southwestern Oaxaca 32 mi west-northwest of the town of Río Grande. [16°05', 97°56'; near sea level]
- Presa Benito Juárez (Presa El Marqués, Presa Juárez).—A large reservoir at the confluence of the Río Tehuantepec and the Río Tequisistlán 16 mi northwest of Tehuantepec City. Capacity 33,268 cubic ft. [16°30', 95°25'; about 350 ft] (Fig. 31)
- Presa Miguel Alemán (Presidente Aleman Reservoir).—A large reservoir formed from the impounded waters of the Río Tonto at Temascal in northern Oaxaca. One of the largest reservoirs in Mexico, with a capacity of 282,528 cubic ft. [16°18', 95°30'; about 200 ft] (Fig. 31)
- Prieto, Picacho (Cerro Azul).—The highest peak in the Oaxaca portion of the Sierra Madre de Chiapas, with its summit, according to the Comisión Map, located 17 mi northeast of Niltépec and just west

- of Cerro Atravesado; but see Cerro Atravesado. [Summit: 16°46', 94°27' (Comision Map); about 7,900 ft] (Fig. 31)
- Progreso (Progreso).—Location unknown. Species (MVZ) taken by R. H. Palmer in April 1924 at "Progreso, 2500'" indicate location is probably on Pacific side of Sierra de Miahuatlán.
- Pto. Escondido Hwy. or Rd.: see Puerto Escondido Road.
- Pueblo Laguna.—A settlement about 2 mi southeast of Putla de Guerrero. [17°01', 97°55']
- Puente Las Minas (Arroyo Las Minas, Las Minas, Puente Las Minas).—A bridge over the Arroyo Las Minas on the Pan-American Highway about 5 mi east of Tapanatepec. A locality for sight records by Lenna (1963) and L. F. Kibler and for specimens taken by Galley and R. D. Ohmart. [About 16°20', 94°05']
- Puerto Angel (Angeles Harbor, Port Angeles).—A small town and port on a small bay along the Pacific coast 5 mi south of San Pedro Pochutla. [15°39', 96°30'; 141 ft] (228)
- Puerto Angel Road (see below).—That portion of Route 175 from its southern junction with Route 131 (south of Oaxaca City near San Bartolo Coyotepec) south-southeast through Ejutla de Crespo, San Andrés Miahuatlán, and San Miguel Suchixtepec to Puerto Angel. The localities on many specimens, especially those collected by Arnold, Galley, Rook, and Rowley, are given as kilometer marker numbers (which see) along this road, and the road is referred to variously as Puerto Angel Road (or Rd.), road to Puerto Angel, Oax.-Puerto Angel Hwy. (or Rd.), or Oaxaca-Puerto Angel road. See Route 175.
- Puerto de Huatulco (Guatulco Harbor, Huatulco, Huatulco B., Port Guatulco, Puerto Guatulco).—A small bay and harbor on the Pacific coast 26 mi east-northeast of Puerto Angel. G. Willett specimens labeled "Huatulco" or "Huatulco B." came from this bay. Some maps show the town of "Huatulco" on the coast and a "Santa Maria Huatulco" some 13 mi inland, whereas other maps place the latter town on the coast. [15°44', 96°06'; sea level] (229)
- Puerto Escondida: see Puerto Escondido.
- Puerto Escondida Road: see Puerto Escondido Road.
- Puerto Escondido (Escondido, Puerto Escondida).—A town on a small bay on the Pacific coast 15 mi south of San Gabriel Mixtepec. [15°51'; 97°03'; near sea level] (217)
- Puerto Escondido Road (see below).—That portion of Route 131 from its southern junction with Route 175 (south of Oaxaca City near San Bartolo Coyotepec) south-southwest through San Miguel Sola de Vega and San Pedro Juchatengo to Puerto Escondido. The localities on many specimens, especially those collected by Arnold, D. C. Carlson, Galley, Rook, Rowley, and J. D. Webster, are given as kilometer marker numbers (which see) along this road, and the road is referred to variously as the Puerto Escondida Road, Puerto Escondido Road (or Rd.), Pto. Escondido Hwy. (or Rd.), road (or rd.) to Puerto Escondido, Oax.-Pto. Escondido Hwy., Oaxaca-Puerto Escondido road, or San Gabriel Mixtepec-Puerto Escondido road. See Route 131.
- Puerto Guatulco: see Puerto de Huatulco.
- Punta Paloma (Puerto Paloma).—A fishing village on the north shore of Mar Muerto 7 mi southeast of Chahuites. [16°12', 94°10'; sea level] (214)
- Putla de Guerrero (Putla).—A town in western Oaxaca at the foot of the Pacific side of the Sierra de Yucuyacua 24 mi southwest of Santa María Asunción Tlaxiaco and 12 mi southwest of San Andrés Chicahuaxtla. Map contours in this area are fairly accurate on the Millionth Map but grossly inaccurate on the Comision Map; the elevation of Putla de Guerrero is often listed on maps and in gazetteers as over 4,000 ft. Erroneously recorded by Saunders and Salvin (1896:22) as in Veracruz and by Wetmore (1947:103) as in Puebla. [17°02', 97°57'; 2,400 ft by my altimeter] (18)
- Putla de Guerrero Road (see below).—That portion of Route 125 from its eastern junction with the Pan-American Highway (Route 190) south through Santa María Asunción Tlaxiaco and Putla de Guerrero to Route 200 near Santiago Pinotepa Nacional. The localities on many specimens, especially those collected by Galley, Rook, and Rowley, are given as kilometer marker numbers (which see) along this road, and the road is referred to variously as the Putla Road (or Rd.), road (or Rd.) to Putla, Oax.-Putla Hwy., or Tlaxiaco-Putla road. See Route 125.
- Quicaltan, Quicatlán: see San Juan Bautista Cuicatlán.
- Quiengola, Cerro de Giengola, Quiengola Mountain).—A hill on the southwestern bank of the Río Tehuantepec 8 mi west-northwest of Tehuantepec City. Nelson and Goldman specimens taken at 1,400 ft elevation on the side of this hill were labeled "Near Tehuantepec." [Summit: 16°24', 95°21'; 3,595 ft] (Fig. 31)

Quiotepec: see San Juan Quiotepec.

Quiotepec, Río (Río de la Vueltas).—A river draining the northwestern slopes of the Sierra Aloapaneca and coursing north to join with the Río Santo Domingo at San Juan Quiotepec. Upper portion known on some maps as the Río de la Vueltas. (Fig. 31)

Ranas, Río.—A small river 2.5 road mi north of San Gabriel Mixtepec near the Puerto Escondido Road. Also the name used by Rowley (1966:110) and Phillips for their collecting locality along this river and near the road. [Collecting station: 16°07', 97°07'; 2,100 ft] (Collecting locality: 111)

Ranchería, La.—A summer camp of the Santo Domingo Indians, located on a river about 12 mi by trail (about 9 airline mi) northwest of Santo Domingo Petapa. Nelson and Goldman specimens taken here were labeled "Mts. near Santo Domingo." A number of published records for "Santo Domingo" pertain to La Ranchería. [16°56', 95°14'; 1,500 ft (Goldman 1951:224)] (186)

Ranchería la Candelaria.—A del Toro Avilés locality, exact position unknown. Since the label of one del Toro Avilés specimen says "Rancheria la Candelaria, Tuxtepec," the locality must be located in the former District of Tuxtepec in northern Oaxaca.

Rancho Bacente: see Colonia Rodolfo Figueroa.

Rancho Boca del Río Sarabia (Boca Río Serabia).—A *rancho* on the Río Coatzacoalcos 0.6 mi south of its junction with the Río Sarabia or about 9 mi east-northeast of Palomares. Graber and Graber (1959) specimens taken here were labeled "Boca Río Serabia." [17°12', 94°56'; about 200 ft] (94)

Rancho Carlos Minne (Rancho Carlos Mina, Rancho Minne, R. Carlos Minia, R. Carlos Minne, R. C. Minne).—A *rancho* at the northwestern corner of Cerro Baúl about 8 mi north of Colonia Rodolfo Figueroa and about 37 km (23.0 mi) northwest of Rizo de Oro, Chiapas. A collecting locality for Galley, Rowley, and others. [3,900 ft]

Rancho Cerro Baúl (Rancho Cerro Baue, Villa Cerro Baul).—A collecting locality for P. Flores, Galley, and Rook in the vicinity of Cerro Baúl. Exact location unknown; given on various specimen labels as "NW," "SE," "40 km. NW," and "25 km. NW" of Tapanatepec. Possibly synonymous with Colonia Rodolfo Figueroa. See Sierra Reten.

Rancho Crisantha.—A *rancho* about 17 mi southeast of Ixtlán de Juárez in the vicinity of San Pedro Cajonos. [About 17°11', 96°17'; 8,000 ft (Goldman 1951:223)]

Rancho de Cacoprieto (Cacoprieto, Cacoprieto Ranch, Cocoprieto, Icacoprieto).—A former *rancho* visited by Sumichrast in the 1870s but found by W. W. Brown to be no longer in existence in 1927. Sumichrast (1881:228) located this *rancho* as "3 leguas S. de Tapanatepec." Brown (*in* Bangs and Peters 1928:385) said that Tapanatepec was "three hours' horseback ride from . . . Cocoprieto Ranch . . ." Hence, a designation of 9 mi from Tapanatepec seems appropriate. The direction from Tapanatepec, however, is probably east or southeast, as Sumichrast frequently said south when he should have said east.

Rancho de las Rosas.—A *rancho* on the Pan-American Highway 46 road mi northwest of Oaxaca City or about 17 airline mi southeast of Asunción Nochixtlán. [17°16', 97°04'; 7,000 ft (Lamb specimen labels)] (33)

Rancho El Ocote.—A *rancho* in the Sierra de Miahuatlán, located along the trail between Santos Reyes Nopala and kilometer marker 186 on the Puerto Escondido Road.

Rancho Enrique (Rancho Enrickie).—A collecting station for Galley, said on his specimen labels to be located 25 km (15.5 mi) northwest of Tapanatepec. Probably close to or part of Colonia Rodolfo Figueroa.

Rancho Las Animas (Las Animas).—A *rancho* on the Pan-American Highway 2 mi west of Nejapa and 3 mi northwest of El Camaron. [About 16°37', 96°01'; about 3,000 ft, not 1,000 ft as erroneously given by Selander (1964:231)] (150)

Rancho Las Cruces (R. Las Cruces).—A *rancho* in the Isthmus of Tehuantepec near Donají. [17°13', 95°04'; 295 ft]

Rancho Las Vegas.—A *rancho* in the Atlantic lowlands near Loma Bonita. Specimens taken here by O. Epping in August and September 1963 (Mees 1970:238, 239). [Loma Bonita: 18°17', 95°53'; 89 ft]

Rancho Minne: see Rancho Carlos Minne.

Rancho Santa Efigenia, Rancho Santa Efigenia: see Santa Efigenia.

Rancho Sol y Luna (Rancho Sol y Lima, Rancho Sol-y-Luna, Rancho Sol-Y-Lune, Rancho Soy y Lima, R. Sol y Luna).—A *rancho* on a creek about 5 mi north-northwest of Tapanatepec and 3 mi northeast of El Jícaro; other distances from Tapanatepec given on specimen labels are 8, 10, 11, 12, and 15 km. Major collecting locality for Galley, Rook, Rowley, Schaldach, T. MacDougall, and others. Two lakes at about 1,500 ft (T. MacDougall *in litt.*) or 2,000 ft elevation (Goodwin 1969: 260) about 3 mi north (Lamb field notes, MLZ) or 1 mi north (T. MacDougall *in litt.*) of the *rancho*

- are usually included under this name but have also been called "Lagoons," "Laguna Sol y Luna," "Lagunas Sol y Luna" (name used herein), "Lakes of Sol y Luna," "La Laguna," "Las Lagunas," "The Lagoons," and the "Twin Lakes." According to Phillips and Rook (1965:3), Rancho Sol y Luna is "a major part of the old Hacienda" Santa Efigenia of Sumichrast (which see); because of the ornithological importance of the old name "Santa Efigenia," here I treat them separately. [16°27', 94°14'; 800 ft] (210)
- Rancho Vicente: see Colonia Rodolfo Figueroa.
- R. Carlos Minia, R. Carlos Minne, R. C. Minne: see Rancho Carlos Minne.
- Real Arriba.—Location unknown but probably not in Oaxaca. Listed as in Oaxaca by Ridgway (1911: 767) in range of *Trogon mexicanus*.
- Reforma.—A small town on a railroad 4 mi northeast of Ixhuatán. [16°25', 94°27'; 75 ft] (202)
- Reforma, La.—A village on the Pan-American Highway about 10 mi west of Tequisistlán. [About 16°24', 95°48']
- Reten, Sierra (Reten).—A mountain ridge north-northwest of Cerro Baúl, exact location unknown. Said on Rook specimen labels to be 40 km (24.9 mi) northwest of Tapanatepec; one locality on this ridge is given on some specimen labels as 4.5 km (2.8 mi) north of Rancho Cerro Baúl.
- Reyes, Reyes Pápalo: see Santos Reyes Pápalo.
- Rico, Monte.—A hill situated between the Río Chimalapilla and Río Coatzacoalcos about 7 mi east of Santa María Chimalapa (MacDougall 1971:89). [About 16°54', 94°35']
- Rincón (Rincón Bamba).—A village 9 mi west of Salina Cruz. A T. MacDougall locality given on specimens as "Rincón Bamba." [16°11', 95°20'] (165)
- Rincón Antonio: see Matías Romero.
- Rincón Bamba: see Rincón.
- Río de la Y Road: see discussions under La Cofradía and Río de la Y.
- Río Grande.—A small town near the Trans-Isthmian Highway 3 mi southeast of Matías Romero. A locality for both Sumichrast and Schaldach, but not Boucard or T. MacDougall. Listed on Schaldach specimen labels variously as "6 mi. S" and "8 mi. S" of Matías Romero. See next two entries and the two rivers with this name. [16°52', 95°00'] (184)
- Río Grande.—A town near the Pacific coast 27 mi west-northwest of Puerto Escondido. Mentioned by Leopold (1959:132) as a locality in an aerial waterfowl survey. A locality for Boucard, but not Sumichrast, T. MacDougall, or Schaldach. See preceding and next entries and the two rivers with this name. [15°59', 97°26'; about 500 ft] (215)
- Río Grande.—An Indian settlement at 1,100 ft elevation on the Río Chicapa north of Niltepec. Visited by MacDougall (1971:86, 92), but not by Boucard, Sumichrast, or Schaldach. See preceding two entries and the two rivers with this name.
- Río Verde.—A small town, probably on the river of the same name, located on a trail between Santiago Jamiltepec and San Miguel Panixtlahuaca and, according to Goldman (1951:10), 20 mi by trail east of the former town. An overnight stopping place for Nelson and Goldman.
- Rizo de Oro [state of Chiapas] (Las Amates).—A small town on the Pan-American Highway 5.6 road mi from the Oaxaca-Chiapas border. Road to Colonia Rodolfo Figueroa begins here. Used as a reference point for some collecting localities in Oaxaca. [16°28', 94°01']
- R. Las Cruces: see Rancho Las Cruces.
- Roatina: see Santa Catarina Roatina.
- Route 125.—The road extending from Tehuacán, Puebla, southwest through Santiago Chazumba and Santiago Miltepec to Huajuapán de León, thence southeast together with the Pan-American Highway (Route 190) to near Yanhuatlán, thence south-southwest through Santa María Asunción Tlaxiaco, San Andrés Chicahuaxtla, and Putla de Guerrero to end at Route 200 near Santiago Pinotepa Nacional. Currently a Federal Route. See Putla de Guerrero Road.
- Route 131.—The road extending from Tehuacán, Puebla, southeast through Teotitlán del Camino and San Juan Bautista Cuicatlán to near Telixtlahuaca, thence southeast together with the Pan-American Highway (Route 190) to Oaxaca City, thence south-southwest through San Miguel Sola de Vega and San Pedro Juchatengo to Puerto Escondido. Currently a State Route north and a Federal Route south of Oaxaca City. See Puerto Escondido Road.
- Route 175.—The road extending from the Veracruz border south-southwest through San Juan Bautista Tuxtepec, Valle Nacional, and Ixtlán de Juárez to Oaxaca City, then south-southeast through Ejutla de Crespo, San Andrés Miahuatlán, and San Miguel Suchixtepec to Puerto Angel. Currently a Federal Route. See Puerto Angel Road and San Juan Bautista Tuxtepec Road.
- Route 185: see Trans-Isthmian Highway.

Route 190: see Pan-American Highway.

Route 200.—The road extending from the Guerrero border near San José Estancia Grande east through Santiago Pinotepa Nacional and Puerto Escondido to Puerto Angel. A second section extends from the Pan-American Highway (Route 190) near Tapanatepec southeast to Arriaga, Chiapas. The two sections will be connected when the part from Puerto Angel to Salina Cruz is completed. Currently a Federal Route.

R. Sol y Luna: see Rancho Sol y Luna.

R. Vicente: see Colonia Rodolfo Figueroa.

Sabandillo, Cerro.—A mountain in the Sierra Madre de Chiapas 20 mi northeast of Zanatepec and 5 mi northwest of the confluence of the Río Mono Blanco and Río Porta Moneda. Visited by MacDougall (1971:101). [Middle of flat top (from Comision Map): 16°44', 94°13'; about 5,300 ft]

Sacátepec: see San Marcos Zacatepec.

Salado, Río.—The large river draining the valley of Tehuacán, Puebla, passing southeast into Oaxaca, and joining with the Río Quiotepec at San Juan Quiotepec to form the Río Santo Domingo. (Fig. 31)

Salazar.—A *ranch* on the Río Tehuantepec 11 mi northwest of Tehuantepec City. [16°26', 95°20'; 148 ft] (163)

Salina Cruz.—The major seaport in Oaxaca, located 12 mi south of Tehuantepec City. [16°10', 95°11'; 184 ft] (166)

Salina Marquéz.—A saltworks on a lagoon about 5 mi west of Salina Cruz. A Shufeldt locality. [About 16°08', 95°15'; sea level]

Salomé.—A village on the main trail between Oaxaca City and Tehuacán, Puebla, 10 mi south of Santiago Dominguillo. Very close to and perhaps synonymous with Santiago Nacaltepec. [17°32', 96°51'; 6,600 ft (Goldman 1951:213)]

Salto, El.—A collecting station for Galley in the Sierra Madre de Chiapas, said on specimen labels to be 7 km (4.3 mi) north of Cerro Baúl and by Rowley (1984:81) to be about 4 mi north of Rancho Carlos Minne. [About 16°38', 94°11'; 3,000 ft]

San Agustín Amatengo (Amatingo).—A small town in the Oaxaca Valley, located on the Río Atoyac 5 mi southwest of Ejutla de Crespo. [16°31', 96°47'; 4,913 ft] (133)

San Andrés Chicahuaxtla (Chicahuaxtla, San Andres Chichihuaxtla).—A small Indian town at the highest point on the Putla de Guerrero Road 14 mi southwest of Santa María Asunción Tlaxiaco. See description and photograph in Rowley (1966:109, 113). [17°11', 97°53'; 7,900 ft by my altimeter] (21)

San Andrés Miahuatlán (Miahuatlan, Mihuatlan).—A large town on the Puerto Angel Road at the southern extremity of the Oaxaca Valley 18 mi south-southeast of Ejutla de Crespo. [16°20', 96°36'; 5,118 ft] (134)

San Andrés Tuxtla [state of Veracruz] (“San Andres, Ticatla”; Tuxtla).—A large town in the state of Veracruz 40 mi east-northeast of Cosamaloapán. Freidmann (1950:127), citing Lawrence (1876: 43), erroneously refers this locality to Oaxaca, even though Lawrence, in listing “San Andres, Ticatla,” mentions no state. The locality “Tuxtla” given without state by Salvin and Godman (1888–1904 [1892]:358) and referred to Oaxaca by Ridgway (1911:632) in the synonymy of *Archilochus colubris* is probably synonymous with the Veracruz locality. [18°27', 95°13'; 1,181 ft]

San Antonio del Río.—A town said to be just south of the Puebla border and north of Santa María Camotlán (Parkes 1974:459). I cannot locate it on maps.

San Agustín.—Exact location unknown. A D. McH. Forbes locality in tropical evergreen forest in extreme northern Oaxaca somewhere near Río Tonto and north of San Miguel Soyaltepec. Elevation given on specimen labels as 600 ft. Probably near but not the same as “San Augustin (Puebla Nuevo),” also a Forbes locality.

San Agustín Pueblo Nuevo (San Augustin [Puebla Nuevo]): see discussion under San Agustín.

San Bartolo: see San Bartolo Yautepec.

San Bartolo Coyotepec.—A town just north of the junction of the Puerto Angel Road and Puerto Escondido Road 7 mi south of Oaxaca City. Adjacent to Santa María Coyotepec. Used as a reference point for specimens taken by Rowley. [16°58', 96°43'; 5,200 ft] (127)

San Bartolo Yautepec (San Bartolo, San Bartolomé, San Bartolomo, St. Bartholo).—A small town, formerly important, on the old main trail between Tehuantepec City and Oaxaca City 25 mi west of Tequisistlán. A collecting locality for Deppe and overnight stop for Nelson and Goldman. See *Melanerpes aurifrons* in Type Localities. [16°24', 95°59'; 2,854 ft] (156)

- San Carlos Yautepec (San Carlos, Yantepec).—A small town on the old main trail between Tehuantepec City and Oaxaca City 18 mi southeast of San Pedro Totolapan. [16°30', 96°06'; 3,280 ft] (148)
- San Domingo, Río: see Río Santo Domingo.
- San Domingo, Sierra; Sierra de San Domingo: see Sierra Santo Domingo.
- San Felipe: see next entry and San Felipe del Agua.
- San Felipe, Cerro (San Felipe, Cerro de San Felipe, Sierra San Felipe).—One of the highest mountains in the state, with its summit located at 10,204 ft elevation in the Sierra Aloapaneca 8 mi north-northeast of Oaxaca City. Goldman (1951) uses the name to indicate both the mountain peak and the mountain range (Sierra Aloapaneca). Nelson and Goldman specimens were taken at "10,300" ft on a neighboring summit and at 10,000 ft on the south slope about 10 mi (by trail) north of Oaxaca City and 3 mi south of the crest of Cerro San Felipe itself (Goldman 1951:208). Lamb specimens are from 6,500 ft on the south slope of the mountain pass. A. S. Leopold specimens are from 7,000 ft, 6 km (3.7 mi) north of Oaxaca City. W. Durrant specimens erroneously labeled "Sierra San Felipe." [Summit: 17°10', 96°40'] (Fig. 31)
- San Felipe del Agua (San Felipe, San Felipe de Agua, San Felipe de Aguas).—A village 3 mi north of Oaxaca City at the base of Cerro San Felipe. [17°06', 96°43'; about 5,200 ft] (49)
- San Felipe Ixtapa.—A village on the Putla de Guerrero Road 2.5 mi (about 9.8 road mi) west-southwest of San Pedro y San Pablo Teposcolula. Site of a meteorological station. [17°30', 97°32'; 7,000 ft by my altimeter] (28)
- San Felipe, Sierra: see Sierra Aloapaneca and Cerro San Felipe.
- San Francisco: see San Francisco del Mar.
- San Francisco Cozoaltepec (Cozoaltepec).—A village 18 mi west-northwest of San Pedro Pochutla. [15°48', 96°44'; about 500 ft] (219)
- San Francisco del Mar (San Francisco).—A village on the southwestern shore of Laguna Oriental 14 mi southwest of Ixhuatán. Sumichrast's locality in 1869 is recorded by Lawrence (1876:46) as simply "San Francisco." Another town called "San Francisco," located 6 mi west of San Francisco del Mar, is shown on only one of my maps and is so small that it probably is not Sumichrast's locality, despite the similarity in names. [16°14', 94°38'; about 100 ft] (200)
- San Francisco Telixtlahuaca (Huitzo, San Francisco Huitzo, Telixtlahuaca).—A town on the railroad to Tehuacán, Puebla, 18 mi northwest of Oaxaca City. Goldman (1951:9) indicates that his and Nelson's locality of "Huitzo" is synonymous with "San Francisco Huitzo," a name that I cannot find but presume to be synonymous with San Francisco Telixtlahuaca, which is sometimes called Huitzo (Selander and Vaurie 1962:34). Sumichrast's locality "Huitzo, near Oaxaca" is also presumed to be the same as San Francisco Telixtlahuaca, although San Pablo Huitzo is located 4 mi to the southeast. [17°17', 96°53'; 5,668 ft] (44)
- San Francisco Tlapancingo (Tlapancingo).—A small town in extreme western Oaxaca 35 mi northwest of Putla de Guerrero. Nelson and Goldman specimens labeled "Tlapancingo" taken between 5,200 and 7,500 ft. [17°28', 98°14'; 5,510 ft] (16)
- San Gabriel Mixtepec (San Gabreil, Mixtepec; San Gabriel; San Gabriel Mextepec; San Miguel Mixtepec).—A small town on the Puerto Escondido Road at the junction of the side road to Santos Reyes Nopala 17 mi south of San Pedro Juchatengo. [16°06', 97°06'; 2,250 ft] (109)
- San Gabriel Mixtepec-Puerto Escondido Road: see Puerto Escondido Road.
- San Gerónimo, San Gerónimo Ixtepec, San Geronomo: see Ixtepec.
- San Ildefonso Villa Alta (Villa Alta, Villa Atla).—A small town 11 mi north of Hidalgo Yalalag. [17°19', 96°08'; 3,733 ft] (66)
- San Jerónimo Ixtepec: see Ixtepec.
- San José Chiltepec (Chiltepec).—A small town on the San Juan Bautista Tuxtepec Road 10 mi south-southeast of that town. A Deppe locality for *Dives dives*. [17°58', 96°10'; 853 ft] (62)
- San José del Pacifico.—A mountain village on the Puerto Angel Road 6 mi (about 10 road mi) north of San Miguel Suchixtepec. [16°09', 96°30'] (136)
- San José Estancia Grande (Estancia Grande).—A village on the road between Acapulco, Guerrero, and Santiago Pinotepa Nacional, Oaxaca, 14 mi west of the latter town. [16°22', 98°15'; 230 ft] (96)
- San José Manialtepec.—A small town where Route 200 crosses a river 13 mi (15.8 road mi) west-northwest of Puerto Escondido and about 1 mi west-northwest of Laguna Lagartero. My locality "2 miles NW San José Manialtepec" is not on Laguna Lagartero but 3 mi northwest on a small freshwater lake in sight of Route 200. [15°57', 97°13'; 50 ft] (216)

San Juan: see San Juan del Río.

San Juan Bautista Coixtlahuaca (Coixtlahuaca).—A small town 20 mi east-northeast of Tamazulapan del Progreso. [17°45', 97°18'; 6,560 ft] (35)

San Juan Bautista Cuicatlán (Cuicatlán, Cuicuitlán, Cuitcatlán, Quicaltan, Quicatlán).—A town on both the railroad and main trail between Oaxaca City and Tehuacán, Puebla, 42 mi east-northeast of Tamazulapan del Progreso. See District of Cuicatlán. [17°48', 96°58'; 1,952 ft] (38)

San Juan Bautista Cuicatlán valley.—The name used herein for the extensive valley system formed by the upper tributaries of the Río Santo Domingo: the Río Tomellin, Río Quiotepec, Río Grande, and the Oaxaca portion of the Río Salado. (Fig. 31)

San Juan Bautista Tuxtepec (Tustepec, Tuxtepec, Tuxtupec).—A large town on the Río Santo Domingo near the Veracruz border 83 mi northeast of Oaxaca City. Nelson and Goldman specimens taken at the town and at a point 10 mi southwest are all labeled "Tuxtepec." Erroneously listed as in Veracruz by Ridgway (1914:344, in synonymy) and Berlepsch (1911:1070). [18°06', 96°07'; 105 ft] (12)

San Juan Bautista Tuxtepec Road (Oax.-Tuxtepec Rd.).—That portion of Route 175 from its eastern junction with the Pan-American Highway (Route 190) just east of Oaxaca City north-northeast through Ixtlán de Juárez and Valle Nacional to the Veracruz border near San Juan Bautista Tuxtepec. The localities on a few specimens, notably those collected by Rowley, are given as kilometer marker numbers (which see) along this road. See Route 175.

San Juan Comaltepec (Comaltepec).—A small town in northcentral Oaxaca 3 mi southwest of Choapan. Nelson and Goldman specimens labeled "Comaltepec" taken between 1,900 and 3,500 ft. [17°19', 95°58'; 2,624 ft] (76)

San Juan del Estado (San Juan Del Estado, San Juan del estado).—A town at the western foot of the Sierra Aloapaneca 16 mi north-northwest of Oaxaca City. [17°16', 96°48'; about 5,600 ft] (45)

San Juan del Río (San Juan, S. Juan, S. Juan del Río).—A small town in the Río Tehuantepec basin on a tributary of the Río Grande, located 13 mi east-southeast of Tlacolula de Matamoros. In the synonymy of *Morococcyx erythropygus*, Ridgway (1916:74), citing Salvin and Godman (1888–1904 [1896]:538), erroneously places San Juan del Río in Guerrero. Rébouch collected the following birds at this town: *Morococcyx erythropygus*, *Melanerpes aurifrons*, *Myiarchus cinerascens*, *Calocitta formosa*, *Thryothorus pleurostictus*, *Turdus rufopalliatu*s, *Passerina leclancherii*, and *Icterus pustulatus formosus*. I have observed all these species except *Turdus* southeast of Santiago Matatlán in the same general region and habitat as San Juan del Río, and hence have no doubt that this particular San Juan del Río was Rébouch's locality. Sclater and Salvin (1870:550) say that San Juan del Río is located "in the centre of the state of Oaxaca." [16°54', 96°13'; 5,018 ft] (144)

San Juan Guichicovi: see Guichicovi.

San Juan Juquila: see discussion under Santa Catarina Juquila. I have not found this town on maps.

San Juan Juquila Mixes (Juquila Mijes, Juquila Mixes).—A town 14 mi south of Cerro Zempoaltepec. Not known to have been visited by zoologists but mentioned by Selander (1964:58) in reference to Santa Catarina Juquila, which see. [16°57', 95°55'; about 5,900 ft] (152)

San Juan Lachao: see San Juan Lachao Pueblo Viejo.

San Juan Lachao Pueblo Nuevo (Lachao Nuevo).—A village in the Sierra de Miahuatlán. Exact location unknown. According to Rowley (1966:110), it is 30 km (18.6 mi) west of Cerro Verde and about midway between La Cima and San Gabriel Mixtepec. Close to or possibly synonymous with Santa Rosa.

San Juan Lachao Pueblo Viejo (San Juan Lachao).—A small town in the Sierra de Miahuatlán a few miles west of the Puerto Escondido Road and 9 mi north of San Gabriel Mixtepec. [16°13', 97°09'; 5,576 ft] (105)

San Juan Los Cues (Los Cues).—A village on the main trail between Oaxaca City and Tehuacán, Puebla, 17 mi north-northwest of San Juan Bautista Cuicatlán. Sumichrast locality in 1868. See *Ciccaba virgata* in Type Localities. [18°03', 97°03'; 2,899 ft] (5)

San Juan Quiotepec (Quiotepec).—A small town on the railroad and main trail between Oaxaca City and Tehuacán, Puebla, 7 mi north of San Juan Bautista Cuicatlán. Sumichrast locality in 1868. Not the town of the same name located 22 mi north-northwest of Ixtlán de Juárez. [17°55', 96°59'; 1,758 ft] (37)

San Juan, Río [state of Veracruz].—A large river entirely within the state of Veracruz, beginning near the Oaxaca border at the confluence of the Río de la Lana and the Río Trinidad and emptying into the Río Papaloapan at Tlacotalpan, Veracruz.

San Lucas Camotlán (Camotlán).—A small town 29 mi northeast of Nejapa. Records mentioned by

- Pardiñas (1946:217) as obtained by del Toro Avilés at "Camotlán" in 1943 perhaps pertain to this locality. See Santa María Camotlán. [16°57', 95°44'; 5,543 ft] (153)
- San Marcial, Río.—A creek just southwest of San Miguel Suchixtepec. Also the name used by Phillips (1966:92) for his collecting locality where the creek meets the Puerto Angel Road. [About 16°05', 96°28']
- San Marcos Moctun: see Moctum.
- San Marcos Zacatepec (Sacátepec, Xacatepec).—A small town in southwestern Oaxaca 8 mi southwest of Santa Catarina Juquila. Sclater's (1859b:388) reference to "Xacatepec" and all literature references to "Sacatepec" pertain to a Boucard specimen of *Aulacorhynchus prasinus wagleri*. San Marcos Zacatepec is near the range and habitat of this subspecies and is located on a major trail between two known Boucard localities, Yolotepec and Río Grande. All other literature references to "Xacatepec," as well as to "Xacatepec" and "Xacatepec," probably pertain to a different locality (see Xacatepec). [16°08', 97°22'; about 3,300 ft] (103)
- San Martín: see San Martín Lachilá.
- San Martínez, Sierra (San Martinez).—A collecting station for Galley. According to specimen labels, located just north of Cerro Baúl and "7 km. [4.3 miles] above El Salto." Presumably a mountain ridge. [About 16°38', 94°11']
- San Martín Lachilá (San Martin).—A small town on the Puerto Escondido Road 12 mi northeast of San Miguel Sola de Vega. [16°38', 96°52'; 4,845 ft] (130)
- San Mateo del Mar (San Mateo, San Matteo).—A small fishing town on a narrow strip of land between the Gulf of Tehuantepec and a western arm of Laguna Inferior 19 mi southeast of Tehuantepec City. A collecting locality for Deppe, Sumichrast, and Nelson and Goldman. [16°13', 94°59'; 49 ft] (198)
- San Mateo Río Hondo ("San Mateo (Río Honda)," "San Mateo (Río Honde)").—Location unknown. Collection by Francis de Maeyer of three specimens of *Passerina rositae* (FMNH) at "San Mateo (Río Honde); 10 mi. South" indicates position in southeastern part of Isthmus. Name in parentheses spelled "Río Honda" on one specimen, but correct spelling probably Río Hondo. Other references to San Mateo pertain to San Mateo del Mar.
- San Mateo Yetla (Yetla).—A village 5 mi west-southwest of Valle Nacional. A J. Cole specimen (UK) from "8 km. S, 800 m." pertains to this town. The only "Yetla" I can find in the state. Boucard's specimen of *Molothrus aeneus* from "Yetla" (Sclater 1859b:381) is doubtfully referable to the present locality. [17°45', 96°24'; elevation of 900 ft given by Goodwin (1969:265) is much too low according to maps I have seen] (59)
- San Mateo Yucucuy.—A town on the Pan-American Highway 6 mi west of Asunción Nochixtlán. [17°29', 97°18'; 7,900 ft by my altimeter] (31)
- San Matteo: see San Mateo del Mar.
- San Miguel Albarradas (San Miguel Albarrados).—A village 10 mi east-northeast of Tlacolula de Matamoros. [17°00', 96°17'; 6,500 ft (Goldman 1951:222)] (142)
- San Miguel Chimalapa (see Santa María Chimalapa).—A small town just south of the continental divide on the Pacific slope of the Isthmus of Tehuantepec 14 mi northwest of Niltepec. See discussion under Santa María Chimalapa. [16°44', 94°45'; 400 ft] (193)
- San Miguel de las Peras: see San Miguel Peras.
- San Miguel Huautla Nochistlán (San Miguel Huautla).—A small town 10 mi southwest of San Juan Bautista Cuicatlán on the trail to San Juan Bautista Coixtlahuaca. Goldman (1951:211) erroneously records the elevation as 6,300 ft and the direction from San Juan Bautista Cuicatlán as northwest. Should not be confused with Asunción Nochixtlán. [17°47', 97°07'; 7,583 ft] (36)
- San Miguel Mixtepec: see San Gabriel Mixtepec.
- San Miguel Panixtlahuaca (Panislahuaca, Panistlahuaca, Panixtlahuaca).—A small town near the western end of the Sierra de Miahuatlán 23 mi northwest of San Gabriel Mixtepec. [16°15', 97°23'; 1,968 ft] (101)
- San Miguel Peras (San Miguel de las Peras).—A mountain town 21 mi southwest of Oaxaca City. All published records for this locality concern a Boucard specimen of *Pipilo albicollis* taken at "San Miguel de las Peras," which according to Sclater (1858:295) is only "two leagues" from Oaxaca City. That Boucard's locality is synonymous with San Miguel Peras is only surmise. [16°56', 97°01'; 6,724 ft] (123)
- San Miguel Sola de Vega (Sola, Sola de Vega).—A town on the Puerto Escondido Road 14 mi northeast of San Pedro Juchatengo. [16°31', 96°59'; 5,182 ft] (121)
- San Miguel Sola de Vega valley.—The name used herein to indicate the large arid valley formed by

- the lower portion of the Río Atoyac from its confluence with the Río Sordo east to the Oaxaca Valley and northwest along the Río Sola past San Miguel Sola de Vega. (Fig. 31)
- San Miguel Soyaltepec (Soyaltepec).—A small town 24 mi west-northwest of San Juan Bautista Tuxtepec. This site now located on a small island in the middle of Presa Miguel Alemán. Should not be confused with Nuevo Soyaltepec, northeast of Temascal, which has not been visited by ornithologists. Specimens taken by del Toro Avilés labeled "Soyaltepec" were taken in 1944 before filling of the reservoir. His specimen labels give an elevation of 600 m (1,968 ft), which is much too high for the town. Miller et al. (1957) frequently quote this elevation from del Toro Avilés specimens. Birds were taken probably near the town, not at 1,968 ft elevation above the town. [18°12', 96°29'; about 250 ft] (9)
- San Miguel Suchixtepec (San Miguel Suchistepec, San Miguel Suchixtepec, San Miguel Suchixtepic, San Pedro Suchistepec, Suchistepec, Suchixtepec).—A small Indian town on the Puerto Angel Road 20 mi (about 35.8 road mi) southeast of San Andrés Miahuatlán. [16°05', 96°28'; 8,400 ft by my altimeter but meteorological station said to be at 9,325 ft] (138)
- San Miguel Talea de Castro (Talca, Talea).—A small town 17 mi east of Ixtlán de Juárez. [17°22', 96°14'; 5,510 ft] (63)
- San Pablo Villa de Mitla (Metla, Mitla).—A town in an eastern arm of the Oaxaca Valley 30 mi east-southeast of Oaxaca City. Site of Zapotec Indian ruins. [16°55', 96°23'; 5,412 ft] (143)
- San Pablo Yaganiza (Yaganiza).—A small town 4 mi south of Hidalgo Yalalag. [17°08', 96°11'] (68)
- San Pedro.—"San Pedro, près de Oaxaca" is listed as a locality for old specimens of *Aphelocoma unicolor*, *Peucedramus taeniatus*, and *Euphonia elegantissima* (see Hellmayr 1934:59; Zimmer 1948:127). I have been unable to determine to which of the many Oaxaca towns by this name the record applies, if indeed it even pertains to the state.
- San Pedro Atoyac.—A small town in extreme southwestern Oaxaca 12 mi northeast of Santiago Pinotepa Nacional. Never visited by an ornithologist; see Atoyac [state of Veracruz]. [16°31', 97°59'] (99)
- San Pedro Cajonos (San Pedro Cajones).—A small town 5 mi west of Hidalgo Yalalag. Nelson and Goldman stayed overnight at Rancho Crisantha near San Pedro Cajonos. [17°10', 96°14'; 5,550 ft] (65)
- San Pedro Etla: see San Pedro y San Pablo Etla.
- San Pedro Juchatengo (Juchatenango, Juchatengo, Juchatingo, Juchetengo).—A town at the intersection of the Puerto Escondido Road and the Río Atoyac 17 mi north of San Gabriel Mixtepec. [16°20', 97°06'; 2,750 ft by my altimeter] (117)
- San Pedro Mixtepec.—A small town on the Puerto Escondido Road 7 mi (about 17.0 road mi) south of San Gabriel Mixtepec. [16°00', 97°07'; 800 ft by my altimeter]
- San Pedro Pochutla (Pochutla).—A large town on the Puerto Angel Road 5 mi north of that town. [15°44', 96°28'; 535 ft] (227)
- San Pedro Suchistepec: see San Miguel Suchixtepec.
- San Pedro Teutila.—A village 17 mi east-northeast of San Juan Quiotepec. [17°59', 96°45'; 4,265 ft] (61)
- San Pedro Totolapan (Totolapa, Totolapán, Totolopa, Totulapa).—A small town on the Pan-American Highway 13 mi south-southeast of Santiago Matatlán. Nelson and Goldman specimens labeled "Near Totolapa" were taken at Los Bichones. See *Icterus pectoralis* in Type Localities. [16°40', 96°18'; 2,785 ft] (146)
- San Pedro y San Pablo Ayutla (Ayutla).—A town 16 mi east-northeast of San Pablo Villa de Mitla. Rowley's collecting locality "Ayutla" pertains to this town. [17°01', 96°06'] (69)
- San Pedro y San Pablo Etla (Etla, San Pedro Etla, Villa de Etla).—A small town on the Pan-American Highway 11 mi northwest of Oaxaca City. Formerly an important stopping place on the railroad and main trail between Oaxaca City and Tehuacán, Puebla. [17°12', 96°48'; 5,379 ft] (46)
- San Pedro y San Pablo Teposcolula (Teposcolula).—A town on the Putla de Guerrero Road 22 mi northeast of Santa María Asunción Tlaxiaco. [17°31', 97°30', 7,147 ft] (29)
- Santa Catarina Juquila (Juguila, Juquila, Juquilla).—A small town near the western end of the Sierra de Miahuatlán 18 mi northwest of San Gabriel Mixtepec. A locality for Boucard and for Nelson and Goldman. Selander (1964:58) attempts to show that Boucard's "Juquila," a locality for "*Campylorhynchus capistratus* (Less.)" published by Sclater (1859b:371) is not Santa Catarina Juquila or San Juan Juquila Mixes, but is "San Juan Juquila at Latitude 17°31', Longitude 96°23', near the head of the Río Soyalapam a tributary of the Río de Valle Nacional, about 38 miles northeast of

- Oaxaca de Juárez." I have reconstructed Boucard's itinerary from his specimens as published by Sclater and others and have determined that his "Juquila" is Santa Catarina Juquila. In May 1858 Boucard collected a number of species there that occur in both the Atlantic and Pacific Regions; however, he also collected *Piaya cayana mexicana* and *Thryothorus felix* (type locality for the species), which occur only in the Pacific Region of Oaxaca. Further, Boucard visited a nearby town, Yolotepec, in the same month, between visits to Oaxaca City. He did not collect at his Atlantic Region localities of Totontepec, Teotalcingo, Choapan, and Playa Vicente (Veracruz) until January–May 1859. See District of Juquila. [16°14', 97°18'; 4,920 ft] (102)
- Santa Catarina Roatina (Roatina).—A village 6 mi southeast of San Andrés Miahuatlán. [16°17', 96°32'; about 6,500 ft] (135)
- Santa Cruz, Bahía (Santa Cruz Bay, Santa Cruz Harbor).—A bay on the Pacific coast about 26 mi east-northeast of Puerto Angel. [15°45', 96°07'; sea level] (Fig. 31)
- Santa Domingo: see Santo Domingo Petapa.
- Santa Domingo, Sierra: see Sierra Santo Domingo.
- Santa Efigenia (Efigenia, Hacienda Santa Efigenia, Rancho Santa Efigenia, Rancho Santa Ephigenia, Sta. Efig', Sta. Efigenia).—A former hacienda in the Pacific foothills of the Sierra Madre de Chiapas 5 mi north-northwest of Tapanatepec. Now largely abandoned and synonymous with Rancho Sol y Luna, which see. Visited by Sumichrast in 1868, 1871, 1877, and 1878; by Lamb in 1948 and 1959; and by Nelson and Goldman in 1895 and 1904 (Goldman only). The distance and direction from Tapanatepec are given variously on specimen labels and in the literature as 8 km north-northwest, 8 mi north, 12 mi northwest, and "2 leguas de"; I use the location shown on the Millionth Map. The elevation is noted variously as 550 ft, 800 ft, and 500 m (1,640 ft), the second seeming the best to me. Lamb's field notes (MLZ) for 1948 say that Santa Efigenia "at one time was of importance as it was a village on the main trail from Chiapas to Veracruz and Oaxaca. I am told the inhabitants moved from here some fifty years ago and founded the town of Tapanatepec. Now there are only two families living in huts and the big Hacienda has fallen into ruins and the house caved in. This on account of the revolution and later Agaristas. The fields are grown up with brush and the once rich place produces nothing but a few ears of corn and a cow or two." [16°27', 94°14'; 800 ft] (210)
- Santa Fe.—An uninhabited trail junction on the Pan-American Highway 1.2 mi southwest of the Chiapas border. A Phillips locality. Should not be confused with the "Santa Fe" near Valle Nacional (see next entry). [About 16°24', 94°08'; between 1,312 and 1,640 ft (A. R. Phillips in litt.)]
- Santa Fe.—An Indian village 1 mi southwest of Valle Nacional along the San Juan Bautista Tuxtepec Road. Specimens taken here by Binford parties labeled "1 mi. SW Valle Nacional." Should not be confused with the "Santa Fe" near Tapanatepec (see preceding entry). [17°46', 96°18'; about 300 ft]
- Santa Inéz del Monte (Santa Inéz).—A village on the eastern slope of the Sierra de Cuatro Venados 13 mi southwest of Oaxaca City. [16°56', 96°52'] (124)
- Santa Lucía (Sta. Lucía).—A former *rancho* on the east slope of Cerro Tres Cruces 16 mi west-southwest of Tehuantepec City. A collecting locality for T. MacDougall (not F. A. Pitelka, who is erroneously listed as collector on some specimens in the AMNH). [About 16°18', 95°28'; Duellman (1960:35) gives 2,624 ft, whereas Goodwin (1969:263) says "about 4,000" ft]
- Santa Margarita, Sierra (Santa Margarita).—A mountain range seen from a distance, but not visited, by Nelson and Goldman. According to Goldman (1951:209), it is located about 25 mi to the southeast of Cerro Zempoaltepec on a ridge separating the Río San Juan and Río Coatzacoalcos basins and appearing to rise from an eastward projecting spur of the range along the continental divide. I cannot find a peak or range with this name in Oaxaca, but if Goldman's description is correct, the name could be synonymous with Picachos de Acatlán.
- Santa María.—A collecting locality for P. Roveglia and R. Martin del Campo in 1937, located on the outskirts of Huajuapán de León. Because several towns are known with this name in the vicinity of Huajuapán de León, I cannot be sure to which these records apply. [Huajuapán de León: 17°48', 97°46'; 5,156 ft]
- Santa María Asunción Tlaxiaco (Tlaxiaco).—A large town on the Putla de Guerrero Road 24 mi northeast of Putla de Guerrero. [17°16', 97°42'; 6,553 ft] (23)
- Santa María Camotlan (Camotlán).—A small town on Route 125 at a point 9 mi northeast of Huajuapán de León. R. K. Selander specimens from here labeled "Camotlán, 5100 ft." See San Lucas Camotlán. [17°55', 97°43'; about 5,250 ft] (25)
- Santa María Chimalapa (see below).—A small town on the Atlantic side of the Isthmus 23 mi east of

- Matías Romero and 14 mi north of San Miguel Chimalapa. Elevation of 4,000 ft given by Salvin and Godman (1888–1904 [1892]:319) much too high for town and probably higher than elevation at which specimens were collected. Names used in reference to Sumichrast records are as follows: Chimalapa; Chualapa; Santa María, Chimalapa; and Santa María (Chimalapa). All definitely pertain to Santa María Chimalapa, not to San Miguel Chimalapa. W. B. Richardson records (March and April 1890) probably, but not definitely, pertain to Santa María Chimalapa, judging from preponderance of tropical evergreen forest species collected. Sclater (1939:141) considered Richardson records to pertain to San Miguel Chimalapa but intimated that such an allocation was dubious. Terms used in reference to Richardson records are as follows: Chimalapa; Chimalapas; Chimalopa; Chimilapa; and Chimalpa. Species taken by A. C. Buller in March 1890, all labeled “Chimalapa,” include a mixture of Atlantic and Pacific slope forms and hence could have been taken at either town. [16°55', 94°42'; 973 ft] (191)
- Santa María Colotepec (Colotepec).—A small town on the Río Colotepec 17 mi southeast of San Gabriel Mixtepec. [15°53', 96°56'] (218)
- Santa María Coyotepec.—A small town just north of the junction of the Puerto Angel Road and Puerto Escondido Road and 6 mi south of Oaxaca City. Adjacent to San Bartolo Coyotepec. A collecting locality for Rowley and for Binford. [16°58', 96°43'; 5,202 ft] (126)
- Santa María del Mar.—A village on a narrow strip of land between Laguna Inferior and the Gulf of Tehuantepec 26 mi east-southeast of Tehuantepec City. [16°14', 94°52'; 39 ft] (199)
- Santa María del Tule (El Tulé).—A small town in the Oaxaca Valley 7 mi east of Oaxaca City. Site of a famous Bald Cypress (*Taxodium mucronatum* Ten.) with a trunk about 170 ft in circumference. [17°02', 96°38'; 5,150 ft] (50)
- Santa María Lachixio.—A town in the Sierra de Cuatro Venados 18 mi southwest of Zimatlán de Alvarez. The locality “Llano Santa María Lachixio, 7,200 ft.,” used by Rowley on specimens (WFWZ) taken 1 August 1967, presumably is synonymous or nearby; I am assuming the “Llano” is a settlement rather than a natural plain. [16°45', 97°01'] (122)
- Santa María Mixtequilla (Mixtequilla).—A village along the Río Tehuantepec 3 mi northwest of Tehuantepec City. [16°22', 95°15'; 125 ft] (170)
- Santa María Ozolotepec (Ozolotepec, Ozolotepec).—A small mountain town 22 mi southeast of San Andrés Miahuatlán. Nelson and Goldman specimens labeled “Mts. near Ozolotepec” were taken about 3 mi north around La Cieneguilla. [16°07', 96°22'] (139)
- Santa María Petapa.—A small town in the Isthmus of Tehuantepec 6 mi southwest of Matías Romero and 2 mi east of Santo Domingo Petapa. The only records definitely pertaining to this Petapa are those of Schaldach, correctly labeled “Santa María Petapa.” Sumichrast records from “Petapa” probably pertain to the more important town of Santo Domingo Petapa. [16°49', 95°07'; 669 ft] (182)
- Santa María Tonameca (Tonameca, Tonemeca).—A village on the Río Tonameca 5 mi west of San Pedro Pochutla. R. H. Palmer specimens taken on 21 April 1924 and labeled “Tonameca” and “Tonemeca” possibly collected at the mouth of the Río Tonameca rather than at the town. [15°44', 96°33'] (226)
- Santa Rosa.—A small town near kilometer marker 199 on the Puerto Escondido road about 4 mi (about 12.2 road mi) north of San Gabriel Mixtepec. Close to or synonymous with San Juan Lachao Pueblo Nuevo. [16°10', 97°07'; 3,800 ft by my altimeter]
- Santiago Chazumba.—A small town on Route 125 near the Puebla border 29 airline mi north-northeast of Huajuapán de León. Specimens taken by Binford and the Berretts about 3 mi northeast of town were labeled “Huajuapán de León, 34 rd. mi. NNE on road to Tehuacán, 6100'.” [18°12', 97°41'] (2)
- Santiago Choapan: see Choapan.
- Santiago Dominguillo (Dominguillo, Dondominguello, Dondominguillo).—A village on what was formerly the main trail between Oaxaca City and Tehuacán, Puebla, 11 mi south-southeast of San Juan Bautista Cuicatlán. [17°39', 96°55'; 2,470 ft] (40)
- Santiago Jamiltepec (Jamiltepec).—A large town 16 mi east-southeast of Santiago Pinotepa Nacional. [16°17', 97°49'; 787 ft] (100)
- Santiago Matatlán (Matatlán).—A small town on the Pan-American Highway at the extreme north-eastern end of the Oaxaca Valley 32 mi southeast of Oaxaca City. [16°53', 96°18'; 5,438 ft] (145)
- Santiago Miltepec.—A small town on Route 125 at a point 14 mi north-northeast of Huajuapán de León. [17°59', 97°41'; about 5,600 ft] (3)

- Santiago Nacaltepec (Nacaltepec).—A small town on what was formerly the main trail between Oaxaca City and Tehuacán, Puebla, 21 mi south of San Juan Bautista Cuicatlán. [17°31', 96°56'; about 6,900 ft] (41)
- Santiago Pinotepa Nacional (Pinotepa, Pinotepa del Estado, Pinotepa Nacional).—A town in extreme southwestern Oaxaca on Route 200 at a point 16 mi west-northwest of Santiago Jamiltepec. [16°20', 98°03'; 623 ft] (98)
- Santiago Yolomécatl.—A small town on the Putla de Guerrero Road 6 mi southwest of San Pedro y San Pablo Teposcolula. [17°28', 97°34'; 6,990 ft] (27)
- Santo Domingo Petapa (Petapa, Santa Domingo, Santo Domingo, S. Domingo, S. Dom. Petapa, Sto. Domingo, St. D. Petapa).—A town in the Isthmus of Tehuantepec 8 mi west-southwest of Matías Romero and 2 mi west of Santa María Petapa. Sumichrast records from "Petapa" probably pertain to this locality rather than to Santa María Petapa. Nelson and Goldman specimens from this town were labeled "Santo Domingo," whereas their birds labeled "Mts. near Santo Domingo" were taken 9 mi to the northwest at La Ranchería. A number of the records reported by Ridgway (e.g., 1902: 270) from "Santo Domingo" actually came from La Ranchería. [16°49', 95°09'; 741 ft] (181)
- Santo Domingo, Río (Río San Domingo).—A very large river in northern Oaxaca, extending from the confluence of the Río Salado and the Río Quiotepec near San Juan Quiotepec east through a deep canyon and joining with the Río Tonto near San Juan Bautista Tuxtepec to form the Río Papaloapan. (Fig. 31)
- Santo Domingo, Sierra (Sierra San Domingo, Sierra de San Domingo, Sierra Santa Domingo, Sierra de Santo Domingo, Sierra S. Domingo, Sierra de S. Domingo).—W. B. Richardson's locality in the Isthmus of Tehuantepec. Exact location unknown. Both tropical evergreen forest birds and tropical deciduous forest birds taken. Possibly the names refer to the mountains west of Santo Domingo Petapa.
- Santos Reyes Nopala (Nopala).—A small town on the Pacific side of the Sierra de Miahuatlán 4 mi west of San Gabriel Mixtepec. [16°06', 97°09'; about 1,500 ft] (106)
- Santos Reyes Pápalo (Reyes, Reyes Pápalo).—A village in the western end of the Sierra de Juárez 7 mi east-northeast of San Juan Bautista Cuicatlán. Nelson and Goldman specimens labeled "Reyes" taken between 6,700 and 10,200 ft elevation. [17°51', 96°52'; 6,700 ft (Goldman 1951:220)] (39)
- Sarabe, Río: see Río Sarabia.
- Sarabia.—A small town on the Trans-Isthmian Railroad and Highway about 13 airline mi north of Matías Romero and 2 mi (3 road mi) south of the Río Sarabia. Schaldach specimens taken at this town labeled "Sarabia" or "16 mi. N. Matías Romero." See Río Sarabia. [17°05', 95°01'; 305 ft] (93)
- Sarabia, Río (Río Sarabe, Sarabia River, Río Serabia).—An upper tributary of the Río Coatzacoalcos, originating in the Sierra de Choapan and joining the Río Coatzacoalcos near the Veracruz border east-northeast of Palomares. An important collecting locality where the river is crossed by the Trans-Isthmian Highway about 16 airline mi north of Matías Romero. Specimens taken at this crossing, not at the town, include all those labeled "Sarabia, 20 mi. N Matías Romero" (Lamb) and "18 mi. N Matías Romero (Lamb, Schaldach, Rook, and others), these distances being road miles. Graber specimens labeled "Boca Río Serabia" taken along the Río Coatzacoalcos 0.6 mi south of its junction with the Río Sarabia at Rancho Boca del Río Sarabia. See Sarabia. [Junction of river and highway: 17°07', 95°01'; 262 ft (Duellman 1960:35)] (Collecting locality: 92) (River: Fig. 31)
- Scarces.—A *ranchito* in the western part of the Sierra Madre de Chiapas 11 mi north of Nilttepec. [16°43', 94°35'; 1,378 ft]
- Screech Owl Camp (Km. 176, Otus Camp).—A collecting station for Rowley at kilometer marker 176, located 2.5 road mi north of a divide, about 8 mi (about 17.7 road mi) south of San Pedro Juchatengo, and about 9 mi (about 27.2 road mi) north of San Gabriel Mixtepec. See description and photograph in Rowley (1966:109, 114). [About 16°15', 97°07'; 6,300 ft] (116)
- S. Domingo: see Santo Domingo Petapa.
- S. Domingo, Sierra; Sierra de S. Domingo: see Sierra Santo Domingo.
- S. Dom. Petapa: see Santo Domingo Petapa.
- Seco, Río.—A collecting locality for T. MacDougall in 1952, located along the Pan-American Highway 3.1 mi west of Tehuantepec City. MacDougall specimens from Río Seco in the AMNH erroneously ascribed to F. A. Pitelka. Should not be confused with Río Seco, Veracruz (see next entry). [16°21', 95°17'; 150 ft]

- Seco, Río [state of Veracruz].—A locality in the state of Veracruz near the town of Córdoba. Erroneously listed as in Oaxaca by Peters and Griscom (1929:44) and later corrected to Veracruz by Brodkorb (1940a:1). Should not be confused with the "Río Seco" in Oaxaca (see preceding entry).
- Sedas, Las.—A railroad station on the continental divide 14 mi northwest of San Pedro y San Pablo Etlá. [17°20', 96°58'; about 6,000 ft] (43)
- Serabia, Río: see Río Sarabia.
- Silacayoapan.—A town in extreme western Oaxaca 7 mi northeast of San Francisco Tlapancingo. [17°31', 98°09'; 5,642 ft] (17)
- Sinai: see Finca Sinai.
- Sin Nombre, Barranca (Baranca Sin Nombre, Barranca sin Nombre).—A ravine on the Puerto Escondido Road about 12 mi (about 27 road mi) south of San Pedro Juchatengo and about 5 mi (about 18 road mi) north of San Gabriel Mixtepec. A collecting locality for Rowley and Galley. [About 16°11', 97°07'; 4,700 ft] (113)
- S. Juan, S. Juan del Río: see San Juan del Río.
- S. Juan La García: see Lajarcia.
- Sola, Sola de Vega: see San Miguel Sola de Vega.
- Sola, Río.—A river originating in the southern end of the Sierra de Cuatro Venados and flowing southeast to join with the Río Atoyac at a point 9 mi southeast of San Miguel Sola de Vega. (Fig. 31)
- Solasita.—A small town visited by Lamb, located on a small river 30 road mi (about 23 airline mi) north of Matías Romero. Possibly synonymous with Loseta or Tolosa. [17°13', 95°04'; about 200 ft]
- Soledad (La Soledad).—A village on the Puerto Angel Road about 15.4 road mi north of Candelaria Loxicha. [About 15°53', 96°25'; 4,700 ft by my altimeter]
- Sol y Luna, Lagunas (Lagoons, The Lagoons, La Laguna, Las Lagunas, Laguna Sol y Luna, Lakes of Sol y Luna, Twin Lakes): see discussion under Rancho Sol y Luna.
- Sordo, Río.—A large river draining the interior valleys east of the Sierra de Yucuyacua and joining with the Río Atoyac 24 mi northeast of Santiago Jamiltepec to form the Río Verde. (Fig. 31)
- Soyaltepec: see San Miguel Soyaltepec.
- Soyolápan, Río (Río Soyolapam).—A river draining the east side of the Sierra de Juárez and coursing northeastward to enter the Río Valle Nacional 7 mi northeast of Valle Nacional. [Junction with Río Valle Nacional: 17°48', 96°13']
- Sta. Efigª, Sta. Efigenia: see Santa Efigenia.
- Sta. Lucía: see Santa Lucía.
- St. Bartholo: see San Bartolo Yautepec.
- Sto. Domingo, Sto. D. Petapa: see Santo Domingo Petapa.
- Suchapam (Suchuapan).—A Boucard locality for *Oryzoborus funereus* in April 1859. Location unknown, but possibly near Playa Vicente, where Boucard spent much of his time in March, April, and May 1859.
- Suchistepec, Suchixtepec: see San Miguel Suchixtepec.
- Suchuapan: see Suchapam.
- Superior, Laguna.—A large saline lagoon on the Pacific coast southeast of Juchitán. Binford party specimens from "19 mi. SW Juchitán" taken at the base of the narrow strip of land separating Laguna Superior from Laguna Inferior. Erroneously listed by Leopold (1959:137, 141) as in Chiapas. [16°20', 94°55'; sea level] (Fig. 31)
- Sur, Mesa del.—A term used to embrace all of the mountainous area in Oaxaca west of the Isthmus of Tehuantepec.
- Sur, Sierra del: see Sierra Madre del Sur.
- Talca, Talea: see San Miguel Talea de Castro.
- Tamasulapa: see Tamazulapan del Progreso.
- Tamazola.—Cooke (1938:187) records the recovery of a banded *Zenaida macroura* at "Tamazola," possibly San Juan Tamazola, a village located at 17°11', 97°03', or about 23 mi west-northwest of Oaxaca City.
- Tamazulapan del Progreso (Tamasulapa, Tamazulapa, Tamazulapam, Tamazulapan).—A town on the Pan-American Highway 16 mi southeast of Huajuapán de León. [17°41', 97°35'; 6,529 ft] (26)
- Tanatepec: see Zanatepec.
- Tangola Tangola, Bahía (Tangola-Tangola).—A small Pacific coast bay about 23 mi east-northeast of Puerto Angel. [About 16°43', 96°09'; sea level]



- of these areas, I use the term Tehuantepec region, which, then, encompasses all of the Oaxaca part of the Pacific coastal plain from just west of Tehuantepec City to the Chiapas border, the Isthmus proper (including the Veracruz portion), all of the Oaxaca part of the Sierra Madre de Chiapas, and all of the District of Tehuantepec. Thus defined, this area corresponds roughly with the Isthmus of Tehuantepec in its broad sense. See Huantepec.
- Tehuantepec, Río (Tehuantepec River).—A large and important river with its upper tributaries draining the southern slopes of the Sierra de Los Mijes, the northern slopes of the eastern portion of the Sierra de Miahuatlán, and the western slopes of the mountains bordering the eastern side of the Oaxaca Valley. Enters the Gulf of Tehuantepec just east of Salina Cruz. (Fig. 31)
- Tehuantepec, state of (Tehuantepec).—Ridgway (*in* Nutting 1882:387) refers to the “States of Oaxaca and Tehuantepec.” I have seen no maps showing the boundaries of such a state. Records so designated doubtfully pertain to Oaxaca unless further restricted, since part of Veracruz may have been included. Tehuantepeque: see Tehuantepec region.
- Tejas, Las (Las Tejedas, Los Tejedos, Los Tejos).—A Lamb and T. MacDougall locality 9 road mi (about 7 airline mi) west of Tehuantepec City, located on the Pan-American Highway at the foot of the mountains near a stream and an old house. [16°21', 95°20'; about 200 ft] (164)
- Telixtlahuaca: see San Francisco Telixtlahuaca.
- Temascal.—A town 22 mi northwest of San Juan Bautista Tuxtepec at the site of Presa Miguel Alemán (the dam). [18°15', 96°24'; 263 ft] (10)
- Temascaltepec [state of México] (Temiscaltepec).—A town in the state of México 39 mi southwest of Toluca. Ridgway (*in* Ferrari-Perez 1886:148) erroneously refers a specimen of *Pipilo fuscus* (USNM) to “Temiscaltepec, Oaxaca.” [19°02', 100°03']
- Teotalcingo.—A mountain village on the eastern side of the Sierra de Zempoaltepec 5 mi north of Choapan. Visited by Boucard in March 1859. In the synonymy of *Spizaetus ornatus*, Friedmann (1950:447), citing Salvin and Godman (1897–1904 [1901]:92), erroneously refers Teotalcingo to the state of Veracruz. [17°26', 95°56'; about 3,000 ft] (78)
- Teotitlán del Camino (Teotitlan, Teotitlan de Camino).—A small town near the Puebla border 24 mi north-northwest of San Juan Bautista Cuicatlán. H. O. Wagner specimens labeled “Teotitlan” taken in May (and possibly September) 1944 between 850 m (2,788 ft) and 1,050 m (3,444 ft). [18°08', 97°05'; 3,198 ft] (4)
- Tepanatepec, Tepastepec, Tepenatepec: see Tapanatepec.
- Tepetlapa [state of Guerrero].—A small town in the state of Guerrero, located on a railroad near the Morelos border. Vaurie (1958:293) considers the H. H. Smith locality for insects to be Tepetlapa, Oaxaca, a town located 16 mi northwest of San Francisco Tlapancingo. However, Salvin and Godman (1888–1904 [1889]) list *Empidonax minimus* (p. 72) and *Myiarchus tuberculifer* (p. 94) from “Tepetlapa . . . in Guerrero (Mrs. H. H. Smith) . . .” I believe that Smith never visited Oaxaca but collected both birds and insects at Tepetlapa, Guerrero, a town along the route that Smith probably took to get to Acapulco.
- Tepitongo.—A village on the eastern side of the Sierra de Zempoaltepec 12 mi northeast of Hidalgo Yalalag. [17°18', 96°02']
- Teposcolula: see San Pedro y San Pablo Teposcolula.
- Tequisistlán (Tequesixtlan, Tequisixtlan, Tequistlán, Tequixistlán, Tequisixtlan).—A small town just south of the Pan-American Highway 26 mi west of Tehuantepec City. [16°24', 95°37'; 623 ft] (160)
- Tequisistlán, Río (Tequixistlan River).—An important river originating in the northeastern section of the Sierra de Miahuatlán and coursing eastward to join with the Río Tehuantepec at Presa Benito Juárez. (Fig. 31)
- Tequisixtlan, Tequistlán, Tequixistlán: see Tequisistlán.
- Tequixistlan River: see Río Tequisistlán.
- Tequisixtlan: see Tequisistlán.
- Terpentine Ridge.—The first ridge along the Puerto Escondido Road southwest of San Miguel Sola de Vega, so named apparently by Rowley. Binford and some Rowley specimens taken near the summit of the Puerto Escondido Road, not far from a fire tower, 4 mi (12 road mi) southwest of San Miguel Sola de Vega. [Collecting locality: 16°29', 97°01'; 6,900 ft] (Collecting locality: 120)
- Tetela.—A railroad station in extreme northern Oaxaca 36 mi northwest of San Juan Bautista Tuxtepec. [18°32', 96°27'; about 200 ft] (8)
- Tierra Blancas, Río.—A small tributary of the Río Tonameca. Also the name used by Phillips for his

- collecting locality where the river intersects the Puerto Angel Road at a point about 4 mi north of Chacalapa.
- Tlacolula de Matamoros (Tlacolula, Tlalcolula).—A large town in an eastern arm of the Oaxaca Valley 23 mi east-southeast of Oaxaca City. [16°57', 96°24'; 5,314 ft] (141)
- Tlapancingo: see San Francisco Tlapancingo.
- Tlaxiaco: see Santa María Asunción Tlaxiaco.
- Tlaxiaco-Putla road: see Putla de Guerrero Road.
- Tolosa (Tollocita, Tollocito, Tollosa, Tolloso, Tolocita, Tolosita).—A small town 22 mi north of Matías Romero, located near the Trans-Isthmian Highway and on the Trans-Isthmian Railroad near its crossing of the Río Jumuapán. Ridgway (1914) refers a number of Tolosa records to Veracruz (e.g., p. 475) but records a specimen of *Campephilus guatemalensis* from Tolosa, Oaxaca (p. 176). Probably many, if not all, old specimen records from "Tolosa" should be referred to Oaxaca. Fugler and Webb (1957:108) erroneously list this locality as on the "banks of the Rí Jaltepéc [sic] . . . eight kilometers (by river) from the town of Jesús Carranza, Veracruz." Specimens taken at "Tolosa" by A. E. Colburn and Shufeldt might pertain to Oaxaca; the type of *Ortalis vetula fulvicauda* (see Type Localities), collected by them, is believed to be from "Tolosa, Oaxaca." Goodwin (1969:264, 265) considers Tolosa synonymous with Donají and separate from "Tolosita"; I believe Tolosa and Tolosita are synonymous, but Donají is distinct. Tolosa possibly synonymous with Loseta or Solasita. [17°12', 95°03'; 207 ft] (89)
- Tomatlán [state of Veracruz] (Tomatla).—A small town in the state of Veracruz on a railroad 11 mi north-northwest of Córdoba. Salvin and Hartert (1892:215) list *Amazilia yucatanensis* from "Tomatla," without giving the state, and Ridgway (1911:42) records *Thamnophilus doliatus* from "Tomatla," Oaxaca. Because I can find neither a "Tomatla" in Mexico nor a "Tomatlan" in Oaxaca, these records probably pertain to Tomatlán, Veracruz. [19°02', 97°00'; 4,451 ft]
- Tomellin, Canyon of.—The deep canyon formed by the Río Tomellin west of Santiago Nacaltepec. Forms one arm of the complex valley of San Juan Bautista Cuicatlán.
- Tomellin, Río.—A large river originating in the mountains northwest of Oaxaca City and flowing north to join with the Río Quiotepec just south of San Juan Bautista Cuicatlán. Forms the Canyon of Tomellin, one arm of the complex valley of San Juan Bautista Cuicatlán. (Fig. 31)
- Tonaguía (Tonagnia, Tonguia, Toniaguia).—A village on the eastern slope of the Sierra de Zempoaltepec about 13 mi northeast of Hidalgo Yalalag and just north of Tepitongo. [17°19', 96°02'] (75)
- Tonalá [state of Chiapas] (Tonila).—A small town on the Pacific coastal plain of southwestern Chiapas about 35 mi southeast of Tapanatepec, Oaxaca. Salvin and Godman (1879–1904 [1884]:328) record *Saltator coerulescens* from "Tonila (Sumichrast)," whereas Ridgway (1901:667), citing Salvin and Godman in the synonymy of this species, incorrectly gives "Tonala, Oaxaca." Ridgway (1911:350) again misquotes Salvin and Godman (1888–1904 [1892]:304) by adding the state of Oaxaca to the locality "Tonila" in the range and synonymy of *Heliomaster longirostris*. Probably, all these listings pertain to Sumichrast records obtained at Tonalá, Chiapas, a locality known to have been visited by that collector. [16°06', 93°46'; 180 ft]
- Tonameca: see Santa María Tonameca.
- Tonameca, Río.—A short river originating on the southern slopes of the Sierra de Miahuatlán and terminating at the Pacific Ocean about 10 mi west of Puerto Angel. A small brackish lagoon has formed at its mouth. (Fig. 31)
- Tonameca: see Santa María Tonameca.
- Tonguia, Toniaguia: see Tonaguía.
- Tonila: see Tonalá [state of Chiapas].
- Tontepec: see Totontepec.
- Tonto, Arroyo.—A Schaldach locality near Sarabia. [17°04', 95°02'; about 300 ft]
- Tonto, Río.—A large river originating in Puebla and Veracruz, coursing through extreme northern Oaxaca, filling the reservoir at Presa Miguel Alemán, forming a small portion of the Oaxaca-Veracruz border, and finally joining with the Río Santo Domingo to form the Río Papaloapan just north of San Juan Bautista Tuxtepec. Also the name used by O. Epping for his collecting locality near Temascal, and by del Toro Avilés for his collecting station probably in the same area (Pardiñas 1946). (Fig. 31)
- Topana, Topanatepec: see Tapanatepec.
- Tortuguero, Río: see Río Jumuapán.

- Torulla (Torullo).—Location unknown and perhaps not in Oaxaca. In the range of *Ortalis poliocephala*, Salvin and Godman (1897–1904 [1902]:280) list “Torulla” without mention of state, and Ridgway and Friedmann (1946:36, 37) record “Torullo” as in Oaxaca.
- Totolapa, Totolapán, Totolopa: see San Pedro Totolapan.
- Totontepec (Tontepec, Mount Totontepec, Totontepeque, Totontepic).—An Indian village on the northwestern slope of Cerro Zempoaltepec 10 mi east-northeast of Hidalgo Yalalag. Nelson and Goldman specimens labeled “Near Totontepec” were taken at a group of Indian *ranchos* 6 mi east of Totontepec at 3,700 ft elevation. Reference by Hellmayr and Conover (1942:226) to “Mount Totontepec” probably pertains to the town of Totontepec. M. del Toro Avilés specimens supposedly from “Totontepec,” judging from the species involved, must have been taken at various elevations and in a number of different habitats. Visited by Boucard in January 1859 and perhaps in February and March 1859. [17°13', 96°03'; 6,068 ft] (71)
- Totulapa: see San Pedro Totolapan.
- Trans-Isthmian Highway (Route 185).—The road extending north-south across the Isthmus of Tehuantepec from Acayucan, Veracruz, through Matías Romero, La Ventosa, and Tehuantepec City to Salina Cruz. From La Ventosa to Tehuantepec City it follows the Pan-American Highway (Route 190). Currently a Federal Route.
- Trans-Isthmian Railroad.—The railroad traversing the Isthmus of Tehuantepec. Extends from Salina Cruz on the Pacific Coast north through Tehuantepec City, Ixtepec, and Matías Romero, enters Veracruz north of Uvero, passes through Jesús Carranza, and ends on the Gulf of Mexico at Coatzacoalcos.
- Tres Cruces, Cerro (C. Tres Cruces).—The mountain located about 17 mi west-southwest of Tehuantepec City. The former *ranchito* of Santa Lucia was located on this mountain. [Summit: about 16°18', 95°28'; about 4,000 ft (T. MacDougall in litt.)] (Fig. 31)
- Trinidad (La Trinidad).—A settlement on the Río Trinidad 26 mi east-northeast of Choapan. [17°26', 95°34'; about 700 ft] (83)
- Trinidad, Río.—A large river in the Río Papaloapan basin on the Atlantic slope of Oaxaca. Its upper tributaries originate near Cerro Zempoaltepec and converge to become the Río Trinidad proper near the settlement of Trinidad. From here the river flows northeastward into Veracruz, where it joins with the Río de la Lana to form the Río San Juan. (Fig. 31)
- Tuchitan: see Juchitán.
- Tuhuántepec: see Tehuantepec region.
- Tulé, El: see Santa María del Tule.
- Tupana: see Tapanatepec.
- Tustepec: see San Juan Bautista Tuxtepec.
- Tutla.—A village on a tributary of the Río Jaltepec 27 mi west of Palomares. The Millionth Map gives an altitude of 1,478 m (4,849 ft), and this elevation has been used by Blake (1949:1); however, other maps indicate an elevation of under 600 ft [17°11', 95°27'] (84)
- Tuxtepec: see next entry and San Juan Bautista Tuxtepec.
- Tuxtepec, District of (Tuxtepec).—A former major political subdivision of the state. Located in northern Oaxaca, it included the towns of Loma Bonita and San Juan Bautista Tuxtepec (see also the latter town).
- Tuxtla: see San Andrés Tuxtla [state of Veracruz].
- Tuxtupec: see San Juan Bautista Tuxtepec.
- Twin Lakes: see Lagunas Sol y Luna.
- Uvero (Nuevo Uvero, Ubero).—A station on the Trans-Isthmian Railroad 10 mi north-northeast of Palomares. All literature references to “Uvero” stem from Sumichrast's records from Uvero, state of Veracruz, a town located between Alvarado and Santiago Tuxtla (Sumichrast 1881:228). Specimens taken since the construction of the Trans-Isthmian Highway probably were collected along the highway at a group of houses variously called Uvero, Ubero, or Nuevo Uvero, a locality in Oaxaca just north of Donají and several miles west of the true Oaxaca Uvero but herein treated as synonymous. [17°17', 95°01'; 98 ft] (86)
- Vacas, Las.—A ranch on the Pan-American Highway 12 mi west of Tequisistlán. [16°24', 95°47'; 2,434 ft] (157)
- Valle Nacional (Villa Nacional).—A town at the northeastern foot of the Sierra de Juárez on the Río Valle Nacional 26 mi southwest of San Juan Bautista Tuxtepec. Some specimens taken by Rook,

- T. Sims, and others erroneously locate Valle Nacional as "60 mi. SE Tuxtepec." See Valle Real. [17°47', 96°18'; 213 ft] (60)
- Valle Nacional, Río (Río de Valle Nacional).—A large river originating in the northeastern section of the Sierra de Juárez and joining the Río Santo Domingo southwest of San Juan Bautista Tuxtepec. (Fig. 31)
- Valle Real.—An old Deppe locality universally referred in the literature to the state of Veracruz. However, I agree with F. W. Loetscher (in litt.) that Valle Real might be in Oaxaca. Supporting this hypothesis is a letter from Deppe to Lichtenstein and translated by E. Stresemann for A. R. Phillips (in litt.), in which Deppe says that Valle Real is "on road from Oaxaca to Alvarado, after passing through heavily forested, steep mts. with coyol palm thickets, and still 40 leagues (=10 days in dry season) by pack train from Alvarado." The only area between Oaxaca City and Alvarado, Veracruz, which fits this description is in the northeastern foothills of the Sierra de Juárez of Oaxaca. Additional evidence is supplied by a Valle Real specimen of *Aulacorhynchus prasinus*, a species unknown from the Veracruz lowlands southwest of Alvarado but common in the mountains of Oaxaca. As suggested by Loetscher (in litt.), Valle Real might be an old name for Valle Nacional. Other species recorded from Valle Real are *Trogon melanocephalus*, *T. violaceus*, *Hylomanes momotula*, *Celeus castaneus*, *Myiobius sulphureipygius*, *Ramphocelus sanguinolentus*, and *Dives dives*. All seven of these have been recorded at Valle Nacional, and *Aulacorhynchus* at higher elevations above the town. Deppe collected *Dives* at "Chiltepec" and at "Cosamaloapam," as well as at Valle Real (Salvin and Godman 1879–1904 [1887]:481). There is a San José Chiltepec, Oaxaca, 17 mi northeast of Valle Nacional, and a Cosamaloapán, Veracruz, farther to the northeast, both on what was probably the main trail to Alvarado.
- Venta, La.—A village near the Pan-American Highway and on the Río Chicapa 13 mi west of Niltepec. [16°35', 94°49'; 89 ft] (194)
- Ventosa (La Ventosa).—A village about 3 mi east of Salina Cruz on Bahía Ventosa. Specimens collected here by Schaldach on 27 February 1961 were labeled "La Ventosa, 5 km. [3.1 mi.] E Salina Cruz." Sumichrast records from here say simply "Ventosa." Should not be confused with the La Ventosa northeast of Juchitán. [16°10', 95°09'; near sea level] (167)
- Ventosa, Bahía (Bahía de la Ventosa, Ventosa Bay, Bay of Ventosa).—The bay on the Pacific coast just each of Salina Cruz into which the Río Tehuantepec empties. [16°11', 95°08'; sea level]
- Ventosa, La.—A village 10 mi northeast of Juchitán at the junction of the Pan-American and Trans-Isthmian Highways. See Ventosa. [16°34', 94°57'; 82 ft] (174)
- Verde, Cerro (Sierra Verde).—A mountain in the Sierra de Miahuatlán 11 mi north-northeast of San Gabriel Mixtepec. Specimens collected by O. Cruz, W. Durrant, Rook, and Rowley were taken between 7,600 (camp) and 8,600 ft elevation and labeled "30 km. E Santa Rosa," "30 km. E Lachao Nuevo," or "Sierra Verde, 30 km. E Santa Rosa." Rowley (1966:110) gives an elevation of 10,600 ft at the summit; various maps show elevations ranging from 8,660 ft to more than 11,152 ft. [Summit: 16°14', 97°02'] (Fig. 31)
- Verde, Río.—A very large river formed by the confluence of the Río Atoyac and the Río Sordo at a point about 24 mi northeast of Santiago Jamiltepec. It enters the Pacific Ocean 20 mi south of the same town. (Fig. 31)
- Verde, Sierra: see Cerro Verde.
- Vigas, Las.—A Schaldach locality 5 mi southeast of Zanatepec. [About 16°27', 94°18']
- Villa Alta: see San Ildefonso Villa Alta.
- Villa Alta, District of (Prov. Villa Alta).—A former major political subdivision of the state. Located northeast of Oaxaca City and including Cerro Zempoaltepec and the towns of Moctum and San Ildefonso Villa Alta. The unmodified name "Villa Alta," indicating the district, might have been used in the past and, if so, should not be confused with the town of San Ildefonso Villa Alta, which has often been written as "Villa Alta."
- Villa Atla: see San Ildefonso Villa Alta.
- Villa Cerro Baul: see Rancho Cerro Baúl.
- Villa de Etlá: see San Pedro y San Pablo Etlá.
- Villa de Tehuantepec: see Tehuantepec City.
- Villa Hidalgo: see Hidalgo Yalalag.
- Villa Nacional: see Valle Nacional.
- Vista Hermosa (Campamento Vista Hermosa).—A tiny Indian settlement near kilometer marker 97

- on the San Juan Bautista Tuxtepec Road 17 road mi (about 7 airline mi) southwest of Valle Nacional. [17°43', 96°22'; 4,800 ft by my altimeter] (58)
- Vivero Rancho Teja.—A rancho in the Sierra de Juárez near Ixtlán de Juárez; a collecting station for L. Baptista in 1966. [7,200 ft]
- Vueltas, Río de la: see Río Quiotepec.
- Xacatepec (Xacaltepec, Xacauetepec).—Exact location unknown. Must be in the Atlantic Region west of the Isthmus of Tehuantepec, judging from the three species taken there. Sclater (1857:253) records a Deppe specimen of *Momotus momota* from "Xacatepec." Salvin and Godman (1888–1904 [1895]:456) and Ridgway (1914:461) report the same record as from "Xacaltepec" and "Xacáltepec," respectively. Salvin and Godman (1888–1904 [1896]:490) list a Deppe record of *Trogon elegans* from "Xacauetepec." Because Deppe was involved in all three records, I believe the localities are one and the same. Salvin and Godman (1888–1904 [1896]:556) list a specimen of *Pteroglossus torquatus* from "Xacatepec," a locality I presume to be synonymous also. This "Xacatepec" is not the same as Boucard's "Xacatepec" reported by Sclater (1859b:388), the latter apparently being in the Pacific Region southwest of Santa Catarina Juquila (see San Marcos Zacatepec).
- Xuchitan: see Xuchitán.
- Y, Río de la.—A creek that begins above 8,800 ft elevation and courses south-southeast to meet the Puerto Escondido Road near kilometer marker 70 or about 4.8 road mi north of San Miguel Sola de Vega. Paralleled by the Río de la Y Road, the kilometer markers for which begin with 1 at the Puerto Escondido Road. Also the name used on some specimens collected by Rowley and Arnold at La Cofradía (= kilometer marker 40 on the Río de la Y Road), which see.
- Yacochi.—An Indian village on the western slope of Cerro Zempoaltepec about 10 mi east-southeast of Hidalgo Yalalag. Nelson and Goldman headquarters for work on Cerro Zempoaltepec, their specimens taken from the town up to 10,500 ft elevation and labeled "Mt. Zempoaltepec" or "Mount Zempoaltepec." [17°08', 96°02'; 7,700 ft (Goldman 1951:209)] (70)
- Yaganiza: see San Pablo Yaganiza.
- Yalalag: see Hidalgo Yalalag.
- Yalina.—A village 7 mi northwest of Hidalgo Yalalag. [17°14', 96°15'; 5,576 ft] (64)
- Yanhuitlán (Anhuiatlán, Ianhuiatlán, Ianhuiatlán, Janhuiatlán, Janhuiatlán, Yauhuitlán).—A village on the Pan-American Highway 9 mi northwest of Asunción Nochixtlán. Although there might be some doubt, all the above names are in my opinion synonyms of the Yanhuitlán near Asunción Nochixtlán. Confusion stems from 1886, when Ferrari-Perez published his *Catalogue of Animals Collected by the Geographical and Exploring Commission of the Republic of Mexico*. In that one publication, he and editor Ridgway give five different locality spellings for five species, as follows: *Trogon citreolus*, "Ianhuiatlán (?)" (p. 162); *Pachyramphus aglaiae*, "Yanhuitlán?" (p. 156); *Cacicus melanicterus*, "Yanhuitlán?" (p. 149); *Icterus pustulatus*, "Ianhuiatlán" (p. 150) and "Anhuiatlán" (editor's note by Ridgway, p. 151); and *Saltator atriceps*, "Janhuiatlán (?)" (p. 141). Of these species, only *Icterus pustulatus* could have been found at the Yanhuitlán near Asunción Nochixtlán, and even it would be unlikely, occurring only as a migrant. The other four species doubtless were taken elsewhere, as indicated by the interrogation marks used by Ferrari-Perez himself. The spelling "Yauhuitlán" is definitely a misquote in subsequent literature. [17°32', 97°21'; 7,039 ft] (30)
- Yantepec: see San Carlos Yautepec.
- Yauhuitlán: see Yanhuitlán.
- Yautepec, District of (Yautepec).—A former major political subdivision of the state. Encompassed the area just west of the southern half of the District of Tehuantepec and included the town of San Bartolo Yautepec. The unmodified name "Yautepec," meaning the district, sometimes was written in conjunction with a town name.
- Yetla: see San Mateo Yetla.
- Yolotepec (Yolétepec).—A small town in the Sierra de Miahuatlán 13 mi north-northwest of San Gabriel Mixtepec and 4 road mi southwest of the Puerto Escondido Road on the road to Santa Catarina Juquila. Boucard locality in May 1858 and used as a reference point by Binford in February 1974. [16°15', 97°12'; 5,640 ft by my altimeter] (104)
- Yucuyacua, Cerro.—The second highest mountain in Oaxaca, its summit located in the Sierra de Yucuyacua 12 mi south of Santa María Asunción Tlaxiaco. [Summit: 17°06', 97°40'; 11,074 ft] (Fig. 31)
- Yucuyacua, Sierra de.—A high mountain range bordering on the Pacific lowlands and extending from

- the valley of the Río Sordo northwest to the Guerrero border. Highest point is Cerro Yucuyacua, cresting at 11,074 ft elevation. (Fig. 31)
- Zampoaltepec, Mount: see Cerro Zampoaltepec.
- Zanatepec (Tanatepec, Zonátepec).—A small town on the Pan-American Highway 12 mi northwest of Tapanatepec. [16°29', 94°21'; 276 ft] (206)
- Zapotitlán (Zapotlan).—A village on the Pacific side of the Sierra de Miahuatlán 8 mi north-northwest of Huamelula. That this is the proper location of Sumichrast's Zapotitlán is demonstrated by the fact that literature references to Sumichrast specimens usually say "Zapotitlan, cerca de Huamelula." Ridgway (1907:26) and Hellmayr (1934:468) erroneously record a Sumichrast Zapotitlán specimen of *Catharus occidentalis* as from the state of Puebla. [16°08', 95°44'; 5,739 ft] (158)
- Zempoaltepec, Cerro (Mount Zampoaltepec, Zempoaltepec, Mount Zempoaltepec, Mt. Zempoaltepec, Cerro de Zempoaltepetl).—The highest mountain in Oaxaca, with its summit located 12 mi east-southeast of Hidalgo Yalalag. Nelson and Goldman specimens labeled "Mt. Zempoaltepec" or "Mount Zempoaltepec" were taken on the west slope between 7,700 and 10,500 ft elevation. [Summit: 17°08', 96°01'; 11,138 ft] (Fig. 31)
- Zempoaltepec, Nudo de.—Exact identity unknown. Briggs (1954:181–182) states that "Amatepec is located in the region of Mixe, which is in the same cordillera forming the Nudo de Zempoaltepec." Perhaps synonymous with Sierra de Zempoaltepec.
- Zempoaltepec, Sierra de.—The name used herein for the isolated mountain range in which Cerro Zempoaltepec is situated. Located along a north-south axis just each of the arid valley formed by the Río Cajones (Hidalgo Yalalag valley). (Fig. 31)
- Zempoaltepetl, Cerro de: see Cerro Zempoaltepec.
- Zepilote, El: see El Zopilote.
- Zimatlán de Alvarez.—A town in the Oaxaca Valley on the Puerto Escondido Road 14 mi south of Oaxaca City. Site of a meteorological station. [16°53', 96°47'; 5,143 ft] (128)
- Zonátepec: see Zanatepec.
- Zopilote, El (El Zepilote).—A collecting station for Rowley, located on the railroad 4 mi west-northwest of Reforma. [16°27', 94°31'; 400 ft] (203)

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## INDEX

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