A Preliminary Survey of the Avifauna of the Mexican State of Oaxaca. (Volumes 1 and 2).

Laurence Charles Binford
Louisiana State University and Agricultural & Mechanical College
BINFORD, Laurence Charles, 1935-
A PRELIMINARY SURVEY OF THE AVIFAUNA
OF THE MEXICAN STATE OF OAXACA.
(VOLUMES 1 AND 2).

Louisiana State University and Agricultural and
Mechanical College, Ph.D., 1968
Zoology

University Microfilms, Inc., Ann Arbor, Michigan
A PRELIMINARY SURVEY OF THE AVIFAUNA OF THE
MEXICAN STATE OF OAXACA

Volume 1

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Zoology and Physiology

by

Laurence Charles Binford
B.S., University of Michigan, 1957
August, 1968
ACKNOWLEDGMENTS

No work of this nature could be completed satisfactorily without the assistance of a large number of people. To the many friends who have aided in this venture, I wish to express my sincerest appreciation.

During the course of my research, I made three field expeditions to México, each lasting four to five months. On the first trip, I was ably assisted by Larry L. Wolf, on the second by Delwyn G. Berrett and Franklin M. Berrett, and on the third by John J. Morony. The aid and cooperation provided by these people not only greatly increased the proficiency of the expeditions in the procurement and preparation of specimens but made the rigorous field work far more enjoyable.

Special thanks are due to Profesor Jordi Julia Z., of the Laboratorio de Entomología, Comisión del Papaloapan, whose unselfish expenditure of time and effort made possible the establishment of collecting stations near Valle Nacional and at Temascal.

The assistance of Thomas MacDougall was indispensable in arranging the pack trip into the cloud forests of the Sierra Madre de Chiapas, and his efforts to procure data on the Wild Turkey in Oaxaca are much appreciated. Mr. and Mrs.
Roy H. Jones, whose beautiful Oaxaca Courts provided days of respite from the rigors of field work, were particularly helpful in obtaining supplies and making space for storage of specimens.

Financial assistance was received from a variety of sources. The Department of Zoology of Louisiana State University provided special funds for one of the field expeditions, and research assistantships were made available for myself and my field companions through the Louisiana State University Museum of Zoology. Research at Louisiana State University and at various museums around the United States was supported in part by one Cooperative Graduate Fellowship and two Summer Fellowships from the National Science Foundation. Research at the American Museum of Natural History was made possible through a grant from the Frank M. Chapman Memorial Fund.

Numerous people have unselfishly supplied me with original unpublished notes on the birds of Oaxaca. Charles G. Sibley and Lester L. Short, Jr., made available the notes taken at La Cumbre by themselves and J. B. Bowers, H. E. Childs, R. H. Long, and F. C. Sibley. Other persons to whom I am greatly indebted for the use of their notes are William B. Davis, Robert W. Dickerman, Ernest P. Edwards, Richard R. and Jean Graber, John Hubbard, Philip R. Lenna, Frederick W. Loetscher, William B. Robertson, and A. W. Schorger.

My heartfelt thanks are especially due to Philip S.
Humphrey, whose instruction, advice, encouragement, and material favors down through the years have, in very large measure, made possible the realization of a dream, of which my work in Oaxaca was a part.

Allan R. Phillips has been especially helpful, not only by allowing free access to his collection but also by spending many hours on my behalf providing data on specimens, localities, and taxonomic problems. I have also benefited greatly from long discussions with Burt L. Monroe, Jr.

For the loan of specimens, free access to collections, cooperation, and assistance, I am greatly indebted to a number of individuals and their associated institutions. Special thanks are extended to the following: Ned K. Johnson, Frank A. Pitelka, and the late Alden H. Miller, Museum of Vertebrate Zoology, University of California, Berkeley; Thomas R. Howell and O. M. Buchanan, Jr., University of California at Los Angeles; John W. Hardy, Robert T. Moore Laboratory of Zoology, Occidental College; Robert M. Mengel and Richard F. Johnson, Museum of Zoology, University of Kansas; Austin L. Rand, Emmet R. Blake, and Melvin A. Traylor, Field Museum of Natural History; Dean Amadon, Eugene Eisenmann, Wesley E. Lanyon, Charles E. O'Brien, and Charles T. Collins, American Museum of Natural History; Raymond A. Paynter, Jr., Museum of Comparative Zoology, Harvard University; Alexander Wetmore, Richard L. Zusi, and John W. Aldrich, United States National Museum; Joe T. Marshall, Department
of Zoology, University of Arizona; Kenneth E. Stager, Los Angeles County Museum; George M. Sutton, Stovall Museum, University of Oklahoma, Norman; Robert W. Storer, Harrison B. Tordoff, and Norman L. Ford, University of Michigan; Charles C. Sibley and Neal G. Smith, Cornell University; Ed N. Harrison and the late William J. Sheffler, Western Foundation of Vertebrate Zoology, Los Angeles; Keith A. Arnold, Texas Cooperative Wildlife Museum, Texas Agricultural and Mechanical University, College Station; and Donald F. Hoffmeister, University of Illinois Museum of Natural History.

I would also like to express my great appreciation to the following: my advisor, George H. Lowery, Jr., whose unfailing support and encouragement has made this project possible; Robert J. Newman, who toiled many weeks in careful examination of the manuscript; and H. Bruce Boudreaux, Walter J. Harman, Douglas A. Rossman, and J. Harvey Roberts, the other members of my graduate committee, who also read the manuscript.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgments</td>
<td>ii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>xii</td>
</tr>
<tr>
<td>List of Figures</td>
<td>xiii</td>
</tr>
<tr>
<td>Abstract</td>
<td>xiv</td>
</tr>
</tbody>
</table>

**Volume 1**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>General Physiography</td>
<td>15</td>
</tr>
<tr>
<td>Physiographic Regions</td>
<td>15</td>
</tr>
<tr>
<td>Mesa del Sur</td>
<td>15</td>
</tr>
<tr>
<td>Atlantic coastal lowlands</td>
<td>19</td>
</tr>
<tr>
<td>Pacific coastal lowlands</td>
<td>20</td>
</tr>
<tr>
<td>Isthmus of Tehuantepec</td>
<td>23</td>
</tr>
<tr>
<td>Sierra Madre de Chiapas</td>
<td>25</td>
</tr>
<tr>
<td>Hydrography</td>
<td>27</td>
</tr>
<tr>
<td>Climate</td>
<td>29</td>
</tr>
<tr>
<td>Habitats</td>
<td>42</td>
</tr>
<tr>
<td>Extensive Terrestrial Habitats</td>
<td>52</td>
</tr>
<tr>
<td>Tropical evergreen forest</td>
<td>52</td>
</tr>
<tr>
<td>Cloud forest</td>
<td>58</td>
</tr>
<tr>
<td>Humid pine-oak forest</td>
<td>63</td>
</tr>
<tr>
<td>Arid pine-oak forest</td>
<td>68</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Tropical semideciduous forest ........................................ 73
Tropical deciduous forest ........................................ 75
Arid tropical scrub ............................................... 79
Arid temperate scrub ........................................ 85
Steppe ..................................................................... 89
Savanna ..................................................................... 91
Restricted Terrestrial Habitats ....................................... 95
Humid gallery forest ............................................. 95
Palm forest .................................................................. 97
Fir forest ..................................................................... 98
Juniper scrub .......................................................... 99
Man-made Terrestrial Habitats ....................................... 100
Fincas ...................................................................... 102
Guamil ...................................................................... 103
Cultivated land ......................................................... 103
Grazed land ............................................................. 104
Structures ................................................................. 104
Open Aquatic Habitats .................................................. 104
Lakes, ponds, and reservoirs ........................................ 105
Rivers and streams ..................................................... 105
Coastal bays, lagoons, and harbors ................................ 106
Open ocean ............................................................... 106
Marshes ..................................................................... 107
Rocky seashores ....................................................... 108
Sand beaches ............................................................ 108

vii

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand dunes</td>
<td>109</td>
</tr>
<tr>
<td>Mud flats</td>
<td>109</td>
</tr>
<tr>
<td>River bars</td>
<td>109</td>
</tr>
<tr>
<td>Forested Aquatic Habitats</td>
<td>110</td>
</tr>
<tr>
<td>Mangrove swamp</td>
<td>110</td>
</tr>
<tr>
<td>Fresh-water swamp</td>
<td>111</td>
</tr>
</tbody>
</table>

**PLAN OF THE SPECIES ACCOUNTS**

- **Status**
- **Relative abundance**
- **Seasonal occurrence**
- **Habitat preference and range**
- **Breeding Evidence**
- **Dates**
- **Elevations**

**SPECIES ACCOUNTS**

- **Family Tinamidae**
- **Family Podicipedidae**
- **Family Procellariidae**
- **Family Hydrobatidae**
- **Family Pelecanidae**
- **Family Sulidae**
- **Family Phalacrocoracidae**
- **Family Anhingidae**
- **Family Fregatidae**
- **Family Ardeidae**
<table>
<thead>
<tr>
<th>Family</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Cochleariidae</td>
<td>149</td>
</tr>
<tr>
<td>Family Ciconiidae</td>
<td>150</td>
</tr>
<tr>
<td>Family Threskiornithidae</td>
<td>150</td>
</tr>
<tr>
<td>Family Anatidae</td>
<td>151</td>
</tr>
<tr>
<td>Family Cathartidae</td>
<td>157</td>
</tr>
<tr>
<td>Family Accipitridae</td>
<td>160</td>
</tr>
<tr>
<td>Family Pandionidae</td>
<td>175</td>
</tr>
<tr>
<td>Family Falconidae</td>
<td>176</td>
</tr>
<tr>
<td>Family Cracidae</td>
<td>180</td>
</tr>
<tr>
<td>Family Phasianidae</td>
<td>181</td>
</tr>
<tr>
<td>Family Aramidae</td>
<td>184</td>
</tr>
<tr>
<td>Family Rallidae</td>
<td>184</td>
</tr>
<tr>
<td>Family Heliornithidae</td>
<td>188</td>
</tr>
<tr>
<td>Family Jacanidae</td>
<td>189</td>
</tr>
<tr>
<td>Family Haematopodidae</td>
<td>189</td>
</tr>
<tr>
<td>Family Charadriidae</td>
<td>189</td>
</tr>
<tr>
<td>Family Scolopacidae</td>
<td>192</td>
</tr>
<tr>
<td>Family Recurvirostridae</td>
<td>202</td>
</tr>
<tr>
<td>Family Phalaropodidae</td>
<td>203</td>
</tr>
<tr>
<td>Family Burhinidae</td>
<td>204</td>
</tr>
<tr>
<td>Family Stercorariidae</td>
<td>205</td>
</tr>
<tr>
<td>Family Laridae</td>
<td>206</td>
</tr>
<tr>
<td>Family Rynchopidae</td>
<td>212</td>
</tr>
<tr>
<td>Family Columbidae</td>
<td>212</td>
</tr>
<tr>
<td>Family Psittacidae</td>
<td>219</td>
</tr>
<tr>
<td>Family</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------</td>
<td>------</td>
</tr>
<tr>
<td>Family Cuculidae</td>
<td>225</td>
</tr>
<tr>
<td>Family Tytonidae</td>
<td>228</td>
</tr>
<tr>
<td>Family Strigidae</td>
<td>229</td>
</tr>
<tr>
<td>Family Nyctibiidae</td>
<td>237</td>
</tr>
<tr>
<td>Family Caprimulgidae</td>
<td>237</td>
</tr>
<tr>
<td>Family Apodidae</td>
<td>241</td>
</tr>
<tr>
<td>Family Trochilidae</td>
<td>245</td>
</tr>
<tr>
<td>Family Trogonidae</td>
<td>265</td>
</tr>
<tr>
<td>Family Alcedinidae</td>
<td>269</td>
</tr>
<tr>
<td>Family Momotidae</td>
<td>271</td>
</tr>
<tr>
<td>Family Galbulidae</td>
<td>273</td>
</tr>
<tr>
<td>Family Bucconidae</td>
<td>274</td>
</tr>
<tr>
<td>Family Ramphastidae</td>
<td>274</td>
</tr>
<tr>
<td>Family Picidae</td>
<td>275</td>
</tr>
<tr>
<td>Family Dendrocolaptidae</td>
<td>283</td>
</tr>
<tr>
<td>Family Furnariidae</td>
<td>287</td>
</tr>
<tr>
<td>Family Formicariidae</td>
<td>289</td>
</tr>
<tr>
<td>Family Pipridae</td>
<td>292</td>
</tr>
<tr>
<td>Family Cotingidae</td>
<td>293</td>
</tr>
<tr>
<td>Family Tyrannidae</td>
<td>297</td>
</tr>
<tr>
<td>Family Alaudidae</td>
<td>323</td>
</tr>
<tr>
<td>Family Hirundinidae</td>
<td>323</td>
</tr>
<tr>
<td>Family Corvidae</td>
<td>327</td>
</tr>
<tr>
<td>Family Paridae</td>
<td>330</td>
</tr>
</tbody>
</table>
**LIST OF TABLES**

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Average annual and monthly rainfall in inches for eighteen stations in Oaxaca</td>
<td>33</td>
</tr>
<tr>
<td>II. Average annual and monthly atmospheric temperatures in degrees Fahrenheit for fourteen stations in Oaxaca</td>
<td>34</td>
</tr>
<tr>
<td>III. Average number of days per month with white or killing frosts; total annual average of number of frosts; and extreme minimum and extreme maximum recorded atmospheric temperatures in degrees Fahrenheit</td>
<td>35</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Distribution of the major habitats in Oaxaca.</td>
<td>48</td>
</tr>
</tbody>
</table>
ABSTRACT

This survey presents separate accounts for the 669 species of birds of undoubted occurrence in Oaxaca and for the 34 species and one hybrid of questionable occurrence. All available information concerning the hypothetical birds is included. For the remaining accounts, information is presented regarding relative abundance, seasonal occurrence, habitat preference, geographical and elevational ranges, and breeding evidence. Some accounts incorporate taxonomic discussions. All Oaxaca data are given for certain rare birds and for the 76 species for which there are no previous acceptable published records for the state. A new scheme for abbreviated presentation of breeding data is discussed and is used in the species accounts.

Chapters are devoted to general physiography and climate. The major avian habitats of Oaxaca are discussed in relation to their distribution, structure, composition, and climate. A map of major habitats is presented. A gazetteer embraces all Oaxaca ornithological localities that have been mentioned in the literature or used on specimen labels. A bibliography of the literature cited in this survey is also given.

An analysis of the avifauna lists by habitat the 456 species believed to breed in the state and discusses current
and past distribution of the various avifaunal elements, particularly with reference to the Isthmus of Tehuantepec.

Current dispersal on an east-west axis of those species occurring in tropical evergreen forest, tropical deciduous forest, or arid tropical scrub is unaffected by the Isthmus of Tehuantepec, because these habitats are continuous across this lowland gap. East-west dispersal of species characteristic of cloud forest, tropical semideciduous forest, and, to a very great degree, of pine-oak forest and arid temperate scrub is impossible today, since these habitats are discontinuous in the Isthmus. Movement on a north-south axis across the Isthmus is possible only for ubiquitous species, for some aquatic birds, and for lowland terrestrial species adapted to both arid and humid conditions.

According to the climatic fluctuation theory, conditions in southern México during Pleistocene glacial advances were colder and more arid, and sea level was much lower. As a result, humid patches of subtropical cloud forest and at times temperate pine-oak forest occurred on the crests of the Isthmus mountains. Probably, each of these habitats was narrowly discontinuous, and the factor responsible was the arid subtropical vegetation in the valleys. The Atlantic and Pacific lowlands, except along the coasts, supported arid subtropical vegetation. In the coastal areas, the warming effects of the Gulf of México and the Pacific Ocean produced tropical conditions. On the Atlantic coast, a high water
table allowed growth of patches of tropical evergreen forest. Arid tropical vegetation on the Pacific coast was uninterrupted.

Glacial recessions raised sea level and caused inundation of both coastal areas in the Isthmus. The warmer and more humid climate produced only tropical evergreen forest in the Isthmus mountains.

Current avian distributional patterns support this theory of climatic and vegetational shifts and also indicate the presence of a Miocene-Pliocene seaway across the Isthmus of Tehuantepec.
INTRODUCTION

In 1960 I began work on what was to be a comprehensive monograph of the avifauna of the Mexican state of Oaxaca. At that time Oaxaca was the only state in southern México that lacked a complete and detailed account of the avifauna, all other southern states having such a work in print or in preparation. Since that time, however, interest in Oaxaca ornithology has risen steadily. The Western Foundation of Vertebrate Zoology has maintained professional collectors nearly continuously within the state. Soon after I became interested in the state, R. T. Orr, A. R. Phillips, and J. S. Rowley began work in Oaxaca, concentrating their efforts on the breeding biology and distribution of the birds of the Sierra de Miahuatlán. The fruits of other expeditions, some made in the 1950's, are now appearing in the literature with increasing frequency. Phillips is at this time preparing the descriptions of numerous new subspecies, many from Oaxaca.

With this renewed interest in Oaxaca ornithology, a monograph of the state seemed to me premature, and although my files contain a vast quantity of information, I decided to confine my efforts to a less ambitious work--one designed
to summarize the most important facets of distribution and at the same time indicate gaps in our ornithological knowledge of the state.

My research, however, has been aimed at a more detailed future survey. I have spent nearly twelve months in the state, collecting more than 1,800 specimens and taking extensive notes. I have visited most of the major museums in the United States and México and have compiled data on over 12,000 additional specimens. Also, I have made a nearly complete survey of the ornithological literature, examining some 475 titles dealing wholly or in part with Oaxaca birds.

Since Ferdinand Deppe visited the state in 1825, numerous ornithologists and professional collectors have studied the birds of Oaxaca. Their efforts were concentrated primarily in the region of the Isthmus of Tehuantepec, an area particularly attractive to early explorers because of its easy access, its status as a major route of travel from one coast to the other, and its wealth of tropical birds, especially those associated with tropical evergreen and tropical deciduous forests. The first major papers on the area were those of P. L. Sclater (1858, 1859b, 1862), who reported on collections made in the middle of the century by Adolphe Boucard and Aguste Sallé. In the latter part of the 1800's, A. L. François Sumichrast took up residence on the Pacific side of the Isthmus, at Juchitán and later Santa Efígenia. 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 and Friedmann contained numerous Oaxaca records, the latter series including the fruits of the extensive travels made by 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), concerning a small collection from the region of Huahuapan de León, no further major papers 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. In the same year, Friedmann, Griscom, and Moore released the first part of the Distributional Check-List of the Birds of Mexico.

Since then, numerous publications have appeared that deal for the large part with Oaxaca. The most important of these are publications by Amadon and Eckelberry (1955), Miller, Friedmann, Griscom, and Moore (the second part of the Distributional Check-List of the Birds of Mexico, 1957), Graber and Graber (1959), Coffey (1960), Lenna (1963), and Rowley (1966). The last is the only paper containing extensive breeding data on the birds of the state.

Prior to the present study, the only publication that has attempted to treat all the species found in Oaxaca is

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
the Distributional Check-List of the Birds of Mexico. This work, however, dealing as it did with all the birds of México, was necessarily confined to bare mention of Oaxaca as a locality for those species recorded therein. Little detailed information on distribution within the state was included. The total avifauna listed in the present survey numbers 669 species, exclusive of the Hypothetical List, which contains an additional 34 species. Of the 669 forms treated as full species in the present survey, the "Mexican Check-List" recorded a total of 562. An additional 12 species were recorded from Oaxaca by the Mexican Check-List but have been relegated to the Hypothetical List in the present survey:

Plegadis chihi
Chen hyperborea
Anser albifrons
Ictinia misisippiensis
Falco mexicanus
Meleagris gallopavo
Bartramia longicauda
Larus californicus
Columba leucocephala
Empidonax virescens
Iridoprocne bicolor
Chlorura chlorura

Of the remaining 107, the following 8 were recorded in print prior to the Mexican Check-List but were overlooked
or erroneously discarded by that publication:

- *Mycteria americana*
- *Ajaia ajaja*
- *Dendrocygna autumnalis*
- *Xema sabini*
- *Thalasseus sandvicensis*
- *Chaetura pelagica*
- *Tilmatura dupontii*
- *Schiffornis turdinus*

Another 23 species have been recorded in the literature subsequent to the Mexican Check-List:

- *Puffinus pacificus*
- *Casmerodius albus*
- *Dendrocygna bicolor*
- *Anas carolinensis*
- *A. strepera*
- *Spatula clypeata*
- *Mareca americana*
- *Aythya affinis*
- *Rostrhamus sociabilis*
- *Penelopina nigra*
- *Heliornis fulica*
- *Limosa haemastica*
- *Ereunetes pusillus*
- *Phalaropus fulicarius*
- *Larus pipixcan*
- *Hydroprogne caspia*
Pionopsitta haematotis
Campylopterus rufus
Eupherusa cyanophrys
Sclerurus guatemalensis
Thamnistes anabatinus
Catharus frantzii
Sporophila schistacea

The remaining 76 species, listed below, have never been acceptably recorded in the literature; five of these (each here marked with an asterisk) were listed by the Mexican Check-List on insufficient or erroneous evidence:

Podiceps caspicus
Podilymbus podiceps
Puffinus auricularis
P. lherminieri
Loomelania melania
Halocyptena microscma
Sula dactylatra
S. sula
S. leucogaster
Bubulcus ibis
Botaurus lentiginosus
Cathartes burrovianus
Elanus leucurus
Buteo albonotatus
B. swainsoni
Busarellus nigricollis

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Falco peregrinus
Rallus limicola
Pardirallus maculatus
Charadrius alexandrinus
C. wilsonia
Heteroscelus incanus
Limnodromus griseus
Gallinago gallinago
Calidris canutus
Erolia fuscicollis
E. bairdii
E. alpina
*Recurvirostra americana
Steganopus tricolor
Stercorarius pomarinus
S. parasiticus
S. longicauda
Columba livia
Columbiculta minuta
Glaucidium gnomah
Rhinoptynx clamator
Otophanes mcleodii
Caprimulgus salvini
Aeronautes saxatalis
Panyptila sanctihieronvmi
P. cavennensis
Amazilia yucatanensis
Lampornis viridipallens
Calothorax lucifer
Stellula calliope
Aspatha gularis
Piculus auricularis
Sclerurus mexicanus
Laniocera refescens
*Muscivora tyrannus
Empidonax wrightii
E. flavescens
Progne subis
Cyanolyca mirabilis
Telmatodytes palustris
Thryothorus modestus
T. sinaloa
Catharus drvas
C. mexicanus
Polioptila plumbea
*Phainopepla nitens
Vireo atricapillus
V. philadelphicus
V. leucophrys
*Chlorophas spiza
Vermivora chrysoptera
V. pinus
Dendroica discolor
D. palmarum
Since much of the ornithological investigation in Oaxaca has been done by professional collectors, procuring specimens for individuals uninterested in publication, many specimens and even a few species have never been recorded in the literature. The most important collections were made by Mario del Toro Avilés, E. W. Nelson and E. A. Goldman, C. C. Lamb, and W. J. Schaldach. These collections, while adding few species to the Oaxaca list, have been invaluable in determining the status of each species within the state.

Oaxaca is ornithologically important in several ways. It includes the southeasternmost extension of the Mexican tableland, and as such represents the limit of breeding and wintering distribution for many species. The state contains the southern portion of the Isthmus of Tehuantepec, a lowland gap that today, as in the past, forms both a major barrier to highland species and an important corridor for contact between the birds of the Atlantic and Pacific lowlands. The Sierra Madre de Chiapas represents the westernmost range extension of many Central American species. The Sierra de Miahuatlán is an isolated range of mountains that has given rise to one species and a number of races and harbors many
other species otherwise unknown from the Pacific slope of México. The Atlantic and Pacific lowlands are important wintering areas for North American migrants, and the Isthmus of Tehuantepec provides what may be an important avenue for movement of migrants between North and South America.

The most extensive ornithological explorations in the state have been made in the lowlands of the Atlantic slope and the Pacific side of the Isthmus of Tehuantepec. The mountainous areas of the Mesa del Sur, except for isolated localities, are still poorly known. Not until the last decade, with the onslaught of civilization, have new roads opened the recesses of the Sierra de Miahuatlán and Sierra de Yucuyacua, making them accessible to zoologists. Perhaps the major area yet to be explored is the region located north of the Sierra Madre de Chiapas and east of the Isthmus. This area is uninhabited even by Indians, uncrossed by trails, and probably contains many square miles of virgin timber. On its north side is an isolated mountain range that, according to some maps, attains elevations matching those of the Sierra de Tuxtla in Veracruz, an area renowned for its endemic forms.

Even the tropical evergreen forest, the best-known habitat in Oaxaca, continues to yield additions to the state's avifauna. The Oaxaca portion of the Sierra Madre de Chiapas doubtless will produce records of species now believed to range west only as far as Chiapas. Although I have spent many days on the ocean, a number of species of
likely occurrence have not been recorded, and the possibility for rarities seems virtually unlimited. If interest in Oaxaca ornithology continues for another twenty years at the same rate as in the last decade, I estimate that the total Oaxaca avifauna will surpass 710 species. Most of the additions will consist of species yet to be discovered in the humid forests east of the Isthmus, of oceanics, and of North American migrants known to range south of the state or to reach Puebla and northern Veracruz.

Because of the great mobility of birds, it has been said that in any given region all species of birds will be found if one waits long enough. While this statement is an obvious exaggeration, it points up the unlimited possibilities for accidental occurrence of birds. On the other hand, the number of unrecorded species that may occur with more than an accidental status are rather limited. Since discovery of such species is more likely if observers are aware of the possibilities, I list here the 81 unrecorded species that I consider of most likely occurrence in Oaxaca. Some of these are discussed in the Hypothetical List. The 41 species marked with asterisks are especially good possibilities.

*Puffinus griseus
*Pterodroma cookii
*Oceanodroma tethys
*O. leucorhoa
*Phaethon aethereus
*Sula nebouxii
*Phalacrocorax aurita
Agamia agami
Jabiru mycteria
*Plegadis chihi
*Chen caerulescens
*C. hyperborea
*Anser albifrons
*Anas platyrhynchos
*A. cyanoptera
Aythya valisineria
A. americana
Oxyura dominica
*Ictinia misissippiensis
*Accipiter chionogaster
Oreophasis derbianus
Philortyx fasciatus
Meleagris gallopavo
Rallus longirostris
Aramidex axillaris
Laterallus jamaicensis
Bartramia longicauda
*Aphriza virgata
Tryngites subruficollis
*Larus heermanni
*L. argentatus
*Sterna fuscata
Anous stolidus
Columba cayennensis
*Bolborhynchus lineola
Geococcyx californicus
*Otus flammeolus
*Micrathene whitneyi
Asio stygius
*Streptoprocne semicollaris
Hylocharis eliciæ
*Archilochus alexandri
*Atthis ellioti
*Electron carinatum
Piculus aeruginosus
*Empidonax virescens
Xenotriccus callizone
*Petrochelidon fulva
Notiochelidon pileata
*Iridoprocne bicolor
Cyanolyca pumilo
Cistothorus platensis
Thryothorus rufalbus
Troglodytes rufociliatus
Microcerculus philomela
Toxostoma longirostre
Melanotis hypoleucus
Turdus rufitorques
T. plebejus
Catharus fuscescens

Anthus spragueii

*Sturnus vulgaris

Vireo pallens

*V. olivaceus

Cyanerpes lucidus

Lymnothlypis swainsonii

*Vermivora luciae

*Dendroica chrysoparia

D. cerulea

D. castanea

*Zarhynchus wagleri

*Icterus maculialatus

*I. chrysater

Tanagra godmani

*Ramphocelus passerinii

*Piranga olivacea

*Pheucticus chrysopeplus

*Passerina amoena

Spinus pinus

*Sicalis luteoia

Arremonops conirostris
GENERAL PHYSIOGRAPHY

The state of Oaxaca is located in southern México between north latitudes 15°38' and 18°44' and west longitudes 93°52' and 98°31'. It is bordered on the south by the Pacific Ocean and on the west, northwest, northeast, and east, respectively, by the Mexican states of Guerrero, Puebla, Veracruz, and Chiapas. Oaxaca is the sixth largest state in México, encompassing a land area of 36,371 square miles or the approximate equivalent of the state of Indiana. Elevations range from sea level on the Pacific coast to 11,138 feet at the summit of Cerro Zempoaltepec.

Physiographic Regions

Oaxaca may 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 physiographic regions should not be confused with the ecophysiographic Regions defined in the chapter entitled Plan of the Species Accounts.

Mesa del Sur

The physiographic region known as the Mesa del Sur is the extensive highland mass extending southeast from the
Guerrero and Puebla borders and comprising the major portion of the state west of the Isthmus of Tehuantepec. Forming the southwestern and southern edges of the Meda del Sur and abutting on the narrow Pacific coastal lowlands are three major mountain ranges: the Sierra de Yucuyacua, extending from the Guerrero border southeast to the canyon formed by the Río Verde; the southwestern extremity of the Sierra de Cuatro Venados, the more northern and higher portions of which border the Oaxaca Valley on the west; and the Sierra de Miahuatlán, stretching along the Pacific coast from the Río Verde east to the Isthmus of Tehuantepec. On the northeast the Mesa del Sur is delimited by several high ranges: the Sierra de Huautla, extending from the Puebla border southeast to the deep canyon of the Río Santo Domingo; the Sierra de Juárez, stretching from the Río Santo Domingo to the valley of the Río Cajones; the Sierra de Zempoaltepec, an essentially north-south range bordering the valley of the Río Cajones on the east; and the Sierra de los Mijes, a range of low mountains extending from the southern boundary of the Sierra de Zempoaltepec east to connect with the Sierra de Choapan, which borders the Isthmus of Tehuantepec. The only other well-defined range of consequence in the Mesa del Sur is the Sierra Aloapaneca, which borders the Oaxaca Valley on the north and is separated from the Sierra de Juárez by the valley of the Río Grande.

To the northwest of Oaxaca the Sierra de Huautla connects with the Orizaba highlands, a mountain mass in the
eastern end of the transverse volcanic axis. The deep chasm of the Río Santo Domingo effectively separates the Sierra de Huautla and the Orizaba highlands from the remainder of the Sierra Madre de Oaxaca. The Sierra de Yucuyacua connects with the western end of the transverse volcanic axis through the Sierra Madre del Sur of Guerrero.

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, torrential streams have created innumerable, small, deep, V-shaped valleys with precipitous slopes and knife-edged ridges. The entire eastern end of the mesa has been eroded away by the dendritic basin of the Río Tehuantepec.

Major rivers have formed large interior valleys, connected with the coastal lowlands only through narrow gaps curved in the high mountain ranges bordering the mesa. Notable among these are the Hidalgo Yalalag valley (formed by the Río Cajones), the San Miguel Sola de Vega valley (formed by the lower portion of the Río Atoyac), and the San Juan Bautista Cuicatlán valley (formed by the tributaries of the Río Santo Domingo). In the last valley, the low elevation of 1,758 feet at San Juan Quiotepec is the lowest found in the Mesa del Sur region 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 México, 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 feet. 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. 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 northwestern portion of the state, the mesa attains its highest average elevation—more than 7,000 feet. 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, extend into Puebla and Guerrero and eventually connect with the Pacific lowlands in 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. The highest is Cerro Zempoaltepec, which
which reaches an elevation of 11,138 feet. Other high peaks are Cerro Yucuyacua (11,074 feet), Cerro León (10,296 feet), and Cerro San Felipe (10,204 feet).

The continental divide enters Oaxaca from Puebla east of Santiago Miltepec, courses southeast, passes 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 swings southeast along the crests of the Sierra Aloapaneca. From the eastern end of this range, the divide cuts across the southern end of the Sierra de Zempoaltepec and follows the crests of the Sierra de Las Mijes to a point north of Lachiguiri. From here it extends north for a short distance into the southern end of the Sierra de Choapan, swings southeast again, passes along the southern edge of the Isthmus mountains and through the 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 México. In Oaxaca the inland termination of these lowlands can be considered to approximate the 300-foot 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 northwestern 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, inter-digitated 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 across the lowlands into Veracruz and thence into the Gulf of México. 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 México 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 feet 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 miles before encountering major foothills and stretch from the Guerrero border east along the coast for about 40 miles. In the Tehuantepec region, the lowlands extend along the coast from
near Tehuantepec City to the Chiapas border, a distance of over 80 miles. They attain their maximum width of 30 miles in the western part, narrowing somewhat toward the eastern end and where they are broken by the north-south ridges and isolated hills associated with the foothills of the Sierra Madre de Chiapas.

Along the southern edge of the Mesa del Sur, the lowlands are much narrower, varying from 1 to 10 miles 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 for ships. 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, brackish, or (rarely) fresh-water lagoons. In areas not influenced by rivers, the headlands may exhibit rocky cliffs with beachless shores, may produce small shallow coves along which clean sands are deposited, or may be widely scalloped to produce deep wide-mouthed bays, the shores of which are rocky or sandy.

The largest lagoons in the state—Laguna Superior, Laguna Inferior, Laguna Oriental, and Mar Muerto—are located on the Pacific coast of the Tehuantepec region, from Salina Cruz east to the Chiapas border. Other large lagoons, all
located west of Puerto Escondido, are (from east to west) Laguna Lagartero, Laguna de Pastoria, Laguna de Chacahua, and Laguna de Alotengo.

There are no oceanic islands off the coast of Oaxaca, although a large dome-shaped rock is located 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 feet. 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 narrow strip of land, in its higher portion composed of sand dunes and elsewhere of mangrove-covered mud bars.

In the steep southern escarpment of the Mesa del Sur originate numerous short rivers that drain only small areas before descending abruptly to cut transversely across the lowlands into the sea. Important among these short rivers are the Río Colotepec, Río Tonameca, and Río Copalita, all draining the southern slopes of the Sierra de Miahuatlán, and the Río Juchitán, Río Chicapa, Río Niltepec, and Río Ostuta, draining the Isthmus mountains and the Sierra Madre de Chiapas. The only large river system 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' west and the Veracruz coast at longitude 94°30' west marks the shortest distance between the oceans--about 165 miles. 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. So defined, the Isthmus is a downfaulted, north-south, tranverse block athwart the general east-west structural trend of the neighboring mountains. 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, longitude 95°10' west) and on the east by the foothills of the Sierra Madre de Chiapas (approximately, longitude 94°40' west); 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 may be said to swing eastward from the Oaxaca Border and be delimited on the coast by Punta San Juan on the west and the town of Tonalá on the east. The Isthmus of Tehuantepec as a physiographic region is almost universally defined not on the basis of topography alone but also on its geologic structure and history. Hence it includes portions of both the Atlantic and Pacific coastal
lowland regions.

Stretching between the foothills of the Sierra de Choapan on the west and those of the Sierra Madre de Chiapas on the east, and separating the Atlantic and Pacific coastal lowlands, is a range of low mountains, here referred to as the Isthmus mountains. This range is characterized by isolated hills, or groups of hills, connected by lower ridges that trend 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, while north of the divide the ridges become gradually lower, beginning their mergence 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 may reach 2,500 feet at the tops of isolated peaks, but the general level is much lower, the lowest point along the continental divide being about 800 feet. 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 miles.

That portion of the Pacific coastal lowlands within the Isthmus is known as the Plains of Tehuantepec. This area extends from the 300-foot level of elevation along the southern base of the Isthmus mountains south to the northern edges of the large coastal lagoons, west just past the Río
Tehuantepec, and east past the Río Chicapa. Separating these plains from the Gulf of Tehuantepec are Laguna Superior and Laguna Inferior. The principal rivers draining the Pacific side of the Isthmus mountains are the Río Chicapa and the Río Juchitán, which cut transversely across the Plains of Tehuantepec and empty into Laguna Superior. For further discussion of this area, see the section on Pacific coastal lowlands.

The Atlantic lowlands occupy only a small part of the Oaxaca portion of the Isthmus, being restricted to the valleys of major rivers. Since these rivers extend south to the continental divide at the southern edge of the central ridges, however, the lowlands are able to penetrate as far as the latitude of Matías Romero. A more extensive lowland area begins at the Oaxaca border and extends to the Gulf of México, a distance of some 60 miles. This region is gently rolling and dotted with isolated hills. Draining the Atlantic side of the Isthmus mountains are a number of large rivers, the waters of which empty into the Gulf of México via the Río Coatzacoalcos; from north to south, these rivers are the Río Jaltepec, Río Jumuapán, Río Sarabia, and Río Malatengo. For further discussion of this area, see the section on Atlantic coastal lowlands.

**Sierra Madre de Chiapas**

Delimiting the Isthmus on its eastern side and stretching into Chiapas is a northwest-southwest 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 Cristobal of northern Chiapas by a tectonic depression, the Valley of Chiapas, which continues eastward through the Motagua Valley of Guatemala and thence into the Caribbean as the Cayman Trench.

The highest peak in the Oaxaca portion of the Sierra Madre de Chiapas is Picacho Prieto, rising to about 7,900 feet elevation. Other high peaks are Cerro Baúl, reaching 6,750 feet, and Cerro Atravesado, at about 6,600 feet. 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 Madre de Chiapas descend abruptly into the Pacific coastal lowlands; on the northern side of the divide, however, 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. 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. On the Atlantic slope, the many small rivers are part of the Río Coatzacoalcos basin. Principal among the rivers of the
Pacific side are the Río Niltepec and the Río Ostuta, which cut transversely across the lowlands and empty into Laguna Inferior and Laguna Oriental, respectively.

Proceeding eastward from the Isthmus, the Sierra Madre de Chiapas gradually approaches the coast, until at the Chiapas border its slopes descend abruptly into Mar Muerto, leaving only a narrow strip of coastal lowlands some two miles in width.

**Hydrography**

The major river systems and coastal bays and lagoons have already been discussed under their respective physiographic regions. The southern border of Oaxaca is formed by the Pacific Ocean, which extends for more than 300 miles between the Chiapas and Guerrero borders. South of the Tehuantepec region, the large, relatively shallow Gulf of Tehuantepec, herein considered part of the ocean, occupies a wide scallop in the shoreline.

West of the Isthmus the Pacific Ocean attains great depths close to shore. The 500 meter line (1,640 feet), passing within 11 miles of shore near the Guerrero border, gradually approaches the coast until it is less than 2 miles distant off Puerto Angel. Thirty miles offshore from this town depths of almost 12,000 feet have been recorded. To the east of Puerto Angel the 500 meter 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 meter line (656 feet) runs parallel to the coast about 33 miles offshore, while the 20 meter line (about 66 feet) ranges as far as 8 miles from the coast.

Few natural lakes are found in the state. The largest that I have seen is located 12 miles southeast of Santiago Jamiltepec and is only about one-half mile 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 ponds spring up on the Plains of Tehuantepec. Roadside ditches in the lowlands sometimes retain water throughout the year and support permanent aquatic vegetation.

There are only two large bodies of fresh water in the state, both reservoirs. In the Atlantic lowlands of extreme northern Oaxaca near Temascal is Presa Miguel Alemán, the second largest reservoir in México, with a capacity of 282,528 cubic feet, formed from the impounded waters of the Río Tonto. Northwest of Tehuantepec City at the confluence of the Río Tehuantepec and the Río Tequisistlán is Presa Benito Juárez, with a capacity of 33,268 cubic feet. Both reservoirs are surrounded by hills, and Presa Miguel Alemán contains numerous, small steep-sided islands.
CLIMATE

The climate of Oaxaca may be classified as tropical at lower elevations throughout the state, temperate at higher elevations in much of the Interior, and subtropical at intermediate elevations. Under the Köppen system of climate classification as modified by Vivó and Gómez (1946) and Strahler (1960), three fundamental zones of climate may be 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 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., by at least one month having an average temperature above 50°F., and by the occurrence of both summer and winter seasons.
Tropical rainy climates 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 to the summer and autumn months, the rest of the year being subjected to severe dryness. This is a true monsoonal type of precipitation cycle, and the climate is known as a tropical savanna climate ("Aw").

Of the dry climates, two major subdivisions may 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, in the western portion of the Río Tehuantepec basin, in the region of AsuncióN Nochixtlán, in the valley of San Miguel Sola de Vega, and in a small area northwest of Huajuapan 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, the average annual temperature is above 64.4°F., but the average of some months is below 64.4°F. ("BShw"). Temperate 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 in both cases.

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. 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, and corresponding approximately with the distribution of cloud forest, 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. ("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 there is a definite, although not severe, dry season during the winter months ("Cwag").

According to Vivó and Gómez, the Sierra Madre de Chiapas and those portions of the Interior 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 atmospheric temperature and rainfall.
Unfortunately, the older meteorological stations in Oaxaca are few and far between, and data from the newer stations have not been published. Available data are presented for rainfall in Table I, for temperature in Tables II and III, and for frost in Table III.

Temperature is the determining factor in the definition of temperate versus tropical climates, and as such greatly influences the type of vegetation found in any given area. Temperate conditions exist throughout most of the Interior, generally above 3,300 feet elevation. Tropical climates are usually found below this level in the lowlands and adjacent mountain slopes of the Atlantic and Pacific Regions and in the low valleys of the Interior. The major factor influencing temperature is elevation, the higher elevations having the colder temperatures. Variation in latitude, although important on a world-wide scale, has little effect within Oaxaca. Distance from the warming effect of the waters of the Gulf of México and the Pacific Ocean causes somewhat colder temperatures in parts of the Interior. As will be discussed later, northern latitude cold fronts cause sudden and often severe periodic drops in temperature.

Several factors influence the amount of rainfall in Oaxaca: water temperature and currents in the Gulf of México 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 México, off southern
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Asunción Nochixtlán*</td>
<td>12.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.3</td>
<td>0.8</td>
<td>2.3</td>
<td>0.6</td>
<td>0.8</td>
<td>4.7</td>
<td>1.6</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Ejutla de Crespo</td>
<td>23.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.4</td>
<td>3.5</td>
<td>5.7</td>
<td>3.2</td>
<td>3.0</td>
<td>6.0</td>
<td>1.9</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Huahuapan de León</td>
<td>29.1</td>
<td>0.0</td>
<td>0.1</td>
<td>0.4</td>
<td>0.7</td>
<td>3.7</td>
<td>5.5</td>
<td>4.7</td>
<td>4.6</td>
<td>6.3</td>
<td>2.3</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Ingenio Santo Domingo*</td>
<td>54.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
<td>0.2</td>
<td>3.4</td>
<td>14.3</td>
<td>7.8</td>
<td>7.2</td>
<td>14.3</td>
<td>6.7</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Ixtlán de Juárez</td>
<td>39.5</td>
<td>0.4</td>
<td>0.4</td>
<td>0.2</td>
<td>0.6</td>
<td>3.3</td>
<td>6.4</td>
<td>6.6</td>
<td>4.7</td>
<td>8.3</td>
<td>6.1</td>
<td>2.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Matías Romero*</td>
<td>69.6</td>
<td>0.7</td>
<td>0.7</td>
<td>0.4</td>
<td>0.5</td>
<td>2.9</td>
<td>12.2</td>
<td>11.9</td>
<td>11.0</td>
<td>18.3</td>
<td>7.2</td>
<td>2.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Oaxaca City</td>
<td>25.6</td>
<td>0.1</td>
<td>0.7</td>
<td>0.4</td>
<td>1.0</td>
<td>2.5</td>
<td>4.9</td>
<td>3.7</td>
<td>4.1</td>
<td>6.7</td>
<td>1.6</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Puerto Angel</td>
<td>40.0</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>3.3</td>
<td>8.0</td>
<td>5.5</td>
<td>6.5</td>
<td>11.1</td>
<td>4.9</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Salina Cruz</td>
<td>40.9</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.2</td>
<td>2.8</td>
<td>13.2</td>
<td>5.4</td>
<td>6.3</td>
<td>8.8</td>
<td>3.9</td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>San Andrés Miahuatlán</td>
<td>20.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
<td>0.7</td>
<td>2.2</td>
<td>5.0</td>
<td>4.0</td>
<td>2.6</td>
<td>4.7</td>
<td>1.1</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>San Carlos Yautepec</td>
<td>31.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
<td>0.4</td>
<td>2.2</td>
<td>9.5</td>
<td>3.4</td>
<td>5.0</td>
<td>6.5</td>
<td>3.4</td>
<td>0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>San Felipe Ixtapa*</td>
<td>29.6</td>
<td>0.1</td>
<td>0.0</td>
<td>0.3</td>
<td>0.4</td>
<td>3.7</td>
<td>7.0</td>
<td>5.4</td>
<td>3.2</td>
<td>6.9</td>
<td>1.2</td>
<td>1.1</td>
<td>0.2</td>
</tr>
<tr>
<td>San Juan Bautista Cuicatlán</td>
<td>11.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
<td>0.7</td>
<td>0.4</td>
<td>4.6</td>
<td>1.7</td>
<td>1.3</td>
<td>2.4</td>
<td>0.3</td>
<td>0.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Santa María Asunción Tlaxiaco</td>
<td>39.5</td>
<td>0.0</td>
<td>0.1</td>
<td>0.6</td>
<td>0.7</td>
<td>3.1</td>
<td>8.2</td>
<td>7.1</td>
<td>8.1</td>
<td>7.6</td>
<td>3.6</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Santiago Jamiltepec</td>
<td>80.9</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>6.5</td>
<td>12.2</td>
<td>15.6</td>
<td>21.4</td>
<td>11.2</td>
<td>1.2</td>
<td>1.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Tlacolula de Matamoros</td>
<td>19.4</td>
<td>0.1</td>
<td>0.0</td>
<td>0.2</td>
<td>0.4</td>
<td>2.9</td>
<td>3.9</td>
<td>3.0</td>
<td>3.0</td>
<td>4.2</td>
<td>1.4</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**TABLE I.** Average annual and monthly rainfall in inches for eighteen stations in Oaxaca. Data for stations marked with an asterisk (*) are from the *Atlas Climatologico de México* (1939) and are based on observations of five years or more; other data are from Wernstedt (1961) and reflect a period of fifteen years (1921 through 1935).
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Asunción Nochixtlán</td>
<td>65.3</td>
<td>60.1</td>
<td>64.6</td>
<td>67.5</td>
<td>69.4</td>
<td>70.7</td>
<td>67.5</td>
<td>65.1</td>
<td>65.7</td>
<td>64.4</td>
<td>64.4</td>
<td>63.3</td>
<td>61.0</td>
</tr>
<tr>
<td>Ejutla de Crespo</td>
<td>71.1</td>
<td>65.7</td>
<td>70.3</td>
<td>73.2</td>
<td>74.5</td>
<td>75.2</td>
<td>73.2</td>
<td>71.8</td>
<td>73.2</td>
<td>72.3</td>
<td>69.8</td>
<td>67.1</td>
<td>66.7</td>
</tr>
<tr>
<td>Huahuapan de León</td>
<td>69.3</td>
<td>63.0</td>
<td>66.0</td>
<td>70.2</td>
<td>73.2</td>
<td>75.2</td>
<td>73.4</td>
<td>71.8</td>
<td>71.4</td>
<td>70.3</td>
<td>68.0</td>
<td>64.4</td>
<td>63.7</td>
</tr>
<tr>
<td>Ingenio Santo Domingo</td>
<td>80.2</td>
<td>75.7</td>
<td>77.7</td>
<td>80.8</td>
<td>82.0</td>
<td>83.7</td>
<td>81.9</td>
<td>82.2</td>
<td>82.4</td>
<td>82.0</td>
<td>79.9</td>
<td>78.1</td>
<td>76.1</td>
</tr>
<tr>
<td>Ixtlán de Juárez</td>
<td>60.1</td>
<td>56.1</td>
<td>58.8</td>
<td>62.4</td>
<td>62.4</td>
<td>64.0</td>
<td>62.1</td>
<td>60.6</td>
<td>60.4</td>
<td>60.4</td>
<td>58.8</td>
<td>56.7</td>
<td>57.6</td>
</tr>
<tr>
<td>Oaxaca City</td>
<td>68.4</td>
<td>63.5</td>
<td>66.2</td>
<td>69.8</td>
<td>72.3</td>
<td>72.9</td>
<td>70.5</td>
<td>69.6</td>
<td>69.4</td>
<td>68.5</td>
<td>67.5</td>
<td>65.1</td>
<td>64.4</td>
</tr>
<tr>
<td>Puerto Angel</td>
<td>82.8</td>
<td>81.7</td>
<td>82.4</td>
<td>82.4</td>
<td>82.6</td>
<td>84.2</td>
<td>82.8</td>
<td>83.5</td>
<td>83.1</td>
<td>82.2</td>
<td>83.1</td>
<td>83.1</td>
<td>82.0</td>
</tr>
<tr>
<td>Salina Cruz</td>
<td>79.9</td>
<td>76.6</td>
<td>77.4</td>
<td>78.8</td>
<td>81.3</td>
<td>82.9</td>
<td>80.8</td>
<td>81.9</td>
<td>81.7</td>
<td>80.1</td>
<td>80.1</td>
<td>78.8</td>
<td>77.7</td>
</tr>
<tr>
<td>San Andrés Miahuatlán</td>
<td>68.7</td>
<td>64.9</td>
<td>66.2</td>
<td>68.7</td>
<td>71.1</td>
<td>72.1</td>
<td>71.4</td>
<td>70.3</td>
<td>70.3</td>
<td>70.0</td>
<td>68.5</td>
<td>66.0</td>
<td>65.3</td>
</tr>
<tr>
<td>San Carlos Yautepec</td>
<td>73.4</td>
<td>67.3</td>
<td>70.7</td>
<td>73.0</td>
<td>75.2</td>
<td>77.7</td>
<td>76.5</td>
<td>75.2</td>
<td>75.6</td>
<td>74.3</td>
<td>73.9</td>
<td>71.8</td>
<td>70.2</td>
</tr>
<tr>
<td>San Juan Bautista</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuicatlán</td>
<td>76.1</td>
<td>73.6</td>
<td>72.9</td>
<td>75.7</td>
<td>79.5</td>
<td>79.7</td>
<td>78.1</td>
<td>77.0</td>
<td>78.3</td>
<td>75.6</td>
<td>74.1</td>
<td>74.1</td>
<td>74.8</td>
</tr>
<tr>
<td>San Pedro Pochutla</td>
<td>78.1</td>
<td>78.6</td>
<td>76.6</td>
<td>76.8</td>
<td>77.7</td>
<td>77.5</td>
<td>78.8</td>
<td>79.3</td>
<td>81.0</td>
<td>80.4</td>
<td>76.6</td>
<td>75.6</td>
<td>77.4</td>
</tr>
<tr>
<td>Santa María Asunción</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tlaxiaco</td>
<td>62.1</td>
<td>56.8</td>
<td>59.0</td>
<td>60.8</td>
<td>63.3</td>
<td>66.0</td>
<td>65.7</td>
<td>64.8</td>
<td>84.6</td>
<td>64.8</td>
<td>62.6</td>
<td>58.6</td>
<td>57.6</td>
</tr>
<tr>
<td>Tlacolula de Matamoros</td>
<td>68.7</td>
<td>64.2</td>
<td>66.9</td>
<td>69.1</td>
<td>71.4</td>
<td>72.9</td>
<td>71.4</td>
<td>70.2</td>
<td>70.0</td>
<td>70.0</td>
<td>68.9</td>
<td>65.3</td>
<td>64.4</td>
</tr>
</tbody>
</table>

**TABLE II.** Average annual and monthly atmospheric temperatures in degrees Fahrenheit for fourteen stations in Oaxaca. Data for San Pedro Pochutla are from the *Atlas Climatológico de México* (1939) and are based on observations of five or more years; other data are from Wernstedt (1961) and reflect a period of fifteen years (1921 through 1935).
TABLE III. Average number of days per month with white or killing frosts (first twelve columns); total annual average of number of frosts (T); and extreme minimum (Min.) and extreme maximum (Max.) recorded atmospheric temperatures in degrees Fahrenheit. Data from the Atlas Climatológico de México (1939) and based on a fifteen-year period from 1921 through 1935.
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, it is these air masses, influenced by other factors, that 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 México, they absorb large quantities of water vapor. When the easterlies are forced to move convectively, either under the influence of the doldrums or because of the effect of a high-elevation land mass, they are cooled and release their moisture in the form of rain.

As the easterlies approach the thermal equator, the doldrums (areas of equatorial calms) force the trades to rise, cool, and release their moisture. During the summer, the thermal equator is located near latitude 12°N, and its effect on the moisture laden easterlies extends into southern México, causing (in part) the annual rainy season (mid-May to mid-October).

During the winter, however, Oaxaca is under the influence of the subtropical calms, or masses of descending air. As this air descends, it is warmed and hence becomes stable and incapable of releasing moisture. At this time of year, the trade winds are also stable and unable to produce much moisture (except along windward slopes of high mountains), since in the latitude of México they can no longer ascend,
because of the counteraction of the descending air. In addition, the thermal equator has now migrated far to the south, and the rains produced there by the effect of the doldrums on the trades do not extend northward into southern México. Hence, a dry season is produced (mid-October to mid-May).

During the winter, Oaxaca is affected by the irregular incursions of cold polar 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 México and Central America. Where these cold aid masses encounter warm tropical air, storm lines are produced. The stronger of the fronts are able to cross the Gulf of México and often hit the Atlantic Region of Oaxaca 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 often result. The Pacific coast of Oaxaca west of the Isthmus of Tehuantepec is little affected because of the shelter afforded by the high mountains in the northern portion of the Mesa del Sur; the nortes usually descend into the Pacific lowlands as hot dry winds. In the Isthmus, however, the strong winds accompanying a front are able to sweep unobstructed into the Pacific lowlands, where they are often associated with rainfall and a decrease in temperature.

During the summer, a semipermanent low pressure area forms over the northwestern section of México, causing a
deflection of the trade winds from northeast to southeast. These southeast winds, blowing over the warm waters of the Pacific Ocean, bring moisture-laden air to the Pacific coast of Oaxaca. When this air is forced to rise by the high mountains bordering the Pacific lowlands, convective rains result, which are extensive enough to affect both the windward mountain slopes and the adjacent lowlands. Some of this moisture-laden air penetrates the Interior and, with additional convection caused by the heating of the land mass, brings scattered thundershowers. During the winter, a high-pressure area develops over northwestern México, and the winds now blow off the land; hence, a winter drought is produced. This seasonal reversal of wind direction, inducing summer rains and winter drought, is called a monsoon.

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 areas associated with such hurricanes, that precipitation and light winds may 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 México may 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 monsoons, cyclones, and normal or
deflected trade winds, are very important in their effect on the Interior of the Mesa del Sur. Although most rainfall occurs there during the summer, when these major air patterns exert their influence, some convective rains may be produced in the Interior even during the 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, while 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 México 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 but little variation in this respect, although the northwestern portion of the Mesa del Sur, located farther from the large bodies of water, does appear 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 the summer, the rains here are heavy; they are caused by cyclones and by the effect of the doldrums and mountain convection on the trade winds. In the winter, the slight reduction in the amount of precipitation results from the convective effect of the mountains on the trades and from periodic occurrences of cold fronts. In the Interior of the Mesa del Sur, precipitation occurs as a result of convective rains associated with the trades, monsoons, and cyclones; and, except on the highest peaks, which receive some moisture throughout the year, 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. There summer rains are a result primarily of the monsoons off the Pacific Ocean and to a lesser degree of the northeasterlies and the occasional cyclones. The effect of the northeasterlies 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 México. The Plains of Tehuantepec may 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 produced through increased rainfall due to convective effects on the
monsoons and to an increase of winter rains from the edges of convective storms at higher elevations in these mountains. A high water table also aids the production 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 80.9 in. of rain annually, has an arid climate, due to 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 that exist 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 may result from climatic, edaphic, atmospheric, hydric, or biotic factors, are too small in Costa Rica to allow mapping.

The Holdridge system probably would adapt well to Oaxaca if detailed 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 belt, formation, and climatic association that probably occurs in a given region. Other associations within a formation, resulting from local (or sometimes extensive) conditions, which may be edaphic, atmospheric, hydric, or biotic, may have quite different vegetations. 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 México, have applied 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 the southwestern United States, because the life zones there corresponded to the different animal habitats.

When applied to a larger geographic area, however, the system often breaks down, as is the case in Oaxaca. A given life zone may have 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,
this subzone is said to support both *Aulacorhynchus prasinus*, which is confined to the former habitat, and *Campylorhynchus megalopterus*, which is restricted to the latter habitat. Similarly, the Lower Tropical Zone may include such diverse habitats as mangrove swamp, savanna, and arid tropical scrub. On the other hand, two or more life zones may 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. In addition, life zones are based primarily on major climatological data, while important variations due to edaphic, hydric, atmospheric, or biotic conditions are not taken into account.

I have decided that the best approach is one utilizing animal habitats, for in my opinion the habitat—the types present and their geographic distributions—is an important controlling factor in the present range of most of the birds in Oaxaca. For natural terrestrial habitats and a few aquatic habitats, the most important feature influencing the avifauna appears to be the physiognomy of the vegetation, and hence these habitats are named and defined in terms of their vegetation. For most aquatic environments, the degree of salinity, amount of water movement, aquatic vegetation, and shore substrate or shore 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 México and in respect to Oaxaca are either inaccurate or too general to be of use in describing the distribution of the avifauna.

In this section, I have attempted to present a classification of the major animal habitats of Oaxaca, based in part on vegetation types. I have not tried to present a detailed botanical classification of the vegetation types themselves. My purpose is not to analyze the flora, but to convey to the reader a picture of the major habitats that influence the avifauna. I have drawn by terminology and descriptive material from a variety of sources. Foremost among these are Carr's (1950) Outline for a Classification of Animal Habitats in Honduras and Duellman's (1965) A Biogeographic Account of the Herpetofauna of Michoacán, México. Vegetation classifications by Conzatti (1926), Leopold (1950 and 1959), Miranda and Sharpe (1950), Miranda (1952), Beard (1955), Miranda and Hernández (1963), and Shelford (1963) 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), Mullerried (1948), Miranda (1948a and 1948b), Rickett (1950), Goldman (1951), Duellman (1960), and Rowley (1966). I have also relied heavily on personal observations, which have formed the primary basis for determination of the
geographic and elevational limits of most of the habitats.

The present distribution of the more extensive habitats is depicted on the habitat map (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 (1959) for the country of México, and Miranda (1952) for Chiapas, and from a variety of other sources. For elevational limits, as well as other descriptive material, I have relied heavily on personal observations and on locality descriptions published by Goldman (1951). Since for much of the state no descriptive material is available, much interpolation has been necessary. For the most part, I have drawn habitat lines along contours, using as a basis the series of maps of Oaxaca prepared by the Comision Intersecretarial Coordinadora del Levantamiento de la Carta de la Republica Mexicana (1958).

In preparing the habitat map, I have taken into account climate and soil. In reference to climate, I have considered temperature (including frosts) and amount and seasonality of rainfall. Since climatological data are unavailable for much of the state, I have had to rely in part on data dealing with the factors responsible for climate. Here I have considered such information as the direction of the prevailing moisture-carrying 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. Also
Figure 1. Distribution of the major habitats in Oaxaca.

Legend

- Tropical evergreen forest
- Cloud forest
- Humid pine-oak forest
- Arid pine-oak forest
- Tropical semideciduous forest
- Tropical deciduous forest
- Arid tropical scrub
- Arid temperate scrub
- Steppe
- Savanna
- Mangrove swamp

Mixtures: (1) arid pine-oak forest and arid temperate scrub; (2) cloud forest, humid pine-oak forest, and arid pine-oak forest; (3) arid pine-oak forest and tropical semideciduous forest; (4) arid temperate 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. Ecophysiographic Regions: (A) Atlantic Region; (B) Interior Region; (C) Pacific Region.
taken into account were the distance of a habitat from major sources of moisture-laden air (Gulf of México and Pacific Ocean) and its proximity to other humid or arid habitats.

Presented below is an outline of the major animal habitats of Oaxaca. An asterisk (*) denotes habitats depicted in their entirety or in part on the habitat map. Following this outline are detailed discussions of the individual habitats.

I. Terrestrial environments.

A. Extensive terrestrial habitats.

*1. Tropical evergreen forest.
   a. Selva.
   b. Jungle.
   c. Breña.

*2. Cloud forest.
   a. Transitional oak belt.
   b. Liquidambar.
   c. Weinmannia.

3. Pine-oak forest.
   *a. Humid pine-oak forest.
      (1) Pure pine.
      (2) Pure oak.
      (3) Mixed pine-oak.
   *b. Arid pine-oak forest.
      (1) Pure pine.
      (a) Highland.
      (b) Nonhighland.
(2) Pure oak.
(3) Mixed pine-oak.
(4) Oak scrub.

*4. Tropical semideciduous forest.
*5. Tropical deciduous forest.
   a. Tall-tree.
   b. Short-tree.

*6. Arid tropical scrub.
*7. Arid temperate scrub.
*8. Steppe.

9. Savanna. Subdivided according to association with the following:
   a. Tropical evergreen forest.
   b. Pine-oak forest.
   *c. Tropical deciduous forest.
   *d. Arid tropical scrub.
   e. Arid temperate scrub.
   *f. Palms.
   *g. Brahea and Dasylirion.

B. Restricted terrestrial habitat (see also forested aquatic habitats).
   1. Humid gallery forest.
   2. Palm forest.
   3. Fir forest.

C. Man-made terrestrial habitats.
   1. Finca.
II. Aquatic environments

A. Open aquatic habitats.

1. Lakes, ponds, and reservoirs.
2. Rivers and streams.
3. Coastal bays and harbors.
4. Coastal lagoons.
   a. Saline.
   b. Brackish.
   c. Fresh-water.
5. Open ocean.
7. Rocky seashores.
8. Sand beaches.
10. Mud flats.
11. River bars.

B. Forested aquatic habitats.

*1. Mangrove swamp.
2. Fresh-water swamp.
Tropical evergreen forest

The tropical evergreen forest, a broad-leaved evergreen forest often referred to as "rain forest," occurs in Oaxaca only on the Atlantic slope. It stretches through the lowlands along the entire length of the state and extends inland (south and west) into the foothills of the mountain ranges bordering the lowlands. In the Isthmus, this habitat in its pure form extends south to the latitude of Matías Romero but may also occur along streams and in isolated patches (in less luxuriant form) as far south as the continental divide.

Tropical evergreen forest is a less luxuriant growth than "true rain forest," a term most properly applied to those forested areas from southern Veracruz eastward that have no dry season, the rainfall exceeding 2.5 in. in each month. In Oaxaca, however, the Atlantic slope is subjected to a short dry spell, usually in March and April, during which the precipitation is much less than during the other months. Although the dominant plants are largely evergreen, they tend to lose more leaves during this dry period than at any other time. Nevertheless, enough moisture is present throughout the year to support a luxuriant forest.

Although it contains many of the plant species characteristic of true rain forest, tropical evergreen forest differs in structure, having only two tree strata instead of
three. The usual upper stratum is composed of trees up to 115 feet tall and presents a fairly solid canopy. Below this is a stratum of short trees about 30 feet in height that forms a broken canopy. Occasional emergents, jutting 10 or 15 feet above the general level of the forest, perhaps should be recognized as a third and uppermost tree stratum. Below the tree strata is sometimes a growth of shrubs, in some places luxuriant and in others absent or scattered. Frequently, probably under the influence of man, this type of forest shows no apparent stratification but instead presents a jumble of dense growth extending from ground to crown.

Tropical evergreen forest presents an aspect of humid lushness, especially during the rainy season. On the larger trees, buttresses are common and often large. Moss, lichens, orchids, and bromeliads festoon the branches, and figs (Ficus) encircle the trunks in their strangling grasp. The trees, with their broad evergreen leaves dripping moisture, sometimes hide the sun, although most of the forest has a slightly broken canopy allowing penetration of some direct sunlight. The undergrowth of shrubs is generally rather sparse and easily negotiable, although along forest edges or below breaks in the canopy, a tangle of vines and small bushes may make passage virtually impossible. The ground is covered with a thick layer of leaves and in places supports dense herbaceous growth.

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* (Mahogany), *Cedrela mexicana* (Cigar Box Tree), *Tabebuia donnell-smithii* (Primavera), *Calophyllum brasiliensis* (grows to 115 feet in height), *Spondias mombin*, and *Ficus* sp. (fig) in the upper story, with *Desmoncus chinantlensis* (a palm) and *Cephaelis tomentosa* as subvegetation. On shallow lime soils west of town are the trees *Brosimum terrabanum* (up to 100 feet tall), *B. costaricanum* (100 feet), *Stemmadenia obovata*, *Bersera simaruba*, *Astronium graveolens*, *Luehea speciosa*, and *Spondias mombin*; the subvegetation here includes *Maranta arundinacea* and *Chamaedorea* sp. In forests along streams are *Ficus segoviae*, *Lonchocarpus hondurensis*, and *Inga spuria*, with the grass *Paspalum* on sandy shores, the willow *Salix chilensis* near the water, and the bush *Lindenia rivalis* 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* and the palm *Scheelea liebmanni* and contains also *Ficus* sp., *Sweetia panemensis* (80 feet tall), *Miconia argentea*, *Spondias mombin*, *Terminalia* sp. (80 feet), *Tabebuia pentaphylla*, *Castilla elastica* (Gumtree), *Cochlospermum vitifolium* (Yellowsilk Shellseed), and *Erythroxylon tabascense*. The subvegetation
includes Siparuna nicaraquensis, Desmoncus sp., Entoda phaseoloides, and various species of Rubiaceae (madders).

Type 2 is characterized by Didymopanax morototoni (115 feet tall) and Scheelea liebmannii and also includes Apeiba tibourbon (50 to 65 feet), Andira galeottiana (100 feet), Sweetia panamensis, Belotia campbellii (40 to 50 feet), Trema micrantha (50 feet), Miconia argentea, Hampea sp., Nectandra salicifolia, Erethroxylon tabascense, Xylopia frutescens, and Luehea speciosa. The dense subvegetation supports the herb Costus spicatus and various species of Rubiaceae, Melastomaceae (meadow-beauties), and Piperaceae (peppers).

Type 3, occurring on shallow lime soils, includes Schizolobium parahibum (100 feet tall), Ochroma limonensis (100 feet), Calocarpum mammosum (100 feet), Brosimum terrabanum, Cupania macrophylla (40 feet), Cecropia mexicana, and Aechmea magdalenae.

Type 4 has the palm Sabal (65 feet tall) and various other species such as Ficus sp., Terminalia sp., Luehea speciosa, Miconia argentea, Schizolobium parahibum, Sweetia panamensis, Bursera simaruba (Gumbo Limbo), Stemmadenia obovata, and Dracaena americana.

Type 5, occurring on undulating and relatively dry terrain where fires are frequent, is composed of open stands of Cordia alliodora (33 to 50 feet tall).

First-growth woods arising on abandoned cultivated land or cut land form dense thickets 20 to 25 feet tall. Miranda
lists the following dominant plants: *Croton gossypifolius*, *C. draco*, *Bixa orellana* (Lipstick Tree; 30 feet tall), *Heliocarpus donnell-smithii* (30 feet), *Conostegia xalapensis* (Tropical Blueberry; 26 feet), *Tabernaemontana alba*, and *Acacia collinsii*.

In the Isthmus of Tehuantepec on the Atlantic slopes of the Isthmus mountains between Mogoné and Matías Romero, Duellman (1960: 31) recorded the following plants: *Ceiba pentandra*, *Cedrela mexicana*, *Swietenia macrophylla*, *Piceus sp.*, *Tabebuia donnell-smithii*, *Zanthoxylum melanostrictum*, *Pithecolobium arboreum*, and a species of *Pterocarpus*.

In most of the Atlantic Region, tropical evergreen forest ranges in pure form up to about 2,600 feet in elevation. From this point up to about 4,100 feet is an ecotone leading to cloud forest. Instead of depicting this transitional area on the map, I have drawn the dividing line at 3,300 feet, the usual elevation given as the upper limit of tropical evergreen forest. Along this border, tropical evergreen forest occurs where atmospheric conditions cannot support cloud forest. The trees in this ecotone are generally taller and the forest more luxuriant than in the lowlands, probably because of increased precipitation and perhaps relative inaccessibility to the logging interests of man. This intermediate forest might well be called lower montane rain forest.

Included within my category of tropical evergreen forest are such naturally occurring local variations as
jungle and breña. Breña, as defined by Carr (1950), consists of impenetrable tangles of shrubby and herbaceous growth overgrown and roped together into a solid mass of vines and creepers. Other major habitats occur in isolated patches within the general range of tropical evergreen forest. These include savanna, humid patches of oak or pine-oak, various aquatic habitats, and all types of terrestrial man-made habitats.

In the Isthmus of Tehuantepec from the latitude of Matías Romero south to the continental divide, tropical evergreen forest takes on a progressively less luxuriant, more arid aspect. The trees are much shorter and less dense, the forest is more open, and the canopy is incomplete. Interdigitation with tropical deciduous forest, arid tropical scrub, savanna, and arid pine-oak forest occurs here, with the tropical evergreen forest usually confined, especially in the more southern areas, to stream valleys. At the same time, the forest itself becomes more and more similar to the arid habitats as it extends southward. This type of forest, here treated and mapped as tropical evergreen forest, is a transitional forest between tropical evergreen forest to the north and tropical deciduous forest or arid tropical scrub to the south.

No detailed climatological data are available for areas of tropical evergreen forest except at Matías Romero, where, however, there is already a definite approach to the more arid conditions of the Pacific slope. In general, rainfall
is nearly continuous throughout the year, but with some slackening in early spring, this decrease probably being responsible for the absence of true rain forest. 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. Most streams contain water all year but are fullest during the rainy season; even flooding occurs. The deeper ponds contain water throughout the year, but smaller ones sometimes become empty by April. Temperatures are high and relatively constant, with only occasional drops due to cold fronts. The forest interior is much cooler than open areas.

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 of the remote mountain areas and the extreme northeastern corner of the state still contain remnants of virgin timber. Most of the forest today, while perhaps appearing luxuriant to those unfamiliar with the tropics, is in reality only second growth. All accessible areas have been, and are still being, heavily logged. The cut-and-burn method of agriculture has destroyed all but a few patches of those forests within sight of lowland roads.

Cloud forest

The term cloud forest as used herein is confined to
broad-leaved hardwood forest. Areas of lush pine-oak that owe their existence to clouds or fog, termed cloud forests by Leopold (1959: 29), are here placed in the humid division of pine-oak forest.

Cloud forests occur in six large isolated 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, and are isolated from one another by lowland 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 cloud forests of the Sierra de Zempoaltepec and Sierra de los Mijes by the valley of the Río Cajones. The forest of the last range is isolated from those of the Sierra Madre de Chiapas by a distance of some 60 miles 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 cloud forest, one on the Pacific-facing slopes of the Sierra de Miahuatlán and the other, isolated by 40 miles of more arid habitat in the basin of the Río Verde, in the Sierra de Yucuyacua.

Cloud forest is the most lush and humid of all the habitats in Oaxaca. Usually, two tree strata are 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

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
generally it is lower than in tropical evergreen forest. In the Sierra Madre de Chiapas, the upper story is composed of trees mostly 15 to 40 feet tall with trunks 10 to 18 inches in diameter; a few trees, however, have trunks as much as 4 feet in diameter. Where exposed to winds, cloud forest is sometimes less than 10 feet in height, but on deeper soils and more sheltered sites, very tall trees 6 to 7 feet in diameter commonly occur.

This forest is characterized by a dense shrub layer. Forming part of this layer and also usually part of the lower tree stratum, are tree ferns (Cyathea), which sometimes attain heights of 25 feet or more and are good indicators of cloud forest. Small palms and Manzanita (Arctostaphylos) frequently occur. On the Atlantic side of the Sierra de Juárez, between 6,300 to 6,600 feet, is a cloud forest composed primarily of oaks and associated with a luxuriant growth of Ericaceae, including Gaultheria, Leucothoë, and Vaccinium (Miranda and Sharpe, 1950: 319). Cloud forest has a dense and lush herb stratum containing a wealth of small ferns, begonias, and Equisetum. Strangler figs (Ficus sp.), important plants in tropical evergreen forest, are absent. Completely encasing the trunks and branches of many trees is a profusion of bromeliads, orchids, mosses, lichens, and lianas. Everywhere the forest drips the moisture that has condensed on the leaves from the fog and clouds. The ground, which is continuously saturated, is covered with leaf litter and moss-covered logs.
The trees of the upper stratum are largely temperate in origin, while the trees, shrubs, herbs, and vines of the lower strata are primarily tropical. The cloud forests of the Atlantic slope contain *Liquidambar styraciflua* (Sweetgum), *Nyssa* (Sourgum), *Weinmannia pinnata*, *Platanus* (Sycamore), *Alnus* (Alder), *Fagus* (Beach), *Tilia* (Linden), *Carpinus* (Dogwood), *Magnolia*, *Ostrya* (Hophornbeam), and *Ostrya* (Hophornbeam). Throughout this habitat in Oaxaca, various species of oaks are conspicuous dominants. While most of these species are deciduous in the north, in Oaxaca they are only partly so; during mild winters they retain some of their foliage until new leaves emerge in the spring.

The cloud forests of the Pacific slope west of the Isthmus are similar structurally but probably less so floristically. Rowley (1966: 108) lists *Garrya laurifolia*, *Oreopanax peltatum*, and *Solanum macrantherum* from this area, but these may properly belong to the adjacent interdigitated humid pine-oak forests. Tree ferns are present and the aspect of the forest is much like the cloud forest of the Atlantic slope.

Oaxaca cloud forests occur only where the physiography is such that high mountains intercept the clouds rolling in off the Gulf of México or Pacific Ocean. Atlantic cloud forests form an extensive belt between the tropical evergreen forest or (rarely) patches of humid pine-oak forest below and the extensive humid pine-oak forest above. In the Sierra de Huautla, Sierra de Juárez, and Sierra de
Zempoaltepec, solid stretches of cloud forest are found between about 4,100 and 6,600 feet elevation. Patches occur as low as 2,600 feet, however, and the dividing line between cloud forest and tropical evergreen forest is herein placed (and mapped) as 3,300 feet. Cloud forests of the Sierra de los Mijes cover the tops of the range and descend to only 4,900 feet on both slopes, a condition probably due to the absence of very high mountains to back up this habitat and produce heavier rainfall. The same conditions exist in the Sierra Madre de Chiapas, where cloud forest extends from the crest down to about 4,100 feet on the Atlantic side and 4,900 feet on the Pacific side. In the Sierra de Miahuatlán, this type of forest does not form a solid elevational belt but occurs primarily along streams and is interspersed with patches and interdigitations of humid pine-oak forest on the intervening ridges. Here cloud forest extends from about 4,900 to 7,200 feet in elevation. Similar conditions exist in the Sierra de Yucuyacua, where, however, patches of arid (or semiarid) pine-oak forest are also interspersed with the cloud and humid pine-oak forests.

On the Atlantic slope west of the Isthmus, important local variations within the cloud forest include nearly pure stands of Liquidambar and Nyssa, occurring on deep soils and most commonly between 4,000 and 5,300 feet elevation. Humid oak forest occurs in patches from 3,300 to 6,600 feet and as a nearly pure transitional belt (without Liquidambar) between elevations of 6,300 and 6,600 feet just below the limits of
pines. Forests of *Weinmannia pinnata* occur on steep slopes at the extreme upper edge of cloud forest and sometimes contain species of *Quercus* and members of the Lauraceae; one such forest is found at 7,000 feet elevation southwest of Valle Nacional.

The climate of cloud forest is much the same throughout its distribution in Oaxaca. The presence of clouds or fog is a prerequisite. Rainfall is very heavy and occurs almost unabated throughout the year. Streams are permanent, clear, and cold, and many of them originate here. Temperatures are cool and rather even throughout the year, and there are no frosts. Local conditions of wind, especially on the crests of the Sierra Madre de Chiapas may produce an elfin forest dominated by dense tangles of small tree ferns.

**Humid pine-oak forest**

Humid, semiarid, and arid pine-oak forests occur throughout the state in a variety of situations from as low as 100 feet elevation to the crests of the highest peaks. Mapping of all the patches is impossible; only the more extensive areas are shown. All manner of intermediate conditions exist between extremely arid and very humid, so that ecotones are often broad and designation to type must sometimes be arbitrary.

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

As its name implies, humid pine-oak forest is a mixture of pine and oak existing under humid conditions. In its best form this forest is dense and lush. There are one or occasionally two tree strata. The upper stratum may be composed either of pure oak, pure pine, or a mixture of both. The trees, which include numerous species of pines and oaks, attain large size and are an important source of lumber. On Cerro San Felipe one of the common oaks is Quercus reticulata. In the Sierra Madre de Chiapas pines include Pinus strobus.

The shorter trees and shrubs on Cerro San Felipe include Alnus (Alder), which sometimes also forms tall stands along streams, Sambucus mexicanus (Mexican Elder), Arbutus (Madrone), Ceanothus coeruleus, Arctostaphylos (Manzanita), and several species of oaks (Goldman, 1951: 209). Cornus also occurs. The shrub layer is dense in the wettest sections and more open elsewhere.

Moss, lichens, and bromeliads are abundant, but tree ferns and vines are usually absent. Under the trees the ground is covered with a thick layer of small ferns and frequently patches of Ribes and cane. Herbs on Cerro San Felipe include Solanum, Castilleia, Pentstemon, Lupinus, Eryngium, Commelina, Tradescantia, Lamoureuxia, Dahlia, and
Salvia (Goldman, 1951: 209). Grasses are common, especially in flatter and more open areas, where moist subalpine meadows are frequent.

On the Atlantic sides of the Sierra de Huautla, Sierra de Juárez, and Sierra de Zempoaltepec, humid pine-oak forest extends from the upper limit of cloud forest at about 6,600 feet elevation to 9,800 feet, where highland pine forest, a more arid habitat, takes over (see arid pine-oak forest). Although most of the precipitation is dropped on the windward (Atlantic, or north and northeast) sides, some extends onto the Interior slopes of the ranges before the full effect of the rain shadow is felt. Thus humid pine-oak overlaps the Interior side, down to about 7,900 feet in elevation. In the Sierra Aloapaneca, this habitat stretches from about 7,900 to 9,800 feet on both windward and leeward sides. Some patches in the Interior of the Mesa del Sur do not extend below about 8,500 feet, since they are distant from the coasts and are partially shadowed by the ranges to the north and east.

On the Interior sides of the Sierra de Miahuatlán and Sierra de Yucuyacua, humid pine-oak forest is found from 9,800 down to 7,900 feet. On the windward Pacific sides, however, solid forest extends down to 7,200 feet. Below this level, extending as low as 2,300 feet, humid pine-oak usually interdigitates with other habitats. In the Sierra de Miahuatlán it is found in pure stands adjacent to patches of cloud forest down to 4,900 feet and, in the western half of
this range, adjacent to tropical semideciduous forest as low as 2,300 feet or even (rarely) 1,850 feet. Toward the eastern end of this sierra, humid pine-oak extends, probably in solid form, to 4,900 feet. On the Pacific side of the Sierra de Yucuyacua, from 7,200 to 4,900 feet, it is interspersed with cloud forest and arid pine-oak forest. In such mixed situations, little if any intermingling of forest elements takes place, each forest type occurring in pure patches side by side with stands of the other types. Humid pine-oak forest is found on humid ridges, arid pine-oak forest on arid 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 on the habitat map. One such forest has been noted at about 3,300 feet elevation, below Liquidambar forest, at the eastern end of the Sierra de Juárez. An area of open, grassy oak forest, perhaps semiarid in nature, occurs below Totontepec in the Sierra de Zempoaltepec. What is probably a similar forest occurs along the Chiapas border just below the limit of cloud forest. 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 feet elevation within tropical evergreen forest. In such situations the ground is grass-covered, and the

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
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 and Q. glaucescens (Miranda and Hernández, 1963: 71).

The primary factors giving rise to humid pine-oak forest as it exists in solid form (above cloud forest) are temperate conditions, heavy rainfall, and the occasional presence of clouds or fog. Frosts occur but are probably somewhat less frequent and severe than in areas of arid pine-oak forest, because of the usually high humidity. Frosts are occasioned by the high elevation together with the irregular occurrence of cold fronts, which may also bring some snow to these areas. The heavy rainfall is a result of the high ridges intercepting the moisture-laden air coming in off the Gulf of México or Pacific Ocean and causing it to rise, cool, and drop its condensed moisture. Precipitation occurs throughout the year but is more intense during the summer rainy season. Most streams are permanent, although during the winter dry spell a few dry up and all diminish in size. Since clouds sometimes enshroud these humid forests, especially locally, they might be termed "cloud forests," as has been done by Leopold (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 forest below, or interdigitated with, cloud forest exists under tropical conditions. The nortes
have little effect except to cause an increase in rainfall and some slight drop in temperatures.

**Arid pine-oak forest**

Although termed a forest herein, this habitat might better be called arid pine-oak "woodland," as the canopy is incomplete. For use in the species accounts, however, I have found it convenient to define the term "forest" loosely and apply it to this type of habitat.

Arid pine-oak forest is the most widespread of all the habitats in Oaxaca. It ranges from nearly sea level to 8,500 feet in elevation and is found under both temperate and tropical conditions. The most extensive portions, however, are in the arid temperate Interior of the Mesa del Sur below the level of humid pine-oak forest and above the limits of arid temperate scrub and steppe. Elevational limits in the Interior vary considerably with local conditions. In the Oaxaca Valley and in the extreme northwestern portion of the state, arid pine-oak takes over from arid temperate scrub along the first foothills approaching mountainous areas, or at about 6,100 feet elevation. In steppe regions in northwestern Oaxaca, however, arid pine-oak does not occur until moister conditions are reached, at about 7,800 feet. Throughout the remainder of the Interior of the Mesa del Sur, this habitat usually replaces arid tropical scrub and mixes with arid temperate scrub at 4,100 feet and becomes solid at about 6,100 feet. Toward the eastern end of the Mesa, arid pine-oak is able to survive at progressively lower elevations,
until in the Isthmus it covers the hills down to about 800 feet, forming a bridge across the Isthmus for bird species inhabiting arid pine-oak forest and able to tolerate tropical conditions. On the Pacific side of the Sierra Madre de Chiapas, pine-oak patches are interspersed with stands of tropical semideciduous forest between about 4,000 and 4,900 feet.

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

There are one or two tree strata in arid pine-oak forest. The upper stratum, which may be composed mostly of oaks, primarily of pines, or include a mixture of both, contains trees that are shorter at lower elevations and taller at high elevations. In areas where pines dominate the upper stratum (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.
Bromeliads occur only sparingly. Brush is sparse in rocky areas of thin soil but is often fairly dense in moister situations, where it usually occurs in patches. The ground is covered with grass, which is likely to be tall and fairly dense in moist situations or short and sparse in other areas. Patches of bracken ferns occur in some places. As the grass desiccates during the dry season, portions of the ground in some localities become partially bare.

A large number of species of pines and oaks are present, two of the most widespread being *Pinus oocarpa* and *P. montezumae*. The open pine-oak forest on the ridges of the Isthmus of Tehuantepec includes *P. caribaea*.

Near San Juan Bautista Cuicatlán, arid pine-oak forest replaces arid tropical scrub at an elevation of about 4,600 feet, where rainfall increases over that in the valley below. Here, according to Miranda (1948b), arid oak woods 16 to 33 feet tall include *Quercus glaucophylla*, *Q. glaucoides*, *Q. liebmannii*, and *Q. obscura*. At the lower limits of the oak forest, *Acacia pennatula*, *Piscidia grandifolia*, and *Xylosma ellipticum* are found. Forests with oaks 33 to 50 feet tall are formed by several species of oaks, one of the most common of which is *Q. conspersa*. The subvegetation in these two types of forest include the following plants: *Arctostaphylos lucida*, *Clintopodium laevigatum*, *Salvia adenophora*, *Vernonia karwinskiana*, *V. oaxacana*, *Hemichaena fruticosa*, *Lamourouiauxia exerta*, *Senecio heierefolius*, *Rumfordia floribunda*, and *Baccharis elegans*. Herbs include species of *Bletia*, *Calea*, *Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.*
Castilleja, Crotalaria, Dalea, Lobelia, and Lopezia. Pines, which occur in pure stands on less humid slopes or may be mixed with the oaks, include Pinus montezumae and P. oocarpa.

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 occurs over extensive areas. Rainfall is seasonal, although some small amount occurs even during the dry season 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 forest, each receive 39.5 in. of rain annually, most falling between mid-May and mid-October. Temperatures are cool. At Ixtlán de Juárez average monthly temperatures range from 56.1°F. to 64.0°F., with an annual average of 60.1°F. Similar conditions exist at Santa María Asunción Tlaxiaco, where temperatures range from 56.0°F. to 66.0°F. and average 62.1°F. Frosts are frequent in such areas; the former town receives an average of 12 days of frost per year, and the latter town 96 days.

Everywhere else in the state arid pine-oak forest occurs under tropical conditions. Annual monthly temperatures average about 10°F. warmer, reflecting an approach to even hotter climates. Rainfall is seasonal, although precipitation falls in traces even during the 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 dry season. Springs are rare. If the terrain has been denuded of vegetation by man, heavy precipitation in the rainy season has a devastating erosional effect on the parched soil.

Oak scrub is an important habitat in the Interior of the Mesa del Sur. It forms a narrow elevational belt (usually only a few hundred feet wide) between arid pine-oak forest above and steppe or arid tropical scrub below. Oak scrub may be present anywhere between 4,900 and 7,900 feet in elevation, depending on factors of temperature and moisture. The oaks are bushy and low (5 to 10 feet tall) and form irregular patches often virtually impossible to penetrate. Between the oaks may be bare rocky stretches or a sparse cover of short grass. Other species of shrubs also occur. Occasional oak trees are quite large, these usually found along streams.

On the highest mountains of the Mesa del Sur, from about 9,800 feet to the summits, are open pine forests devoid of oaks and dominated by *Pinus hartwegii*. These large scattered trees form the only tree stratum, one with an open canopy. There is little or no shrub layer; only a few scattered small alders or madrones break the monotony of the thick ground cover of grass. This habitat I call highland pine forest.
Humid and arid pine-oak forests border on one another, sometimes forming sharp lines of contact but more often producing ecotones of intermediate humidity and variable width. This habitat may be termed semiarid pine-oak forest.

**Tropical semideciduous forest**

Tropical semideciduous forest, sometimes called Pacific coast tropical evergreen forest, occurs only on the Pacific sides of the Sierra de Yucuyacua, Sierra de Miahuatlán, and Sierra Madre de Chiapas. In the first range it is found between 4,100 and 4,900 feet elevation and is intermingled with patches of arid to semiarid pine-oak forest. In the eastern half of the Sierra de Miahuatlán, where it attains its most extensive and luxuriant form, it occurs mainly between about 2,400 and 4,900 feet but sometimes as low as 1,250 feet along streams. In the western part of this mountain range it occupies an elevational range of from 2,300 to 4,900 feet and is interspersed with patches of humid pine-oak forest, the latter on ridges and hill tops and the tropical semideciduous forest in valleys. In the Sierra Madre de Chiapas, this habitat forms a narrow belt extending from 4,000 to 4,900 feet, the lower reaches of which contain patches of semiarid oak or pine-oak.

During the rainy season, tropical semideciduous forest is similar in aspect to tropical evergreen forest. There are usually two tree strata, although as in tropical evergreen forest the strata often are not clearly differentiated. The trees are usually tall, with thick trunks and large
buttresses. There is a dense understory of shrubs. Epiphytes, figs, 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. Usually the upper canopy is complete, producing deep shade. Rowley (1966: 107) lists Ceropia, Phoebe, Ficus, and Rondeletia from this type of forest.

During the dry season (mid-October to mid-May), the forest takes on a somewhat more arid aspect than does tropical evergreen forest. A number of the trees lose all or a part of their foliage. Nevertheless, the forest retains a fairly humid atmosphere. Some streams dry up, but most retain water throughout the year.

In respect to climate, areas with this type of vegetation are in an intermediate zone, where there is felt neither the full force of the monsoonal climate prevalent in the tropical deciduous forest below nor the full effect of the permanent rains and clouds of the humid pine-oak forest and cloud forest above. Rainfall is heavy from mid-May to mid-October and may continue much diminished well into or throughout the remainder of the year. Temperatures are warm and relatively constant. 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 tropical semideciduous forests and other habitats is sharp in some areas and evenly blended in others. At the lower limits fingerlike projections of
tropical semideciduous forest extend downward along streams between strips of arid tropical deciduous forest on the ridges. At its upper limits, tropical semideciduous forest merges almost imperceptibly with the cloud forest that occurs along streams or on flat areas, while pine-oak forest projects downward along ridges from the peaks above.

**Tropical deciduous forest**

Tropical deciduous forest, primarily of the short tree form but locally of the tall tree type (Shelford, 1963), 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. In my opinion and that of Thomas MacDougall, tropical deciduous forest does not extend eastward through the Río Coatzacoalcos basin to connect with the arid forests of interior Chiapas, although Leopold (1959) indicates that it does. Our opinion is based on limited observations by MacDougall (pers. comm.) and on theoretical climatological grounds. This area is herein mapped as tropical evergreen forest.

The vegetation of the arid lowland tropics of Oaxaca shows all manner of variation from open stands of bushes or very short trees to dense, closed-canopied forests of very tall trees. In general, however, this vegetation may be divided into arid tropical scrub (to be discussed later), short tree tropical deciduous forest, and local patches of tall tree tropical deciduous forest.
In its most luxuriant form, short tree tropical deciduous forest has two tree strata, the upper composed of trees 40 to 60 feet tall with a closed canopy. These trees are often smooth-barked, with large, glabrous, entire leaves. Compound leaves are also common. The boles usually are not heavily buttressed. The lower tree stratum is formed by scattered trees averaging about 20 feet in height. The shrub layer may be sparse but is usually fairly dense; it is often thorny; and its height varies considerably but frequently reaches 7 feet. In the sparse herb layer grass is common. Epiphytic growth, including bromeliads and orchids, is fairly abundant. Figs (Ficus) are fairly common. Leaf litter covers the ground in places. Rowley (1966: 107) lists the following plants from the habitat in the Sierra de Miahuatlán: Ceiba, Lysiloma, Lonchocarpus, Bursera, Bucida, and Gliricidium. In its less luxuriant form, especially where approaching arid tropical scrub, short tree tropical deciduous forest may attain a height of only about 25 feet. In this event there is only a single tree stratum.

Tall tree tropical deciduous forest occurs only locally. One patch is found just west of Puerto Angel. Here there are two tree strata, and the tallest trees are over 60 feet in height, with some reaching 130 feet. Forests along streams and in locally humid situations adjacent to coastal bays or lagoons are sometimes considered to fall into this category. However, since such forests are dependent on a high water table and are mostly or completely evergreen,
they are here considered to be gallery forest, a habitat to be discussed later.

Tropical deciduous forests have a monsoonal climate. During the dry season (mid-October to mid-May), the dominant trees lose most or all of their leaves. Only a very few scattered trees and some of the 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 trees. The general aspect is one of extreme aridity. Exposed to the desiccating effects of sun and wind, ponds and ground dry up, and dust and dry leaves are everywhere. 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, similar in appearance to tropical evergreen forest. Streams and ponds fill once more, and the moist ground gives rise to numerous herbs and fresh grass.

Temperatures in this type of habitat are quite constant. At Puerto Angel, for example, average monthly temperatures vary from 81.7°F. (January) to 83.5°F. (July), with an average annual temperature of 82.8°F. There are, of course, no frosts. Rainfall, as noted, is seasonal. Puerto Angel receives an annual average of 40.0 in., with all but 0.7 in. falling from May through October. Prevailing winds are off the Pacific, whence come the summer rains. Nortes have little effect in the region of tropical deciduous forest, descending into the Pacific lowlands as hot dry winds. Similar climatological conditions exist at San Pedro Pochutla,
the only other town in this habitat for which data are available.

Upper elevational limits of tropical deciduous forest vary considerably with local conditions of temperature and precipitation. West of the Sierra de Miahuatlán such forests usually extend up to the lower limit of arid pine-oak forest at 4,100 feet elevation. South of the central and western portions of this mountain range, however, conditions are wetter, and tropical deciduous forest gives way to tropical semideciduous forest at 2,300 or 2,400 feet. In the lower half of the Río Tehuantepec basin and on the Pacific side of the Sierra Madre de Chiapas, the 4,100 feet level again represents the border with arid pine-oak. In the upper portion of the Río Tehuantepec basin, colder and drier conditions produce arid temperate scrub, which meets tropical deciduous forest (or arid tropical scrub) at about 3,300 feet. Approaching the Isthmus from the west, arid pine-oak forest 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 replaces the latter habitat at an elevation of about 800 feet. In the Pacific lowlands of the Tehuantepec region, tropical deciduous forest occurs in isolated patches, usually along streams; such forests are not here considered humid gallery forest since the latter retains most of its foliage throughout the year.

In the region of San Gabriel Mixtepec, on the Pacific
side of the Sierra de Miahuatlán, patches of humid oak appear at about 1,350 feet in elevation, and stands of humid pine-oak forest and tropical semideciduous forest begin at 1,850 feet. The deciduous forest becomes progressively scarcer and disappears entirely at about 2,350 feet.

**Arid tropical scrub**

Arid tropical scrub occurs over extensive areas only in the broad flat valleys of the Interior of the Mesa del Sur and on the Pacific side of the Tehuantepec region. However, small patches (unmapped) may be found anywhere in the arid tropical section of the state within the general range of tropical deciduous forest. Arid tropical scrub also extends in patches north across the Isthmus to the region of Guichicovi and stretches far up Interior river valleys into otherwise temperate regions.

Arid tropical scrub, a deciduous habitat, merges almost imperceptibly with short tree tropical deciduous forest. In general, however, arid tropical scrub is characterized by the presence of only one tree stratum, which varies in different localities from about 6 to 26 feet in height and presents a partially broken to very open canopy. In many areas, trees are scarce or virtually absent, leaving only the shrub layer. Giant cacti are a conspicuous feature in some localities. Shrubs, which are generally quite thorny, may occur in almost impenetrable tangles or (especially on rocky soils) be quite widely spaced. The sparse herb stratum is composed of grasses and small cacti. The ground
is usually very rocky and often bare of vegetation. The shrubs and trees produce no leaf litter except in the densest patches.

Miranda (1948b) discusses the arid tropical scrub vegetation of the lower portions (up to 4,600 feet) of the San Juan Bautista Cuicatlán valley. He divides the wooded land into three major vegetational types. Below 3,000 feet is found (1) a low spiny woods with trees no more than 26 feet tall with small deciduous leaves and characterized by *Cercidium praecox* (Paloverde). Also found there are *Prosopis chilensis* (Honey Mesquite), *Bursera odorata*, *B. submonili-formis*, *B. morelensis*, *B. aloeylon*, and *Capparis incana*. Less frequent are *Chlorophora mollis*, *Ceiba parvifolia*, *Cyrtoarpa procera*, and *Juliana adstringens*. The subvegetation is composed of spiny thicket characterized below. The sparse herbaceous layer contains species of *Ayenia*, *Cracca*, *Indiqofera*, *Stachytarpheta*, *Commicarpus*, *Tragia*, *Zinnia*, *Euphorbia*, and *Oxalis*. In some open areas is the grass *Pentarrhaphis polymorpha*. A creeper, *Antigonum leptopus*, and *Coccus sycoides* are also present. Scattered here and there are many large cacti: *Lemaireocereus weberi* (Candelabra), *L. pruinosus* (Pitayo), *L. stellatus*, *Escontia chiotilla* (Jiotilla), and *Cephalocereus chrysacanthus*. Smaller cacti include species of *Ferocactus*, *Coryphantha*, and *Mammillaria*. In ravines are *Chlorophora mollis*, *Podopterus mexicanus*, *Zizyphus sonorensis*, and *Agonandra conzattii*.

A second type of forest (2) is a low woods with medium-
sized deciduous leaves and dominated by *Cyrtocarpa procera*. This type occurs from about 3,000 to about 4,600 feet elevation in areas with higher rainfall or lower temperatures or both. Also found, in order of abundance, are *Bursera submoniliformis*, *B. morelensis*, *Julania adstringens*, *Bursera bipinnata*, *Ceiba parvifolia*, *Bursera aloexylon*, *B. odorata*, *B. fagaroides*, *Cassia emerginata*, *Euphorbia schlechtendalii*, *Pseudosmoringium multifolium*, *Gyrocarpus americanus*, and *Leucaena pueblana*. Cacti include *Lemaireocereus weberi* and *Cephalocereus chrysacanthus*. In the subvegetation are *Acacia cymbispina*, *Mimosa sp.* , and two species of *Randia*. The sparse herb cover includes *Pentarrhapis polymorpha*, *Gomphrena dispersa*, *Melampodium*, *Traqia sp.* , and *Talinum sp.* As a result of increased availability of water and abundance of shade, different plants occur along streams. These include *Cyrtocarpa procera* (up to 50 feet tall), *Euphorbia fulva*, *Thevetia ovata*, *Ficus sp.* , *Plumeria rubra*, *Tabebuia pentaphylla*, *Ruprechtia pringlei*, *Sideroxylon capiri*, *Caesalpinia velutina*, and *Pileus mexicanus*. This association might better be placed with my gallery forest habitat, but I do not know to what extent it is evergreen.

Miranda's third type (3) is called spiny thicket. This occurs alone and as the understory of low spiny woods. Spiny thicket ranges from about 1 to 6 feet tall and is composed of spiny plants with very small leaves. Legumes are numerous: *Mimosa polyantha*, *M. lactiflua*, *M. luisana*, *Pithecolobium acatlense*, and *Acacia cymbispina*. Other spiny
bushes are *Zizyphus pedunculata*, *Randia nelsonii*, *Celtis pallida*, and *Castela tortuosa*. Nonsyn dense bushes are *Calliandra eriophylla*, *C. unijuga*, *Karwinskia humboldtiana*, *Cordia cylindrostachya*, *C. stellata*, *Cassia pringlei*, *Plocosperma microphyllum*, *Lippia graveolens*, *Pedilanthus pringlei*, *Turnera diffusa*, *Bronquniartia mollicula*, *Aeschynomene compacta*, *Malpighia galeottiana*, *Adelia oaxacana*, *Sebastiania* sp., and *Hintonia standleyana*. Succulents include *Echinocereus*, *Coryphantha*, *Opuntia*, *Hechtia*, and *Agave*. The ground is mostly bare with a very sparse cover of grass (*Pentarrhapis polymorpha*).

Five local variations are recognized by Miranda. Cardoneras (1) are large stands of *Lemaireocereus weberi*. These are associated with spiny thicket. Tetecheras (2) are dense groups of the columnar cactus *Neobuxbaumia tetetzo* and are usually intermixed with spiny woods. *Cephalocereus hoppenstedtii* also is found. Quiotillales (3), associations of *Esoctia chiotilla*, are found near towns. Cucharales (4), stands of *Acacia cymbispina*, are of secondary origin on abandoned cultivated land. Quebrachales (5) are associations of *Acacia unijuga*, which are found along streams and may reach 50 feet in height and be rather dense. Trees associated with *Acacia unijuga* are *Diospyros oaxacana*, *Agonandra* sp., *Sapium appendiculatum*, *Elaeodendron xylocarpum*, *Zizyphus sonorensis*, *Thevetia peruviana*, *Vallesia glabra*, and sometimes *Ficus* sp. and *Taxodium mucronatum*. The subvegetation includes *Capsicum baccatum*. Quebrachales are perhaps best
placed in my gallery forest habitat, although again I do not know to what extent the plants are evergreen.

Duellman (1960: 32) lists the following trees found in arid tropical scrub on the Plains of Tehuantepec: Acacia cymbispina, Prosopis chilensis, Caesalpinia coriaria, C. eriostachys, Celtis iquanaea, Cordia brevispicata, Jatropha aconitifolia, and Crescentia alata. Goldman (1951) lists some of the same plants plus Guazuma ulmifolia, Ficus sp., Ipomoea sp., Pithecollobium sp., Acacia farnesiana, and Cassia sp.

The climate in areas of arid tropical scrub is characterized by rather high constant temperatures, no frosts, and little rainfall. As is the case in regions of tropical deciduous forest, precipitation is seasonal. San Juan Bautista Cuicatlán receives an annual average rainfall of 11.8 in. all but 1.9 in. from June through September. Thus the dry season is somewhat longer and more severe than in areas supporting tropical deciduous forest. At the same town, average monthly temperatures range from 72.9°F. (February) to 79.7°F. (May), with the average annual temperature 76.1°F. These temperatures are similar to those found at San Pedro Pochutla, a town in tropical deciduous forest.

During the dry season, ponds and all but the largest rivers in arid tropical scrub become dry. The Río Tehuantepec is 25 to 50 yards wide and easily fordable in dry weather but becomes swollen and difficult or impossible to cross in the rainy season (Goldman, 1951: 226). With the onset of
summer rains, small depressions become temporary ponds. Since the forest is essentially leafless during the dry winter, the ground 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 the habitat.

Precipitation on the Pacific side of the Isthmus is much greater than in the arid Interior valleys. During the rainy period, rainfall may occur daily. Salina Cruz receives an annual average of 40.9 in. of rainfall, an amount similar to that in areas of tropical deciduous forest. Probably, the arid tropical scrub in this region is due to edaphic factors or to the influence of man's clearing.

Along the Pacific coast of extreme southwestern Oaxaca near Minitán is a forest that is very similar to what Leopold (1959) and others have called thorn forest. If this type does in fact occur in Oaxaca, it would be included under my arid tropical scrub habitat.

Elevational limits of arid tropical scrub vary somewhat with local conditions of rainfall and temperature. In general, however, arid tropical scrub can occur from sea level to 4,600 feet. Above this level it merges with arid pine-oak forest or arid temperate scrub. Probably, the arid tropical scrub that occurs in the Pacific Region within the general range of tropical deciduous forest are a result of man's clearing and are not climax in nature.
Arid temperate scrub

Arid temperate scrub is similar to arid tropical scrub in structure but occurs under temperate rather than tropical conditions. Recognizing arid temperate scrub is often difficult in the absence of local climatological data, especially along its border with arid tropical scrub. The former usually may be identified, however, by the presence of Yucca and the much greater abundance of small cacti and other primarily temperate plants such as Agave and Opuntia.

Arid temperate scrub is found only in the arid Interior Region of the Mesa del Sur, where it occupies an elevational band between arid tropical scrub or tropical deciduous forest below and arid pine-oak forest or steppe above. The most extensive portion is located in northwestern Oaxaca. Here it occupies the relatively more level land away from rivers, occurring between 4,600 feet on the one hand (upper limit of arid tropical scrub or tropical deciduous forest) 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. Much of the Oaxaca Valley today is covered with steppe, probably man-made in origin. But in portions of this valley grow stands of arid scrub that are somewhat transitional between the arid tropical and arid temperate habitats. Such an area surrounds Ejutla de Crespo, a town that averages less than one day of frost per year. Since, however, most of the natural vegetation of the valley is arid temperate scrub, and the avifauna contains
few tropical elements, I have shown no arid tropical scrub in the area.

In the San Juan Bautista Cuicatlán valley, and perhaps in the Sola de Vega valley and the valley of the upper Río Sordo, arid pine-oak elements have partially invaded the arid temperate scrub, making the latter difficult to discern. In the first valley, elevational limits are approximately 4,600 to 6,100 feet. In the last two valleys, arid temperate scrub apparently occurs at lower elevations, perhaps between 3,300 and 4,600 feet, but the elevational limits are by no means clear. In the upper Río Tehuantepec basin, the boundaries again appear to be 3,300 and 4,600 feet. Arid tropical elements also ascend river valleys into otherwise temperate regions of the Interior, occurring in local areas where frosts are rare or not severe. Such conditions are found near Tamazulapan del Progreso and Huahuapan de León. Where slopes are gradual, as in the Oaxaca Valley, the ecotone with arid tropical scrub is often fairly extensive. In this valley the upper limit of arid scrub is reached at the first abrupt foothills, where oak scrub takes over, usually at about 6,100 feet elevation.

Perhaps the dominant features of the landscape in most areas of arid temperate scrub are the tree species of *Yucca* and large *Opuntia*, which attain 15 or more feet in height and are usually the tallest plants in the habitat. Although these plants are usually well scattered, they occasionally occur in dense patches. The lower vegetation consists of
short, small-leaved, thorny, deciduous bushes, growing in dense patches or scattered singly throughout the landscape, and reaching heights of 4 to about 7 feet. *Prosopis chilensis* (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 small 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* to the southeast of Huahuapan de León at about 5,400 feet elevation. For the Oaxaca Valley, Goldman (1951) lists *Acacia farnesiana*, *Cassia*, a tree *Ipomoea*, *Fouquieria formosa*, *Jatropha*, and *Prosopis chilensis*, with *Baccharis* and *Taxodium mucronatum* along streams. The large Bald Cypress at Santa María del Tule is said to have a trunk circumference of about 170 feet (Goldman, 1951: 438). MacDougal (1908: 27-28) lists *Cereus eburneus*, *Opuntia*, *Agave karwinskii*, *Nopalea*, *Pereskopsis chapistle*, *Yucca*, *Dasylirion*, and *Taxodium mucronatum*. The presence of the tropical plant *Ficus* indicates the somewhat intermediate position of this valley.

Bravo (1931) records the following cacti in the Oaxaca Valley: *Pereskopsis chapistle*, *Nopalea auberi*, *Opuntia pumila*, *O. pilifera*, *O. affinis*, *O. hyptiacantha*, *Pachycereus marginatus*, *Lemaireocereus pruinosus*, *L. treleasei*, *L. stellatus*, *Nyctocereus serpentinus*, *Heliocereus speciosus*, *Selenicereus hamatus*, *Aporocactus conzattii*, *Ferocactus*.
macrodiscus, F. latispinus, Coryphanta pycnacantha, C. retusa, Neomammillaria karwinskiana, N. conzatti, and N. schmollii.

Areas of arid temperate scrub receive amounts of precipitation too low for the support of pine-oak forest. Average annual rainfall varies from 19.4 in. at Tlacolula de Matamoros to 29.1 in. at Huahuapan de León. Rainfall is seasonal, with all but 0.5 to 2.0 in. falling from May through October. Ejutla de Crespo, with an annual average of 23.7 in., receives no rain in December, January, February, or March. Most of the rain in arid temperate 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.

Average annual temperatures vary from 68.4°F. at Oaxaca City to 71.1°F. at Ejutla de Crespo. The coldest month of all stations is January; the warmest is May. Average monthly temperatures vary from 63.0°F. (Huahuapan de León) to 75.2°F. (Ejutla de Crespo and Huahuapan de León). 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).

The relationships of arid temperate scrub to arid tropical scrub and arid pine-oak forest appear to be related to
differences in temperature and rainfall. Arid temperate scrub is found in areas where frosts occur and the rainfall is slight. Arid pine-oak also is found under temperate conditions but where the temperature is lower and the precipitation heavier. Arid tropical scrub develops where the rainfall often is much the same as in regions of arid temperate scrub but where frosts do not occur. At places such as Ejutla de Crespo, frosts are rare and not severe; hence, this town is in the transitional zone between arid temperate and arid tropical scrub. Since frosts can be very local, tropical conditions may invade the otherwise temperate Interior, usually along streams, as at Tamazulapan del Progreso and Huahuapan de León. Steppe in Oaxaca apparently is largely an edaphic habitat (as in north-central Oaxaca) or a man-made one (as in the Oaxaca Valley), but in the north-central steppe, decreased rainfall is also a factor.

*Steppe*

Steppe occurs in two large areas in Oaxaca, one in the north-central portion of the state from Asunción Nochixtlán and San Juan Bautista Coixtlahuaca west to the regions of Tamazulapan 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 disintegration forms a lime subsoil known as *tepate* (Goldman, 1951: 211). The 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. Here and there are thin patches of short grass. Occasionally, a few bushes or even a low tree may break the monotony of the landscape. On the lower ridges and hill tops are low growths of scrub oak or arid oak forest. Arid pine-oak occurs on the higher ridges.

In the region of Asunción Nochixtlán, the production of steppe probably is a result of both the poor soil, which fails to hold moisture, and the general lack of rain. The town receives an annual average of only 12.2 in., falling primarily from June through October, with small amounts in November, December, April, and May and none from January through March. In the San Felipe Ixtapa area, however, steppe must be largely an edaphic habitat, since this town receives an annual average of 29.6 in. of rainfall, easily enough to support arid temperate scrub.

The Oaxaca Valley contains some areas of steppe and others of arid temperate scrub, the two occurring in no apparent pattern and impossible to map separately. Here the soil is fertile, and rainfall is adequate to support arid scrub throughout. The presence of steppe is probably a result of man's disturbance, as the valley has been under cultivation for more than 2,000 years (West, 1964: 63). Continual grazing by goats undoubtedly aids in keeping arid temperate scrub from reclaiming the area.

All areas of steppe receive some frost and hence are temperate in climate. Temperatures are similar to those in
areas of arid temperate scrub. Asunción Nochixtlán has an average annual temperature of 65.3°F., with an average monthly range of 60.0°F. (December) to 70.7°F. (May). Rainfall and temperatures in the Oaxaca Valley are discussed under the section on arid temperate scrub. In the north-central steppe there are few streams and no ponds. During the infrequent rains, runoff is swift, leaving little soil moisture to support plants. The Oaxaca Valley contains a few ponds, marshes, and streams.

Steppe seems to be confined to relatively level regions. Probably this fact is due both to the restriction of prolonged cultivation to flatter areas and to the lack of physiographic relief to produce convective rainfall. The general level of the underlying geologic formations producing tepetate also exerts an influence. 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 feet. In the north-central region, steppe occurs up to about 7,900 feet, and its lower dividing line from arid temperate scrub, which usually occurs at about 6,500 feet, is determined by the distribution of the lime subsoil.

Savanna

Isolated patches of savanna are scattered over the state below 6,000 feet elevation and within the general range of a number of other major habitats. Only the most extensive savannas have been mapped as solid patches. These are found west of San José Estancia Grande, northwest of
Huahuapan de León, south of Chahuites, east of La Ventosa, and at two points east of Chivela. Savannas too small to be mapped are known to occur in all three Regions: in the Atlantic Region near Temascal, between San Juan Bautista Tuxtepec and Loma Bonita, near Tutla, north of Sarabia, and near Mogoñé; 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 miyes; and in the Pacific Region near Minitán and in the Sierra Madre de Chiapas. In the Tehuantepec region, the habitat map indicates savanna mixed with other habitats from Tehuantepec City east to the Chiapas border and north across the Isthmus as far as the latitude of Guichicovi. Savannas are probably scattered throughout the general range of tropical evergreen forest. On the Pacific side of the Isthmus, grassland is more extensive to the east of La Ventosa than to the west.

The savannas of Oaxaca are open areas of rather evenly distributed grass of short to medium height with scattered trees or shrubs. Trees may be species of palm, pine, or oak or be related to the particular forest habitat surrounding the savanna, including tropical evergreen forest, tropical deciduous forest, arid tropical scrub, or the subtropical portions of arid temperate scrub. Strips or patches of gallery forest, often quite humid and luxuriant, occupy the
beds and other low places, with savanna on the drier ridges.

The height of the trees scattered over the savanna varies considerably. West of San José Estancia Grande, trees range from 10 to 15 feet tall. In areas of tropical evergreen forest, isolated dicotyledonous trees may surpass 100 feet, while palms are known to reach 115 feet in height. Bushes occur 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, such 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 without a detailed knowledge of the species of grass involved. Apparently, however, undisturbed grasslands 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, grass may be very dense and reach several feet in height.

Miranda (1948a) believes that natural primitive savannas once occurred in Oaxaca near San Juan Bautista Tuxtepec but now have been destroyed by man. 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 and Crescentia cujete. 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 liebmii* (up to 115 feet tall). Other large trees are *Ceiba pentandra* (Kopok Tree) and *Enterolobium cyclocarpum* (Guanacaste).

In the grasslands on the Pacific coast near Chicapa de Castro, the small trees are mostly *Byrsonima crassifolia* (Nanche) and *Curatella americana* (Goldman, 1951). The very different savanna occurring on shallow lime soils northwest of Huajuapan de León is dominated by a palm, *Brahea dulcis*, and a close relative of the yuccas, *Dasylirion lucidum* (Miranda and Hernández, 1963: 63).

The Plains of Chivela are covered with a savanna containing widely scattered palms (species unknown) and clumps of small trees and shrubs including *Croton nivea*, *Cordia cana*, *Jacquinia aurantiaca*, *Calycophyllum candissimum*, and *Cassia emarginata* (Duellman, 1960: 32).

Savannas in Oaxaca are not a climatic climax type of vegetation. The origin of Oaxaca savannas is unknown, but most likely they result from a variety of factors. Some probably occur as a natural edaphic habitat in regions having permeable soil horizons lying on top of an impermeable horizon 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 herein considered marshes.

Many savannas, especially those in areas of tropical
evergreen forest and tropical deciduous forest, are probably
man-made, being an aftermath of very early clearing and
cultivation. Maintenance of such savannas requires fire
(natural or man-made), grazing, or repeated cutting, to avoid
long-time reforestation by the natural climatic vegetation.
In Oaxaca, the small number of bird species restricted to
savannas argues for a man-made rather than a natural origin
for this habitat.

Savannas may occur in areas of heavy or light rainfall
but in Oaxaca are most common in regions of seasonal rain­
fall, where the soils are allowed to desiccate during the
dry season. The savannas in the Oaxaca Valley and northwest
of Huajuapan de León, which range between 5,000 and 6,000
feet in elevation, may be termed subtropical, as they occur
in areas that occasionally receive mild frosts. Streams are
scarce in savannas, but temporary ponds frequently form
during the rainy season, and permanent ponds supporting
aquatic marsh vegetation often occur in association.

**Restricted Terrestrial Habitats**

**Humid gallery forest**

The term humid gallery forest is here restricted to
patches or strips of lush, mostly evergreen forest occurring
in otherwise arid regions. Such forests are the result of a
high water table, either along streams and rivers or at the
edges of coastal bays and lagoons.
Gallery forests are too small in extent to be mapped. They are confined to that area on the habitat map occupied by tropical deciduous forest. Strips of tall trees following rivers far into the Interior are not here considered humid gallery forests since they are invariably too limited in extent to produce a humid atmosphere and are completely or mostly deciduous. Patches of humid gallery forest occur around the perimeter of most coastal lagoons and bays. In such areas the usual distribution of habitats is one in which mangrove swamp occupies the flooded 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 humid gallery forest containing scattered palms. The border between humid gallery forest and the adjacent tropical deciduous forest or arid tropical scrub is very abrupt, following along the first rise in terrain, with the gallery forest restricted to the low ground. From this point, humid gallery 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.

In the region north and east of Tapanatepec along the foothills of the Sierra Madre de Chiapas, humid gallery forests are quite extensive and have been termed tropical evergreen forest by Leopold (1959: 32). A large humid
gallery forest occurs near Minitán at the edge of Laguna de Alotengo in extreme southwestern Oaxaca. This forest is evergreen, although during the dry season leaves are shed at a greater rate than in the rainy season. There are two tree strata, the upper containing trees 40 to 80 feet tall and the lower 15 to 40 feet tall. Stratification is not clear-cut; the two strata merge to a certain extent. Some trees have trunks 6 feet in diameter and buttresses 15 feet in diameter at ground level. The shrub layer consists of scattered clumps of bushes up to 15 feet tall. For the most part, however, the forest is rather open, and the ground 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 sp.). Strangler figs (Ficus sp.) and epiphytes are fairly numerous.

The climate in areas of humid gallery forest is the same as that in adjacent tropical deciduous forest, the former habitat being present in response to a high water table. The dense shade, abundance of foliage throughout the year, and the thick leaf litter all aid in keeping the interior of the gallery forest cool and humid even during the dry season. **Palm forest**

Forests composed completely or primarily of tall palms are occasionally found along the Pacific coast but their extent is too small or too poorly known to permit mapping.
The only extensive palm forest I have seen is found along the main road between Santiago Jamiltepec and Puerto Escondido and stretches from the Río Grande southeastward for a distance of some 15 miles. The palms here reach 50 feet in height and are so dense that shading is complete, and the forest is very dark. 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.

Strips or small patches of palm forest are also found at the edges of some coastal bays and lagoons, between the narrow strip of savanna bordering the mangrove-edged open water and the humid gallery forest on the inland side. Apparently, palm forest in Oaxaca is an edaphic habitat, occurring where the water table is higher than that supporting humid gallery forest and where periodic flooding occurs during the rainy season.

**Fir forest**

Small patches of fir forest (Abies) occur in the high mountains of the Mesa del Sur. These are not mapped separately but are included within the general range of humid pine-oak forest. Fir forest has been noted in the Sierra Aloapaneca and Sierra de Juárez, on the northeastern slope of Cerro Zempoaltepec, and near La Cieneguilla in the Sierra de Miahuatlán. It doubtless occurs elsewhere.

The approximate elevational limits of fir forest are between 8,200 and 9,800 feet (probably above 10,000 feet 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. Little is known about the structure of fir forest in Oaxaca. Probably, the forest also contains pines and oaks and in appearance is similar to humid pine-oak forest.

*Abies religiosa* is listed by Duellman (1960: 32) for Cerro Zempoaltepec and by Goldman (1951: 224) for La Cieneguilla. Martínez (1948a), however, in his monograph on Mexican firs, indicates that *religiosa* is not found south of the transverse volcanic axis and records three species for Oaxaca: *hickeli*, *quatemalensis*, and *oaxacana*.

**Juniper scrub**

In certain parts of the arid portion of the Interior of the Mesa del Sur occur patches of juniper scrub. Too little known to map, these are included within the general range of arid pine-oak forest with which they are allied. Juniper scrub is found between the arid temperate scrub below and arid pine-oak forest above and when present occupies a narrow elevational spread of about 400 feet. It may occur anywhere between 4,700 and 7,000 feet in elevation. Juniper scrub has been noted at 5,000 feet elevation 7 miles 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 miles southwest of the turnoff from the Pan-American Highway southwest for about 23 road miles).

The dominant trees are *Juniperus flaccida* and *Quercus*. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
The trees are short and irregularly spaced, occurring singly or in clumps. Between them are short 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. Probably, arid pine-oak forest would develop in such areas were it not for the shallow soil and lack of moisture.

Although no detailed climatological data are available for juniper scrub areas, there can be little doubt that the climate is temperate and rather arid. Rainfall is seasonal and probably in amounts intermediate between those received in areas of arid pine-oak forest and arid temperate scrub. Runoff is rapid as a result of the rocky terrain. Frosts are probably infrequent and not severe.

**Man-made 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 temperate scrub, and steppe may well be a result of the inroads of civilization, although each habitat also exists naturally.

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

Improper forestry techniques can destroy such a large percentage of the tall trees that the understory, thus exposed to the deleterious effects of the climate, can no longer exist. In sloping terrain, which includes most of Oaxaca, the inevitable aftermath is extreme erosion. With the soil washed away, hundreds of years may pass before another forest can develop. Much of the Interior of Oaxaca, once completely covered with 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 remainder of the forest, until nothing is left but charred ground. So poor is the soil in areas of 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 then 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 in steeper terrain are not immune. In the arid pine-oak belt, forests are cut for the planting of corn, beans, apples, peaches, and quinces. In humid lowland areas, 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 the fact that at the same time he creates new habitats, which allow some bird species (particularly those associated with open habitats) to invade otherwise unsuitable areas. Unnatural or greatly modified habitats resulting from the activities of man include fincas, guamil, cultivated land, grazed land, and man-made structures. These are not indicated on the habitat map, as they are often too small or their distributions too poorly known.

**Fincas**

Coffee fincas are found throughout much of the humid tropical forests of Oaxaca within the general range of tropical evergreen forest, tropical semideciduous forest, and the lower portions of cloud forest. Most of the larger trees remain uncut to provide shade for the coffee plants. Most underbrush, however, is removed. In such areas, the brush-inhabiting avifauna is usually destroyed along with its
habitat. Tree-dwelling species are much less affected. Since, however, coffee fincas are seldom kept clean, herbs and patches of brush return and can support at least part of the natural avifauna.

Guamil

Guamil is the term used by Carr (1950) to denote abandoned farm land that has been allowed to grow up to thickets of brush, vines, and saplings. Also included in guamil is the grass-herb-vine successional stage just prior to the brush stage; usually the formerly cultivated plants, now gone wild, make up a portion of this stage. Once the saplings have become large enough to shade out the grass and herbs, the habitat is considered part of the natural forest association. Thus guamil includes only the first successional stages in the development of the naturally-occurring climax vegetation.

Cultivated land

Cultivated land includes any area under active cultivation. Included are the plants being grown, the weeds that have escaped removal, and the vegetation along fence rows. In the Oaxaca Valley and in part of the Pacific lowlands of the Isthmus of Tehuantepec, some cultivated land is irrigated. Most cultivated fields are used for subsistence agriculture and are quite small, are poorly tilled, and contain weeds or even a few small bushes. Hence, the differences between guamil and some cultivated land are not marked.
Grazed land

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

Structures

Included here are all man-made structures, including piers, bridges, roads, and all types of buildings, in or out of towns.

Open Aquatic Habitats

Included in this category are all aquatic habitats that contain open nonforested waters. Open habitats may, however, have a forested edge ("forest-edged aquatic habitats"); such forests are not flooded but border the open water only by chance. For additional discussion of open aquatic habitats, see the chapter entitled General Physiography.
Lakes, ponds, and reservoirs

Lakes, ponds, and reservoirs are fresh-water habitats. Only the open water is here considered part of the habitat. Marsh or swamp edges are considered separate habitats. Few bodies of fresh water in Oaxaca are permanent. Most arise as temporary ponds that fill depressions during the rainy season. Other wet areas are marshy throughout and are not here treated as true ponds. There are only two large bodies of fresh water in the state, both 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 recent construction, these reservoirs, unlike lakes, lack aquatic vegetation and some aquatic animals. Future development should result in lake conditions.

Rivers and streams

In the Interior, waters of rivers and streams are usually shallow, cold, and swift-moving. In the lowlands, especially in the wider portions of the Atlantic lowlands, waters are warm, muddy, sluggish, and fairly deep. Because of the movement of the water, other habitats, such as swamp and marsh, are usually restricted to backwaters. Rivers provide excellent avenues for dispersal of birds that feed in the shallows along the banks or dive into the mid-stream currents. Because of the seasonality of the rainfall, all rivers, even those in the humid Atlantic lowlands, are fullest during the rainy season. Many of the streams and
smaller rivers dry up completely during the dry season, especially in the Interior and Pacific Regions.

Coastal bays, lagoons, and harbors

Coastal bays are bodies of saline water, usually rather deep, directly connected with the ocean by way of broad open mouths. Usually, Oaxaca bays are bordered by rocky hills supporting arid tropical scrub or tropical deciduous forest.

Man-made harbors are similar to natural bays in that the waters of both are saline, deep, and directly connected with the ocean. Harbors are frequently made from natural bays, but differ in that they are more completely lined with man-made structures and may have their bottoms dredged occasionally. The only large harbor in Oaxaca is located at Salina Cruz.

Coastal lagoons have waters that may be saline, brackish, or fresh. In general, these lagoons are shallow, with edges supporting mud flats or mangrove swamp. The large lagoons in the Isthmus are, however, fairly deep in their middle portions. The waters of Laguna Superior are now being utilized for salt production. Large basins constructed in the shallower portions are occupied by mud flats. Water is pumped into these basins, allowed to evaporate, and the salt crystals collected. The shallow open water of the lagoons and salt basins provide foraging habitat for pond ducks, herons, and large shorebirds.

Open ocean

In this category I have included 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. Sea turtles, sailfish, tuna, flying fish, and many other fish are numerous, and an occasional sea snake may be seen. Off Puerto Angel, the water is usually quite calm, permitting small outboard motorboats to venture far offshore. The shallower waters of the Gulf of Tehuantepec, however, are usually quite rough as a result of the constant winds that blow across the Isthmus from the north or south. Away from the Gulf of Tehuantepec, the great depth of the ocean near shore probably accounts for the occurrence and abundance of oceanic birds within three miles of the coast.

Marshes

Marshes are nonforested areas, with permanently high water tables, that are flooded throughout most or all of the year and hence can support permanent hygrophytic or aquatic vegetation. I know of no saline or brackish marshes in the state. Areas of savanna 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 usually found at the edge of drainage ditches, ponds, lakes, or fresh-water lagoons. The most extensive marshes I have seen in the state are located in the region between San Juan Bautista Tuxtepec and Loma Bonita. The area around Tehuantepec City once supported many large marshes, but most of these have been drained for cultivation, and the marsh
vegetation is now confined largely to drainage ditches. I have noted other marsh vegetation at the mouth of the Río Tonameca, around two ponds near San José Estancia Grande, along a river just east of Putla de Guerrero, at a pond near Santa María Coyotepec, and in drainage ditches at numerous points in the Tehuantepec region.

Vegetation includes greases, sedges, and various types of floating plants. Short shrubs, such as willows (*Salix*), usually edge marshy areas or are scattered among the grass. Miranda (1948a) gives some of the plants found in association with what he calls marshy prairies: *Andropogon bicornis* (grass over 3 feet tall), *Solanum diversifolium* (spiny bush 3 to 6 feet tall), *Mimosa pigra* (leguminous bush 3 to 6 feet tall), and *Cassia reticulata* (leguminous plant 6 to 20 feet tall).

**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, 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 Chahuites; at and near Puerto Angel, Salina Cruz, and Puerto Escondido; at the mouth of the Río Tonameca; and near Minitán.

**Sand dunes**

Some of the sand beaches that are 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. One such area forms the narrow strip of land, one to two miles wide, on which San Mateo del Mar is located. Goldman (1951: 222) states that these dunes support salt grass (*Distichlis*). A similar area is located between the ocean and Laguna de Alotengo.

**Mud flats**

Mud flats, open areas of bare mud, may occur at the edges of any aquatic habitat in the state but are extensive only in association with shallow coastal lagoons. The largest mud flats that I have seen in Oaxaca are located at Laguna de Alotengo and at the edges of the large lagoons on the Pacific coast of the Tehuantepec region. At Laguna Superior such mud 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, while beneath the shallow waters, the mud is soft and may be a foot deep.

**River bars**

In most of the larger rivers are ridges of rock or sand, which may be exposed permanently or only during the dry
season. These afford feeding and breeding sites for a number of resident birds, notably Least Terns, Lesser Night-hawks, and Collared Plovers.

**Forested Aquatic Habitats**

Forested aquatic habitats are forested areas that are flooded throughout most or all of the year. These include fresh-water swamp and mangrove swamp. Gallery forests along the coast or in flood plains of rivers are inundated occasionally during the rainy season but never for long periods of time.

**Mangrove swamp**

There are two types of mangrove swamp in Oaxaca. One type occurs in permanently flooded areas, in rather deep water, and is composed of dark-leaved Red Mangrove (*Rhizophora mangle*). These trees are frequently quite large and dense. The numerous stilt roots often form so thick a tangle that penetration is possible only by walking by the roots themselves. Shade is complete. Deepest waters are without bushes or other types of trees.

A second type of mangrove swamp, composed of Black Mangrove (*Avicennia nitida*), occurs where the waters are shallower or occasionally disappear completely during parts of the dry season. These plants send up short vertical pneumatophores in a circular array around the trunk. The swamp may be negotiated by carefully stepping between the
rootlets. The pale-leaved trees are small and seldom produce a complete canopy. The ground may be bare mud, but on higher ground in the vicinity of the trees there may be a sparse cover of grass or low succulents.

Mangrove swamps are found in saline or brackish water and are scattered in patches along the length of the Pacific coast wherever there are lagoons. On the habitat map I have shown mangrove swamp at the edges of all coastal lagoons, although in many cases the distribution is based on theoretical grounds rather than direct observation.

**Fresh-water swamp**

Fresh-water swamps are forested areas permanently or semipermanently inundated by fresh water. The only forest of this type that I have seen is a small patch at the mouth of the Río Tonameca. Miranda (1948a: 111) lists the following plants in a swamp forest near San Juan Bautists Textepec: *Pachira aquatica* (Shaving-Brush Tree), *Coccoloba schiedeana*, and *Chlorophora tinctoria*. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
PLAN OF THE SPECIES ACCOUNTS

In writing species accounts, I had in mind three primary goals. First, I have attempted to present a clear and concise summary of the status of each species in the state of Oaxaca with respect to such information as relative abundance, seasonal occurrence, habitat preference, geographical and elevational ranges, and breeding evidence. Second, in an attempt to bring the literature up to date, I have presented all Oaxaca data of which I am aware for those species previously unreported or for which records are few. Third, I have tried to indicate gaps in our knowledge, so that future workers will have some guide for further research.

The species of birds recorded for Oaxaca have been divided into three categories. The main list includes the 669 species that in my opinion have been reliably recorded within the state. Of these, 651 are supported by specimens that I have examined personally. Of the remaining 18 species, 9 are supported by published specimen records, 8 by sight records only, and 1 by a published record with the basis unspecified. Each of the 18 has its scientific and vernacular name enclosed in brackets ([]); I have not employed the usual procedure of enclosing in brackets only those species
whose occurrence is unsupported by a specimen. An additional 34 species and 1 hybrid, said to have occurred in the state but not, in my opinion, on the basis of wholly acceptable records, are given in the Hypothetical List. An asterisk (*) marks each of the 76 species for which there is no previous acceptable record in the literature.

The sequence of families, genera, and species follows Eisenmann (1955). The Scientific nomenclature for the most part follows Eisenmann (1955) or the American Ornithologists' Union Committee on Classification and Nomenclature (1957). Where subsequent taxonomic studies have indicated desirable changes or where different studies have disagreed, I have given a literature reference or presented my evidence for following a particular usage. Vernacular nomenclature usually follows Eisenmann (1955) except where deviation from A. O. U. (1957) usage has seemed to me unwarranted or undesirable or where subsequent taxonomic changes incorporated herein have necessitated correlated vernacular changes. I have used vernaculars not found in one of these two publications in only two instances where taxonomic changes were not involved. These are Northern Beardless Flycatcher and Wied's Flycatcher, both taken from Blake (1932). Policies of hyphenation and capitalization follow Eisenmann (1955) except in the case of Great Crested Flycatcher, the name employed by the A. O. U. (1957).

Usually, I have confined my discussions to the species level. An adequate analysis of the numerous intricate
subspecific problems in the state must await a more extensive future work. I have confined my remarks regarding subspecific variation to the cases in which doubt exists whether two forms are full species or races of a single species. Even in these cases, I have not attempted to resolve the problems, since the issues involved require thorough individual studies far beyond the scope of this survey.

In the course of preparing this report, I have examined more than 14,000 Oaxaca specimens housed in museums in the United States and México. All specimens mentioned in the species accounts are skins unless otherwise noted. For all specimens listed in detail in the species accounts and not located in the Louisiana State University Museum of Zoology, I give either a museum catalogue number or a reference to a publication. If the former is the case, the specimen has been examined recently by myself or another ornithologist; if the latter is true, the present location of the specimen is unknown to me. All specimens mentioned without a museum number or citation are to be found in the Louisiana State University Museum of Zoology.

Abbreviations used for the various museums are as follows: American Museum of Natural History (AMNH); A. R. Phillips Collection, México City (ARPC; numbers are the original field numbers of Phillips); Berlin Museum (BM); British Museum (Natural History) (BMNH); Cornell University (CU); Field Museum of Natural History (FM); G. M. Sutton Collection, Norman, Oklahoma (GMSC); Western Foundation of
Vertebrate Zoology, E. N. Harrison Collection, Los Angeles (HC); Louisiana State University Museum of Zoology (LSUMZ); Museum of Comparative Zoology, Harvard University (MCZ); Moore Laboratory of Zoology, Occidental College (MLZ); Museum of Vertebrate Zoology, Berkeley (MVZ); United States National Museum (USNM); University of Kansas, Museum of Natural History (UK); University of Michigan Museum of Zoology (UMMZ).

In the interest of saving space, I have used only last names for those people who are well known or are mentioned frequently in the text. These people are as follows: Mario del Toto Avilés, Delwyn G. Berrett, Franklin M. Berrett, Adolphe Boucard, Ferdinand Deppe, Don A. Fenochio, Edward A. Goldman, Chester C. Lamb, John J. Morony, Edward W. Nelson, Eugène Rébouch, Warren Rook, Auguste Sallé, William J. Schaldach, P. W. Shufeldt, A. L. François Sumichrast, Larry L. Wolf. In all other cases, I have used initials or full names or have given a citation.

Each species account is headed by the scientific name, the author of that name, and the vernacular name. The first paragraph is a summary of data concerning status, breeding, dates, and elevations, in that order. Complete information is presented in this paragraph only for those species known from very few records. If the occurrence of a species is based on many records, but the bird has not previously been recorded for the state or its status in Oaxaca is poorly documented, succeeding paragraphs detail the information on
which the summary paragraph is based. Taxonomy or miscellaneous information is discussed in subsequent paragraphs. Errors in the literature or on specimen labels are presented only when deemed important. Forms listed as subspecies herein but possibly deserving full specific rank are accorded separate summary paragraphs.

The status of each species is discussed in relation to relative abundance, seasonal occurrence, habitat preference, and range. Statements as to probable or possible status are given for many species and may be used as guides by future workers. Such information is based on the limited information available for Oaxaca and on the known status outside the state. For bracketed species, the first paragraph usually begins with a statement as to the number of specimens examined, the number of published specimen records, and the total number of sight records, published or not. The term "record" refers either to a specimen or a sighting. Two or more records are considered different if they involve differences in date or locality.

**Status**

**Relative abundance**

Relative abundance is presented according to the following scale: abundant, very common, common, fairly common (the "not uncommon" of some authors), uncommon, very uncommon, rare, very rare, casual, and accidental. I have attempted
to assign to each species an abundance rating in relation to other closely related species, usually on the family level. Conspicuousness of each species is taken into account, as is the amount of time workers have spent in areas where the species occurs. Some authors have attempted to define abundance numerically, basing their terms on the number of times a species has been observed and taking into account all variables. Such a scheme, while perhaps desirable, is impractical for the birds of Oaxaca because of insufficient data.

**Seasonal occurrence**

Seasonal status is indicated by the terms presented in the following outline:

**Resident.**—Permanent and summer residency imply probable breeding.

Permanent.

Summer.

Winter.

**Migrant.**

**Transient.**—Individuals of a species that traverse all or a given part of the state without prolonged stops.

Spring.

Fall.

**Nontransient.**—Summer and winter residents during their periods of arrival or departure.
Visitant.—Wanderers, occurring irregularly and for short durations.

Spring.
Summer.
Fall.
Winter.

**Habitat preference and range**

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. The reasons for this conclusion are discussed elsewhere in this report. 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 have listed all habitats in which each species is known to occur. By referring to the major habitats (Figure 1), by understanding the information presented in the section on habitats, and by allowing for variations explained in each species account, the reader should usually be able to 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 on the habitat map and are always capitalized in the
text to distinguish them from the five physiographic regions of Oaxaca (see the chapter entitled General Physiography) and from such terms as "Tehuantepec region" and "Isthmus region."

The boundaries between the three ecophysiographic Regions, as this term implies, are based on both the physiography of the state 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 slope 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 usually follows the upper limits of tropical evergreen forest and tropical deciduous forest. In the Río Tehuantepec basin, the line delimiting the Interior is drawn along the lower, river-facing edges of arid temperate scrub or (where this habitat is not present) arid pine-oak forest. Thus the Interior encompasses all solid areas of humid pine-oak forest west of the Isthmus and all arid temperate scrub and steppe in the state. The Interior ends at the western edge of the Isthmus. The line separating the Atlantic and the Pacific Regions in the Isthmus approximates the continental divide. In the Sierra Madre de Chiapas, the single ecophysiographic boundary follows the southern edge of cloud forest.

The ecophysiographic Regions should not be confused
with drainage slopes. While both the Atlantic and the Pacific Regions occur completely within their respective Atlantic and Pacific slopes, neither embraces an entire slope. The Interior includes parts of both slopes.

Describing range of birds in terms of ecophysiographic Regions serves two purposes: (1) to give the casual reader a quick broad picture of distribution; (2) to facilitate the description of range in terms of habitat. Also used in describing range is the Isthmus of Tehuantepec, defined as that area whose Oaxaca portion is delimited by west longitudes 95°10' and 94°40', or as a north-south strip of land extending between the gulfs of México 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 in this area coincides with the ecophysiographic boundary between the Atlantic and Pacific Regions. The phrase "across the Isthmus," unless otherwise noted, means along a north-south axis from one slope to the other.

Localities of record are also used to delimit ranges. The term "lowlands" is used only in reference to the Atlantic and Pacific Regions and is defined as the areas below 300 feet elevation. The reader should interpret ranges within the framework of the stated elevations. For example, a statement may say "common in tropical evergreen forest," but if the range of elevations is given as "sea level to 2,000
feet," the species is restricted to that portion of the tropical evergreen forest below 2,000 feet.

Distances are given in miles. Distances in kilometers are used only when so recorded on specimen labels or in the literature; in such cases I add, in parentheses, the equivalent in miles. Under two conditions, 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, and when I suspect that a record was obtained in the vicinity of a town rather than actually within the town limits. The latter is done only when the section on elevations questions the elevation (and hence locality) of the record; if the elevation section does not mention the locality, no quotation marks are used, even though for all old records the exact point of record probably was rarely within the limits of the town given as the locality.

Breeding Evidence

A special subdivision is devoted to breeding evidence. The usual method employed in check-lists 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 may 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. A system of symbols is necessarily based only on the author's opinions. In addition, such a scheme does not reveal the type of information on which the author bases his conclusions. Obviously, no system of symbols can take into account all grades of evidence. 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. This scale contains all the major types of breeding evidence that may be obtained for a species. The sequence employed is a 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 of the scale are the categories that represent the weakest evidence. For each species, only the highest-ranking datum according to the scale is usually given. Presentation of this datum 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. In some cases, if the data do not fully meet the requirements of the most similar entry in the scale, I also give the next highest category for which there is evidence. Data not matching the scale are followed by a reference to a publication or a specimen label. For colonial species I
give all important data concerning each known rookery. For unusual breeding records, I frequently present details for the categories high on the scale. Breeding evidence is given only for those species that at least probably breed in the state. If a species is considered a migrant, visitant, or only a possible breeder or possible permanent resident, or if all known breeding data have already been presented in the summary paragraph, the breeding evidence section is omitted. The scale employed for breeding evidence is presented below.

Prejuvenal.—The term "prejuvenal," coined herein, denotes an individual that has left the nest but has not yet attained full growth of its 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 is used only in reference to nidifugous birds, the term "prejuvenal" may be applied to both nidifugous and nidicolous species. Some species (e.g., hummingbirds and swifts) probably lack a prejuvenal stage. Unless otherwise stated, reference in the species accounts to a prejuvenal means that a study skin has been examined.

Nest with young.—An examined specimen of a nestling is considered equivalent evidence.

Nest with eggs or nest with one egg.
Active nest completed, contents unknown.—This and the following four categories imply nests used for breeding. In the case of species known to build roosting nests, data for these categories are automatically suspect.

Active nest completed but empty.

Nest under construction.

Active nest, condition unknown.—Herein employed primarily for hole-nesting species.

Adults carrying nest material.

Hard-shelled egg in oviduct.

Soft-shelled egg in oviduct.

Egg without shell in oviduct.

Ruptured follicle or ruptured follicles.

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

Copulation observed.—This and the next category probably deserve equivalent position on the scale.

Enlarged testes (...mm).—If measurements of the testes or enlarged follicle are unknown, or if either follicles or testes are only slightly or moderately enlarged, evidence is considered incomplete and the next highest known category is also given. 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 accounts.

Courtship flight observed or courtship display observed.

Range.—This and the following two categories are always given together. If all evidence considered under one of these three categories indicates breeding, the unmodified name of that category is given. If some but not all evidence within one of these categories indicates breeding, the word "possibly" or "probably" is added to that category. If none of the evidence for any one of these categories indicates breeding, the modifier "not" is used. The breeding evidence section is omitted if both range and date categories are negative.

Considered in evaluating range as breeding evidence have been the known facts regarding the range of a species outside Oaxaca; the distance from Oaxaca to the nearest area of known breeding; whether a species breeds on only one or on two or more sides of Oaxaca; whether or not continuity in habitat exists between Oaxaca and the known breeding range; and the degree of localness exhibited by a species. In the last case, a species known to be local in its breeding distribution has been considered a less likely breeding prospect than a wide-ranging species.

Habitat.—Habitat is used as breeding evidence if a
A species has been recorded in Oaxaca in its proper breeding habitat. This category is never used alone but must be supported by evidence from either range or dates.

**Dates**—Taken into consideration here are the sedentary versus nonsedentary habits of the species and its known dates of occurrence. A species is considered a more likely breeding prospect in the state 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 occurrence, whether or not it is for the breeding season, is regarded as conclusive. For a nonsedentary species, lack of a breeding season date negates the date category, and the phrase "not dates" is given.

**Dates**

This subdivision is used primarily to indicate extreme dates for summer residents, winter residents, and visitants, 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 unmodified word "dates" is used to mean "extreme dates." If a species falls into more than one
seasonal occurrence category (e.g., is both a transient migrant and a winter resident) and the dates are known for both periods, phrases such as "extreme dates," "migration periods," or "winter dates" are used. Miscellaneous dates falling outside a normal continuous period usually are listed also, before or after the delimiting dates of the period; in some instances, such miscellaneous dates are discussed in detail in the first paragraph, and the unmodified word "dates" is replaced by a phrase like those mentioned above.

Miscellaneous notes, such as a known arrival date at a given locality, are sometimes presented in this subdivision. The date subdivision is omitted if all known dates or those dates normally placed in the date section have already been mentioned.

Elevations

The range of elevations for each species is given in a separate subdivision at the end of the first paragraph. Elevations presented are the extremes that have actually been recorded or (in rare instances) have been deduced from a locality of record if that locality is in flat country. Many records, especially older ones, lack elevation data.

In parentheses following the known extremes are the localities of record that may exceed the maximum or minimum known elevations but for which no exact elevations are
available. Such cases arise under three conditions: when the exact point of record is known but the elevation there is not; 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 or hilly country could be several hundred feet higher or lower than the town; or when neither the exact location of the point of record nor its elevation are known. Most old records fall into the second category. If such a questionable locality is used in the elevation subdivision, but elsewhere in the species accounts my wording implies that the record was obtained "at" the town, quotation marks enclose the name where it occurs outside the elevation subdivision.

Other localities, not mentioned in the elevation subdivision, may also be questionable in this light, but no quotation marks are used. The reader should be aware that virtually any locality, when recorded simply as a town name, may be only approximate.

In a few instances, only one extreme elevation is known and the other is represented only by a town name. In such a case, I precede the questionable extreme with the word "about" and then give the locality and its elevation in parentheses. Recorded extremes well outside the normal range are separated from the latter by semicolons.

All elevations are assumed to be land elevations at the points from which observations were made. Extreme elevations
are given to the nearest 50 feet. If on a specimen label or in the literature an elevation is given in meters, I list it as such and, in parentheses, add its equivalent in feet. The elevation section is omitted for oceanic species or when all known elevations have been mentioned previously in the account.
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 miles southwest of Valle Nacional and south in Isthmus to a point 24 road miles north of Matías Romero. Breeding evidence: range, habitat, and dates. Elevations: 200 to 4,100 feet.

Crypturellus soui (Hermann). Little Tinamou.

Fairly common permanent resident in Atlantic Region in dense undergrowth of tropical evergreen forest, recorded south in Isthmus to Sarabia. Breeding evidence: enlarged follicle (15 mm). Elevations: 250 to 1,500 feet.

Crypturellus boucardi (Sclater). Slaty-breasted Tinamou.

Common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semi-deciduous forest of Sierra Madre de Chiapas. Breeding evidence: prejuvenal; nest with 4 eggs found by Binford on 8 June 1964 on an island in Presa Miguel Alemán 5 miles west of Temascal. Elevations: 200 to 4,900 feet.
Crypturellus cinnamomeus (Lesson). Refescent Tinamou.

Permanent resident, common in Pacific Region between 1,600 and 4,900 feet elevation in tropical semideciduous and humid gallery forests of Sierra Madre de Chiapas and very uncommon in Atlantic Region below 250 feet in tropical evergreen forest from San Juan Bautista Tuxtepec northwest to San Miguel Soyaltepec. To be expected elsewhere in Atlantic Region and in Pacific Region west of Isthmus. Breeding evidence: enlarged follicle (28 mm). Elevations: 100 to 4,900 feet.

Family PODICIPEDIDAE

Podiceps dominicus (Linnaeus). Least Grebe.

Common permanent resident in Atlantic and Pacific Regions on shallow lakes and ponds and in roadside ditches. Only one record for Interior, a single bird that I saw at 5,050 feet elevation in the Oaxaca Valley 1 mile west of Santa María del Tule on 27 May 1964; apparent rarity in the Interior probably due to temperate conditions and to scarcity of suitable habitat. Unrecorded on saline or brackish water. Breeding evidence: range, habitat, and dates. Elevations: sea level to 8,100 feet.

*Podiceps caspicus (Hablizl). Eared Grebe.

One specimen; also two sight records. Status uncertain; probably an uncommon winter resident throughout state on lakes, ponds, and fresh-water and saline lagoons but recorded

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
only as follows: 27 birds seen on 1 December 1961 (including a female collected, 254.5 grams, very fat, ovary small, Binford) and 12 on 2 December 1961 by the Berretts and Binford in Atlantic Region at 200 feet elevation on Presa Miguel Alemán near Temascal; 2 seen by Binford on 9 January 1962 in Pacific Region at sea level at southwestern edge of Laguna Superior 19 road miles southwest of Juchitán.


Uncommon winter resident in Atlantic and Pacific Regions on ponds, lakes, reservoirs, and fresh-water lagoons, occurring southeast in Atlantic Region at least to Temascal and east in Pacific Region at least as far as south of Río Tonameca. Rare late fall breeder in Atlantic Region on a slough near San Juan Bautista Tuxtepec; breeding individuals presumed to be permanent residents, although there are no records for the species between 28 April and 20 November. Probably breeds locally in Pacific Region. Unrecorded in the Interior. Breeding evidence: prejuvenal. Elevations: sea level to 300 feet.

In 1961 on Presa Miguel Alemán, the Berretts and I recorded 7 Pied-billed Grebes on 11 February, 30 on 1 December (including a male collected, 444.7 grams, moderately fat, testes slightly enlarged, Binford), and 10 on 2 December. At a small pond 9 road miles west-northwest of San José Estancia Grande, I saw a single individual on 14 and 15 February 1964. On a fresh-water lagoon at the mouth of the
Rio Tonameca, Morony and I observed 8 on 19 April and 27 on 28 April 1964 (including a female collected, 344.1 grams, very fat, largest follicle 3 mm, Binford).

On 20 November 1961 at 100 feet elevation on a small slough 1 mile southwest of San Juan Bautista Tuxtepec, I observed two groups of young Pied-billed Grebes. One group consisted of five, full-sized, stripe-headed immatures, attended by two adults. Nearby was a group of five, small, unattended downy young, one of which I preserved as a specimen (sex?, 60.3 grams). 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 immatures.

Family PROCELLARIIDAE

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

Five specimens; also two sight records. Status uncertain; probably an irregular winter resident or a nonsummer visitant; occurs on open ocean, sometimes within 100 yards of shore.

I have observed this species on four of the eleven trips taken out of Puerto Angel; all specimens were collected about 3 miles offshore; observations extend to about 10 miles offshore. On 20 January 1962 the Berretts and I saw 15 Wedge-tailed Shearwaters, of which 3 were collected.
(male, 318.2 grams, little fat, Binford; male, 320.4 grams, little fat, D. G. Berrett; female, 334.4 grams, moderately fat, D. G. Berrett; all possessed small gonads). In 1964 Morony and I saw 25 birds on 20 April (including a female collected, 384.2 grams, moderately fat, ovary small, Morony), 34 on 21 April (including a male collected, 358.0 grams, moderately fat, testes small, Morony), and 21 on 22 April. Birds in light phase far outnumbered those in dark phase; only one of the five specimens was in dark phase (21 April).

On 25 April 1963 P. R. Lenna and L. F. Kibler saw a single bird flying west about 100 yards off the breakwall at Salina Cruz (Lenna, 1963: 5).

*Puffinus auricularis* Townsend. Townsend's Shearwater.

Fairly common winter resident on open ocean to within at least 1 mile of shore. Dates: 30 September to 22 April.

This shearwater was seen between 1 and 10 miles from shore on seven of the eleven oceanic trips made out of Puerto Angel. In 1961 the Berretts and I made the following observations: 30 September, 45 seen, of which 4 were collected (male and female, 315.4 and 344.4 grams, respectively, both moderately fat, with small gonads, and collected by Binford; two males, 352.8 and 351.5 grams, the latter AMNH 776558, both very fat, with small testes, and collected by D. G. Berrett); 9 October, 250 seen, of which 1 was taken (male, 358.3 grams, very fat, testes small, Binford); 11 October, 50 seen. On 20 January 1962 we observed 5 birds, of which 1
was collected (male, 255.6 grams, little fat, testes small, D. G. Berrett). In 1964 Morony and I saw 5 on 20 April (including a female collected, 321.0 grams, moderately fat, ovary small, Morony), 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): 2 females, 33.4 and 31.2; 4 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 collected on 20 January had worn wings and tail and was molting the body feathers; the short wing (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.

Known only from two records obtained on open ocean 3 miles off Puerto Angel: one male (133.9 grams, moderately fat, testes very small) collected by me on 29 September 1961; and two males collected (133.1 grams, Binford; 147.3 grams, D. G. Berrett; both with moderate fat and very small testes) and another bird seen on 9 October 1961. Status uncertain; occurs on open ocean, where probably a very uncommon nonsummer visitant but so far recorded only in fall. Unrecorded elsewhere in México.
*Loomelania melania* (Bonaparte). Black Petrel.

Common transient migrant on open ocean from 1 to at least 10 miles offshore. Possibly an uncommon winter resident but so far recorded only in spring and fall. Dates: 5 March to 4 May; 28 September to 11 October.

Black Petrels were seen between 1 and 10 miles offshore on ten of the eleven days spent on the open ocean out of Puerto Angel and on the only trip off Puerto Escondido (5 March); specimens were taken three miles offshore. Wolf and I saw two birds on 3 May and one on 4 May 1961. In the fall of 1961 the Berretts and I recorded the following data: 28 September, 15 seen, of which 2 were collected by D. G. Berrett (male, 46.0 grams; sex?, 46.9 grams); 29 September, 20 seen, of which 3 were collected (male, 45.7 grams, D. G. Berrett; 2 sex?, 46.8 grams, D. G. Berrett, and 49.4 grams, F. M. Berrett); 30 September, 20 seen; 9 October, 8 seen, of which 1 was collected (female, 50.6 grams, D. G. Berrett); 11 October, 16 seen. In 1964 Morony and I observed 18 on 20 April, 11 on 21 April, and 12 on 22 April. On 5 March 1964, between 1 and 9 miles offshore from Puerto Escondido, Morony and I saw three Black Petrels. All specimens were moderately fat. The gonads of the sexable birds were very small.

All birds were flying parallel to the coast, heading east in the fall and west in the spring. They flew rapidly and directly, pausing only briefly to feed. Although no
Black Petrels were definitely identified on my one winter oceanic trip, 20 January 1962 off Puerto Angel, one all-dark petrel was seen. I was informed by fishermen in Puerto Angel that this species is present at least through December.

*Halocyptena microsoma* Coues. Least Petrel.

Common transient migrant on open ocean from 1 to at least 10 miles offshore. Possibly an uncommon winter resident but so far recorded only in spring and fall. Dates: 5 March to 4 May; 28 September to 11 October.

Least Petrels were seen on eleven of the twelve days spent on the ocean off the coast of Oaxaca. On 3 and 4 May 1961 Wolf and I saw several of these petrels within 3 miles of shore off Puerto Angel. In the fall of 1961 the Berretts and I made the following observations within 10 miles of shore off Puerto Angel: 28 September, 3 seen, of which 1 was collected (female, 16.1 grams, moderately fat, D. G. Berrett); 29 September, 8 seen, of which 1 was collected (male, 16.8 grams, moderately fat, Binford); 30 September, 25 seen, of which 3 were collected (male, 14.5 grams, little fat, F. M. Berrett; male, 16.5 grams, moderately fat, D. G. Berrett; female, 16.2 grams, moderately fat, Binford); 9 October, 3 seen; 11 October, 3 seen. All five of the specimens mentioned above had very small gonads.

On 5 March 1964 Morony and I saw nine Least Petrels between 1 and 9 miles off Puerto Escondido. Between 1 and 10 miles out of Puerto Angel we recorded the following data:
20 April, 27 seen; 21 April, 12 seen, of which 1 was collected (male, 16.0 grams, testes very small, Morony); 22 April, 4 seen.

As was the case with *Loomelania melania*, all the Least Petrels were flying rapidly and rather directly, pausing only briefly in order to feed. Invariably, they were flying west in the spring and east in the fall. Although I failed to identify this species on my only winter oceanic trip, 20 January 1962 off Puerto Angel, I did see one all-dark petrel that probably was either this species or a Black Petrel.

Family PELECANIDAE


No specimen examined; one published specimen record; numerous sight records. Uncommon winter resident on coastal bays and lagoons, occasionally wandering out along ocean shore. One record for Atlantic Region, a flock of 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. Dates: 20 October to 2 May. Elevations: sea level to 200 feet.


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.

Family SULIDAE

*Sula dactylatra* Lesson. Blue-faced Booby.

Uncommon winter resident on open ocean from 3 to at least 10 miles offshore. Dates: 28 September to 22 April.

This species was seen between 3 and 10 miles offshore on eight of the eleven oceanic trips made out of Puerto Angel. In 1961 the Berretts and I obtained the following records: 28 September, four seen, of which one was collected (immature male, 1658 grams, little fat, Binford); 29 September, three seen, of which one was collected (adult male, 1759.4 grams, moderately fat, testes small, D. G. Berrett); 30 September, two seen; 11 October, two seen. On 20 January 1962 we observed a single bird. In 1964 Morony and I saw two birds each on 20, 21, and 22 April.


One specimen; also one sight record. Recorded on open ocean about 3 miles offshore from Puerto Angel, as follows: one immature male (1003 grams, little fat, testes very small) collected by Binford on 29 September 1964; two adults seen by Morony and Binford on 20 April 1964. Status uncertain; occurs on open ocean, where probably a very uncommon winter resident.
Sula leucogaster (Boddaert). Brown Booby.

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

About 1 mile 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 have recorded this species on all of our eleven oceanic trips out of Puerto Angel. In 1961 Wolf and I observed 5 on 3 May (including an immature female collected, 1147 grams, little fat, follicles not enlarged, Binford) 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 number is the maximum that I have 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 number of birds observed near Puerto Angel is a reflection of several facts. On some days we did not visit the bird rock and thus failed to record the birds roosting there. On other days we did not visit the rock until late morning, when many of the birds had gone to sea. Finally, there were fewer birds present on the rock in spring and fall than there were during mid-winter.

I have 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. On 5 March 1964 Morony and I saw six birds about 3 miles offshore from Puerto Escondido. At the mouth of the Río Tonameca on 19 April 1964, I saw a single bird flying close to shore.

Family PHALACROCORACIDAE

Phalacrocorax olivaceus (Humboldt). Olivaceous Cormorant.

Very common permanent resident in Atlantic and Pacific Regions, occurring on lakes, ponds, reservoirs, lagoons, and large rivers. One record for Interior, a single bird seen by Binford and Morony on 28 May 1964 on a small lake at 5,000 feet elevation 1 mile west of Santa María Coyotepec. Breeding evidence: a nest with contents unknown found by Binford on 19 April 1964 on a lagoon at mouth of Río Tonameca, the only known breeding site. Elevations: sea level to 5,000 feet.

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, occurring on lakes, ponds, reservoirs, and coastal lagoons and occasionally along rivers. Breeding evidence: one nest under construction and two others completed but with unknown contents found by Binford on 28 April 1964 at mouth of Río Tonameca,
the only known breeding locality. Elevations: sea level to 800 feet.

Family FREGATIDAE

Fregata magnificens Mathews. Magnificent Frigatebird.

Common permanent resident along Pacific coast, occurring on ocean, large saline lagoons, and coastal bays. Occasionally soars a few miles inland and may regularly cross Isthmus of Tehuantepec from one coast to the other. Breeding evidence: 3,000 adults and hundreds of nests containing young found by Morony and Binford on 20 March 1964 south of Punta Paloma on a mangrove-covered island on southern edge of Mar Muerto, the only known breeding locality. Elevations: sea level to 350 feet.

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 miles east-southeast of the town of Jesús Carranza. He postulated that this species may regularly fly overland from one ocean to the other, a supposition with which I concur. Only once have I noted this species inland: a single bird on 10 October 1961 at an elevation of 350 feet about 3 road miles north of Puerto Angel.

Family ARDEIDAE

[Ardea herodias Linnaeus. Great Blue Heron.]
No specimen examined; one published specimen record; numerous sight records. 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, one seen, Wolf and Binford; 1 and 2 December 1961, fifteen 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 (M. T. Cooke, 1946: 254). The only recorded Oaxaca specimen, a bird taken by Sumichrast at Tehuantepec City (Lawrence, 1876: 48), cannot be located. Dates: 19 October to 18 May. Elevations: sea level to 300 feet.

_Butorides virescens_ (Linnaeus). Green Heron.

Common winter resident and uncommon permanent resident, occurring in most aquatic habitats throughout lower portions of Atlantic and Pacific Regions. Should be sought in the Interior. Breeding evidence: at least 25 pairs and numerous nests with eggs found by Morony and Binford on 28 April 1964 at only known breeding location, the mixed rookery at mouth of Río Tonameca. Elevations: sea level to 1,050 feet.

_Florida caerulea_ (Linnaeus). Little Blue Heron.

Fairly common winter resident in shallow aquatic habitats of Atlantic and Pacific Regions. Probably an
uncommon and local permanent resident. Breeding evidence: habitat; probably range and dates; two 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 feet.

**Dichromanassa rufescens** (Gmelin). Reddish Egret.

Common permanent resident on Pacific coast, occurring 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, two birds seen by Morony and Binford at a point 4 road miles southeast of Puerto Escondido on 4 March 1964. Occasionally wanders a short distance inland along major rivers (one specimen, USNM 59775, Tehuantepec City, 28 October 1869, Sumichrast). No certain records for Atlantic or Interior Regions. Record from "Cuicatlan, Oaxaca, Oct. 20, 1923" (Hellmayr and Conover, 1948: 193), presumably the San Juan Bautista Cuicatlán located in an arid Interior valley northwest of Oaxaca City, is questionable in view of improbable locality and lack of substantiating data. Breeding evidence: three active nests with contents unknown found by Morony and Binford on 20 March 1964 on a mangrove-covered island south of Punta Paloma near southern shore of Mar Muerto, the only known breeding site. Elevations: sea level to 100 feet.
Two of the nests in the colony at Mar Muerto 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 7.3 light-phase to 3 dark-phase birds.

*Casmerodius albus* (Linnaeus). Common Egret.

Common permanent resident in shallow aquatic habitats, occurring throughout Atlantic and Pacific Regions but most abundant in lowlands. One record for Interior, two birds seen by Morony and Binford on 28 May 1964 at 5,000 feet elevation 1 mile west of Santa Maria Coyotepec. Only one certain Oaxaca specimen, a male (974.5 grams, little fat, testes 10 X 3 mm) taken by Binford on 18 October 1961 at Laguna Superior 19 road miles southwest of Juchitán; male specimen (USNM 73067) collected by Sumichrast may be from Oaxaca, but label data are not readable. Breeding evidence: nesting records obtained by Binford and Morony in the rookeries at Minitán (10 adults, 5 active nests with contents unknown, 29 February 1964) and mouth of Río Tonameca (34 adults, at least 3 active nests with contents unknown, 19 April 1964), the only known breeding sites. Elevations: sea level to 5,000 feet.


Very common permanent resident in shallow aquatic habitats in lower portions of Atlantic and Pacific Regions.
Breeding evidence: 54 adults and at least 12 active nests each with one to four eggs noted by Morony and Binford on 19 and 28 April 1964 at only known breeding site, the mixed rookery at mouth of Río Tonameca. Elevations: sea level to 800 feet.

*Bubulcus ibis* (Linnaeus). Cattle Egret.

Uncommon early spring visitant in grazed land along entire length of Pacific Region lowlands. Only record for Atlantic Region (Isthmus of Tehuantepec) is also only mid-winter record. Possibly a permanent resident in suitable habitat in lowlands. Dates: 8 January; 24 February to 21 March. Elevations: sea level to 300 feet.

The first record for the state was a group of four birds that the Berretts and I saw along the Trans-Isthmian Highway 11 road miles north of Matías Romero on 8 January 1962; I collected one of the four (male, 312.0 grams, 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 1961-62.

In 1964 Morony and I made the following observations: 4 birds on 24 February and 3 on 25 February at Minitán; 8 on 2 March 12 road miles southeast of Santiago Jamiltepec; 2 on 3 March and 18 on 11 March 3 road miles northwest of Puerto Escondido; 4 on 4 March 4 road miles southeast of Puerto Escondido; 3 on 8 March a few miles northwest of Puerto
Escondido; 2 on 9 March 4 road miles northwest of the same town; and 16 on 19 March at the outskirts of Tapanatepec. The only other record that I can find was obtained by G. H. Lowery, Jr., (pers. comm.) who saw four birds at kilometer marker 757 along the Pan-American Highway about 20 miles northwest of Tehuantepec City on 21 March 1965.

*Hydranassa tricolor* (Müller). Louisiana Heron.

Fairly common permanent resident in shallow aquatic habitats of Pacific coastal plain. No records for Atlantic or Interior Regions. Breeding evidence: six adults and at least two active nests with contents unknown found by Morony and Binford on 28 April 1964 at only known breeding site, the mixed rookery at mouth of Río Tonameca. Elevations: sea level to 100 feet (probably higher at small lake 12 miles by road southeast of Santiago Jamiltepec but exact elevation unknown).

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

Very uncommon winter resident in swamps and at edges of open aquatic habitats, recorded in Atlantic Region only at Presa Miguel Alemán and in Pacific Region only in Isthmus of Tehuantepec. Possibly a rare and local permanent resident in lowlands. Dates: 20 October to 11 February. Elevations: sea level to 200 feet.

I can find only five 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 one adult at Presa Miguel Alemán. In the same year the Berretts and I saw three on 20 October and two on 21 October at the southwestern edge of Laguna Superior 19 road miles southwest of Juchitán and six on 1 December at Presa Miguel Alemán.

_Nyctanassa violacea_ (Linnaeus). Yellow-crowned Night-Heron.

Uncommon bird in shallow aquatic habitats (especially swamps) in lower portions of Atlantic and Pacific Regions; presumably a permanent resident but recorded only from 20 October to 20 May. Breeding evidence: habitat, and probably range and dates. Elevations: sea level to 2,400 feet.

I have examined four Oaxaca specimens of the Yellow-crowned Night-Heron, as follows: unsexed specimen (HC uncatalogued), Valle Nacional, 18 March 1960, Rook; male, 25 miles south of San Juan Bautista Tuxtepec, 23 March 1960, T. Sims; male (637.0 grams, little fat, testes small), Laguna Superior 19 road miles southwest of Juchitán, 20 October 1961, Binford; and male (ARPC 7200), San Gabriel Mixtepec, 1 December 1963.

_Heterocnus mexicanus_ (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 a point 18 road miles north of Matias Romero [specimen labeled "Sarabia, 20 miles north of Matias Romero"], occurring in fresh-water environments within tropical deciduous, tropical evergreen, and humid gallery
forests. Probably occurs as a very uncommon permanent resident elsewhere in Atlantic Region. Breeding evidence: somewhat enlarged testes (right, 14 x 5, left, 25 x 11 mm); range, habitat, and dates. Elevations: sea level to 1,500 feet.

**Ixobrychus exilis** (Gmelin). Least Bittern.

Only one record, a male (USNM 59783) collected by Sumichrast on 29 October 1869 at "Tehuantepec City" (city at 115 feet but elevation at exact point of collection unknown). Status uncertain; probably a rare winter resident in marshes throughout state. Possibly a rare and local permanent resident.

**Botaurus lentiginosus** (Rackett). American Bittern.

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

Family COCHLEARIIDAE

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

Uncommon and local permanent resident in lower portions
of Atlantic and Pacific Regions, occurring in fresh-water swamps and on shores of all other forest-edged fresh-water habitats. Unrecorded in saline or brackish habitats.
Breeding evidence: enlarged follicle (11 mm, with yolk).
Elevations: sea level to 800 feet.

Family CICONIIDAE

**Mycteria americana** Linnaeus. Wood Ibis.

Common permanent resident in shallow aquatic habitats along entire Pacific coastal plain. Only one record for Atlantic Region, a flock of 80 observed by Morony and Binford at 1,000 feet elevation near El Barrio on 3 June 1964.
Breeding evidence: 136 adults and numerous nests containing small young found by Morony and Binford on 29 February 1964 on an island near Minitán, the only known breeding site.
Elevations: sea level to 1,000 feet.

Family THRESKIORNITHIDAE

**Endocimus albus** (Linnaeus). White Ibis.

Common permanent resident in shallow aquatic habitats of Pacific coastal plain. Unrecorded in Atlantic or Interior Regions. Breeding evidence: 240 adults and numerous active nests (three nests containing one, two, and three eggs, respectively) found by Binford on 28 April 1964 in mangroves at mouth of Río Tonameca, the only known breeding site.
Elevations: sea level to 100 feet.
Ajaia ajaja (Linnaeus). Roseate Spoonbill.

Fairly common winter and spring resident in shallow aquatic habitats in lower portions of Pacific Region, breeding during this period. Probably a permanent resident, although unrecorded between 1 June and 9 January. Only one record for Atlantic Region, two birds seen by Wolf and Binford 3 road miles southwest of San Juan Bautista Tuxtepec on 19 April 1961. Breeding evidence: 16 adults with 5 old nests under reconstruction found by Morony and Binford on 29 February 1964 on an island near Minitán, the only known breeding site. Elevations: sea level to 800 feet.

Family ANATIDAE

[Dendrocygna bicolor (Vieillot). Fulvous Tree-Duck.]

No specimen; two acceptable sight records. Rare winter visitant or winter resident in shallow aquatic habitats of Pacific coast southeast at least to Laguna Lagartero. Unrecorded, but possibly a casual winter visitant or winter resident, in Atlantic Region. Possibly a rare permanent resident, most likely to be found in lowlands of western portion of Pacific Region. All dates: January and 28 April. Elevation: sea level.

On 28 April 1964 I saw four birds in a large flock of Black-bellied Tree-Ducks at the mouth of the Río Tonameca on 28 April 1964. Leopold (1959: Table 5, p. 141) saw 30 Fulvous Tree-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. Since no details, however, are mentioned either on the map or in the text, I do not consider this a definite Oaxaca record.

Dendrocygna autumnalis (Linnaeus). Black-bellied Tree-Duck.

Permanent resident in open and forested aquatic habitats at low elevations, fairly common in Pacific Region and uncommon in Atlantic Region. Breeding evidence: range, habitat, and dates. Elevations: sea level to 2,400 feet.

Cairina moschata (Linnaeus). Muscovy.

Very uncommon and local permanent resident in swamps and forest-edged aquatic habitats, recorded in Pacific Region only at Tapanatepec, Santa Efigenia, and Laguna Lagartero and in Atlantic Region only at Presa Miguel Alemán. Breeding evidence: range, habitat, and dates. Elevations: sea level to 800 feet.

[Anas carolinensis Gmelin. Green-winged Teal.]

No specimen; four sight records. Very uncommon winter resident in shallow aquatic habitats of Pacific Region. Unrecorded, but probably a rare winter resident, elsewhere. Dates: January to 21 February. Elevations: sea level to 300 feet.
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, which he lists erroneously as in Chiapas. On a small pond at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande, I saw a male and female on 18 February and a lone female on 19 February 1964. On 21 February 1964 Morony and I saw 14 birds on a pond 2.5 road miles west-northwest of the same town.

**Anas acuta** Linnaeus. Common Pintail.

Fairly common winter resident in shallow aquatic habitats of Pacific Region, with largest concentration on Laguna Inferior. Unrecorded, but probably a very uncommon winter resident in suitable habitat, in Atlantic and Interior Regions. Only one Oaxaca specimen, a female (very fat, ovary small) collected by Morony at 300 feet elevation 9 miles west-northwest of San José Estancia Grande on 19 February 1964. Dates: 7 January to 21 February. Elevations: sea level to 300 feet.

*Anas strepera* Linnaeus. Gadwall.

No specimen; four sight records. Status uncertain; winter resident in shallow aquatic habitats, probably occurring irregularly throughout state; found in greater numbers in some years than in others. Unrecorded in Atlantic and Interior Regions. All dates: January; 19 April. Elevation: sea level.
Leopold (1959: Table 4, p. 137), on an 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 single female at the mouth of the Río Tonameca.

*Anas discors* Linnaeus. Blue-winged Teal.

Fairly common winter resident in shallow aquatic habitats of Pacific Region, with largest concentration on Laguna Inferior. Unrecorded, but probably an uncommon winter resident, elsewhere. Possibly a rare and local permanent resident. Dates: 19 October to 22 May. Elevations: sea level to 300 feet.

*Spatula clypeata* (Linnaeus). Northern Shoveler.

Fairly common winter resident in shallow aquatic habitats of Pacific Region, with largest concentration on Laguna Inferior. Unrecorded, but probably an uncommon winter resident, in Atlantic Region. No record for Interior. Only one Oaxaca specimen, a female (443.9 grams, little fat, small ovary) collected by Binford at southwestern shore of Laguna Superior 19 road miles southwest of Juchitán on 9 January 1962. Dates: 2 December to 22 May. Elevations: sea level to 300 feet.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Mareca americana (Gmelin). American Widgeon.

Fairly common 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, four birds seen on Presa Miguel Alemán near Temascal, 2 December 1961, the Berretts and Binford). No record for Interior. Only one Oaxaca specimen, a female (726 grams, moderately fat, ovary small) collected by Binford at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande on 14 February 1964. Dates: 2 December to 22 May. Elevations: sea level to 300 feet.

Aythya collaris (Donovan). Ring-necked Duck.

One specimen examined; in addition, one published specimen record and two sight records. Status uncertain; probably a very uncommon winter resident in open aquatic habitats 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 feet.

P. L. Sclater (1862: 20) records Boucard specimens from "Oaxaca" [=state of Oaxaca]"; Salvin and Godman (1897-1904 [1902]: 224) cite Sclater; and Griscom, Friedmann, and Moore (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; in text Rojas states (1955: 124), apparently erroneously, that species occurs to "northern Oaxaca."

In 1964 at a small pond at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande, Morony and I recorded the following birds: one specimen (female, extremely fat, follicles not enlarged) collected by Morony on 17 February; four birds seen on 19 February; and one 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 is fourth largest in México (Leopold, 1959: Table 4, p. 137, where Laguna Superior erroneously listed as in Chiapas). Possibly, a rare, non-breeding summer resident (flock of 39 birds seen 15 road miles south of Reforma, 1 June 1964, Binford). No record for Interior. Only one Oaxaca specimen, a male (532.4 grams, little fat, small testes) collected by Binford at 100 feet elevation 1 mile southwest of San Juan Bautista Tuxtepec on 20 November 1961. Dates: 20 November to 1 June. Elevations: sea level to 200 feet.

[Oxyura jamaicensis (Gmelin). Ruddy Duck.]

No specimen examined; one published specimen record; two
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 feet (probably higher at a small lake 12 road miles southeast of Santiago Jamiltepec but exact elevation unknown).

P. L. Sclater (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 Sclater 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 two Ruddy Ducks on a small pond at 100 feet elevation 1 mile southwest of San Juan Bautista Tuxtepec. At a pond 12 road miles southeast of Santiago Jamiltepec on 2 March 1964, Morony and I observed a flock of 36 birds.

Family CATHARTIDAE

*Sarcoramphus papa* (Linnaeus). King Vulture.

Uncommon permanent resident, occurring in Pacific Region in tropical semideciduous and humid gallery forests of Sierra
Madre de Chiapas and in Atlantic Region in tropical evergreen forest northwest at least to Valle Nacional. Should be sought in Pacific Region west of Isthmus. Breeding evidence: range, habitat, and dates. Elevations: sea level to 4,900 feet.

*Coragyps atratus* (Bechstein). Black Vulture.

Permanent resident throughout state, occurring in most terrestrial habitats, but preferring open areas in the vicinity of habitation; abundant in lowlands, uncommon in highlands, and rare in large areas of unbroken forest. Breeding evidence: range, habitat, and dates. Elevations: sea level to 9,000 feet. See *Cathartes aura*.

*Cathartes burrovianus* Cassin. Yellow-headed Vulture.

Two adult specimens; also four sight records. Status uncertain; probably a very uncommon permanent resident along Pacific coastal plain and in extreme lowlands of Atlantic Region; occurs over grassy areas, especially in vicinity of open, shallow aquatic habitats. No fall records; recorded only from 15 January to 6 June. Breeding evidence: hard-shelled egg in oviduct. Elevations: sea level to 100 feet.

In 1964 near Minitán, Morony and I saw two Yellow-headed Vultures on 24 February and one on 25 February. At the mouth of the Río Tonameca we saw one bird on 19 April and three on 28 April; two of the latter were collected (male, 935 grams, little fat, testes 15 x 11 mm, Binford; female, fully-formed egg in oviduct, Morony [egg preserved
by Binford]). On 6 June we saw two birds at 100 feet elevation 7 road miles west of Loma Bonita and another along the road between that town and San Juan Bautista Tuxtepec. A. R. Phillips (in litt.) informs me that he saw one bird 6 miles south of Niltepec on 15 January 1966.

**Cathartes aura** (Linnaeus). Turkey Vulture.

Permanent resident throughout state, occurring 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 solid forest. Numbers augmented by birds from north, both winter residents and transient migrants. Breeding evidence: range, habitat, and dates. Elevations: sea level to 9,700 feet.

On 19 March 1964 at Zanatepec, I witnessed what I believe to have been a migration of Turkey Vultures. During the few minutes in which I watched, two single vultures and two loose groups numbering 7 and 8 birds were observed as they 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.

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, Blacks invariably outnumber Turkey Vultures.
Family ACCIPITRIDAE

*Elanus leucurus* (Vieillot). White-tailed Kite.

Uncommon bird in lowlands of Atlantic Region and south across Isthmus onto Plains of Tehuantepec, occurring in savanna, cultivated land, and grazed land; probably a permanent resident, although recorded only from 1 August to 28 March. Breeding evidence: range and habitat but not dates. Elevations: 100 to 300 feet.

Ten specimens have been collected, as follows: male, 25 miles north of San Juan Bautista Tuxtepec, 28 March 1960, Rook; female (HC 4721), same locality and date, Rook and T. Sims; female, 10 miles north of Matías Romero, 18 November 1960, Rook; female (HC uncatalogued), 10 miles north of Matías Romero, 19 November 1960, K. Wolfe; male, 15 miles north of Niltepec, 20 November 1960, Rook; immature male (381.3 grams, moderate fat, testes small), 11 road miles northeast of Valle Nacional, 12 February 1961, Binford; female (not very fat, largest ovum 3 mm, AMNH 775866), 15 miles north of Matías Romero, 18 February 1961, Schaldach; male (HC uncatalogued), 10 miles north of Matías Romero, 23 February 1961, K. Wolfe; female (no fat, ovary not enlarged), La Ventosa, 1 August 1961, Rook and L. Petite; male, 11 miles north of Matías Romero, 2 August 1961, Rook and L. Petite.

The Berretts and I have observed this species as follows: one adult feeding over a grassy field 4 miles east of
Tehuantepec City on 19 October 1961; one bird seen at a
point 1 mile east of Tehuantepec City on 21 October 1961;
one chasing a Red-tailed Hawk 5 miles east of Tehuantepec
City on 23 October 1961; one observed near San Juan Bautista
Tuxtepec on 30 November 1961; one adult seen 12 road miles
north of Matías Romero on 8 January 1962.

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

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

One record, a specimen of the nominate race (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). Although
Oaxaca is listed by the American Ornithologists' Union Com­
mittee on Classification and Nomenclature (1957: 101) as
within the breeding range of this species, the race and
October date of the only specimen and the absence of other
Oaxaca records indicate that the species has a transient
migrant status only.

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

Uncommon breeder, occurring in Atlantic Region near
aquatic habitats in tropical evergreen forest and in Pacific
Region in humid gallery forest in vicinity of Santa Efígenia,
Tapanatepec, and Chahuites. Presumably a permanent resident,
although unrecorded between 20 April and 12 November.
Breeding evidence: greatly enlarged follicles (Sumichrast, in Lawrence, 1876: 43); range, habitat, and dates. Elevations: near sea level to 800 feet.

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

Uncommon permanent resident in Pacific Region, occurring usually in vicinity of water in tropical deciduous forest, palm forest, humid gallery forest, and mangrove swamp. One record for Interior, a brown-phase bird seen well by Morony and Binford 9 road miles north of San Andrés Chicahuaxtla in sparse, arid pine-oak forest at 6,600 feet elevation on 25 May 1964. Recorded in Atlantic Region only in Isthmus of Tehuantepec (female specimen, 18 road miles north of Matías Romero, 8 April 1960, Rook). Breeding evidence: range, habitat, and dates. Elevations: sea level to 6,600 feet.

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

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 1 mile southwest of Valle Nacional and in Pacific Region in humid gallery forest in vicinity of Santa Efiginia and Rancho de Cacoprieto. Breeding evidence: nest under construction. Elevations: 300 to 4,100 feet.

*Ictinia plumbea* (Gmelin). Plumbeous Kite.

Summer resident in lowlands, fairly common throughout
Atlantic Region in tropical evergreen forest and uncommon in Pacific Region west of Isthmus in tropical deciduous forest. Breeding evidence: enlarged follicle (6 mm). Dates: 22 February to 24 May; definite arrival date in 1961 for my collecting locality 1 mile southwest of Valle Nacional: 4 March. Elevations: sea level to 300 feet (record for "Chimalapa" [=Santa María Chimalapa] perhaps higher but elevation at exact point of collection unknown).

The only records for the Pacific Region of México west of the Isthmus were obtained by Morony and me in 1964 as follows: two seen on 9 March and one on 11 March at a point 16 road miles northwest of Puerto Escondido; one seen on 12 March at a point 8 road miles northwest of Puerto Escondido; one collected (female, 436.5 grams, moderately fat, largest follicle 3 mm, Binford) on 19 April near the mouth of the Río Tonameca.


Rare spring and summer visitant in shallow, fresh-water aquatic habitats, including roadside ditches, on both sides of Isthmus of Tehuantepec. Possibly a rare permanent resident. Dates: 29 April to 18 July. Elevations: 100 to 300 feet.

The only Oaxaca specimen (male, HC 3338, 367 grams, testes small) was collected by J. T. Marshall, Jr., at a small roadside pool 42 kilometers (26 miles) west of Tapantepec on 18 July 1957. On 28 and 29 May 1959 D. A. Zimmerman,
J. Hubbard, G. L. Brody, and I watched a bird catch a snail in a shallow roadside ditch along the Pan-American Highway 13.6 road miles 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. P. R. Lenna and L. F. Kibler saw four birds flying across the Pan-American Highway at Tehuantepec City on 29 April 1963 (Lenna, 1963: 5).

**Accipiter bicolor** (Vieillot). Bicolored Hawk.

Rare breeder in Atlantic Region in tropical evergreen forest; presumably a permanent resident but recorded only on 4, 5, and 6 March, on 28 November, and in December. Only one record for Pacific Region, an immature male (USNM 76973) collected by Sumichrast near Tapanatepec in December 1877. Breeding evidence: enlarged follicle (20 mm). Elevations: 250 to 4,100 feet.

**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 800 feet (record for Totontepec definitely higher but elevation at exact point of collection unknown.

**Accipiter striatus** Vieillot. Sharp-shinned Hawk.

Fairly common transient migrant and uncommon winter resident in forest habitats throughout state. Probably a rare permanent resident west of Isthmus (one male specimen,
USNM 155658, taken by Nelson and Goldman on 19 August 1894 at La Parada (presumably in arid pine-oak forest) could be either a permanent resident or an early migrant. Breeding evidence: range, habitat and possibly dates. Extreme dates: 19 August; 6 October to 22 April. Major migration periods: March and October. Elevations: sea level to 9,000 feet.

On 19 March 1964 I saw an adult Accipiter chionigaster Kaup, sometimes considered conspecific with A. striatus (see Storer, 1952), at Riso de Oro, Chiapas, as small settlement on the Pan-American Highway 5.6 road miles from the Oaxaca border. This species probably occurs and may possibly breed in the pine-oak forests of Oaxaca adjacent to the Chiapas border.

Buteo albicaudatus Vieillot. White-tailed Hawk.

Fairly common permanent resident in the Interior in arid temperate scrub and oak scrub and in the Isthmus from Tehuantepec City east to Tapanatepec and north (into Atlantic Region) to Matías Romero, occurring in arid tropical scrub and sparse tropical deciduous forest. Breeding evidence: "testes greatly enlarged" (Rook and L. Petite specimen label); range, habitat, and dates. Elevations: sea level to 6,500 feet.

Buteo jamaicensis (Gmelin). Red-tailed Hawk.

Fairly common winter resident and uncommon permanent resident in many habitats, occurring throughout Interior, above 4,100 feet elevation in Atlantic Region, above 7,300
feet in Pacific Region west of Tehuantepec City, and above 100 feet in Pacific Region east of Tehuantepec City. Breeding evidence: range, habitat, and dates. Elevations: 100 to 10,000 feet.

*Buteo albonotatus* Kaup. Zone-tailed Hawk.

Very uncommon winter resident, occurring 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. Possibly a permanent resident but recorded only from 22 October to 26 March. Breeding evidence: range and habitat and probably dates. Elevations: sea level to 650 feet.

I know of only eight Oaxaca records for the Zone-tailed Hawk. On 26 March 1960 Schaldach took a female (HC 4675) near Matías Romero. At Tehuantepec City on 22 October 1961, I saw two birds. On 14 January 1962 the Berretts and I observed a single 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, one, two, and one seen, respectively; Puerto Escondido, 7 March, one collected (male, 682.5 grams, very fat. small testes, Binford); Zanatepec, 19 March, one seen.

*Buteo swainsoni* Bonaparte. Swainson's Hawk.

One specimen and several sight records as recorded below. Status uncertain; recorded only in southwestern corner of
Pacific Region from 13 to 21 February. Elevation: 300 feet.

In February 1964 at a small savanna surrounded by tropical deciduous forest at 300 feet elevation 9 road miles 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 collected (male, 623 grams, little fat, small testes, Binford). 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 miles west-northwest of San José Estancia Grande. Whether the birds seen during this period were winter residents, and the observed movements represented only local wanderings, or whether the birds were early migrants, moving slowly up the coast and making frequent and prolonged stops, is not clear.

I can find only two published references pertaining to Swainson's Hawk in Oaxaca. The record 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), in stating that the Swainson's Hawk migrates in great numbers across the Isthmus of Tehuantepec, does not mention the state of Oaxaca and fails to give any substantiating data.

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

Fairly common transient migrant in lowlands and adjacent foothills throughout Atlantic and Pacific Regions; uncommon winter resident in Isthmus and on Pacific slopes of Sierra Madre de Chiapas. Occurs in tropical evergreen forest, tropical deciduous forest, arid tropical scrub, and probably other forest habitats. No record for Interior. Migration periods (including extreme dates for winter residents: 16 March to 10 April; 10 to 23 October. Elevations: sea level to 2,300 feet.

The Broad-winged Hawk has been recorded in winter in Oaxaca as follows: female (ARPC 7105), 2 kilometers (1.2 miles) south of San Gabriel Mixtepec, 25 November 1963, Santos Farfán B.; unsexed specimen, Santa Efígenia, December 1868, Sumichrast (Lawrence, 1876: 41); male (HC uncatalogued), 18 miles south of Matías Romero, 21 December 1960, Rook; one male (HC uncatalogued) and two females (LSUMZ), Santa Efígenia, 800 feet elevation, 28 January 1958, 31 January 1959, and 13 February 1959, respectively, Lamb; female (AMNH 775882), 18 road miles north of Matías Romero, 18 February 1861, Schaldach. All of these specimens are in immature plumage.
**Buteo magnirostris** (Gmelin). Roadside Hawk.

Common permanent resident throughout lowlands and adjacent foothills of Atlantic and Pacific Regions, occurring in tropical deciduous forest, arid tropical scrub, and in openings within tropical evergreen forest. Breeding evidence: prejuvenal. Elevations: sea level to 2,400 feet (probably higher at a point south of San Miguel Suchixtepec but exact elevation unknown).

**Buteo brachyurus** Vieillot. Short-tailed Hawk.

Uncommon breeding bird in tropical deciduous forest of Pacific lowlands and adjacent foothills from a point 6 road miles south of Chahuites west to a point 10 road miles northwest of Puerto Escondido and probably to Guerrero border; presumably a permanent resident but recorded only from 13 October to 20 March. The six adults of known color included four in dark phase and two in light phase. Breeding evidence: dark-phase female containing enlarged follicle (22 mm) taken by Morony on 4 March 1964 at a point r miles south-east of Puerto Escondido. Elevations: sea level to 500 feet.

**Buteo nitidus** (Latham). Gray Hawk.

Common permanent resident throughout lowlands and adjacent foothills of Atlantic and Pacific Regions, occurring most abundantly in tropical evergreen forest and tropical deciduous forest but ranging into arid tropical scrub and savanna; recorded northwest in Río Tehuantepec basin to
Rancho Las Animas. The only report for the Interior (P. L. Sclater, 1859b: 389) is for "San Miguel Talea de Castro." Numbers augmented by winter residents from north. Breeding evidence: active nest completed, contents unknown. Elevations: sea level to 3,000 feet (record for San Miguel Talea de Castro probably higher but elevation at exact point of collection unknown).

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

Uncommon permanent resident in the Interior in arid temperate scrub and in Pacific Region in arid tropical scrub from Tequisistlán east to Tapanatepec. Breeding evidence: range, habitat, and dates. Elevations: sea level to 6,100 feet.

*Leucopternis albicollis* (Latham). White Hawk.

Uncommon permanent resident in Atlantic Region in heavy tropical evergreen forest, occurring northwest at least to Temascal and south in Isthmus to a point 6 miles north of Matías Romero. Breeding evidence: range, habitat, and dates. Elevations: sea level to 4,100 feet.

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

One record, a female (MLZ 31343) collected by Avilés on 15 October 1943 in Atlantic Region at "San Miguel Soyaltepec" (elevation at exact point of collection unknown but probably much lower than the 600 meters [1,968 feet] given on label). Status uncertain; possibly a rare permanent resident at low
elevations in mangrove swamps, marshes, and forest-edged aquatic habitats.

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

Fairly common permanent resident in lower portions of Atlantic and Pacific Regions in tropical evergreen, tropical semideciduous, and tropical deciduous forests, often in vicinity of fresh-water aquatic habitats. The only record for Interior (P. L. Sclater, 1858: 295), an immature male collected by Boucard in October 1857 at "La Parada" (town at 7,900 feet but elevation at exact point of collection unknown), should be considered doubtful pending reexamination of the specimen by a modern ornithologist. Breeding evidence: prejuvenal. Elevations: see level to 2,900 feet (record for La Parada perhaps higher; see above).

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

Uncommon permanent resident, found along entire length of Pacific Region and north across Isthmus into Atlantic Region at least to Montebello, occurring in tropical evergreen, tropical semideciduous, and humid gallery forests and in more humid portions of tropical deciduous forest. To be expected elsewhere in Atlantic Region. Breeding evidence: enlarged follicle (25 mm). Elevations: sea level to 3,500 feet.

I agree with Amadon and Eckelberry (1955: 66) that *Hypomorphnus* is generically inseparable from *Buteogallus*. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
No specimen examined. One published specimen record, a bird in immature plumage taken by Sumichrast in "Tehuantepec" [=Tehuantepec region] (Salvin and Godman, 1897-1904 [1900]: 88). Also two sight records, an immature bird seen by Morony and Binford on 24 March and 2 April 1964 as it circled over dense cloud forest at 4,900 feet elevation in Atlantic Region in Sierra Madre de Chiapas 12 airline miles north-northeast of Zanatepec. Status uncertain; probably a very rare visitant in dense cloud forest and tropical evergreen forest of Atlantic Region east of Isthmus; possibly a very rare permanent resident, but scarcity of records and the fact that all Oaxaca records pertain to immature birds suggests nonbreeding status.

Harpia harpyja (Linnaeus). Harpy Eagle.

One record, a male (USNM 54224) collected by Sumichrast on 8 October 1868 in Isthmus of Tehuantepec at "Almoloya" (town at 754 feet but elevation at exact point of collection unknown). Status uncertain; probably accidental.

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 the specimen as 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 collected "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 collected the bird in this range of hills at a point near Almoloya.

Statements by Oswald (1878) to the effect that he found the Harpy Eagle to be a very common breeding bird in the mountains of Oaxaca are, in my opinion, completely 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.

One record, a male (USNM 76988) collected by Sumichrast in March 1877 in Pacific Region in Sierra Madre de Chiapas at "Santa Efígenia" (ranch at 800 feet but elevation at exact point of collection unknown). The record from Uvero listed by Salvin and Godman (1897-1904 [1901]: 94) and referred to Oaxaca by Friedmann (1950: 441) pertains to Vera-cruz. Status uncertain; possibly a very rare permanent resident in Atlantic Region in tropical evergreen forest.
Spizaetus ornatus (Daudin). Ornate Hawk-Eagle.

Very uncommon permanent resident in Atlantic Region in heavy tropical evergreen forest. Rare winter visitant, and perhaps a rare permanent resident, in Pacific Region in humid forests of Sierra Madre de Chiapas (Santa Efigenia and Rancho de Cacoprieto). Breeding evidence: courtship flight observed. Elevations: 800 to 4,100 feet (record for Tutla probably lower but elevations of town and exact point of collection unknown).

Spizaetus tyrannus (Wied). Black Hawk-Eagle.

One record, a female (MLZ 31342) collected by Avilés on 3 December 1943 in Atlantic Region at "San Miguel Soyaltepec" (elevation at exact point of collection unknown but probably much lower than the 600 meters [1,968 feet] given on label). Status uncertain; possibly a very rare permanent resident in Atlantic Region in tropical evergreen forest.

[Circus cyaneus (Linnaeus). Marsh Hawk.]

No specimen examined; three published specimen records; numerous sight records. Fairly common transient migrant and uncommon winter resident in open grassy areas throughout state. Dates: 23 September to 12 April. Elevations: sea level to 6,100 feet.

Geranospiza caerulescens (Vieillot). Crane-Hawk.

Permanent resident, uncommon in Pacific Region in humid gallery forest and very uncommon in Atlantic Region in
tropical evergreen forest. Breeding evidence: slightly enlarged follicle (5 mm); range, habitat, and dates. Elevations: sea level to 800 feet.

I agree with Howell 1957: 77) and other authors that the pale South American birds (caerulescens) and the dark northern populations (nigra) are conspecific. The differences are only in color and are bridged by the race balzarensis Sclater from Panamá to northwestern Perú.

Family PANDIONIDAE

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 mile southwest of Valle Nacional. Probably a rare permanent resident in Atlantic Region near San Juan Bautista Tuxtepec (one summer record, three birds seen over the Río Tonto, 8 June 1964, Morony and Binford). Should be sought along Pacific coast in summer. Breeding evidence: habitat, probably dates, and possibly range. Dates: 11 October to 19 April; 8 June. Elevations: sea level to 300 feet (record for Chihuitán perhaps higher but elevations of town and exact point of collection unknown).
Family FALCONIDAE

*Herpetotheres cachinnans* (Linnaeus). Laughing Falcon.

Fairly common permanent resident in Atlantic and Pacific Regions in savanna and at edges of clearings within tropical evergreen and tropical deciduous forests, recorded northwest in Río Tehuantepec basin to Las Tejas. Breeding evidence: "nesting" (Rook specimen label); slightly enlarged follicle (6 mm); range, habitat, and dates. Elevations: sea level to 800 feet (record for "Chimalapa" [=Santa María Chimalapa?] possibly higher but elevation at exact point of collection unknown).

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

Uncommon permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in humid gallery forest within tropical deciduous forest. Breeding evidence: range, habitat, and dates. Elevations: sea level to 1,600 feet.

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

Rare permanent resident of Atlantic Region in tropical evergreen forest and of Pacific Region in general area of San Gabriel Mixtepec in Sierra de Miahuatlán in tropical semideciduous forest and lower reaches of cloud forest. Breeding evidence: range, habitat, and dates. Elevations: 300 to 4,100 feet (higher north of San Gabriel Mixtepec at kilometer marker 183 but exact elevation unknown).
Polyborus cheriway (Jacquin). Crested Caracara.

Common permanent resident in arid temperate scrub, arid tropical scrub, steppe, savanna, cultivated land, grazed land, and guamil, occurring along entire length of Pacific Region, northwest through Río Tehuantepec basin into Oaxaca Valley in the Interior, and north across Isthmus into Atlantic Region to a point 11.7 road miles south of Matías Romero; also occurs in valley of San Juan Bautists Cuicatlán. One record for Atlantic Region outside of Isthmus, two seen by the Berretts and me at Temascal on 2 December 1961. Breeding evidence: nest with eggs. Elevations: sea level to 5,400 feet (record for La Parada perhaps higher but elevation at exact point of collection unknown).

*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. Dates: 9 October to 21 April. Elevation: sea level.

The only specimen for Oaxaca is a 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 one bird on 21 March and two adults on 22 March. In the fall of 1961 and winter of 1962, the Berretts and I made the following observations: single birds seen on 9 and 11 October and 20 January at Puerto Angel; single birds noted on 19, 20, and 21 October, and two each seen on 9 and 12
January, at southwestern corner of Laguna Superior 19 road miles southwest of Juchitán. In 1964 Morony and I observed this species as follows: one on 23 February, two on 25 February, and two on 1 March at Minitán; one on 21 April at Puerto Angel.

**Falco rufilgularis** Daudin. Bat Falcon.

Permanent resident, fairly common in Atlantic Region tropical evergreen forest and in Pacific Region in humid gallery forest of Sierra Madre de Chiapas and uncommon in tropical deciduous forest in vicinity of Puerto Escondido and probably elsewhere in Pacific Region. Rare visitant in the Interior (two records: "La Parada" [Friedmann, 1950: 676]; female specimen, USNM 54217, near Oaxaca City, 13 August 1868, Sumichrast). Breeding evidence: range, habitat, and dates. Elevations: sea level to 5,100 feet (record for La Parada probably higher but elevation of exact point of collection unknown). For the use of the specific name *rufilgularis*, see Meyer DeSchauensee (1966: 65).

**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. Probably a permanent resident, but only known dates are from 14 to 19 February. Breeding evidence: habitat and probably range but not dates. Elevations: 100 to 300 feet.

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

**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 feet.

**Falco sparverius** Linnaeus. American Kestrel.

Common winter resident throughout state, occurring in savanna, arid tropical scrub, arid temperate scrub, and openings within all forest habitats. Probably a rare permanent resident in arid temperate scrub in northwestern portion of Interior (one summer record, an individual seen by Morony and Binford 4 road miles southeast of Temazulapan del Progreso on 13 June 1964). Breeding evidence: range, habitat, and probably dates. Dates: 25 October to 19 April; 13 June. Elevations: sea level to 6,300 feet (record for La Parada perhaps higher but elevation at exact point of collection unknown).
Family CRACIDAE

**Crax rubra** Linnaeus. Great Curassow.

Very uncommon permanent resident in Atlantic Region in heavy tropical evergreen forest and in Pacific Region in humid forests of Sierra Madre de Chiapas. Breeding evidence: range, habitat, and dates. Elevations: 100 to 350 feet (records for Tapanatepec and "Chimalapa" [=Santa María Chimalapa?] perhaps higher but elevations of former town and both points of collection unknown).

**Penelope purpurascens** Wagler. Crested Guan.

Permanent resident, uncommon in Atlantic Region in tropical evergreen forest and cloud forest and very uncommon in Pacific Region in humid gallery, tropical semideciduous, and cloud forests of Sierra Madre de Chiapas and Sierra de Miahuatlán. Breeding evidence: prejuvenal. Elevations: sea level to 10,000 feet.

**Ortalis poliocephala** (Wagler). Gray-headed Chachalaca.

Common permanent resident in tropical deciduous forest, tropical semideciduous forest, and arid tropical scrub, occurring along entire length of Pacific Region and north across Isthmus into Atlantic Region to a point 6 miles south of Matías Romero and perhaps to Santa María Chimalapa (the female, AMNH 50435, taken by A. C. Buller on 8 March 1890 at "Chimalapa" may, however, pertain to San Miguel Chimalapa). Breeding evidence: prejuvenal. Elevations: sea level to 5,000 feet.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
I agree with Moore and Medina (1957) and C. Vaurie (1965) that *Ortalis poliocephala* should be considered specifically distinct from *O. vetula*. The two are known to occur within about eleven miles of each other (*vetula* at Guichicovi and *poliocephala* at a point 6 miles south of Matías Romero), and their ranges may actually overlap at Santa María Chimalapa and perhaps elsewhere.

*Ortalis vetula* (Wagler). Plain Chachalaca.

Common permanent resident in Atlantic Region in guamil and dense second growth forest within general range of tropical evergreen forest, occurring south in Isthmus at least to Santa María Chimalapa and Guichicovi. Breeding evidence: prejuvenal. Elevations: 100 to 1,900 feet. See *Ortalis poliocephala*.

*Penelopina nigra* (Fraser). Black Chachalaca.

Permanent resident in Atlantic and Pacific Regions in Sierra Madre de Chiapas, common in cloud forest and uncommon in tropical semideciduous and humid gallery forests. Oaxaca represents northwestern limit of range of species. Breeding evidence: enlarged testes (right, 15 x 9, left, 21 x 12 mm). Elevations: 800 to 5,200 feet.

**Family PHASIANIDAE**

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

Uncommon permanent resident in all Regions in humid
pine-oak forest and cloud forest, occurring east to Cerro Zempoaltepec and a point near La Cima, the southeasternmost localities in entire range of species. Breeding evidence: nest with eggs. Elevations: 5,800 to 9,000 feet (record for Moctum perhaps lower but elevations of town and exact point of collection unknown).

**Colinus virginianus** (Linnaeus). Common Bobwhite.

Common permanent resident along entire length of Pacific Region and north through Isthmus portion of Atlantic Region into Veracruz, occurring in savanna and arid tropical scrub, also in cultivated land, grazed land, and guamil within general range of tropical deciduous and tropical evergreen forests. Recorded in Atlantic Region outside of Isthmus only at Tutla and at a point 3 road miles east of Temascal. Breeding evidence: hard-shelled egg in oviduct. Elevations: sea level to 2,400 feet.

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

Uncommon permanent resident in Atlantic Region in tropical evergreen forest from Isthmus northwest at least to "tectalcingo." Unrecorded but doubtless present in same habitat and Region east of Isthmus. Breeding evidence: enlarged testes (19 x 9 mm). Elevations: 250 to 1,500 feet (record for Teotalcingo probably higher but elevations of town and exact point of collection unknown).
**Dactylortyx thoracicus** (Gambel). Singing Quail.

Fairly common permanent resident of Pacific Region in Sierra Madre de Chiapas, occurring in humid gallery forest, tropical semideciduous forest, and extreme lower edge of cloud forest. Should be sought west of Isthmus. Breeding evidence: hard-shelled egg in oviduct. Elevations: 800 to 4,900 feet. See discussion in Gazetteer under Sierra de la Gineta.

**Cyrtonyx montezumae** (Vigors). Harlequin Quail.

Fairly common permanent resident in the Interior in the Sierra Aloapaneca and Sierra de Miahuatlán, 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 labeled "Mts. near Ozolotepec"). Breeding evidence: soft-shelled egg in oviduct. Elevations: 3,500 to 10,000 feet.

**Cyrtonyx ocellatus** (Gould). Ocellated Quail.

Uncommon permanent resident in Pacific Region in pine-oak forests of Sierra Madre de Chiapas near Tapanatepec and north of Santa Efigenia, the northwesternmost localities in entire range of species. Breeding evidence: range, habitat, and dates. Elevation: 1,200 feet.
Family ARAMIDAE

Aramus guarauna (Linnaeus). Limpkin.

Very uncommon permanent resident in shallow fresh-water habitats of Pacific Region from Chiapas border west to Tehuantepec City. Unrecorded on Pacific slope of México northwest of Isthmus. Breeding evidence: enlarged follicle (9 mm). Elevations: 50 to 800 feet.

Family RALLIDAE

*Rallus limicola Vieillot. Virginia Rail.

One record, a male (little fat, testes 6 x 3 mm; specimen in possession of R. W. Dickerman) collected by Juan Nava S. on 25 October 1965 in Pacific Région in rice fields (at about 2,400 feet elevation) "2½ kilometers east?" of Putla de Guerrero. Status uncertain; probably only a rare transient migrant or winter resident throughout state but possibly a rare and local permanent resident.

*Pardirallus maculatus (Boddaert). Spotted Rail.

Common permanent resident in Pacific Region at 2,400 feet elevation in the river valley just east of Putla de Guerrero, occurring in marshes, weedy ponds, flooded pastures, rice fields, and long-grass savanna. Should be sought in Atlantic Region and elsewhere in Pacific Region. Breeding evidence: prejuvenal.

In 1964 Morony and I recorded the following data 1 mile
east of Putla de Guerrero: 18 May, one bird seen; 19 May, seven seen, of which two were collected (male, 190.2 grams, Morony; female, 140.1 grams, moderately fat, Morony); 20 May, seven seen, of which four were collected (female, 162.9 grams, moderately fat, Morony; male, 159.6 grams, little fat, Binford; male, 175.6 grams, moderately fat, Binford; male, 189.1 grams, moderately fat, Binford); 22 May, two seen, of which one was collected (139.8 grams, little fat, Morony). All specimens had the gonads slightly enlarged, each male with the largest testis measuring about 10 x 5 mm, and each female with the largest follicle 3 or 4 mm in diameter. The food of this species is indicated by the presence of earthworms in the stomach of one of the female specimens. At least three of the specimens, all males, were undergoing obvious body molt. The only specimen that I have seen other than our own is in the possession of R. W. Dickerman and was taken at about the same locality (immature female, moderately fat, 19 December 1965, Santos Farfán B.). Dickerman (in litt.) informs me that he also has a very young bird taken in the same general area during October.

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 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.
Amaurolimnas concolor (Gosse). Uniform Crake.

Rare and local permanent resident in fresh-water swamps (habitat from Friedmann, Griscom, and Moore, 1950: 85) in Atlantic Region in vicinity of Isthmus, recorded only at "Tutla" and a point east of Sarabia, the latter area represented by a male specimen (AMNH 768793) taken by Schaldach on 15 July 1962. Species otherwise unknown from México. Breeding evidence: prejuvenal. Elevations: unknown for Tutla record; 300 feet at the point east of Sarabia.

A. R. Phillips (in litt.) informs me that he has additional specimens secured by Schaldach somewhere in the Isthmus of Tehuantepec, including a young bird not fully grown. Hopefully, Schaldach will publish an account of these specimens.

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, fresh-water swamp, and humid gallery forest, recorded in these habitats from Santa Efigenia west at least to a point 8 road miles northwest of Puerto Escondido. Breeding evidence: prejuvenal. Elevations: sea level to 800 feet.

Porzana carolina (Linnaeus). Sora.

Very uncommon winter resident in marshes of Pacific and Interior Regions, recorded only at Rancho de Cacoprieto
(Sumichrast, 1881: 229), San Pablo Villa de Mitla (male specimen, MLZ uncatalogued, 7 January 1942, probably Avilés), Putla de Guerrero (male specimen in possession of R. W. Dickerman, very fat, testes 7 x 3 mm, 20 December 1965; Dickerman, in litt.), and at 300 feet elevation at a point 9 road miles west-northwest of San José Estancia Grande (male specimen, 82.5 grams, very fat, testes 2 x 1 mm, 16 February 1964, Binford). Probably occurs in Atlantic Region and elsewhere in Pacific and Interior Regions.

Laterallus ruber (Sclater and Salvin). Ruddy Crake.

Uncommon and very local permanent resident in freshwater marshes probably throughout lowlands but recorded in only three localities, in Atlantic Region at Tutla and a point about 1 mile east of Sarabia, and in Pacific Region near Putla de Guerrero. Breeding evidence: prejuvenal. Elevations: 300 to 2,400 feet.

Gallinula chloropus (Linnaeus). Common Gallinule.

Winter resident in shallow fresh-water 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 feet.
Porphyryula martinica (Linnaeus). Purple Gallinule.

Locally a fairly common permanent resident in marsh at edges of weed-choked fresh-water ponds in Atlantic and Pacific Regions, recorded in only three areas, at several ponds between San Juan Bautista Tuxtepec and Loma Bonita, at mouth of Río Tonameca, and near Putla de Guerrero. Breeding evidence: slightly enlarged follicle (4 mm); enlarged testis (10 x 4 mm). Elevations: sea level to 2,400 feet.

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 feet.

Family HELIORNITHIDAE

Heliornis fulica (Boddaert). Sungrebe.

Rare permanent resident in lowlands of Atlantic Region in forest-edged ponds and streams within tropical evergreen forest, recorded northwest at least to a point 1 mile southwest of San Juan Bautista Tuxtepec and south in Isthmus to a point 10 miles north of Matías Romero. Breeding evidence: range, habitat, and dates. Elevations: 100 to 300 feet (record for Tutla perhaps higher but elevations of town and exact point of collection unknown).
Family JACANTIDAE


Common permanent resident in marsh at edges of shallow, weed-choked fresh-water habitats in lower portions of Atlantic and Pacific Regions. Breeding evidence: "about ready to lay" (Lamb specimen label); range, habitat, and dates. Elevations: sea level to 800 feet.

Family HAEMATOPODIDAE


Very uncommon inhabitant of saline lagoon edges on Pacific coast of Tehuantepec region from Punta Paloma west to San Mateo del Mar; probably a permanent resident but recorded only from 21 February to 1 April. Breeding evidence: habitat, and probably range and dates. Elevation: sea level.

Family CHARADRIIDAE

*Squatarola 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.

Very uncommon transient spring migrant in Pacific Region, occurring on mud flats, savannas, river bars, and sand beaches. One record for Interior, a single bird seen by Morony at 5,000 feet elevation 1 mile 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 to 28 May. Elevations: sea level to 5,000 feet.

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 feet.

*Charadrius alexandrinus Linnaeus. Snowy Plover.


I have recorded the Snowy Plover on nine of twelve days spent at a point 19 road miles southwest of Juchitán at the southwestern corner of Laguna Superior. In 1961 Wolf and I recorded the following data: 16 May, five birds seen, of which two were collected (male, 34.4 grams, moderately fat, testes 5 x 2 and 3 x 2 mm, Wolf; male, 33.7 grams, slight fat, testes 8 x 4 and 6 x 4 mm, Binford); 17 May, two seen,
of which one, a downy bird a few days old, was collected (male, 9.7 grams, little fat, testes minute); 18 May, two seen. In the fall of 1961 and winter of 1962 the Berretts and I saw 4 on 19 October (including a male collected, 35.9 grams, moderately fat, testes small, D. G. Berrett), 27 on 20 October, 2 on 21 October, and 2 each on 9 and 11 January. Finally, on 31 May 1964 Morony and I noted 12 Snowy Plovers.

**Charadrius collaris** Vieillot. Collared Plover.

Uncommon permanent resident in Pacific Region, occurring on mud flats and sand beaches and on bars in larger rivers. To be expected on river bars of Atlantic Region. Breeding evidence: adults observed attending prejuvenals; range, habitat, and dates. Elevations: sea level to 100 feet (higher at a point 25 road miles north of Santiago Pinotepa Nacional, where elevation uncertain but probably near 700 feet).

**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. Apparently avoids saline habitats. Dates: 21 October to 29 March. Elevations: 50 to 800 feet.

*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 miles southwest of Juchitán, the Berretts and I recorded the following data:
18 October, 10 birds seen, of which 1 was collected (female, 52.7 grams, moderately fat, ova small, Binford); 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 two Wilson's Plovers on 19 April and again on 28 April.

Family SCOLOPACIDAE

**Numenius phaeopus** (Linnaeus). Whimbrel.

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

**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 a casual transient migrant in Atlantic Region and elsewhere in Pacific Region. Dates: 20 October to 18 May. Elevations: sea level (record
for Juchitán slightly higher but elevation at exact point of collection unknown).

**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; July. Elevation: sea level.

There are only three Oaxaca records for the Hudsonian Godwit. Blake (1953: 140) mentions a sight record by L. I. Davis and Richard Herbert at Salina Cruz in July 1952. My only records are from the southwestern corner of Laguna Superior 19 road miles southwest of Juchitán, where single males were collected on 15 May 1961 (241.0 grams, very fat, testes 10 x 5 mm, Wolf) and 18 May 1961 (181.9 grams, slightly fat, left testis 7 x 3 mm, right testis 4 x 2 mm, Binford). These are the only specimens for México.

**Limosa fedoa** (Linnaeus). Marbled Godwit.

Uncommon winter resident on mud flats of coastal lagoons. Dates: August to 1 June. Elevation: sea level.

**Totanus flavipes** (Gmelin). Lesser Yellowlegs.

Fairly common winter resident in shallow portions of open aquatic habitats 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 feet.
**Totanus melanoleucus** (Gmelin). Greater Yellowlegs.

Common winter resident in shallow portions of aquatic habitats 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 feet.

**Tringa solitaria** Wilson. Solitary Sandpiper.

Uncommon transient migrant in shallow portions of freshwater habitats of Pacific Region. Very rare winter resident at least in lowlands of Pacific Region (one record, two birds seen, 8 road miles southwest of Juchitán, 9 January 1962, the Berretts and Binford). One record for Atlantic Region (two seen, 1 mile southwest of Valle Nacional, 20 April 1961, Wolf and Binford). Should be sought on migration in the Interior. Dates: 9 January; 11 March to 5 May; 15 August to 21 October. Elevations: 50 to 8,500 feet.

**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 feet.

**Catoptrophorus semipalmatus** (Gmelin). Willet.

Very common winter resident, restricted to shallows and mud flats of saline lagoons. Dates: 6 August to 1 June. Elevation: sea level.
*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: one seen and another collected on 28 September (male, 71.8 grams, little fat, testes small, D. G. Berrett), and one seen on 9 October on an offshore "bird rock" just west of Puerto Angel; one seen on 17 October and another on 10 January on the breakwall at Salina Cruz. In 1964 Morony saw a single bird at the harbor of Puerto Escondido on 3 March, and Morony and I saw one along the coast 6 road miles west of Puerto Angel on 27 April.

The only other record for Oaxaca is a sighting of two birds by F. W. Loetscher (in litt.) at Salina Cruz on 21 March 1939.

*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. Possibly a rare winter resident on Pacific coast. Dates: 19 April to 31 May; 9 August (only "fall" date; Sumichrast specimen, San Mateo del Mar, 1869; published by Lawrence, 1876: 46). Elevation: sea level.

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

Two specimens; also three sight records. Status of *L. griseus* and *L. scolopaceus* uncertain because of difficulty
of separation in field. Both species probably 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 both 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 feet.

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

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

Four specimens examined. See *Limnodromus griseus*.

The only definite records for the long-billed Dowitcher are four specimens taken 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).

*Gallinago gallinago* (Linnaeus). Common Snipe.

Very uncommon winter resident in shallow fresh-water
habitats of Pacific Region. To be expected at least on migration in Atlantic and Interior Regions. Dates: 5 October to 20 February. Elevations: 300 to 700 feet.

On 5 October 1961 at 700 feet elevation 9 road miles north of San Pedro Pochutla, I collected the only specimen for the state (male, 107.3 grams, moderately fat, testes small). In 1964 Morony and I saw this species almost daily at a small savanna pond at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande, as follows: one bird each on 12, 14, 17, 18, and 20 February, and two each on 15, 16, and 19 February. See Mayr (1963) for use of Gallinago instead of Capella.

*Calidris canutus* (Linnaeus). Red Knot.

Uncommon transient spring migrant on Pacific coast on mud flats and sand beaches. Probably occurs as a rare spring transient migrant elsewhere in state. 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 miles southwest of Juchitán, Wolf and I saw 13 Red Knots on 15 May (including one male collected, 115.3 grams, slightly fat, testes small, Binford), 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 two birds on 19 April 1964.
Crocethia alba (Pallas.). Sanderling.

Winter resident along Pacific coast, very common on sand beaches and uncommon on mud flats. Possibly occurs elsewhere in state, at least as a transient migrant. Dates: 5 August to 1 June. Elevation: sea level.

Ereunetes pusillus (Linnaeus). Semipalmated Sandpiper.

Two specimens; also one published sight record. Status uncertain; probably a very uncommon or rare winter resident at edges of aquatic habitats of entire Pacific coast but so far recorded only in spring and only on Pacific side of Isthmus of Tehuantepec, as follows: three birds seen by Coffey (1960: 292) at about 100 feet elevation just east of Tehuantepec City on 19 May 1954; and two collected at sea level 19 road miles southwest of Juchitán at southwestern edge of Laguna Superior on 17 May 1961 (one female, a skeleton, UMMZ 156458, 28.3 grams, heavily fat, ovary small, Wolf; and one male, a skin, 22.5 grams, moderately fat, testes small, Binford). Confusion in field with much commoner Western Sandpiper probably accounts in part for the scarcity of records.

Ereunetes mauroi 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 aquatic habitats. Probably more common in remainder of Pacific Region than indicated by the one record (one bird seen, mouth of Río Tonameca, 28 April 1964,
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 feet.

**Erolia minutilla** (Vieillot). Least Sandpiper.

Common winter resident on muddy or sandy shores of aquatic habitats throughout lowlands of Atlantic and Pacific Regions. Unrecorded in the Interior. Dates: 13 October to 16 May. Elevations: sea level to 300 feet.

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

No specimen or published record; one sight record, a single bird that I observed carefully as it fed on a large mud flat at sea level in the Pacific Region 19 road miles southwest of Juchitán at the extreme southwestern edge of Laguna Superior on 18 May 1961. Status uncertain; probably a rare spring transient migrant on mud flats of Pacific side of Isthmus of Tehuantepec and a casual spring transient migrant elsewhere. Should be sought in late May.

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

Rare but probably regular transient spring migrant, recorded only on the mud flats of Pacific side of Tehuantepec region but to be expected in similar habitats, as well as on river bars and sand beaches, 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 miles southwest of Juchitán, Wolf and I obtained the following records: 17 May, three seen, of which two were collected (male, 27.6 grams, Wolf; female, 36.8 grams, Binford; both moderately fat and with small gonads); 18 May, two seen. In 1964 I observed one at the same locality on 31 May and eight on a mud flat near the eastern end of Laguna Inferior 15 road miles 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.

_Erolia melanotos_ (Vieillot). Pectoral Sandpiper.

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

*Erolia alpina* (Linnaeus). Dunlin.

One record, one bird seen and another collected (male, 43.0 grams, little fat, testes very small, D. G. Berrett) 20 October 1961 on mud flats at sea level in Pacific Region 19 road miles southwest of Juchitán at extreme southwestern corner of Laguna Superior. Status uncertain; probably a casual transient migrant or casual winter resident.
Micropalama 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 record that I have examined is a male specimen (USNM 58925) taken by Sumichrast at San Mateo del Mar on 24 February 1869. I have not seen two other specimens supposed to be of this species that were recorded in the catalogue of the United States National Museum but then sent to other museums; I suspect that these two birds were taken by Sumichrast in the same month and at the same locality. Ridgway (1916: 207) misquotes Lawrence (1876: 47) by listing August instead of February as the month in which Sumichrast took the Stilt Sandpiper at San Mateo del Mar. In 1961 at the southwestern edge of Laguna Superior 19 road miles southwest of Juchitán, Wolf and I recorded the following data: 15 May, seven birds seen, of which two were collected by Wolf (male, 52.8 grams, heavy fat, testes small; female, 54.7 grams, moderately fat, follicles small); 18 May, eight seen.
Family RECURVIROSTRIDAE

Himantopus mexicanus (Müller). Black-necked Stilt.

Common permanent resident in Pacific Region at edges of ponds, lakes, and coastal lagoons. Breeding evidence: range, habitat, and dates. Elevations: sea level to 300 feet.


One specimen; also twelve sight records. Status uncertain; occurs locally in lowlands of Pacific Region near edges of ponds, lakes, and lagoons; probably a fairly common winter resident but recorded only from 21 February to 1 June. Elevations: sea level to 300 feet.

Although Friedmann, Griscom, and Moore (1950: 101) list Oaxaca in the range of the American Avocet, I can find no records prior to my own, which were obtained 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 Minitán (including one female collected, 296.3 grams, very fat, follicles not enlarged, 22 February, Binford); 15 seen at a small pond 12 road miles southeast of Santiago Jamiltepec on 2 March; 3 seen at mouth of Río Tonameca on 28 April; flock of 178 noted on a mud flat 15 road miles south of Reforma on 1 June.
Phalaropus fulicarius (Linnaeus). Red Phalarope.

One specimen; also four sight records. Status uncertain; occurs to within 3 miles of shore on open ocean, where probably an uncommon transient migrant and winter resident, although unrecorded in fall or early winter. Dates: February to 22 April.

Loye Miller and Frank Richardson, during two trips across the Gulf of Tehuantepec in 1936, noted rafts of "uncountable numbers" in February and "a scant dozen birds" in April (L. Miller, 1937: 19). I recorded this species from 3 to 6 miles offshore on three of eleven oceanic trips made off Puerto Angel. In 1961 Morony and I recorded the following data: 20 April, one bird seen and another collected (female, 52.2 grams, very fat, follicles not enlarged, Binford); 21 April, seven seen; 22 April, one seen.

*Steganopus tricolor Vieillot. Wilson's Phalarope.

One specimen; also two sight records. Status uncertain; probably a fairly common transient migrant in shallow aquatic habitats throughout state but so far recorded only on Pacific coast of Tehuantepec region and only in spring. Scarcity of records probably due to scant field work during very late spring and very early fall. Dates: 16 May to 1 June.

Elevation: sea level.

On 16 May 1961 at the southwestern shore of Laguna Superior 19 road miles southwest of Juchitán, I collected a
female Wilson's Phalarope (53.2 grams, slightly fat, follicles poorly developed). In 1964 Morony and I saw a male on a small pond 8 road miles southwest of Juchitán on 31 May and a flock of 44 birds on a mud flat 15 road miles south of Reforma on 1 June.

*Lobipes lobatus* (Linnaeus). Northern Phalarope.

Fairly common transient migrant on ocean from surf line to at least 3 miles offshore. Dates: 20 April to 4 May; 11 to 24 October.

**Family BURHINIDAE**


Fairly common permanent resident in savanna on Pacific side of Tehuantepec region from Tapanatepec and Punta Paloma west to Tehuantepec City and Huilotepec and north to Chivela and Niltepec; also at Rancho Las Animas. To be expected between Tehuantepec City and Rancho Las Animas. Should be sought in savanna on Atlantic side of Isthmus. Breeding evidence: "eggs large, ready for laying" (Schaldach field catalogue in LSUMZ); enlarged testes (11 x 5 mm). Elevations: sea level to 3,000 feet.
Family STERCORARIIDAE

[*Stercorarius pomarinus* (Temminck). Pomarine Jaeger.]

No specimen or published record; two sight records, light-phase adults seen by Morony and Binford about 3 miles offshore from Puerto Angel on 21 April (one bird) and 22 April 1964 (flock of four). Status uncertain; probably a very uncommon transient migrant or winter resident.

*Stercorarius parasiticus* (Linnaeus). Parasitic Jaeger.

One specimen, a male (345.9 grams, fat between moderate and little, testes small) collected by Morony on 21 April 1964 about 3 miles offshore from Puerto Angel; also one sight record, an adult seen by the Berretts and me on 30 September 1961 at the same locality. Status uncertain; occurs on open ocean, where probably an uncommon transient migrant and possibly a winter resident.

On the eleven days spent on open ocean off Puerto Angel, I have recorded this species definitely only on the occasions noted above. However, my companions and I saw jaegers that were either parasiticus or longicaudus on two other trips off Puerto Angel, 20 April 1964 (two birds) and 3 May 1961 (one bird).

*Stercorarius longicaudus* Vieillot. Long-tailed Jaeger.

The one record, an immature female (298.0 grams, very fat, follicles not enlarged) that I collected on 21 April 1964 on open ocean 3 miles offshore from Puerto Angel, is
the first acceptable specimen record for México. Status uncertain; occurs on open ocean, where probably a rare transient migrant and possibly a rare winter resident. See *S. parasiticus*.

**Family LARIDAE**

*Larus delawarensis* Ord. Ring-billed Gull.

One specimen examined; also one published specimen record. Status uncertain; occurs on Pacific coast of Isthmus of Tehuantepec, where probably a very rare winter resident or visitor. Recorded only at "San Mateo" [=San Mateo del Mar] (specimen, sex?, USNM 58953, 21 February 1869, Sumichrast) 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). To be expected elsewhere on Pacific coast. Elevation: sea level. See *L. californicus* in Hypothetical List.

*Larus atricilla* Linnaeus. Laughing Gull.

Winter resident, common along ocean shore and on coastal lagoons, uncommon inland in Pacific lowlands, where found on lakes, or ponds, and in cultivated fields, and very uncommon in lowlands of Atlantic Region (one record, an immature female weighing 317.6 grams and possessing little fat and small follicles, collected by Binford from flock of seven birds on Presa Miguel Alemán on 1 December 1961). Possibly a local permanent resident. Dates: 7 August to 1 June.
Elevations: sea level to 200 feet.


Transient migrant, very common during flights on a north-south axis across Isthmus of Tehuantepec and uncommon on remainder of Pacific coast. Possibly a winter resident on Pacific coast; the only winter record, two birds seen on 2 December 1948 at Salina Cruz by Coffey (1960: 293), may, however, represent late migrants. Usually noted in flight but occasionally seen feeding or resting in cultivated fields, on coastal lagoons, or on 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 (211.9 grams, slightly fat, follicles small) collected by Binford 2 road miles east of Tehuantepec City on 14 May 1961. Unrecorded in the Interior or in Atlantic Region outside of Isthmus. Dates: 19 April to 3 June; 19 to 23 October; 2 December. Elevations: sea level to 350 feet.

*Xema sabini* (Sabine). Sabine's Gull.

Fairly common transient migrant on open ocean to within 3 miles of shore. Possibly a winter resident on open ocean. Dates: 5 March to 4 May; 29 September to 11 October.

Loye Miller and Frank Richardson noted Sabine's Gulls flying up the coast west of Tehuantepec City on 11 and 12 April 1936 (L. Miller, 1937: 19). I have observed this species from 3 to 10 miles offshore on nine of twelve oceanic trips taken off the coast of Oaxaca. Off Puerto Angel in
1961 Wolf and I saw 2 birds on 3 May and 20 on 4 May. In the same area during the fall of 1961, the Berretts and I observed three on 29 September, two on 30 September, and two on 11 October. Morony and I noted three on 5 March 1964 about 3 miles offshore from Puerto Escondido. Off Puerto Angel in 1964, Morony and I recorded the following data: 20 April, 3 seen; 21 April, 13 seen, of which one was collected (adult male, 210.9 grams, testes small and black, Binford only Oaxaca specimen); 22 April, 13 seen.

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. Should be sought as a winter resident on Pacific coast and perhaps elsewhere in state (30 seen by Morony and Binford on 5 March 1964 offshore from Puerto Escondido may represent early migrants). Boucard record (immature male specimen, October) from "Putla, Vera Cruz" (Saunders and Salvin, 1896: 22) may pertain to Putla de Guerrero, Oaxaca. Dates: 5 March; 20 April to 18 May; 9 August to 21 October. Elevations: sea level to 100 feet.

Gelochelidon nilotica (Gmelin). Gull-billed Tern.

Very uncommon winter resident and probably a local permanent resident, occurring on bays and lagoons of Pacific
coast from San Mateo del Mar west to mouth of Río Tonameca. Breeding evidence: enlarged follicles (largest 6 mm) very fat adult female specimen weighing 205 grams and taken by Morony at mouth of Río Tonameca on 19 April 1964; habitat and probably range and dates. All dates: 22 February 1869, 19 and 28 April 1964, and 16 and 17 May 1961; 6 August 1869. Elevation: sea level.

*Hydroprogne 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. Only Oaxaca specimens: one male (648.4 grams, moderately fat, testes small, Binford) and one female (583.0 grams, moderately fat, follicles not enlarged, D. G. Berrett) taken at southwestern corner of Laguna Superior 19 road miles southwest of Juchitán on 9 January 1962. Dates: 20 October to 18 May. Elevations: sea level to 200 feet.


Fairly common winter resident on open ocean within several miles of shore and along Pacific coast on lagoons, bays, and harbors. One specimen (USNM 59750, 22 December 1869, Sumichrast), and perhaps others, from Bahía Ventosa originally misidentified by Lawrence (1876: 51) as *S. forsteri*. Dates: 29 September to 18 May. Elevation: sea level.
**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*.

**Sterna albifrons** Pallas. 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. Breeding evidence: 8 to 10 adult pairs and nests with eggs noted by Shufeldt on 8 May 1915 and 20, 24, and 26 May 1917 on river bars about 1 mile northwest of Tehuantepec City, the only definite breeding site; probably breeds at mouth of Río Tonameca, where Binford and Morony observed six adult pairs courting on 28 April 1964. Dates: 19 April to 19 October. Elevations: sea level to 100 feet.

**Thalasseus maximus** (Boddaert). Royal Tern.

Fairly common winter resident on Pacific coast on lagoons, bays, and harbors from Punta Paloma west at least to a point 4 road miles southeast of Puerto Escondido. Possibly a permanent resident. Dates: 6 August to 31 May. Elevation: sea level.

**Thalasseus elegans** (Gambel). Elegant Tern.

Uncommon transient migrant on open ocean and on bays and harbors of Pacific coast. Possibly occurs in winter and as
a breeding bird in spring and summer. Dates: 3 March to 13 May; 17 October. Elevation: sea level.

**Thalasseus sandvicensis** (Latham). Sandwich Tern.

Very uncommon bird on coastal lagoons from southwestern edge of Laguna Superior east to Punta Paloma; probably only a winter resident but possibly a permanent resident. Dates: August to 18 May. Elevation: sea level.

Lawrence (1875: 51) records an unstated number of Sumichrast specimens taken at San Matel del Mar in August and February. Most subsequent authors have correctly followed Lawrence. Friedmann, Griscom, and Moore (1950: 111), however, state that the "very old record from the Pacific coast of Oaxaca was originally a misidentification of **T. comatus** [=**T. elegans**] by Sumichrast, corrected by Sclater and Salvin in 1871, but perpetuated by all subsequent authors!" This statement is completely incorrect; P. L. 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 still in the United States National Museum (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 miles south-
west of Juchitán, Wolf and I recorded the following data:
16 May, one bird collected (female, 210.5 grams, follicles
minute, Wolf); 17 May, one of two collected (female, 160.5
grams, slightly fat, follicles minute, Wolf); 18 May, nine
seen. On 20 March 1964 near Punta Paloma, Morony and I saw
19 Sandwich Terns.

Family RYNCHOPIDAE

Rynchops nigra Linnaeus. Black Skimmer.

Very uncommon winter resident on bays and lagoons of
Pacific coast. Possibly a permanent resident on Pacific
coast. One record inland from coast, an individual seen by
Morony and Binford on a small lake 12 road miles southeast
of Santiago Jamiltepec on 2 March 1964. Dates: 9 August to
4 March. Elevations: sea level; higher at a point 12 road
miles southeast of Santiago Jamiltepec but exact elevation
unknown.

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
feral. Unrecorded but probably occurs in Atlantic Region.
Breeding evidence: range, habitat, and dates. Elevations:
50 to 7,000 feet.

I have observed this species in numerous towns, including Oaxaca City, Puerto Angel, San Pedro Pochutla, and San Pedro y San Pablo Teposcolula.

**Columba flavirostris** Wagler. Red-billed Pigeon.

Permanent resident, common in Pacific Region in tropical deciduous, tropical semideciduous, and humid gallery forests and fairly common to uncommon in Atlantic Region in tropical evergreen forest. Breeding evidence: nest with young. Elevations: sea level to 4,900 feet.

**Columba fasciata** Say. Band-tailed Pigeon.

Fairly common breeding bird in pine-oak forests (especially humid portions) in Pacific Region west of Isthmus and in the Interior; presumably a permanent resident but recorded only from 1 April to 10 September. Breeding evidence: nest with young. Elevations: 5,800 to 9,700 feet.

**Columba speciosa** Gmelin. Scaled Pigeon.

Rare bird in Atlantic Region in tropical evergreen forest, recorded northwest to San Juan Bautista Tuxtepec and a point 6 road miles southwest of Valle Nacional and south in Isthmus to a point 2 miles north plus 2 miles east of Matías Romero; presumably a permanent resident but recorded only from 21 February to 22 April. Breeding evidence: enlarged testes (19 x 8 mm). Elevations: 100 to 1,900 feet.
**Columba nigrirostris** Sclater. Short-billed Pigeon.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest, occurring northwest to "Lalana" and "Moctum" and south in Isthmus to Palomares. Breeding evidence: enlarged follicle (11 mm). Elevations: 250 to 300 feet (records for Lalana and Moctum probably much higher but elevations of towns and exact points of collection unknown).

**Zenaidura macroura** (Linnaeus). Mourning Dove.

Mainly a winter resident, common in Pacific Region and in the Interior, occurring in arid tropical scrub, arid temperate scrub, and tropical deciduous forest, and uncommon in Atlantic Region in clearings within tropical evergreen forest. Uncommon permanent resident in the Interior in arid temperate scrub (see below). Bird banded on 21 August 1927 at Tiffin, Ohio, shot in December 1934 at Tamazola (M. T. Cooke, 1938: 187). Breeding evidence: nest with two eggs found by Binford 9 road miles east of Santa María del Tule on 8 May 1961. Elevations: sea level to 7,300 feet (record for La Parada perhaps slightly higher; elevation at exact point of collection uncertain but not 10,000 feet as erroneously reported by Salvin and Godman [1897-1904 (1902): 243]).

**Zenaida asiatica** (Linnaeus). White-winged Dove.

Permanent resident, common in Pacific Region in clearings and sparsely wooded sections within tropical deciduous...
forest and arid tropical scrub and uncommon in the Interior in arid temperate scrub; recorded north in Isthmus to Chivela. Unrecorded, but probably occurs, in arid tropical scrub of Interior valleys. Numbers augmented by transient migrants and winter residents. Isthmus population largest in October. Breeding evidence: nest with young. Elevations: sea level to 6,300 feet.

*Scardafella inca* (Lesson). Inca Dove.

Permanent resident in Pacific and Interior Regions, very common in arid tropical scrub, arid temperate scrub, and tropical deciduous forest and rare near habitation within arid pine-oak forest and cloud forest, recorded north in Isthmus to Chivela. Probably a rare permanent resident in Atlantic Region (one record, one seen in scrubby savanna at Amapan, 3 December 1961, the Berretts and Binford). Breeding evidence: nest with eggs. Elevations: sea level to 6,400 feet.

*Columbigallina passerina* (Linnaeus). Common Ground-Dove.

Common permanent resident in Pacific and Interior Regions, occurring in arid temperate scrub, in arid tropical scrub, and in guamil and savanna within tropical deciduous forest. The only record for Atlantic Region (female specimen, USNM 33779, Moctum, 3 September 1941, Avilés) needs substantiation by additional data. Breeding evidence: nest with eggs; two nestlings (UNSM 155433 and 155434) collected by Nelson and Goldman on 18 June 1895 at La Ranchería.
(specimens labeled "Mts. near Santo Domingo") are *C. talpacoti*, not *C. passerina* as erroneously listed by Todd (1913: 538) and Ridgway (1916: 403). Elevations: sea level to 6,100 feet.

*Columbiqallina 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 miles north of Matias Romero north to Donaji. Probably a permanent resident but recorded only from 5 March to 7 August. Should be sought elsewhere at low elevations. Breeding evidence: nest with young. Elevations: 300 to 2,400 feet.

In savanna and pastures 1 mile east of Putla de Guerrero, Morony and I observed from 1 to 16 individuals daily from 18 to 22 May 1964. Eight male specimens, all with greatly enlarged testes, were collected as follows: 18 May, one (34.2 grams, Morony); 19 May, one (39.9 grams, little fat, Morony); 20 May, one (little fat, Binford); 22 May, five (33.8 grams, little fat, Morony; 36.4, 38.3, 39.5, and 42.2 grams, all with little fat and collected by Binford). 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 have examined five specimens from the Atlantic side
of the Isthmus of Tehuantepec, as follows: one male (testes not enlarged, ARPC uncatalogued) collected by Rook and L. Petite at a point 12 miles north of Matías Romero on 7 August 1961; one female (follicles not enlarged, AMNH 775906) taken by Schaldach at Montebello on 5 March 1961; one female (some fat, largest follicle 2 mm, ARPC uncatalogued) collected by Schaldach at Rancho Las Cruces near Donaji on 3 July 1962; and one male (moderately fat, testes not enlarged, ARPC uncatalogued) and one female (moderately fat, follicles not enlarged, AMNH 787502) both secured by Schaldach at Donaji on 15 July 1962.

*Columbigallina talpacoti* (Temminck). Ruddy Ground-Dove.

Permanent resident in guamil, 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 Puerto Escondido; and uncommon in remainder of Pacific Region. Breeding evidence: nest with young (see *C. passerina*). Elevations: sea level to 2,400 feet (record for Moctum perhaps higher but elevations of town and exact point of collection unknown).

*Claravis pretiosa* (Ferrari-Perez). Blue Ground-Dove.

Uncommon permanent resident in Atlantic Region in dense understory of tropical evergreen forest, recorded northwest to San Juan Bautista Tuxtepec and south in Isthmus to
Escuilapa. Breeding evidence: enlarged follicle (5 mm).
Elevations: 100 to 2,600 feet.

**Leptotila verreauxi** Bonaparte. White-fronted Dove.
Permanent resident in all Regions of state, very common in tropical evergreen, tropical deciduous, tropical semi-deciduous, and humid gallery forests, uncommon in arid tropical scrub and extreme lower reaches of cloud forest, and rare in densely forested canyons within general range of arid temperate scrub. Breeding evidence: nest with young.
Elevations: sea level to 6,100 feet.

**Leptotila plumbeiceps** Sclater and Salvin. Gray-headed Dove.
Very uncommon permanent resident in tropical evergreen forest of Atlantic Region lowlands, recorded south in Isthmus to Sarabia. Breeding evidence: enlarged testes (right, 13 x 6, left, 15 x 7 mm). Elevations: 250 to 300 feet.

**Geotrygon montana** (Linnaeus). Ruddy Quail-Dove.
Permanent resident, fairly common in Pacific Region west of Isthmus in tropical semideciduous forest and uncommon in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to a point 16 road miles north of Matías Romero. Breeding evidence: nest with eggs. Elevations: 300 to 4,900 feet.

**Geotrygon albifacies** Nelson. White-faced Quail-Dove.
Permanent resident in cloud forest, very common in Atlantic Region in Sierra Madre de Chiapas, common in Pacific
Region in Sierra de Miahuatlán, and uncommon in Atlantic Region west of Isthmus. Breeding evidence: nest with young. Elevations: 4,100 to 5,800 feet (records for Totontepec and Cerro Zempoaltepec probably higher but elevations at exact point of collection unknown).

Family PSITTACIDAE

[Ara militaris (Linnaeus). Military Macaw.]

No specimen examined; one published record, a listing by Sumichrast (1881: 238) of the locality "Reg. alp. de . . . Zapotitlan, cerca de Huamelula" (Zapotitlán at 5,739 feet but elevation at exact point of collection unknown). All other Oaxaca references, including that by Lawrence (1875: 35) from "Mountains north of Tehuantepec," pertain to the Zapotitlán record. I do not know whether or not Sumichrast's record is based on a specimen. In the catalogue of the United States National Museum, 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. Should be sought in mountains throughout state.

Ara macao (Linnaeus). Scarlet Macaw.

Permanent resident in lower portions of Pacific Region in gallery 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 miles 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); now very uncommon or extirpated over much of former range. Breeding evidence: range, habitat, and dates. Elevations: sea level to 800 feet.

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 a point 12 airline miles north-northeast of Zanatepec, occurring in tropical deciduous forest, tropical semideciduous forest, humid gallery forest, and arid tropical scrub. Breeding evidence: egg without shell in oviduct (A. h. strenua). Elevations: 50 to 4,900 feet.

Birds from eastern Oaxaca and south along the Pacific slope of Central America are larger than typical holochlora from the Atlantic slope of México and are sometimes considered a distinct species, A. strenua (Ridgway). 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 that I have seen are close to *strenua*, although one female (AMNH 775908) from the Oaxaca-Chiapas border 10 miles east of Tapanatepec is close to *holochlora*. A male (AMNH 775907) from the same locality and two males (LSUMZ 39655 and 43731) from Tonala, 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 of the situation. It is interesting to note that the Oaxaca population and that of the Atlantic slope of México 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 eastern Oaxaca and western Chiapas, the latter must be a different population from that which inhabit Atlantic México, even though the two apparently are morphologically identical.

**Aratinga astec** (Souancé). Olive-throated Parakeet.

Common permanent resident in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to El Barrio. Breeding evidence: range, habitat, and dates. Elevations: 100 to 1,050 feet.

**Aratinga canicularis** (Linnaeus). Orange-fronted Parakeet.

Very common permanent resident in tropical semideciduous forest, humid gallery forest, tropical deciduous forest, and arid tropical scrub, occurring along entire length of Pacific Region, northwest in Río Tehuantepec basin to Rancho Las Animas, and north across Isthmus into Atlantic Region to a

**Brotogeris jugularis** (Müller). Orange-chinned Parakeet.

Uncommon permanent resident in humid gallery forest, and perhaps other habitats, of Pacific lowlands and adjoining foothills from Chiapas border west to Ostuta. Should be sought elsewhere in Pacific Region. Breeding evidence: "testes full size" (Lamb specimen label); range, habitat, and dates. Elevations: sea level to 800 feet.

**Pionopsitta haematotis** (Sclater and Salvin). Brown-hooded Parrot.

Fairly common permanent resident in Atlantic Region in cloud forest and heavy tropical evergreen forest, recorded northwest to Vista Hermosa and a point 6 road miles southwest of Valle Nacional and south in Isthmus to a point 18 road miles north of Matías Romero. Breeding evidence: range, habitat, and dates. Elevations: 200 to 5,200 feet.

**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 miles north of Matías Romero. Local migration indicated by records from a point at 300 feet elevation 1 mile southwest of Valle Nacional, where species unrecorded from 14 February through 25 March 1961 but fairly common thereafter. Breeding evidence: enlarged testes (12 x 6 mm).
Elevations: 300 to 1,900 feet (record for San Ildefonso Villa Alta probably higher but elevation at exact point of collection unknown).

**Amazona albifrons** (Sparrmann). White-fronted Parrot.

Common permanent resident in tropical deciduous forest and arid tropical scrub, occurring along entire length of Pacific Region and north across Isthmus into Atlantic Region as far as Matías Romero. Record from La Parada (Ridgway, 1916: 256) probably erroneous. Breeding evidence: nest with one egg. Elevations: sea level to 3,000 feet.

**Amazona finschi** (Sclater). Lilac-crowned Parrot.

Very uncommon permanent resident in humid and semiarid pine-oak forests of Pacific Region west of Isthmus, wandering into lowlands of Pacific Region (including Isthmus) in fall; recorded from Putla de Guerrero east to Zanatepec, the easternmost point in entire range of species. Breeding evidence: range, habitat, and dates. Elevations: sea level to 4,900 feet.

**Amazona autumnalis** (Linnaeus). Red-lored Parrot.

Common permanent resident in Atlantic Region in tropical evergreen forest, occurring south in Isthmus to El Barrio. Breeding evidence: enlarged testes (12 x 5 mm). Elevations: 100 to 1,050 feet.

**Amazona ochrocephala** (Gmelin). Yellow-headed Parrot.

Uncommon and local permanent resident in tropical
deciduous and humid gallery forests, from Pacific Region north across Isthmus into Atlantic Region to "Petapa" [=Santo Domingo Petapa?]. Should be sought elsewhere in Atlantic Region. Breeding evidence: enlarged testes (19 x 8 mm). Elevations: sea level to 1,050 feet.

A. o. auropalliata (Lesson), sometimes considered a distinct species, occurs from the Chiapas border west to the Río Ostuta and to a point near Ixhuatán. A. o. oratrix Ridgway is found from near the Guerrero border east to "Petapa" [=Santo Domingo Petapa?] and El Barrio. No intermediates between these two forms have been collected; a detailed field study is needed to determine whether or not intergradation occurs in the intervening area. The race magna Monroe and Howell has never been recorded in Oaxaca but may occur in the lowlands of the Atlantic Region. Alleged occurrence at Santa María Chimalapa, listed by Ridgway (1916: 232) as a locality for auropalliata, is based on a misidentification of A. farinosa.

Amazona farinosa (Boddaert). Mealy Parrot.

Fairly common permanent resident in Atlantic Region in heavy tropical evergreen forest west to Uvero and a point 16 road miles north of Matías Romero. Breeding evidence: range, habitat, and dates. Elevations: 100 to 950 feet. See A. ochrocephala.
Family CUCULIDAE

*Coccyzus erythropthalmus* (Wilson). Black-billed Cuckoo.

Very uncommon transient migrant, recorded in only four localities, three in tropical evergreen forest in Atlantic Region in vicinity of Isthmus of Tehuantepec (Escuilapa, Tutla, and a point 24 road miles north of Matías Romero) and one in the Interior in arid temperate scrub (La Hacienda). Dates: 8 March to 23 April; latter part of September. Elevations: 300 to 5,250 feet.

*Coccyzus americanus* (Linnaeus). Yellow-billed Cuckoo.

Fairly common transient migrant throughout state occurring in tropical evergreen forest, tropical deciduous forest, tropical semideciduous forest, arid tropical scrub, arid temperate scrub, and humid gallery forest. Rare winter resident at least in Atlantic Region: three specimens taken by Avilés at Tutla in 1941, one male (FM 119422) and one female (FM 119421) on 11 February and one female (FM 119424) on 11 March. Dates: 11 April to 31 May; September to 1 October. Elevations: 50 to 5,250 feet.

*Coccyzus minor* (Gmelin). Mangrove Cuckoo.

Uncommon permanent resident in Pacific Region in mangrove swamp, tropical deciduous forest, and humid gallery forest, recorded from Punta Paloma and a point 9 road miles east of Tapanatepec west along foothills of Sierra Madre de Chiapas to a point 5.2 miles west of Niltepec and also in Río
Tehuantepec basin at Rancho Las Animas and Río Coyul. Should be sought in Atlantic Region and elsewhere in Pacific Region. Breeding evidence: enlarged testes (10 x 5 mm). Elevations: sea level to 3,000 feet.

Piaya cayana (Linnaeus). Squirrel Cuckoo.

Common permanent resident in tropical evergreen, tropical semideciduous, and tropical deciduous forests throughout state and in gallery forest within general ranges of both arid tropical scrub and savanna where they occur in southern and western portions of state. Unrecorded in arid valleys of San Juan Bautista Cuicatlán and Hidalgo Yalalag. Breeding evidence: nest with young. Elevations: sea level to 5,250 feet.

The two races in Oaxaca, thermophila Sclater of the Atlantic Region and mexicana (Swainson) of the Pacific Region and arid Interior valleys, sometimes considered full species, demonstrate incomplete intergradation in the arid lowlands from Las Tejas east to the Chiapas border and north to the Río Sarabia. A detailed study should be made to determine the exact extent of intergradation.

Crotophaga sulcirostris Swainson. Groove-billed Ani.

Common permanent resident in all Regions in guamil, cultivated land, grazed land, and natural brushy areas, in each case within general range of tropical evergreen forest, tropical deciduous forest, tropical semideciduous forest, arid tropical scrub, and lower reaches of arid temperate
scrub (in Oaxaca Valley and at Huajuapan de León. Breeding evidence: prejuvenal. Elevations: sea level to 5,250 feet.

*Tapera naevia* (Linnaeus). Striped Cuckoo.

Very uncommon permanent resident in Atlantic Region northwest at least to San Miguel Soyaltepec and in Pacific Region in Sierra Madre de Chiapas (Santa Efigenia), occurring in brush at edges of tropical evergreen and tropical semideciduous forests. Breeding evidence: egg without shell in oviduct. Elevations: 250 to 800 feet.

*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. Breeding evidence: prejuvenal. Elevations: sea level to 3,200 feet (record for San Juan del Río possibly higher but elevation at exact point of collection unknown).

*Dromococcyx phasianellus* (Spix). Pheasant Cuckoo.

Uncommon permanent resident in Pacific Region and in Atlantic Region northwest at least to a point 5 miles west of Temascal, occurring in tropical evergreen, tropical demideciduous, and cloud forests and in humid gallery forest adjacent to first three habitats. Breeding evidence: hard-shelled egg in oviduct. Elevations: 300 to 4,900 feet.
Geococcyx velox (Wagner). Lesser Roadrunner.

Permanent resident, common in Pacific Region in tropical deciduous forest, arid tropical scrub, and related savanna, uncommon in Pacific and Interior Regions in pine-oak forests and in the Interior in arid temperate scrub and arid tropical scrub, and rare in Atlantic Region in unknown habitats (Mocum and points 2 miles south and 6 miles north of Matías Romero). Breeding evidence: nest with young. Elevations: sea level to 9,000 feet.

Family TYTONIDAE

[Tyto alba (Scopoli). Barn Owl.]

No specimen examined; three published localities. Status uncertain; probably, a rare permanent resident, occurring in all Regions of state. Recorded as follows: "Oaxaca" [=Oaxaca City?], Boucard specimen (P. L. Sclater, 1859b: 390); "Tehuantepec City" (town at 115 feet 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). Breeding evidence: range and habitat; dates unknown.
Family STRIGIDAE

Otus asio (Linnaeus). Common Screech-Owl.

O. a. lambi Moore and Marshall.—Fairly common permanent resident in Pacific Region from Puerto Angel and Rancho Las Animas east through Ixtepec to northern edge of Laguna Inferior 14 miles south of Niltepec, recorded in arid tropical scrub and tropical deciduous forest and in mangrove swamp and adjacent humid gallery forest. Breeding evidence: "laying" (A. R. Phillips specimen label); range, habitat, and dates. Elevations: sea level to 3,000 feet.

O. a. cooperi Ridgway.—Uncommon permanent resident in Pacific Region in mangrove swamp and adjacent open humid gallery forest from vicinity of Chahuites east to Punta Paloma and undoubtedly into Chiapas. Breeding evidence: range, habitat, and dates. Elevation: sea level. See O. trichopsis.

I follow Marshall (1967) in considering asio and cooperi as incipient species and in merging the race chiapensis Moore with cooperi.

Otus trichopsis (Wagler). Spotted Screech-Owl.

Fairly common permanent resident in dense clumps of oaks within humid and arid pine-oak forests in highlands of Interior Region and of Pacific Region in Sierra de Miahuatlán. Records from Cacoprieto (Sumichrast, 1881: 237) and "Tehuantepec" [=Tehuantepec region] (Beristain and Laurencio, 1894: 228) pertain to O. asio cooperi. Should be sought in
Sierra Madre de Chiapas. Breeding evidence: range, habitat, and dates. Elevations: 6,400 to 9,000 feet.

Otus guatemalae (Sharpe). Vermiculated Screech-Owl.

Uncommon permanent resident, occurring in tropical evergreen forest of Atlantic Region from "Chimalapa" [=Santa María Chimalapa?] (one female and one bird not sexed, W. B. Richardson; records published by Moore and Peters, 1939: 50) west to Tutla and in dense tropical deciduous and tropical semideciduous forests of Pacific Region from above San Gabriel Mixtepec east to a point 13 road miles north of Puerto Angel. Should be sought in similar habitats elsewhere in Atlantic and Pacific Regions. Breeding evidence: prejuvenal. Elevations: 300 to 750 feet (much higher, over 2,350 feet, at a point above San Gabriel Mixtepec but exact elevation unknown.

Lophostrix 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 miles north of Matías Romero) and in Pacific Region in humid gallery forest of Sierra Madre de Chiapas (known only from Rancho de Cacoprieto). Should be sought elsewhere in Pacific Region east of Isthmus and throughout lower portions of Atlantic Region. Breeding evidence: range, habitat, and dates. Elevations: 300 feet; record for San Ildefonso Villa Alta probably higher but elevation at exact point of collection unknown.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
**Bubo virginianus** (Gmelin). Great Horned Owl.

Rare permanent resident in arid habitats probably throughout Pacific and Interior Regions but so far recorded definitely only on Pacific side of Tehuantepec region—at Rancho de Cacoprieto (four specimens, BMNH, Sumichrast; records published by Griscom, 1935: 546) and "Tehuantepec City" (female specimen, USNM 59497, 16 October 1869, Sumichrast; city at 115 feet but elevation at exact point of collection unknown). Old published record (P. L. Sclater, 1859b: 390) of Boucard specimen from "Oaxaca" may pertain to Oaxaca City. Breeding evidence: range, habitat, and dates.

**Pulsatrix perspicillata** (Latham). Spectacled Owl.

Uncommon permanent resident in Pacific Region in humid gallery forest of Sierra Madre de Chiapas and in Atlantic Region in tropical evergreen forest northwest at least to a point 5 miles west of Temascal. Nelson and Goldman specimen (USNM 155672, type of *P. p. saturata* Ridgway), often reported as from "Santo Domingo," came from "Mts. near Santo Domingo" at La Rancheria. Record for Tehuantepec City (Ridgway, 1914: 758) is erroneous. Breeding evidence: range, habitat, and dates. Elevations: 250 to 1,500 feet.


Uncommon permanent resident in Pacific Region west of Isthmus and in the Interior, recorded only in humid pine-oak forest but to be expected also in arid pine-oak forest.
Breeding evidence: range, habitat, and dates. Elevations: 6,600 to 9,300 feet (record for above Rio Guajolote perhaps lower but elevation at exact point of collection unknown).

There are four definite Oaxaca records for the Northern Pygmy-Owl. In 1961 Wolf collected a lone male (52.5 grams, moderately fat, testes small) at 9,300 feet elevation 38 road miles southwest of Valle Nacional on 28 April and one of two birds (male, 50.3 grams, slightly fat, testes small) seen at 6,600 feet elevation 10 road miles south of San Miguel Suchistepec on 1 May. A. R. Phillips (in litt.) informs me that he has two specimens, a male (ARPC 7814 fat, testes not enlarged) collected by Juan Nava S. above Rio Guajolote on 15 November 1964 and a female (ARPC 7654 moderate fat, ovary not enlarged) taken by Hermilo Garcia F. at 7,300 feet elevation at Río Molino on 8 November 1964. Specimens taken by Sumichrast at Tapanatepec and Tehuantepec City and reported by Lawrence (1876: 37) and Sumichrast (1881: 237) as gnoma represent G. brasilianum, as may the record from "Tehuantepec" [=Tehuantepec region] listed by Beristain and Laurencio (1894: 228).

Glaucidium minutissimum (Wied). Least Pygmy-Owl.

Permanent resident, very common in Pacific Region in tropical deciduous and humid gallery forests up to 1,050 feet elevation north and northwest of Puerto Escondido and rare in Atlantic Region up to at least 4,100 feet elevation in tropical evergreen forest and lower reaches of cloud
forest. Breeding evidence: range, habitat, and dates. Elevations: 500 to 4,100 feet (record for Moctum perhaps higher but elevation of town and exact point of collection unknown).

It is interesting to note that near Puerto Escondido, where minutissimum is very common, G. brasilianum is absent, whereas in the Atlantic Region, where minutissimum is rare, brasilianum is common.

Glaucidium brasilianum (Gmelin). Ferruginous Pygmy-Owl.

Permanent resident below 5,000 feet elevation throughout major portion of Atlantic and Pacific Regions, common in tropical evergreen forest, tropical deciduous forest, and humid gallery forest, fairly common in arid tropical scrub and tropical semideciduous forest, and uncommon in the cloud forests of the Sierra de Miahuatlán. Should be sought in arid tropical scrub of Interior. Breeding evidence: enlarged testes (8 x 5 mm). Elevations: sea level to 5,000 feet. See G. gnoma and G. minutissimum.

Speotyto cunicularia (Molina). Burrowing Owl.

Very uncommon winter resident in savanna throughout state. Possibly a rare and local permanent resident. Dates: 17 November to 26 March. Elevations: 50 to 5,400 feet.

Ciccaba virgata (Cassin). Mottled Owl.

Fairly common permanent resident in Atlantic and Pacific Regions in tropical evergreen forest, tropical semideciduous
forest, tropical deciduous forest, humid gallery forest, and arid tropical scrub and in Pacific Region in lower reaches of cloud forest. Breeding evidence: enlarged testes (14 x 7 mm). Elevations: sea level to 4,900 feet (probably higher at a point above San Gabriel Mixtepec but exact elevation unknown).

*Ciccaba nigrolineata* Sclater. Black-and white Owl.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in humid gallery forest of Sierra Madre de Chiapas. Record for Tehuantepec City (Lawrence, 1876: 37) highly doubtful because of locality. Breeding evidence: prejuvenal. Elevations: 250 to 800 feet.

*Strix varia* Barton. Barred Owl.

Very rare permanent resident in high elevation pine-oak forest of Interior, recorded only at "parada" [=La Parada] (December 1857, Boucard; record published by P. L. Sclater, 1858: 295) and on Cerro San Felipe (two female specimens, 23 and 29 August 1894, Nelson and Goldman, USNM 155665 and 155666, respectively). Oaxaca localities are southeasternmost in entire range of species. Breeding evidence: range, habitat, and dates. Elevations: exact elevations at which specimens obtained unknown; La Parada located at 7,900 feet; Nelson and Goldman collected between 10,000 and 10,300 feet on Cerro San Felipe.
Strix fulvescens (Sclater and Salvin). Fulvous Owl.

Very rare permanent resident, recorded only in Atlantic Region. Known only from four specimens from "Totontepec" taken by Avilés in 1942: two adult females on 11 and 5 May and one adult male and one prejuvenal male on 14 May (MLZ 33799-33802, respectively). These are the only Mexican records west of Isthmus. Elevation and habitat at exact point of collection unknown; Totontepec located at 6,068 feet in cloud forest.

*Rhinoptynx clamator* (Vieillot). Striped Owl.

Very rare permanent resident in Atlantic Region in tropical evergreen forest. Known only from three specimens taken at 250 feet elevation at junction of Trans-Isthmian Highway and the Río Sarabia 18 road miles north of Matías Romero in 1960: two full-sized but partially downy juvenals, one a male (LSUMZ 61377) and one a female (HC 4680), taken by Schaldach on 7 February and one adult female (HC 4707) collected by Rook on 12 April. Should be sought elsewhere in lowlands of Atlantic Region. Breeding evidence: range, habitat, and dates; see above.

[Asio flammeus (Pontoppidan). Short-eared Owl.]

No specimen examined; one published record, a specimen collected by Boucard in "Oaxaca" [=Oaxaca City?] (P. L. Sclater, 1859b: 390), has formed the basis for all subsequent references. Status uncertain; probably an accidental winter visitant. 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.

*Aegolius acadicus* (Gmelin). Saw-whet Owl.

Very rare permanent resident of Interior highlands; habitat unknown but probably humid pine-oak forest. Breeding evidence: range, dates, and probably habitat. Elevations: uncertain; elevation of 2,100 meters (6,888 feet) given by Avilés on label of Amatepec specimen is questionable.

Briggs (1954), in her original description of the race *A. a. brodkorbi*, considers *A. acadicus* and *A. ridgwayi* (Alfaro) conspecific on the basis of her type, which is in juvenal plumage and is exactly intermediate between juvenal *A. a. acadicus* to the north and *A. ridgwayi tacanensis* Moore to the south, the latter race being known only from the immature plumage. Although the case for conspecificity is far from proved, I prefer to follow Briggs, pending collection of additional specimens. Thus this Oaxaca population should be known as *A. acadicus brodkorbi* Briggs.

P. L. Sclater (1858: 295) published a record of a male specimen collected by Boucard in October 1857 at Cinco Señores. 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. The only other record for Oaxaca is the type of brodkorbi, a male in juvenal plumage (USNM 462871) collected by Avilés on 12 May 1949 at Amatepec (elevation of 2,100 mètres [6,888 feet] given on specimen label may not be accurate).

Family NYCTIBIIDAE

*Nyctibius griseus* (Gmelin). Common Potoo.

Uncommon permanent resident, occurring in Isthmus portion of Atlantic Region in clearings and savanna within tropical evergreen forest and in Pacific Region west to El Guamol in openings near humid gallery forest. Probably occurs elsewhere in lower portions of Atlantic and Pacific Regions. Breeding evidence: range, habitat, and dates. Elevations: sea level to 800 feet.

Family CAPRIMULGIDAE

*Chordeiles acutipennis* (Hermann). Lesser Nighthawk.

Permanent resident near openings within forested regions of lowlands and adjacent foothills, common in Pacific Region in tropical deciduous forest, arid tropical scrub, and humid gallery forest and uncommon in Atlantic Region in tropical evergreen forest. Breeding evidence: nest with eggs. Elevations: sea level to 800 feet (record for San Pedro Juchatengo probably higher but elevation at exact point of collection unknown).
Chordeiles minor (Forster). Common Nighthawk.

Three specimens examined; apparently no additional records. Status uncertain; probably, a rare transient migrant throughout Atlantic Region and a very rare permanent resident in lowlands on Atlantic side of Isthmus. Breeding evidence: slightly enlarged follicle (3 mm); range, habitat, and probably dates. Elevations: uncertain but probably about 200 to 350 feet.

The 7 June 1939 date of a female specimen (MLZ 26373) collected by Avilés at Tutla suggests breeding status. The only other records for Oaxaca are a male (MLZ 26382) taken by Avilés at Palomares on 6 May 1939 and a female (AMNH 787511, moderately fat, largest follicle 3 mm) collected by Schaldach on 16 May 1962 at a point 4 miles north plus 2 miles east of Matías Romero.

Nyctidromus albicollis (Gmelin). Pauraque.

Very common permanent resident, occurring in Atlantic Region in tropical evergreen forest, in Pacific Region in tropical deciduous forest, arid tropical scrub, humid gallery forest, and extreme lower reaches of tropical semi-deciduous forest, and in the Interior in arid tropical scrub. Breeding evidence: prejuvenal caught and released; nest with eggs. Elevations: sea level to 2,950 feet.

*Otophanes mcleodii Brewster. Eared Poorwill.

One record, a male (36.4 grams, little fat, testes not enlarged, stomach full of remains of many small brown
beetles) that I collected on 13 May 1964 in Pacific Region at 4,350 feet elevation 16 road miles north of San Gabriel Mixtepec in a locally arid patch of stunted and recently burned oaks within a general area of humid pine-oak forest and tropical semideciduous forest. Status uncertain; possibly a rare permanent resident, but no other birds seen during daylight or heard at night, and small size of gonads suggests nonbreeding status at least at this time of year.

*Caprimulgus carolinensis* Gmelin. Chuck-will's-widow.

Recorded only in Atlantic Region in tropical evergreen forest, where a very rare transient migrant. Possibly a very rare winter resident. Only two Oaxaca records, a male specimen collected by W. B. Richardson in April in Sierra Santo Domingo (Salvin and Hartert, 1892: 566) and a female (AMNH 778257, quite fat, largest follicle 2 mm) collected by Schaldach on 13 April 1962 along the Río Malatengo 14.5 road miles north of Matías Romero. Elevations: 300 feet; record for Sierra Santo Domingo possibly higher but elevation at exact point of collection unknown.

*Caprimulgus salvini* Hartert. Tawny-collared Nightjar.

One record, a female (MLZ 31787) taken by Avilés on 16 January 1944 in Atlantic Region at "San Miguel Soyaltepec" allegedly at "600 mts." elevation (probably incorrect and close to 250 feet). Status uncertain; probably a rare winter visitant but possibly a rare permanent resident.

Uncommon permanent resident in Pacific Region in arid tropical scrub and in open areas within short-tree tropical deciduous forest and in the Interior in arid temperate scrub of Oaxaca Valley and perhaps elsewhere; recorded north in Isthmus to Mezahuite. Breeding evidence: range, habitat, and dates. Elevations: 100 to 5,400 feet.


Fairly common winter resident and uncommon permanent resident, breeding in both the Pacific Region west of Isthmus and in the Interior in pine-oak forests (especially highland pine) down to 5,800 feet elevation and wintering in all Regions in pine-oak forests, tropical deciduous forest, tropical semideciduous forest, tropical evergreen forest, arid tropical scrub, and probably other habitats down to 100 feet elevation. Breeding evidence: prejuvenal. Elevations: 100 to 9,300 feet.

Caprimulgus maculicaudus (Lawrence). Spot-tailed Nightjar.

Fairly common breeding bird in savanna of Atlantic Region at "Tutla" and Donaji; presumably a permanent resident, although recorded only from 1 February to 10 July. Should be sought elsewhere in lowlands of Atlantic Region. Breeding evidence: enlarged follicle (16 mm). Elevations: 300 feet at Donaji; elevation of Tutla and exact point of collection unknown.

I have examined 26 specimens of the Spot-tailed Nightjar,
the first of which was taken by Avilés on 9 June 1939 at "Tutla." This town is located at a much lower elevation (probably below 650 feet) than the 1,478 meters (4,448 feet) given by Blake (1949: 1) and subsequent authors. Extreme dates of the ten specimens in the Field Museum of Natural History, frequently misquoted in the literature, are 1 February (not January) to 22 (not 2) April.

Family APOIDAE

Streptoprocne zonaris (Shaw). White-collared Swift.

Permanent resident throughout state, breeding and roosting in mountains and feeding daily over all terrestrial habitats in mountains and lowlands; very common in Atlantic Region, common in Pacific Region in Sierra de Miahuatlán, and fairly common elsewhere. Breeding evidence: nest with one egg. Elevations: recorded from 100 to 9,000 feet; known to breed at 7,300 feet at Río Molino.

Chaetura pelagica (Linnaeus). Chimney Swift.

Very uncommon spring transient migrant, recorded only in Atlantic Region over tropical evergreen forest. Should be sought as a fall transient migrant. Generally overlooked because of occurrence within flocks of C. vauxi. Dates: 20 March to 19 April. Elevations: 200 to 300 feet.

Chaetura vauxi (Townsend). Vaux's Swift.

Common winter resident and fairly common permanent resident over all terrestrial habitats of Atlantic and Pacific
Regions, breeding and roosting in mountains in tropical deciduous and tropical semideciduous forests and probably in cloud and tropical evergreen forests and feeding there and over adjacent lowlands. Rare in the Interior over pine-oak forests and arid temperate scrub. Breeding evidence: active nest completed, contents unknown. Elevations: recorded from sea level to 9,000 feet; in Sierra de Miahuatlán, known to breed from 1,900 to 4,700 feet.

C. v. richmondi Ridgway, the breeding race of the Atlantic Region of Oaxaca, is sometimes considered a full species, but intermediacy of C. v. warneri Phillips, the breeding population of the Pacific Region of Oaxaca, indicates conspecificity.

Cypseloides rutilus (Vieillot). Chestnut-collared Swift.

Fairly common summer resident in mountains of Atlantic and Pacific Regions in vicinities of Valle Nacional, Putla de Guerrero, and Río Molino, breeding in caves in humid mountain forests and feeding down to lowlands. Rare in the Interior (one record, 10 birds seen well by L. L. Short (in litt.), R. H. Long, and F. C. Sibley on 26 August 1954 at La Cumbre). Should be sought in winter. Breeding evidence: nest with eggs. Dates: 3 March (1961, female specimen, 25.5 grams, follicles not enlarged, 1 mile southwest of Valle Nacional, Wolf) to 6 October (1961, 10 birds seen by the Berretts and Binford 11 road miles north of San Pedro Pochutla). Elevations: recorded from 300 to 9,000 feet;
in Pacific Region west of Isthmus, known to breed from 4,600 to 7,300 feet.

*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 temperate scrub at a point 4 road miles east of Santiago Matatlán; probably a permanent resident but recorded only from 27 May to 18 July. Breeding evidence: only one record, a nest with one egg found at 5,800 feet elevation at La Cima on 14 July 1965 (Rowley, 1966: 133). Elevations: 5,800 to 6,300 feet (record for Cerro San Felipe perhaps higher but elevation at exact point of collection unknown).

The Isthmus sight record by Graber and Graber (1959: 68) possibly is based on a misidentification. Ridgway (1911: 708 and 709-710), citing Salvin and Godman (1888-1904 [1894]: 379), lists Guichicovi as a locality for this species. The latter authors, however, never mention Guichicovi with reference to the Black Swift. In the absence of other references, Guichicovi must be deleted from the range of *C. niger*.

*Aeronautes saxatalis* (Woodhouse). White-throated Swift.

Very uncommon breeding bird in the Interior over arid temperate scrub and arid pine-oak forest; probably a permanent resident but recorded only from 9 May to 13 June. Only two Oaxaca specimens, one male (47.7 grams, little fat,
testes 10 x 5 mm, Binford) and one female (35.2 grams, little fat, largest follicle 1 mm, Morony) taken on 16 May 1964 at 7,400 feet elevation 6 road miles northeast of San Andrés Chicahuaxtla. Breeding evidence: enlarged testes (10 x 5 mm). Elevations: 5,400 to 7,700 feet.

*Panyptila sanctihieronymi* Salvin. Greater Swallow-tailed Swift.

One record, a female (46.9 grams, little fat, largest follicle 1 mm) that I took on 7 May 1964 in Pacific Region at 5,900 feet elevation 23 road miles north of San Gabriel Mixtepec. Status uncertain; probably only a casual spring visitant but possibly a rare permanent resident.

[*Panyptila cayennensis* (Gmelin). Lesser Swallow-tailed Swift.]

No specimen or published record; numerous sight records. Recorded only in Atlantic Region at a point 1 mile southwest of Valle Nacional at 300 feet elevation in tropical evergreen forest (one to nine seen by Wolf and Binford on fifteen dates from 25 February to 7 April 1961). Status uncertain; probably a rare permanent (or summer?) resident in Atlantic Region in tropical evergreen forest. Breeding evidence: habitat, probably dates, and possibly range.

Usually these birds were noted at dusk along with other species of swifts, but *Panyptila* appeared somewhat later in the evenings and flew higher than the other species. On only two occasions, both during midday, did I see this species.
flying at treetop level.

Family TROCHILIDAE

Phaethornis superciliosus (Linnaeus). Long-tailed Hermit.

Fairly common permanent resident in tropical evergreen forest up to 2,600 feet in Atlantic Region in tropical semi-deciduous forest and lower reaches of cloud forest from 900 to 5,000 feet in Pacific Region west of Isthmus, and in humid gallery forest and probably tropical semideciduous forest in Pacific Region in Sierra Madre de Chiapas. Breeding evidence: nest with eggs. Elevations: 250 to 5,000 feet.

Phaethornis longuemareus (Lesson). Little Hermit.

Common permanent resident in Atlantic Region in undergrowth of tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to Escuilapa. Breeding evidence: active nest completed, contents unknown. Elevations: 250 to 2,600 feet (record for Teotalcingo perhaps higher but elevations of town and exact point of collection unknown).

Campylopterus curvipennis (Deppe). Wedge-tailed Sabrewing.

Occurs in tropical evergreen forest of Atlantic Region; fairly common permanent resident from 4,600 to 1,900 feet; uncommon winter visitant from 1,900 to 250 feet; status as a rare permanent resident down to 300 feet suggested by two
records (male specimen, FM 119477, Tutla, 14 April 1941, Avilés; two birds seen, 28 road miles north of Matías Romero, 300 feet, 23 May 1961, Binford). Distribution in relation to time of year poorly known. To be expected in tropical evergreen forest of Atlantic Region east of Isthmus. Breeding evidence: nest with eggs.

**Campylopterus rufus** Lesson. Rufous Sabrewing.

Fairly common in Atlantic Region in cloud forest of Sierra Madre de Chiapas, where presumably a permanent resident. The only two records from east of Isthmus ("Tutla") probably represent winter visitors. Breeding evidence: range, habitat, and dates. Oaxaca localities are northwesternmost in entire range of species. Elevations: 4,900 feet; Tutla record probably lower but elevations of town and exact point of collection unknown.

In 1941 Avilés took a female (FM 119485) on 2 February and a male (FM 119486) on 3 February at "Tutla." In 1964 in cloud forest at 4,900 feet elevation 12 airline miles north-northeast of Zanatepec, Morony and I recorded the following data: 25 March, one female collected (6.4 grams, little fat, largest follicle .5 mm, crop containing one large, and seven small, spiders, Binford); 26 March, two birds seen, one of which was collected (female 6.8 grams, little fat, follicles minute, Binford); 3 April, five seen, two of which were collected by Morony (male, 9.0 grams, testes small; and female, 6.9 grams, follicles minute); 4 and 5 April, two seen each
day; 6 April, three seen; 7 April, six seen; 8 April, eight
seen; and 9 April, one seen.

**Campylopterus hemileucurus** (Deppe). Violet Sabrewing.

Fairly common permanent resident in Atlantic Region in
tropical evergreen forest and lower reaches of cloud forest,
occuring northwest at least to San Miguel Soyaltepec and
south in Isthmus to Escuilapa; recorded at low elevations
(below 800 feet) in November and from February through June.
Breeding evidence: range, habitat, and dates. Elevations:
250 to 5,200 feet.

**Florisuga mellivora** (Linnaeus). White-necked Jacobin.

Fairly common permanent resident in Atlantic Region in
tropical evergreen forest, recorded northwest at least to
San Miguel Soyaltepec and south in Isthmus to "Escuilapa."
Breeding evidence: range, habitat, and dates. Elevations:
250 to 350 feet (records for Lalana and Escuilapa probably
higher but elevations of towns and exact points of collection
unknown).

A female specimen (ovary slightly enlarged, many develop-
ing ova, oviduct not enlarged, AMNH 776291) taken by
Schaldach on 19 June 1961 at Montebello is a definite example
of a female in full adult male plumage.

**Colibri thalassinus** (Swainson). Green Violet-ear.

Fairly common permanent resident in humid pine-oak
forest of Interior and in upper reaches of tropical evergreen
forest (winter only?) and cloud forest in Atlantic Region west of Isthmus (three birds seen, 1,900 feet elevation, 6 road miles southwest of Valle Nacional, 22 April 1961, Wolf and Binford). Breeding evidence: range, habitat, and dates. Elevations: 1,900 to 9,000 feet.

**Anthracothorax prevostii** (Lesson). Green-breasted Mango.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in humid gallery forest of foothills of Sierra Madre de Chiapas. Breeding evidence: nest under construction. Elevations: 100 to 800 feet (record for Choapan probably higher but elevations of town and exact point of collection unknown).

**Abeillia abeillei** (Lesson and DeLattre). Emerald-chinned Hummingbird.

Status uncertain; occurs only in Atlantic Region, where, probably, a rare permanent resident in cloud forest west of Isthmus and a local winter visitant in tropical evergreen forest. Recorded in only three localities: "San Miguel Soyaltepec" (male specimen, MLZ 31234, 26 December 1943, Avilés, elevation of 600 meters [1,968 feet] on label questionable), "Moctum" (male specimen, MLZ 30950, 14 September 1941, Avilés, elevation at exact point of collection unknown), and a point 12 airline miles north-northeast of Zanatepec in cloud forest at 4,900 feet elevation (fairly common; one to four birds seen almost daily from 27 March to 10 April 1964, Morony and Binford; male specimen, 2.7 grams,

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
little fat, testes small; and female specimen, very fat, ovary small; both collected by Binford on 27 March). Breeding evidence: range, habitat, and probably dates.

**Paphosia helenae** (DeLattre). Black-crested Coquette.

Rare permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 6 road miles southwest of Valle Nacional and south in Isthmus to Escuilapa. Breeding evidence: range, habitat, and dates. Elevations: 300 to 1,900 feet (records for Lacova and Lachixola perhaps higher but elevations of town and exact points of collection unknown).

**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 forests and uncommon in gallery forest and semiarid tropical scrub within the tropical deciduous forest that lies adjacent to humid forests. Breeding evidence: nest with young. Elevations: 100 to 4,350 feet.

**Cynanthus sordidus** (Gould). Dusky Hummingbird.

Fairly common permanent resident in arid temperate scrub throughout Interior, recorded east to Rancho Las Animas, the easternmost point in entire range of species. Breeding evidence: "breeding condition" (Friedmann, Griscom, and Moore, 1950: 166); "large brood patch" (D. A. Zimmerman
Friedmann, Griscom, and Moore (1950: 167) record a supposed hybrid between C. sordidulus and C. l. latirostris Swainson, a male (MLZ 37930) taken by Lamb at Tamazulapan del Progreso on 9 July 1943. I have examined this specimen as well as two similar male birds, one from Michoacan (MLZ) and the other from Oaxaca (4.7 grams, slightly fat, testes small, 9 road miles east of Santa María del Tule, 8 May 1961, Wolf, LSUMZ 24339). All three birds have metallic dark blue or green subterminal bands on some of the throat feathers but otherwise agree exactly in color and size with typical sordidulus. In my opinion these are not hybrids but age variants of sordidulus, the unusual coloration probably being due to old age. Were they hybrids, one would expect some additional approach in color of size to latirostris. Also, latirostris is unknown from the Oaxaca Valley, where one of the three birds was taken.

*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 (sight record), Chihuitán, and Chivela. Breeding evidence: range, habitat, and dates. Elevations: sea level to 900 feet.

For the sake of convenience I here consider C. latirostris conspecific with the C. doubledayi-nitida group. I an not, however, convinced that such is the case. Both
doubledayi (Bourcier) and nitida (Salvin and Godman) differ from other forms in having black crissums, glittering bluish-green crowns, bluer abdomens, more purplish throats, and smaller dimensions.

The relationship of doubledayi to nitida is also obscure. On the basis of the specimens that I have examined, I suspect that the two are not separable and that the apparent differences are a function of age, with the oldest males attaining the richest colors. A thorough study of this complex, including examination of types, is necessary in order to clarify specific and subspecific relationships.

I can find no basis for the statement that C. l. doubledayi or any other member of this complex occurs in "northern Oaxaca" as claimed by Friedmann, Griscom, and Moore (1950: 167). The same authors (ibid.) list C. l. latirostris Swainson from Oaxaca on the basis of two females in the Moore Laboratory of Zoology taken "near Tequisistlán" in February. I have been able to find only one such specimen, an immature female (MLZ 45107) taken by Lamb at 3,000 feet elevation at Rancho Las Animas on 18 February 1947. This specimen, in my opinion, cannot be identified to race; even its specific identity is questionable, the tail color closely resembling that of C. sordidulus. All unquestionable Oaxaca records, therefore, pertain to one form, which probably should be called C. l. doubledayi (Bourcier), pending a complete revision.

The record listed by Graber and Graber (1959: 69) for...
the Atlantic side of the Isthmus of Tehuantepec in December is undoubtedly erroneous; the original field notes of these authors state only "1 Cynanthus l."? See C. sordidulus.

_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 temperate scrub valleys of Interior at least during flowering season. Status in arid pine-oak forest uncertain, but probably a visitant to arid sections near humid and semiarid pine-oak forests. Breeding evidence: specimen of nestling or prejuvenal (ARPC 7894; specimen obtained from native); nest with eggs. Elevations: 5,000 to 9,700 feet (Moctum record perhaps lower but elevations of towns and exact points of collection unknown).

_Amazilia candida_ (Boucier and Mulsant). White-bellied Emerald.

Permanent resident, very common in Atlantic Region at low elevations in tropical evergreen forest south in Isthmus to a point 4 kilometers (2.5 miles) south of Chivela (specimen in ARPC taken 7 January 1965; A. R. Phillips, _in litt._), uncommon at higher elevations up to lower edge of cloud forest in Atlantic Region and very uncommon in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas (winter only?; Santa Efígenia, 15 January to 7 February) and Sierra de Miahuatlán (two female specimens collected by A. R. Phillips, one at San Gabriel Mixtepec on 8 December 1963.
[ARPC 7300] and the other 2 kilometers south of San Gabriel Mixtepec on 24 November 1963 [ARPC 7085]. Breeding evidence: "testes full size" (Lamb specimen label); range, habitat, and dates. Elevations: 250 to 5,250 feet.

**Amazilia cyanocephala** (Lesson). Red-billed Azurecrown.

Uncommon permanent resident in Atlantic Region in humid patches of oak and pine-oak within tropical evergreen forest, recorded east to a point 2.4 miles north of Matías Romero. Breeding evidence: nest with eggs. Elevations: 650 to 2,600 feet (records for Lacova, Choapan, Totontepec, and Sierra Santo Domingo perhaps higher but elevations of first two localities and all four points of collection unknown).

**Amazilia beryllina** (Deppe). Berylline Hummingbird.

Permanent resident in all Regions of state, common in pine-oak forests and less common and perhaps not breeding in many adjacent habitats such as arid temperate scrub, tropical deciduous forest, tropical semideciduous forest, and cloud forest; sometimes winters down into tropical evergreen forest (San Miguel Soyaltepec). Breeding evidence: nest with eggs. Elevations: 250 to 9,000 feet.

**Amazilia rutila** (DeLattre). 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. Breeding evidence: nest with eggs. Elevations: sea level to 3,000 feet (record for Santa Catarina Juquila perhaps higher but elevation at exact point of collection unknown).

*Amazilia yucatanensis* (Cabot). Buff-bellied hummingbird.

One record, a male taken by Rook and L. Petite on 21 August 1961 in Atlantic Region 24 road miles north of Matías Romero (at or near Montebello, a ranch at 300 feet; elevation at exact point of collection unknown). Status uncertain; probably only a casual late summer visitant but possibly a rare permanent resident at lowest elevations in Atlantic Region. Specimen record in Salvin and Hartert (1892: 215) from "Tomatla" probably pertains to Tomatlán, Veracruz.

*Amazilia tzacatl* (De la Llave). Rieffer's Hummingbird.

Very common permanent resident in Atlantic Region in tropical evergreen forest, occurring south in Isthmus to Escuilapa and a point 4 miles north plus 2 miles east of Matías Romero. Breeding evidence: nest with young. Elevations: 100 to 800 feet (record for Choapan perhaps higher but elevations of town and exact point of collection unknown; extreme elevation of 5,700 feet given by Friedmann, Griscom, and Moore [1950: 173] undoubtedly erroneous).

*Amazilia violiceps* (Gould). Violet-crowned Hummingbird.

Uncommon inhabitant of arid temperate scrub in extreme northwestern portion of Interior; probably a permanent resident but recorded only from 16 July to 27 October.
Localities based on specimens examined: vicinity of Tamazulapan del Progreso (2 miles west, 6,000 feet; and 3 miles northwest, 5,600 feet) and Huajuapan de León (34 road miles north-northeast [near Santiago Chazumba], 6,100 feet; 16 road miles north-northeast [at Santiago Miltepec], 5,600 feet; and 4 miles east, 5,000 feet). Additional published records probably pertaining to this species: specimens from "Huajuapan" [=Huajuapan de León] and Santa María [near Huajuapan de León]" (Martin del Campo, 1942: 353); questionable sight observation from very near Oaxaca City (Edwards, 1955: 16). Localities published under A. violiceps but pertaining to A. viridifrons: "Putla" [=Putla de Guerrero]; Santa Efígenia; and "Tapana" [=Tapanatepec]. Oaxaca localities probably southeasternmost in entire range of species, since Chiapas records probably are all A. viridifrons, according to Phillips (1964: 221). Breeding evidence: "large ova" and "testes full size" (Lamb specimen labels); range, habitat, and dates. Elevations: 5,000 to 6,100 feet.

I prefer to follow Friedmann, Griscom, and Moore (1950: 173-174) in considering A. violiceps and A. viridifrons specifically distinct. These two similar forms apparently are sympatric over a wide area in Guerrero, although they have not been found breeding at the same locality. Unless intergradation can be demonstrated clearly, allocation to the subspecific level, as advocated by Phillips (1964: 217-223), would only further confuse an already difficult problem. The paper by Phillips (ibid.) is the only publication that
gives a clear understanding of plumages, range, and synonymy in this complex and, aside from its treatment of *A. viridifrons* as a race, should be used as a basis for further studies. All Oaxaca specimens examined by me are of the nominat race, *A. violiceps violiceps* (Gould). See the discussion under *A. viridifrons* for additional comments concerning this complex.

*Amazilia viridifrons* (Elliot). Green-fronted Hummingbird.

Fairly common permanent resident in Pacific Region in tropical semideciduous forest, tropical deciduous forest, and arid tropical scrub, and in the Interior probably in arid temperate scrub ("San Pablo Villa de Mitla"; habitat at exact point of collection uncertain), occurring in three areas as follows: near Putla de Guerrero (1 mile east, *A. v. viridifrons*); from Cydad Camp and "San Pablo Villa de Mitla" east to Tehuantepec City and a point 12 miles northeast of Juchitán (*A. v. waqneri* Phillips); and in extreme eastern Oaxaca (a point northeast of Zanatepec, Santa Efigenia, Rancho Sol y Luna, Tapanatepec, and two localities 5 road miles east and 8 road miles 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* (Gould). Juvenal specimen (ARPC 5453) taken 7 kilometers (4.3 miles) 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. Breeding evidence: nest with eggs (wagneri). Elevations: 100 to 3,200 feet (higher for San Pablo Villa de Mitla record but elevation at exact point of collection unknown).

I prefer to maintain A. violiceps (Gould) and A. viridifrons (Elliot) as distinct species (see comments under A. violiceps). Although I have accepted the record from San Pablo Villa de Mitla (female specimen, 17 June 1942, Avilés, MLZ 38413), some doubt perhaps attaches to its origin in view of the errors in locality made by Avilés on other specimens of his labeled "Mitla." This record and the sight record of A. violiceps near Oaxaca City (Edwards, 1955: 16) require substantiation by additional specimens.

I place wagneri with viridifrons rather than with 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 faint 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. 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
noninterbreeding 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.

**Eupherusa eximia** (DeLattre). Stripe-tailed Hummingbird.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest; possibly, only wintering at low elevations and breeding only at higher elevations in heavy humid forest just below cloud forest. Breeding evidence: range, habitat, and dates. Elevations: 250 to 4,100 feet (record for Moctum perhaps higher but elevations of town and exact point of collection unknown). See *E. poliocerca*.

**Eupherusa poliocerca** Elliot. White-tailed Hummingbird.

Rare permanent resident in Pacific Region in tropical semideciduous forest, recorded in Oaxaca only at "Putla" [Putla de Guerrero] (male, AMNH 38583) and Río Jalatengo (female, AMNH 766563, 9 May 1962, J. S. Rowley; female, ARPC 6146, 11 May 1962, A. R. Phillips). Endemic to Oaxaca and Guerrero. Breeding evidence: range, habitat, and dates. Elevations: 4,500 feet at Río Jalatengo; perhaps lower for Putla de Guerrero record but elevation at exact point of collection unknown.

Tentatively, I agree with Rowley and Orr (1964) that *poliocerca* is a distinct species. That it is specifically distinct from *E. eximia* seems very likely on the basis of differences in size and plumage; that it is distinct from *E.
cyanophrys, however, is questionable because of the very remote possibility that specimens of poliocerca are missexed females of cyanophrys. The supposed size differences reported by Rowley and Orr (1964) seem to be bridged by no specimens of cyanophrys, although differences in measuring technique may account for the apparent large size of my specimens. Additional specimens are required to settle this question. If poliocerca and cyanophrys are not the same entity, and the Río Jalatengo birds are truly poliocerca, the two probably should be considered specifically distinct, as they occur within four miles of each other without demonstrated intergradation, poliocerca having been taken at Río Jalatengo and cyanophrys at a point 3 road miles north of Pluma Hidalgo.


Species endemic to Sierra de Miahuatlán, where locally a fairly common permanent resident in tropical semideciduous forest and lower reaches of cloud forest. Recorded at a point 3 road miles north of Pluma Hidalgo (four males and one female, LSUMZ) and in vicinity of State Rouge 131 (11 miles south of San Pedro Juchatengo; 4 kilometers [2.5 miles] north of Lachao Nuevo; on Cerro Verde; near La Cima; at points 16 road miles north [two males, LSUMZ] and 18 road miles north [Binford sight records] of San Gabriel Mixtepec; and at Jamaica Junction). Breeding evidence: nest with young. Elevations: 2,400 to 5,800 feet (record for Cerro
Verde probably higher but elevation at exact point of collection unknown). See E. poliocerca.

_Lampornis clemenciae_ (Lesson). Blue-throated Hummingbird.

Uncommon permanent resident in humid pine-oak forest in Pacific Region west of Isthmus and in the Interior. Should be sought east of Isthmus. Breeding evidence: range, habitat, and dates. Elevations: 6,000 to 9,700 feet (perhaps lower north of San Gabriel Mixtepec but exact elevation unknown).

_Lampornis amethystinus_ Swainson. Amethyst-throated Hummingbird.

Common permanent resident in cloud forest in Atlantic Region in Sierra de Juárez and Sierra de Zempoaltepec and in Pacific Region Sierra de Miahuatlán; also recorded in September in unknown habitat 15 miles southwest of Oaxaca City. Should be sought east of Isthmus. Breeding evidence: nest with eggs. Elevations: 4,100 to 8,000 feet (higher, somewhere between 8,800 and 9,300 feet, at a point 15 miles southwest of Oaxaca City but exact elevation unknown).

Red-throated and blue-throated color types both occur in the Sierra de Miahuatlán and may yet prove to be specifically distinct (A. R. Phillips, _in litt._).
*Lampornis viridipallens* (Bourcier and Mulsant). Green-throated Mountain-gem.

Fairly common presumptive permanent resident in Atlantic Region in cloud forest of Sierra Madre de Chiapas, recorded only at a point 12 airline miles north-northeast of Zanatepec at 4,900 feet elevation, the only Oaxaca locality and westernmost point in entire range of species. Probably occurs elsewhere in this mountain range. Recorded as follows: one to six birds seen almost daily from 25 March to 10 April 1964 by Morony and Binford, including male specimens with mature but unenlarged testes taken on 27 March (6.9 grams, little fat, Binford, and 6.6 grams, Morony), 28 March 6.2 grams, Morony), and 31 March (6.2 grams, Morony). Breeding evidence: range, habitat, and probably dates.

*Lamprolaima rhami* (Lesson). Garnet-throated Hummingbird.

Uncommon permanent resident in all Regions west of Isthmus in cloud forest and humid pine-oak forest. Should be sought in cloud forest east of Isthmus. Breeding evidence: nest with eggs. Elevations: 4,100 to 9,000 feet.

*Eugenes fulgens* (Swainson). Rivoli's 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 temperate scrub. Breeding evidence: range, habitat, and dates. Elevations: 4,100 to 9,000 feet.
Heliomaster constantii (DeLattre). Plain-capped Starthroat.

Fairly common permanent resident in tropical deciduous forest and arid tropical scrub, occurring along entire length of Pacific Region and north across Isthmus into Atlantic Region to Lagunas. Breeding evidence: "breeding condition" (Friedmann, Griscom, and Moore, 1950: 178); range, habitat, and dates. Elevations: 50 to 3,200 feet.

Heliomaster longirostris (Audebert and Vieillot). Long-billed Starthroat.

Uncommon permanent resident in Atlantic and Pacific Regions, occurring in humid gallery forest of Sierra Madre de Chiapas and in tropical evergreen forest, tropical semi-deciduous forest, and extreme lower reaches of cloud forest. Breeding evidence: nest with eggs. Elevations: 250 to 4,850 feet.

Tilmatura dupontii (Lesson). Sparkling-tailed Hummingbird.

Very uncommon permanent resident in humid pine-oak forest of Pacific Region west of Isthmus, recorded 1 mile north of San Andrés Chicahuaxtla, 11 road miles north of San Gabriel Mixtepec, and at Río Jalatengo. Breeding evidence: range, habitat, and dates. Elevations: 3,000 to 8,000 feet.

*Calothorax lucifer (Swainson). Lucifer Hummingbird.

One record, an immature male specimen (MLZ 54435) taken by Lamb in the Interior at 5,600 feet elevation 3 miles northwest of Tamazulapan del Progreso on 25 October 1952.
Status uncertain; probably, a rare visitant or rare winter resident and not a permanent resident.


Uncommon permanent resident in the Interior in arid temperate scrub, recorded west to a point 5 miles west of San Pedro Totolapan at 3,200 feet elevation. Occurrence in Pacific Region at "Putla" [=Putla de Guerrero] (Rébouch specimens; Salvin and Godman, 1888-1904 [1892]: 351) questionable in light of distribution and habitat as otherwise known. Breeding evidence: "breeding" (Friedmann, Griscom, and Moore, 1950: 180); range, habitat, and dates. Elevations: 3,200 to 7,300 feet (record for Putla de Guerrero perhaps lower; see above).

Archilochus colubris (Linnaeus). Ruby-throated Hummingbird.

Fairly common winter resident, occurring 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 feet (higher, somewhere between 8,800 and 9,300 feet, at a point 15 miles southwest of Oaxaca City but exact elevation unknown).

*Stellula calliope* (Gould). Calliope Hummingbird.

One record, an adult male (ARPC 6002) taken by A. R. Phillips on 30 November 1961 in Pacific Region in unknown habitat at about 7,300 feet elevation at Río Molino. Status
uncertain; probably a very rare winter resident but possibly a rare and local permanent resident.

*Atthis heloisa* (Lesson and DeLattre). Heloise's Hummingbird.

Permanent resident in all Regions west of Isthmus in humid pine-oak forest and perhaps cloud forest, common (in fall) at "Moctum" and uncommon elsewhere. Record of *A. heloisa* (not *A. ellioti* Ridgway) from Sierra Madre de Chiapas ("Montañas Gineta," adult male, MLZ 25873, 6 February 1939, Avilés) should be treated with caution until substantiated by additional specimens, since on geographical grounds *A. ellioti*, while unrecorded, is the form to be expected in these mountains. Easternmost definite point in entire range of species is "Moctum," Oaxaca. Breeding evidence: range, habitat, and dates. Elevations: 7,300 to 8,000 feet (records for Totontepec, Moctum, and above San Gabriel Mixtepec probably lower but elevations of last two localities and all three points of collection unknown; record for a point 15 miles southwest of Oaxaca City higher, between 8,800 and 9,300 feet).

*Selasphorus platycercus* (Swainson). Broad-tailed Hummingbird.

Very uncommon winter resident in pine-oak forest in the Interior and in Pacific Region west of Isthmus, recorded east to Totontepec and Río Molino, the easternmost localities in entire range of the nominate race. Possibly a permanent resident. Dates: September to 17 April. Elevations: 6,000 to 7,300 feet (record for Tonaguía perhaps lower but elevation
elevations of town and exact point of collection unknown).

*Selasphorus rufus* (Gmelin). Rufous Hummingbird.

Very uncommon bird in pine-oak forests of Interior; presumably a winter resident but recorded only from 16 September to 14 December. Elevations: 5,000 to 7,300 feet (higher, between 8,800 and 9,300 feet, at a point 15 miles southwest of Oaxaca City but exact elevation unknown).

**Family TROGONIDAE**

*Pharomachrus mocinno* de la Llave. Quetzal.

Very uncommon permanent resident in Atlantic Region in cloud forest of Sierra Madre de Chiapas (12 miles east of La Gloria; and north-northeast of Zanatepec), the northwesternmost limits of entire range of species. Breeding evidence: range, habitat, and dates. Elevation: 5,000 feet.

*Trogon massena* Gould. Slaty-tailed Trogon.

Fairly common permanent resident in Atlantic Region in dense tropical evergreen forest, occurring south in Isthmus to Escuilapa. Breeding evidence: nest with young. Elevations: 250 to 1,900 feet.


Very common permanent resident in Pacific Region in tropical deciduous forest, humid gallery forest, and tropical scrub, and lower reaches of tropical semideciduous forest, recorded 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). Breeding evidence: prejuvenal. Elevations: sea level to 3,000 feet. See *T. melanocephalus*.


Common permanent resident in Atlantic Region in tropical evergreen forest, occurring south in Isthmus at least to Sarabia and Escuilapa. Breeding evidence: "testes about 3/4 full size" (Lamb specimen label); range, habitat, and dates. Elevations: 250 to 1,900 feet.

I cannot agree with the current 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 may be a species-specific character. Perhaps the major differences between these two forms are in the colors of the iris and fleshy eyering. In *melanocephalus* the iris is dark brown, and the eyering is very pale blue. At a distance the dark eye matches the darkness of the head feathering, and the pale eyering gives the bird a spectacled appearance. In *citreolus*, on the other hand, the iris is bright rich yellow, and the eyering 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 may 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 may be equaled 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 may play in isolating these two forms as separate species.

**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. Breeding evidence: nest with young. Elevations: 6,500 to 9,700 feet (perhaps lower at several localities where elevations at exact points of record are unknown).


Very uncommon permanent resident in all Regions, occurring east to Lalana, San Gabriel Mixtepec, and a point 2 road miles west of San Pedro Totolapan, these localities being the easternmost in entire range of species. Habitats poorly understood; known habitats are short-tree tropical deciduous forest, humid pine-oak forest and arid pine-oak forest. Breeding evidence: range, habitat, and dates. Elevations: 2,350 to 7,000 feet.

**Trogon collaris** Vieillot. Bar-tailed Trogon.

Permanent resident in Atlantic and Pacific Regions fairly common in tropical semideciduous and cloud forests of Sierra Madre de Chiapas, Sierra de Miahuatlán, and Atlantic Region west of Isthmus and uncommon throughout tropical evergreen forest, recorded south in Isthmus to Escuilapa. Should be sought in similar habitats in Sierra de Yucuyacua.
Breeding evidence: nest with young. Elevations: 250 to 6,000 feet (record for a point south of San Miguel Suchixtepec perhaps higher but exact elevation unknown).

*Trogon violaceus* Gmelin. Violaceous Trogon.

Permanent resident, fairly common in Atlantic Region in tropical evergreen forest south in Isthmus to Escuilapa and a point 2 miles north plus 2 miles east of Matías Romero, and rare in Pacific Region in humid forests of Sierra Madre de Chiapas (Rancho de Cacoprieto and Santa Efigenia).

Breeding evidence: active nest, condition unknown. Elevations: 250 to 4,100 feet.

**Family ALCEDINIDAE**

* Megaceryle torquata* (Linnaeus). Ringed Kingfisher.

Fairly common permanent resident at edges of aquatic habitats throughout lower portions of Atlantic and Pacific Regions. Breeding evidence: range, habitat, and dates. Elevations: sea level to 800 feet.

* Megaceryle alcyon* (Linnaeus). Belted Kingfisher.

Fairly common winter resident at edges of 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 feet.
**Chloroceryle amazona** (Latham). Amazon Kingfisher.

Fairly common permanent resident in forest-edged freshwater habitats, occurring throughout Atlantic Region and south across Isthmus into Pacific Region to Almoloya and Chichitán. Two records for Pacific Region east of Isthmus, female specimens taken by Sumichrast at Santa Efigenia on 17 December 1868 (AMNH 43933) and 18 January 1869 (USNM 57715). Probably occurs sparingly in Pacific Region west of Isthmus. Breeding evidence: range, habitat, and dates. Elevations: sea level to 800 feet.

**Chloroceryle americana** (Gmelin). Green Kingfisher.

Common permanent resident at edges of aquatic habitats in Atlantic and Pacific Regions (so far recorded only in fresh-water situations), penetrating the Interior along rivers at least near Santa María Asunción Tlaxiaco (2 miles east, 5,800 feet elevation, male specimen, CU 26368, 20 August 1954, F. C. Sibley), San Miguel Sola de Vega (female specimen, April, Trujillo; record published by Sharpe and Ogilvie-Grant, 1892: 136), San Pedro Juchatengo (female specimen, April, Trujillo; *ibid.*), and Oaxaca City (specimens of one male and one female, March, Trujillo; *ibid.*). Breeding evidence: prejuvenal. Elevations: sea level to 5,800 feet.

**Chloroceryle aenea** (Pallas). Pygmy Kingfisher.

Uncommon permanent resident in forest-edged aquatic habitats of Atlantic Region. One record for Pacific Region, a female (labeled "male"; FM uncatalogues) taken by
Sumichrast at Santa Efigenia on 19 April 1871. Breeding evidence: range, habitat, and dates. Elevations: 100 to 800 feet.

Family MOMOTIDAE

*Hylomanes momotula* Lichtenstein. Tody Motmot.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to Escuilapa. Breeding evidence: range, habitat, and dates. Elevations: 250 to 1,900 feet.

*Aspatha gularis* (Lafresnaye). Blue-throated Motmot.

Uncommon presumptive permanent resident in Pacific Region in cloud forest of Sierra Madre de Chiapas at a locality 12 airline miles north-northeast of Zanatepec. Recorded by Morony and Binford as follows: three birds seen and two of them collected by Binford on 28 March 1964 (male, 65.3 grams, little fat, black testes slightly enlarged, stomach containing two beetles each 20 mm long; female, 67.3 grams, little fat, ovary adult but not enlarged); single bird seen on 30 and 31 March; two birds each seen on 2 April and 5 April. Breeding evidence: slightly enlarged testes (6 x 3 mm); range, habitat, and presumably dates. Elevations: 4,900 to 5,200 feet.
**Eumomota superciliosa** (Sandbach). Turquoise-browed Motmot.

Known definitely from only three localities, all in Pacific Region in or near the Sierra Madre de Chiapas; Rancho de Cacoprieto (male specimen, USNM 145282, February 1880, Sumichrast, original number 42), Santa Efigenia (Sumichrast, 1881: 239), and Tepanatepec (male specimen, USNM 58830, 27 April 1869, Sumichrast). Label of a third specimen (USNM 145279), collected 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 (ibid.) refer to this specimen. Record from Tolosa, Veracruz, given by Ridgway (1914: 480) may pertain to Tolosa, Oaxaca. Habitat unknown but probably humid gallery forest and tropical semi-deciduous forest. Status uncertain; possibly a very rare permanent resident; more likely a very rare visitant, as Sumichrast himself (in Lawrence, 1876: 9) considered his Pacific records to represent "wanderers" from Atlantic slope. Elevations: unknown; Santa Efigenia located at 800 feet.

**Momotus mexicanus** Swainson. Russet-crowned Motmot.

Very common permanent resident in tropical semideciduous forest, tropical deciduous forest, humid gallery forest, and arid tropical scrub, occurring in the Interior in valleys of San Miguel Sola de Vega, San Juan Bautista Cuicatlán, and Huajuapan de León, along entire length of Pacific Region, and north across Isthmus into Atlantic Region to a point 3
miles north of Matías Romero. Should be sought in other arid tropical scrub valleys of Interior. Breeding evidence: prejuvenal observed; nest with young. Elevations: sea level to 6,000 feet.

*Momotus momota* (Linnaeus). Blue-crowned Motmot.

Common permanent resident in Atlantic Region in tropical evergreen forest, occurring south in Isthmus to Chivela and Escuilapa. Sumichrast (in Lawrence, 1876: 9) suggests it might be a "wanderer" to Pacific Region but cites no records. Breeding evidence: one specimen with one enlarged follicle (12 mm) and four ruptured follicles. Elevations: 200 to 1,900 feet (record for Teotalcingo perhaps higher but elevations of town and exact point of collection unknown).

**Family GALBULIDAE**

*Galbula ruficauda* Cuvier. Rufous-tailed Jacamar.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to "Escuilapa." Breeding evidence: prejuvenal. Elevations: 250 to 350 feet. (record for Escuilapa perhaps higher but elevations of town and exact point of collection unknown).
Family BUCCONIDAE

*Notharchus macrorhynchos* (Gmelin). White-necked Puffbird.

Very uncommon permanent resident in Pacific Region in humid forests of Sierra Madre de Chiapas (Santa Efigenia and Tapanatepec) and in Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to a point 2 miles north plus 2 miles east of Matías Romero. Breeding evidence: range, habitat, and dates. Elevations: 250 to 800 feet.

Family RAMPHASTIDAE

*Aulacorhynchus prasinus* (Gould). Emerald Toucanet.

Permanent resident in Atlantic and Pacific Regions, very common in cloud forest and uncommon to rare in tripical semi-deciduous forest. Breeding evidence: pair apparently selecting nest site (Rowley, 1966: 155); enlarged follicle (15 mm); both records pertain to *A. p. wagleri* (Sturm). Elevations: 900 to 5,200 feet.

Should differences in bill color, head pattern, or head color prove to be isolating mechanisms in this genus, *A. p. wagleri*, which inhabits humid forests of the Pacific Region of Oaxaca west of the Isthmus, might be elevated to full species rank.
Pteroglossus torquatus (Gmelin). Collared Aracari.

Common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semi-deciduous and humid gallery forests from foothills of Sierra Madre de Chiapas south to Pacific coast at Punta Paloma. Breeding evidence: prejuvenile. Elevations: sea level to 1,500 feet.

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. Breeding evidence: "laying" (Lamb specimen label); range, habitat, and dates. Elevations: 150 to 1,500 feet; elevation of 4,000 feet for "Chimalapa" [=Santa Maria Chimalapa?] record (P. L. Sclater and Shelley, 1891: 458) possibly erroneous.

Family PICIDAE

Colaptes auratus (Linnaeus). Common Flicker.

Fairly common permanent resident in the Interior in humid and arid pine-oak forests (including highland pine forest), recorded east to Cerro Zempoaltepec and La Cieneguilla. Breeding evidence: active nest completed, contents unknown. Elevations: 5,800 to 10,000 feet (record for San Ildefonso Villa Alta perhaps lower but elevation at exact point of collection unknown).
I follow Short (1965) and Phillips (1962b: 341-342) in considering as conspecific all flickers north of South America.

*Piculus auricularis* (Salvin and Godman). Gray-crowned Woodpecker.

Uncommon permanent resident in pine-oak forests of Pacific Region west of Isthmus, recorded east to "Finca Mercedes" and Copalita, the easternmost points in entire range of species. Breeding evidence: slightly enlarged testes (7 x 4 mm); range, habitat, and dates. Elevations: 2,900 to 4,350 feet (record for Finca Mercedes perhaps slightly lower but elevations of finca and exact point of collection unknown).

There are six specimens and two additional sight records for this species. On 1 May 1961 I collected a male (68.3 grams, slightly fat, testes small) 21 road miles south of San Miguel Suchixtepec. In the same year A. R. Phillips collected an adult female (very little fat, largest follicle about 1 mm, ARPC 6032) at "Finca Mercedes" on 10 December and a male (no fat, testes not enlarged, ARPC 6044) at Copalita on 13 December. On 14 December 1963 Phillips collected a female (little fat, ovary not enlarged, ARPC 7379) northwest of San Gabriel Mixtepec. In 1964 at a point at 4,350 feet elevation 16 road miles north of San Gabriel Mixtepec, Morony and I recorded the following data: 10 May, three birds seen, of which one was collected (female, 64.1
grams, little fat, follicles not enlarged, Binford); 11 May, three seen; and 12 May, two seen. The only other record for Oaxaca is a male (63.9 grams, little fat, testes slightly enlarged) taken by Morony at 2,900 feet elevation along the main road 9 road miles south of Putla de Guerrero on 17 May 1964.

**Piculus rubiginosus** (Swainson). Golden-olive Woodpecker.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas. Record from "15 mi. NE Tapanatepec" (Miller, Friedmann, Griscom, and Moore, 1957: 28) pertains to Finca Cacahuatl, Chiapas. Breeding evidence: "laying" (Lamb specimen label); enlarged testes (right, 7 x 4, left, 11 x 6 mm). Elevations: 200 to 4,900 feet.

Miller, Friedmann, Griscom, and Moore (1957: 27-28) consider **P. aeruginosus** (Malherbe) to be conspecific with **P. rubiginosus** (Swainson). Although this view may prove correct, the evidence for conspecificity presented by these authors is erroneous. Intermediacy of the specimen from Atoyac described by Salvin and Godman (1888-1904 [1895]: 407) is based on its possession of a red superciliary that is "carried forward in a very narrow line to the base of the bill," a character usually ascribed to **rubiginosus**. This character, however, is highly variable, the red often appearing in
specimens from the northern portion of the range of aeruginosus; two specimens of aeruginosus from San Luis Potosi (LSUMZ 16897 and 18061) and one from Tamaulipas (LSUMZ 5176) exhibit nearly complete, narrow red superciliaries. Salvin and Godman add that in the Atoyac specimen "the bars of the breast are, however, those of C. aeruginosus." With the only known intermediate proving to be aeruginosus, we have merely another example of two similar allopatric forms, and until such time as intergradation is demonstrated, I prefer to maintain them as separate species. The region between Atoyac, Veracruz, and San Miguel Soyaltepec, Oaxaca, should be searched for an area of sympatry. See P. aeruginosus in the Hypothetical List for a discussion of the locality "Atoyac."


Fairly common permanent resident in Atlantic Region in heavy tropical evergreen forest northwest at least to a point 5 miles west of Temascal and south in Isthmus to Sarabia and "Chimalapa" [=Santa María Chimalapa?]. Breeding evidence: enlarged follicle (5 mm; with yolk). Elevations: 250 to 1,500 feet.

Dryocopus lineatus (Linnaeus). Lineated Woodpecker.

Common permanent resident in Atlantic and Pacific Regions in tropical evergreen forest, tropical deciduous forest, humid gallery forest, and lower reaches of tropical semideciduous forest; also, ranges (breeding?) into arid
tropical scrub of Tehuantepec region. Breeding evidence: adults observed feeding prejuvenals or juvenals (Rowley, 1966: 156); range, habitat, and dates. Elevations: sea level to 3,000 feet.

**Melanerpes formicivorus** (Swainson). Acorn Woodpecker.

Fairly common permanent resident in pine-oak forests of all Regions, including oak patches within tropical evergreen forest (near San Juan Bautista Tuxtepec), recorded east to "Chimalapa" (W. B. Richardson record pertaining to either Santa María Chimalapa or San Miguel Chimalapa) and to a point 9.3 miles north of Matías Romero (two male specimens, LSUMZ 45064 and HC uncatalogued, 9 February 1960, Schaldach). To be expected east of Isthmus. Record from "15 mi. NE Tapanatepec" (Miller, Friedmann, Griscom, and Moore, 1957: 31) pertains to Finca Cacahuatl, Chiapas. Breeding evidence: "nesting" (Lamb specimen label); enlarged testes (13 x 7 mm). Elevations: 100 to 9,700 feet.

**Centurus hypopolius** (Wagler). Gray-breasted Woodpecker.

Common permanent resident in the Interior in arid temperate scrub, occurring east to a point 2 road miles west of San Pedro Totolapan, the easternmost locality in total range of species. Breeding evidence: enlarged testes (7 x 5 mm). Elevations: 2,950 to 7,900 feet (record for San Juan Bautista Cuicatlán perhaps lower but elevation at exact point of collection unknown).
**Centurus 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 Isthmus northwest through Río Tehuantepec basin to San Juan del Río and a point 2 road miles west of San Pedro Totolapan and west along Pacific coast at least to Ventosa. Breeding evidence: prejuvenal. Elevations: sea level to 3,200 feet.

**Centurus chrysogenys** (Vigors). Golden-cheeked Woodpecker.

Common permanent resident in Pacific Region in tropical deciduous forest east to Bahía Santa Cruz. Specimen from Tehuantepec City (female, UMMZ 137900, 10 November 1913, Shufeldt), the easternmost record in entire range of species and the only record east of Bahía Santa Cruz, perhaps represents a migrant or visitant. Breeding evidence: range, habitat, and dates. Elevations: sea level to 2,400 feet.

**Centurus pucherani** (Malherbe). Black-cheeked Woodpecker.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to Escuilapa and La Gloria. Records for "Cuicatlán" [=San Juan Bautista Cuicatlán] and Oaxaca City (Ridgway, 1914: 122) undoubtedly erroneous. Breeding evidence: enlarged testes (8 x 5 mm). Elevations: 250 to 1,900 feet.
Sphyrapicus varius (Linnaeus). Yellow-bellied Sapsucker.

Very uncommon winter resident throughout state. To be expected in almost any habitat; my only record is from humid pine-oak forest; habitat at other localities of record unstated and indeterminable, since more than one habitat occurs at each. Dates: October to 8 April. Elevations: 800 to 7,300 feet.

Veniliornis fumigatus (d'Orbigny). Smoky-brown Woodpecker.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest, occurring south in Isthmus of Tehuantepec to Escuilapa. Record for "Santo Domingo" (Miller, Friedmann, Griscom, and Moore, 1957: 38) pertains to La Ranchería. Breeding evidence: active nest, condition unknown. Elevations: 250 to 4,100 feet.

Dendrocopos villosus (Linnaeus). Hairy Woodpecker.

Fairly common permanent resident in pine-oak forests of Interior. One record east of Isthmus, a single female (45.8 grams, moderately fat, largest follicle 1 mm) that I collected in Atlantic Region in cloud forest at 4,900 feet elevation 12 airline miles north-northeast of Zanatepec on 26 March 1964. Breeding evidence: nest with one egg. Elevations west of Isthmus: 6,100 to 9,700 feet (record for Tonaguía perhaps lower but elevations of town and exact point of collection unknown).
Dendrocopos scalaris (Wagler). Ladder-backed Woodpecker.

Permanent resident, uncommon in the Interior in arid temperate scrub and arid tropical scrub, very uncommon in Atlantic Region in open scrubby areas within tropical evergreen forest of extreme northern Oaxaca (two records, one bird seen by Binford and Morony along road between San Juan Bautista Tuxtepec and Loma Bonita on 6 June 1964, and one seen by the same observers 3 road miles east of Temascal on 8 June 1964) and very uncommon and local in Pacific Region in tropical deciduous forest of foothills of high mountains. Further field study is needed to clarify its apparently disjunct distribution. Two male specimens collected by Avilés, supposedly at San Pablo Villa de Mitla on 10 June 1942 (MLZ 33741) and 20 December 1942 (MLZ 35122), belong to a more northern race and hence are of doubtful origin (A. R. Phillips, in litt.). Breeding evidence: range, habitat, and dates. Elevations: 150 to 6,100 feet.

Phloeocceastes guatemalensis (Hartlaub). Pale-billed Woodpecker.

Fairly common permanent resident in Atlantic and Pacific Regions, occurring in tropical evergreen forest, humid gallery forest, the more arid portions of tropical semideciduous forest, and all tropical deciduous forest except in RíO Tehuantepec basin west of Las Tejas. Breeding evidence: "laying" (Miller, Friedmann, Griscom, and Moore, 1957: 44); enlarged testes (8 x 5 mm). Elevations: Sea level to 4,100 feet.
Family DENDROCOLAPTIDAE

Dendrocincla anabatina Sclater. Tawny-winged Woodcreeper.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest, northwest to a point 15 road miles southwest of Valle Nacional and south in Isthmus to Escuialapa. Breeding evidence: range, habitat, and dates. Elevations: 250 to 4,100 feet.

Dendrocincla homochroa (Sclater). Ruddy Woodcreeper.

Rare permanent resident in Atlantic Region in tropical evergreen forest northwest to a point 15 road miles southwest of Valle Nacional, the northwesternmost locality in entire range of species, and in Pacific Region in tropical semi-deciduous forest of Sierra Madre de Chiapas. Breeding evidence: enlarged testes (6 x 3 mm). Elevations: 4,100 to 4,900 feet (records for "Chimalapa" [=Santa María Chimalapa?] and Teotalcingo probably lower but elevations of latter town and both points of collection unknown).

The Ruddy Woodcreeper has been found in only four localities in Oaxaca. The first specimen for the state, the type specimen of the species, was taken by Boucard at "Teotalcingo" in March 1890 (BMNH). Other specimens in the same museum are two males collected by W. B. Richardson at "Chimalapa" [=Santa María Chimalapa?] on 27 and 28 March 1890. In 1961 at 4,100 feet elevation 15 road miles southwest of Valle Nacional, the Berretts and I recorded the following data: 27 November, two birds seen and one of them
collected (female, 40.5 grams, very fat, skull not completely ossified, ovary small, Binford); 28 November, two males collected by D. G. Berrett (47.7 and 49.8 grams, both with moderate fat, completely ossified skulls, and small testes); 29 November, eight seen following an army ant march. On 8 April 1964 at 4,900 feet elevation 12 airline miles north-northeast of Zanatepec, I collected one of two Ruddy Woodcreepers (male, 39.6 grams, little fat, skull completely ossified, testes 6 x 3 mm).

*Sittasomus griseicapillus* (Vieillot). Olivaceous Woodcreeper.

Fairly common permanent resident in Atlantic Region in tropical evergreen and cloud forests and in Pacific Region in tropical semideciduous and cloud forests of Sierra Madre de Chiapas and Sierra de Miahuatlán; to be expected in the latter two habitats in Sierra de Yucuyacua. Breeding evidence: adults carrying food into nest cavity (Rowley, 1966: 157); enlarged testes (11 x 7 mm). Elevations: 250 to 4,850 feet.

*Glyphorhynchus spirurus* (Vieillot). Wedge-billed Woodcreeper.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest to San Miguel Soyaltepec and south in Isthmus to "Escuilapa." Breeding evidence: range, habitat, and dates. Elevations: 250 to 300 feet (records for Escuilapa and Tutla perhaps higher but elevations of towns and exact points of collection unknown).
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; perhaps also occurs in cloud forest of Atlantic Region west of Isthmus. Breeding evidence: range, habitat, and dates. Elevations: 9,300 feet; elevations at other localities of record, particularly Moctum (town at 4,600 feet), lower but elevations of towns or exact points of collection unknown.

Dendrocolaptes certhia (Boddaert). Barred Woodcreeper.

Permanent resident, uncommon in Atlantic Region in tropical evergreen forest, occurring south in Isthmus to Escuilapa, and rare in Pacific Region in tropical semideciduous forest of Sierra de Miahuatlán. Breeding evidence: enlarged testes (18 x 9 mm). Elevations: 250 to 4,100 feet.

Xiphorhynchus flavigaster Swainson. Ivory-billed Woodcreeper.

Very common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest, humid gallery forest, and dense-canopied tropical deciduous forest, recorded northwest in Río Tehuantepec basin to Jalapa. Breeding evidence: pre-juvenal. Elevations: sea level to 4,900 feet.

Xiphorhynchus erythropygus (Sclater). Spotted Woodcreeper.

Fairly common permanent resident in Atlantic Region in cloud forest and upper reaches of tropical evergreen forest.
Breeding evidence: enlarged testes (13 x 8 mm). Elevations: 1,900 to 5,200 feet.

*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 to a point near San Miguel Suchixtepec, the easternmost localities in entire range of species. Breeding evidence: slightly enlarged follicle (3 mm); range, habitat, and dates. Elevations: 6,400 to 10,800 feet.


Fairly common permanent resident in Atlantic Region, occurring in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to La Gloria and a point 2 miles north plus 2 miles east of Matías Romero, and in Pacific Region in tropical semideciduous forest of Sierra de Yucuyacua. Breeding evidence: enlarged testes (12 x 5 mm). Elevations: 250 to 1,900 feet.


Common permanent resident in all Regions in humid pine-oak and cloud forests down to 4,100 feet elevation. Very rare winter visitant to lowland tropical evergreen forest.
(one record, a female specimen, MLZ 31467, taken by Avilés on 23 January 1944 at "San Miguel Soyaltepec"; elevation of 600 meters [1,968 feet] given on specimen label doubtfully correct). Breeding evidence: enlarged testes (14 x 8 mm). Elevations: 4,100 to 9,700 feet (record for San Miguel Soyaltepec probably much lower but elevation at point of collection uncertain; see above).

Family FURNARIIDAE

*Synallaxis erythrothorax* Sclater. Rufous-breasted Spinetail.

Fairly common permanent resident in lower portions of Atlantic Region, occurring in brushy areas within tropical evergreen forest northwest at least to a point 5 miles west of Temascal and south in Isthmus to "Escuilapa." Breeding evidence: nest under construction. Elevations: 100 to 500 feet (record for Escuilapa perhaps higher but elevations of town and exact point of collection unknown).

*Anabacerthia variegaticeps* (Sclater). Scaly-throated Foliage-gleaner.

Fairly common permanent resident in cloud forest of Atlantic Region. Breeding evidence: enlarged testes (7 x 4 mm). Elevations: 4,100 to 5,250 feet (doubtless higher and lower at several localities where elevations at exact points of record are unknown).
Automolus rubiginosus (Sclater). Ruddy Foliage-gleaner.

Permanent resident in cloud forest, uncommon in Pacific Region in Sierra de Miahuatlán and very uncommon in Atlantic Region west of Isthmus. To be expected in cloud forest elsewhere in state. Breeding evidence: nest with eggs. Elevations: 4,100 to 5,250 feet (record for Totontepec perhaps higher but elevation at exact point of collection unknown).

Automolus ochrolaemus (Tschudi). Buff-throated Foliage-gleaner.

Fairly common permanent resident of Atlantic Region in tropical evergreen forest, recorded south in Isthmus to Escuilapa. Breeding evidence: enlarged testes (12 x 8 mm). Elevations: 250 to 4,100 feet.

Xenops minutus (Sparrman). Plain Xenops.

Uncommon permanent resident of Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to "Escuilapa." Breeding evidence: range, habitat, and dates. Elevations: 250 to 350 feet (records for Escuilapa, Lacova, and Tutla probably higher but elevations of towns and exact points of collection unknown).

*Sclerurus mexicanus Sclater. Tawny-throated Leafscraper.

Very rare permanent resident in cloud forest of Atlantic Region. Only Oaxaca records: one female (27.6 grams, ovary not enlarged) collected on 28 March and another seen on 1
April 1964 by Morony at 4,900 feet elevation 12 airline miles north-northeast of Zanatepec; one male (26.2 grams, largest testis 3 mm, UK uncatalogued) collected on 26 June 1964 by D. M. Power at 5,250 feet elevation at Vista Hermosa.

Breeding evidence: range, habitat, and dates.

*Sclerurus guatemalensis* (Hartlaub). Soaly-throated Leaf-scraper.

Rare permanent resident in tropical evergreen forest of Isthmus of Tehuantepec. Oaxaca records perhaps westernmost in total range of species. Should be sought elsewhere in lowlands of Atlantic Region. Known only from five specimens: one female (GMSC uncatalogued, 35 grams, not fat, ovary not enlarged, skull ossified) taken by J. W. Graber at Rancho Boca del Río Sarabia (about 200 feet elevation) on 22 December 1957; three males and one female (all with gonads not enlarged) collected by Schaldach at Montebello (about 300 feet elevation) on 15, 23, and 24 March and 8 May 1962, respectively (AMNH 778314, 778315, 778313, and 768809, respectively). Breeding evidence: range, habitat, and dates.

**Family FORMICARIIDAE**

*Taraba major* (Vieillot). Great Antshrike.

Uncommon permanent resident of Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to "Escuilapa." Breeding evidence: range, habitat, and dates. Elevations: 200 to
350 feet (record for Escuilapa perhaps higher but elevations of town and exact point of collection unknown).

**Thamnophilus doliatus** (Linnaeus). Barred Antshrike.

Permanent resident, common in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to Escuilapa, and very uncommon in Pacific Region in Sierra Madre de Chiapas (Santa Efigenia and Tapanatepec; records published by Sumichrast, 1881, p. 248). Breeding evidence: "laying" (Lamb specimen label); range, habitat, and dates. Elevations: 100 to 1,500 feet (records for Choapan and Tonaguía perhaps higher but elevations of towns and exact points of collection unknown).

**Thamnisteres anabatinus** Sclater and Salvin. Russet Antshrike.

Three specimens examined; apparently no other records. Status uncertain; probably a very rare permanent resident. Occurs in tropical evergreen forest on Atlantic side of Isthmus, where recorded as follows: female (GMSC uncatalogued, 22.5 grams, not fat) collected by J. W. Graber at Rancho Boca del Río Sarabia on 22 December 1957; one male (HC uncatalogued, testes not enlarged) and one female (LSUMZ 40746) collected on 10 February 1960 by Schaldach in "heavy brush in shaded barranca near ground" (data from specimen labels) at a point 18 road miles north of Matías Romero near junction of Trans-Isthmian Highway and the Río Sarabia. These records are westernmost in entire range of species. Breeding evidence: range, habitat, and probably dates.
Elevations: 200 to 250 feet.

*Microrhopias quixensis* (Cornalia). Dot-winged Antwren.

Uncommon permanent resident in lowlands of Atlantic Region in tropical evergreen forest, occurring northwest at least to a point 5 miles west of Temascal and south in Isthmus of Tehuantepec to "Escuilapa." Breeding evidence: range, habitat, and dates. Elevations: 250 to 350 feet (record for Escuilapa perhaps higher but elevations of town and exact point of collection unknown).

*Cercomacra tyrannina* (Sclater). Dusky Antbird.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to "Escuilapa." Breeding evidence: range, habitat, and dates. Elevations: 250 to 300 feet (record for Escuilapa perhaps higher but elevations of town and exact point of collection unknown).

*Formicarius analis* (d'Orbigny and Lafresnaye). Black-faced Antthrush.

Fairly common permanent resident in Atlantic Region in cloud forest west of Isthmus and throughout tropical evergreen forest, occurring northwest at least to a point 5 miles west of Temascal and south in Isthmus to Escuilapa. To be expected in cloud forest of Sierra Madre de Chiapas. Breeding evidence: enlarged testes (15 x 8 mm). Elevations: 250 to 5,250 feet.
Grallaria quatimalensis Prévost and Des Murs. Scaled Ant-pitta.

Very uncommon permanent resident in all Regions, occurring in tropical evergreen forest, cloud forest, and humid pine-oak forest. Breeding evidence: nest with eggs. Elevations: 250 to 8,000 feet.

Family PIPRIDAE


Fairly common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to Escuilapa. Breeding evidence: "testes greatly enlarged" (Schaldach specimen label); range, habitat, and dates. Elevations: 250 to 1,900 feet.

Chiroxiphia linearis (Bonaparte). Long-tailed Manakin.

Fairly common permanent resident in tropical semi-deciduous and humid gallery forests in Pacific Region in Isthmus mountains and Sierra Madre de Chiapas, occurring 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. Breeding evidence: enlarged testes (6 x 4 mm). Elevations: 700 to 4,900 feet (probably lower at several localities where elevations at exact points of record unknown).
Manacus candei (Parzudaki). White-collared Manakin.

Fairly common permanent resident in lowlands of Atlantic Region in tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to junction of Trans-Isthmian Highway and the Río Sarabia 18 road miles north of Matías Romero. Breeding evidence: "testes enlarged" (Schaldach specimen label); range, habitat, and dates. Elevations: 250 to 350 feet.

Schiffornis turdinus (Wied). Thrushlike Manakin.

Uncommon permanent resident in lowlands of Atlantic Region in tropical evergreen forest, occurring west to "Tutla" and south in Isthmus to "Escuilapa." "Tutla" is one of westernmost localities in entire range of species (other records extend to southern Veracruz). Breeding evidence: enlarged testes (10 x 5 mm). Elevations: 250 to 300 feet (records for Tutla and Escuilapa perhaps higher but elevations of towns and exact points of collection unknown).

Family COTTINGIDAE


Very uncommon permanent resident in Atlantic Region, occurring in tropical evergreen forest, often in association with oaks, northwest at least to points 6, 11, and 15 road miles southwest of Valle Nacional and south in Isthmus to "Chimalapa" [=Santa María Chimalapa] and to a point 0.5 mile south of Matías Romero. Breeding evidence: range, habitat,
and dates. Elevations: 300 to 4,100 feet.

**Attila spadiceus** (Gmelin). Bright-rumped Attila.

Permanent resident in all Regions of state; common in tropical evergreen forest east of Trans-Isthmian Highway and in humid gallery forest and tropical semideciduous forest; uncommon in tropical deciduous forest, including Río Tehuantepec basin northwest to Rancho Las Animas; very uncommon and local in tropical evergreen forest west of Isthmus (two localities, San Miguel Soyaltepec and a point 5 miles west of Temascal); and very rare in the Interior (San Miguel Sola de Vega and San Pedro Juchatengo, Trujillo; records published by Salvin and Godman (1888-1904 [1891]: 135).

Breeding evidence: enlarged testes (14 x 6 mm). Elevations: sea level to 5,000 feet.

**Laniocera refescens** (Sclater). Speckled Mourner.

One record, a male (testes completely enlarged, ARPC uncatalogued) taken by Abraham Ramirez V. on 21 June 1962 in Atlantic Region in tropical evergreen forest at "El Jobal" (town at about 300 feet but elevation at exact point of collection unknown). Status uncertain; probably a very rare and local permanent resident in Atlantic Region in tropical evergreen forest. This specimen represents the only record for México outside Chiapas. Breeding evidence: habitat, date, and possibly range.
Rhytipterna holerythra (Sclater and Salvin). Rufous Mourner.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest, recorded northwest to a point 6 road miles southwest of Valle Nacional and south in Isthmus to a point on the Río Sarabia 18 road miles north of Matías Romero. One record for Pacific Region, a male specimen (LSUMZ 61647) taken by Lamb on 31 January 1959 at 800 feet elevation at Santa Efígenia, presumably in humid gallery forest. Breeding evidence: copulation observed. Elevations: 250 to 1,900 feet (probably not to the 1,478 meters [4,848 feet] indicated by Blake [1949: 2] and subsequent authors).

Lipaugus unirufus Sclater. Rufous Piha.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest, recorded northwest to a point 6 road miles southwest of Valle Nacional and south in Isthmus to Escuilapa and La Gloria. Record for "Juchitán" (Miller, Friedmann, Griscom, and Moore, 1957: 60) pertains to La Gloria, District of Juchitán. Breeding evidence: adult observed feeding juvenal; enlarged testes (10 x 5 mm). Elevations: 250 to 1,900 feet.

Pachyramphus cinnamomeus Lawrence. Cinnamon Becard.

Very uncommon permanent resident in Atlantic Region lowlands in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to "Escuilapa." Breeding evidence: enlarged testes (7 x 3 mm). Elevations: 250
to 300 feet (records for Escuilapa and Tutla perhaps higher but elevations of towns and exact points of collection unknown).

*Pachyramphus major* (Cabanis). Gray-collared Becard.

Fairly common permanent resident in Atlantic and Pacific Regions, breeding throughout state in tropical semideciduous forest, lower reaches of humid pine-oak forest, cloud forest, and adjacent tropical evergreen forest and on Pacific side of Sierra Madre de Chiapas in humid gallery forest. Winters down to 250 feet elevation in tropical evergreen forest. Only one record for Interior ("La Parada"; Ridgway, 1907: 835). Breeding evidence: adults attending "full-feathered juveniles" (Rowley, 1966: 161); enlarged follicles (*ibid.*); enlarged testes (9 x 4 mm). Elevations: 250 to 7,300 feet (record for La Parada perhaps higher but elevation at exact point of collection unknown).

*Platypsaris aglaiae* (Lafresnaye). Rose-throated Becard.

Permanent resident, fairly common in Pacific Region in tropical deciduous forest, humid gallery forest, and at least lower reaches of tropical semideciduous forest, extending into Río Tehuantepec basin as far as Rancho Las Animas and uncommon in Atlantic Region in tropical evergreen forest and lower reaches of cloud forest and in the Interior in arid tropical scrub. Occurrences at "Oaxaca" [=Oaxaca City?] (Sumichrast, 1881: 249) and "Yanhuitlan?" [=Yanhuitlán] (Ferrari-Perez, 1886: 156) need confirmation by additional
data. Breeding evidence: enlarged testes (9 x 5 mm).

Elevations: sea level to 4,850 feet.

Tityra semifasciata (Spix). Masked Tityra.

Permanent resident in Atlantic and Pacific Regions, common in tropical evergreen forest, fairly common in tropical semideciduous forest, humid gallery forest, and lower reaches of cloud forest, and uncommon in tropical deciduous forest exclusive of upper Río Tehuantepec basin, where unrecorded. Breeding evidence: nest under construction. Elevations: sea level to 5,250 feet.

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 (female, MLZ 47452, 800 feet elevation at Santa Efígenia, 18 January 1948, Lamb), where probably a rare permanent resident. Breeding evidence: slightly enlarged testes (6 x 3 mm); range, habitat, and dates. Elevations: 100 to 4,100 feet.

Family TYRANNIDAE

Sayornis phoebe (Latham). Eastern Phoebe.

Rare winter resident probably occurring in all Regions of state; exact habitat 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 collected by W. W. Brown on 7 November 1927 (Bangs and Peters, 1928: 394) both at Tapanatepec; female (MLZ 35125) taken by Avilés on 9 January 1943 at San Pablo Villa de Mitla. The locality "Cuicatlán" [=San Juan Bautista Cuicatlán], published without details by the American Ornithologists' Union Committee on Classification and Nomenclature (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 in light of other errors of identification in their report. Elevations: no definite records; could occur at any elevation.

*Sayornis nigricans* (Swainson). Black Phoebe.

Uncommon permanent resident near fresh-water habitats in all Regions of state, breeding within general ranges of tropical evergreen and tropical semideciduous forests and occurring, perhaps as a breeder, within general ranges of tropical deciduous forest, arid temperate scrub, and lower portions of pine-oak forest. Breeding evidence: nest with young. Elevations: 250 to 6,300 feet.

*Sayornis saya* (Bonaparte). Say's Phoebe

Uncommon winter resident in the Interior in arid temperate scrub, occurring east into Oaxaca Valley. The only lowland record, a single bird seen by the Berretts and Binford in arid tropical scrub 8 road miles southwest of Juchitán on
18 October 1961, is also southeasternmost in entire range of species. Very rare permanent resident in the Interior. Breeding evidence: only one record (Davis, 1957: 365), a pair feeding young in nest on 29 June 1952 "about 90 miles (via Pan-American Highway) northwest of the city of Oaxaca" (by my calculations, probably located at about 7,500 feet elevation northeast of San Pedro y San Pablo Teposcolula near junction of road to Putla de Guerrero); this is southeasternmost breeding locality in entire range of species.

Dates: 15 October to 16 January; 29 June. Extreme elevations of winter residents: 50 to 5,100 feet.

**Pyrocephalus rubinus** (Boddaert). Vermilion Flycatcher.

Common permanent resident throughout state in savanna, arid temperate scrub, arid tropical scrub, guamil, cultivated land, and grazed land. Breeding evidence: nest with eggs. Elevations: sea level to 7,000 feet.

**Muscivora forficata** (Gmelin). Scissor-tailed Flycatcher.

Occurs in savanna, arid tropical scrub, and arid temperate scrub, and in guamil, 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 lowlands, and uncommon in the Interior. Winter resident in lowlands, fairly common on Pacific side of Isthmus, uncommon in remainder of Pacific Region, and rare in Atlantic Region.
Extreme dates: 29 September to 22 May. Major migration periods: last half of March through first half of April; October. Elevations: sea level to 5,100 feet.

*Muscivora tyrannus* (Linnaeus). Fork-tailed Flycatcher.

One record, a female collected by Rook on 28 March 1960 in Atlantic Region at low elevation (probably below 300 feet) 25 miles south of San Juan Bautista Tuxtepec. Boucard specimen record from Playa Vicente (P. L. Sclater, 1859b: 384) pertains to Veracruz. Records from "Oaxaca" (Ridgway, 1907, p. 720; and Blake, 1953, p. 340) stem from Playa Vicente specimen. Bird in Moore Laboratory of Zoology (MLZ 51725) said to be from "Oaxaca (near Loma Bonita, February 26)" (Miller, Friedmann, Griscom, and Moore, 1957: 70) taken by Lamb at Arroyo Claro, Veracruz. Possibly a rare, breeding summer resident in savannas in lowlands of Atlantic Region.

*Tyrannus tyrannus* (Linnaeus). Eastern Kingbird.

Common May transient migrant across Isthmus of Tehuantepec, occurring in savanna, in arid tropical scrub, and at edges of tropical deciduous forest and tropical evergreen forest. The only other Oaxaca records, a male (FM 119681) and a female (FM 119680) taken by Avilés in Atlantic Region at Tutla on 18 February and 1 March 1941, respectively, may represent either early transient migrants or winter residents. To be expected as a fall transient migrant. Migration period: 4 to 21 May. Elevations: 350 to 800 feet.
**Tyrannus vociferans** Swainson. Cassin's Kingbird.

Fairly common permanent resident in the Interior in arid temperate scrub, oak scrub, and adjacent portions of open, arid pine-oak forest. The only lowland record, a single bird seen by the Berretts and Binford in Pacific Region at 350 feet elevation 3 road miles north of Puerto Angel on 10 October 1961, probably represents an individual that bred elsewhere. All breeding evidence: nest under construction (6,400 feet elevation, 11 road miles southwest of San Andrés Chicahuaxtla, 16 May 1964, Morony and Binford); egg without shell in oviduct (from female associated with above-mentioned nest, 23 May 1964, Morony); enlarged testes (11 x 5 mm; from male taken by Morony on 27 May 1964 at 6,100 feet elevation 4 road miles east of Santiago Matatlán). Oaxaca represents southeasternmost extreme in breeding range of species. Elevations: 350 feet; 5,000 to 6,400 feet.

**Tyrannus verticalis** Say. Western Kingbird.

Uncommon transient migrant in the Interior in arid temperate 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. One record for Atlantic Region, a female (MLZ 36218) taken by Avilés at Moctum on 12 October 1941. Dates: 12 October to 14 May. Elevations: 100 to 4,800 feet.
**Tyrannus melancholicus** Vieillot. Tropical Kingbird.

Permanent resident; very common below 3,000 feet elevation in Atlantic and Pacific Regions, occurring in savanna and arid tropical scrub, and in guamil, grazed land, and cultivated land as they 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 (42.7 grams, moderately fat, skull ossified, ovary not enlarged) collected by Wolf at 5,100 feet elevation 2 road miles east of Oaxaca City on 7 May 1961; probably, a rare visitant and not a permanent resident in Oaxaca Valley. Breeding evidence: nest with young. Elevations: sea level to 3,000 feet; 5,100 feet.

**Tyrannus crassirostris** Swainson. Thick-billed Kingbird.

Winter resident, fairly common in lower portions of Pacific Region in savanna, arid tropical scrub, and in openings within tropical deciduous forest and very uncommon in the Interior in arid tropical scrub and arid temperate scrub. Permanent resident in arid temperate scrub at Tamazulapan del Progreso (six records for June and July) and perhaps on Cerro San Felipe (one female, USNM 144899, 21 June 1894, Nelson and Goldman), apparently the southeastern-most definite breeding localities in total range of species. Possibly a permanent resident in arid habitats elsewhere in state. Rare visitant in Atlantic Region (two records: 6
miles south of Matías Romero at Río Grande, male [AMNH 778341, moderately fat, testes not enlarged], 9 April 1962, Schaldach; 10 miles north of Matías Romero, female [HC uncatalogued], 18 February 1961, K. Wolfe). Breeding evidence: range, habitat, and dates. Extreme dates for winter residents: 24 September to 28 April. Elevations: sea level to 6,000 feet (perhaps higher on Cerro San Felipe but exact elevation unknown).

**Legatus leucophaius** (Vieillot). Piratic Flycatcher.

In general a very uncommon, but locally a fairly common, breeding bird in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to a point on the Río Sarabia 18 road miles north of Matías Romero. Apparently a spring or summer resident; recorded only on 13 February and from 14 March to 25 April. Breeding population at a point 1 mile southwest of Valle Nacional definitely migratory; in 1961 the birds arrived there on 25 March. Record for 13 February (male specimen, FM 119689, Tutla, Avilés) may represent either a winter resident or an early arrival. Additional data needed to clarify status. Breeding evidence: "laying" (Lamb specimen label); enlarged testes (6 x 3 mm). Elevations: 250 to 1,900 feet.

**Myiodynastes luteiventris** Solater. 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 humid gallery and tropical deciduous forests. Breeding evidence: nest with young. Dates: 25 March to October. Definite arrival date in 1961 at a point 1 mile southwest of Valle Nacional was 25 March. Arrives in Sierra de Miahuatlán in "last few days of April and the first of May" (Rowley, 1966: 162). Elevations: 250 to 5,000 feet.

*Myiodynastes maculatus* (Müller). Streaked Flycatcher.

Rare breeding bird of Atlantic Region in tropical evergreen forest, recorded only at following localities: La Ranchería at 1,500 feet elevation (two adult females and one prejuvenal male, 17 June 1895, and one prejuvenal male, 20 June 1895, respectively USNM 114934-144937, Nelson and Goldman); a point 5 kilometers (about 3 miles) east of Vista Hermosa at about 800 meters (about 2,600 feet) elevation (male, 49.5 grams, skull completely ossified, testes 9 mm; female, 42.7 grams, ovary granular; both UK uncatalogued and collected by R. L. Holland on 21 June 1964); and a point at an unrecorded elevation 13 kilometers (8 miles) north of Vista Hermosa (sex?, UK uncatalogued, D. A. Johnson, 27 June 1964). Records for "Santo Domingo" published by Ridgway (1907: 661) and Miller, Friedmann, Griscom, and Moore (1957: 74) pertain to La Ranchería. Probably a summer resident and transient migrant but possibly a permanent resident. To be expected elsewhere in lower portions of Atlantic Region.
**Megarynchus pitangua** (Linnaeus). Boat-billed Flycatcher.

Common permanent resident in all Regions, occurring in tropical evergreen, tropical deciduous, humid gallery, and tropical semideciduous forests, and penetrating the Interior along streams at least near Huahuapan de León. Breeding evidence: prejuvenal. Elevations: 100 to 5,250 feet.

**Myiozetetes similis** (Spix). Social Flycatcher.

Very common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical deciduous forest, humid gallery forest, and lower reaches of tropical semideciduous forest. Breeding evidence: prejuvenal. Elevations: sea level to 3,000 feet.

**Pitanquus sulphuratus** (Linnaeus). Great Kiskadee.

Permanent resident, very common in Pacific Region in tropical deciduous and humid gallery forests, common in Atlantic Region in tropical evergreen forest and in both Regions in arid tropical scrub, and uncommon in the Interior, where recorded in cultivated land within both arid temperate scrub and steppe of Oaxaca Valley and in arid tropical scrub of valley of San Juan Bautista Cuicatlán. Breeding evidence: nest with eggs. Elevations: sea level to 5,100 feet (record for San Pablo Villa de Mitla perhaps slightly higher but elevation at exact point of collection unknown).

**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 humid gallery forest. Rare winter resident in Pacific Region east of Isthmus, apparently in humid gallery forest and arid tropical scrub. Migration periods: 28 March to 20 April; September to 26 October. Winter dates: 23, 29, and 31 January and 4, 12, and 16 February. Elevations: sea level to 800 feet.

*Myiarchus cinerascens* (Linnaeus). Ash-throated Flycatcher.

Uncommon winter resident in Pacific and Interior Regions in arid temperate 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 feet. Account based solely on specimens examined, literature references being hopelessly confused with *M. nuttingi*.


Common permanent resident in Pacific and Interior Regions, occurring throughout arid tropical scrub and tropical deciduous forest and in lower reaches of arid temperate scrub. Breeding evidence: enlarged testes (14 x 6 mm). Elevations: sea level to 6,000 feet. Account based only on publication by Lanyon (1961) and on specimens examined.

*Myiarchus tyrannulus* (Müller). Wied's Flycatcher.

Permanent resident, fairly common in tropical deciduous
forest and arid tropical scrub of Pacific Region west of Isthmus and uncommon in the Interior in arid tropical scrub of valley of San Miguel Sola de Vega and arid temperate scrub of Oaxaca Valley. Uncommon permanent resident and fairly common winter resident in both arid tropical scrub and tropical deciduous forest of Pacific Region from Isthmus eastward. Uncommon summer resident (3 March to 15 June) in open portions of tropical evergreen forest in Atlantic Region west of Isthmus, these birds wintering on both slopes from Isthmus eastward. Definite arrival date in 1961 at a point 1 mile southwest of Valle Nacional: 20 March. Should be sought in winter in Atlantic Region west of Isthmus. Breeding evidence: enlarged testes (13 x 6 mm). Elevations: sea level to 5,100 feet (record for San Pablo Villa de Mitla perhaps slightly higher but elevation at exact point of collection unknown).

*Myiarchus tuberculifer* (D'Orbigny and Lafresnaye).

Olivaceous Flycatcher.

Permanent resident in all Regions of state, very common in tropical evergreen forest, common in tropical semideciduous forest and humid gallery forest, fairly common in cloud forest, humid pine-oak forest, semiarid pine-oak forest, and tropical deciduous forest, and uncommon in arid pine-oak forest, arid tropical scrub, and arid temperate scrub. Numbers probably augmented by winter residents from north. Breeding evidence: prejuvenal. Elevations: sea level to 9,700 feet.
**Deltarhynchus flammulated** (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 miles west-northwest of Tapanatepec and 16 road miles northwest of Puerto Escondido. To be expected in tropical deciduous forest throughout lowlands and adjacent foothills of Pacific Region. Scarcity of records perhaps due to confusion with *Myiarchus* in field. Breeding evidence: range, habitat, and dates. Elevations: sea level to 800 feet.

**Nuttallornis borealis** (Swainson). Olive-sided Flycatcher.

Uncommon transient migrant in all Regions, occurring in all major terrestrial habitats. Possible status as winter resident suggested by male specimens taken in Atlantic Region in tropical evergreen forest at 300 feet elevation 1 mile southwest of Valle Nacional on 27 February 1961 (38.1 grams, very fat, skull ossified, Binford) and by sightings of single birds at points 6 and 11 road miles southwest of Valle Nacional on 21 and 22 November 1961, respectively (the Berretts and Binford). Migration periods (excluding dates of possible winter residents mentioned above): 8 April to 12 May; 16 August; 25 September to 12 October. I find no basis for date of 30 May given by Miller, Friedmann, Griscom, and Moore (1957: 82). Elevations: 100 to 9,700 feet.
Contopus virens (Linnaeus). Eastern Wood-Pewee.

Two specimens examined; also at least one published record. Status uncertain because of confusion with C. sordidulus; probably a rare transient migrant in entire Atlantic Region and in Pacific Region from Isthmus eastward. Only 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 feet 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 collected by Sumichrast at Tehuantepec City on 7 October 1869 (AMNH 82073) has been called both sordidulus and virens but cannot in my opinion be safely identified as either.

Contopus sordidulus Sclater. Western Wood-Pewee.

Common transient migrant in all Regions and in virtually all major terrestrial habitats. Uncommon summer resident from arid pine-oak forest of Interior east through Isthmus mountains onto Pacific side of Sierra Madre de Chiapas. Extreme dates: 1 April to 26 October. Breeding evidence: nest under construction (9 May). Extreme dates: 1 April to
26 October. Major migration periods: April and May; October.
Elevations: 100 to 9,700 feet. See C. virens.

**Contopus cinereus** (Spix). Tropical Pewee.

Very uncommon breeding bird of Atlantic Region in tropical evergreen forest, recorded south in Isthmus to a point 4 miles north plus 2 miles 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. Breeding evidence: moderately enlarged follicle (4 mm); enlarged testes (8 x 5 mm). Elevations: 100 to 1,500 feet.

**Contopus pertinax** Cabanis and Heine. Greater Pewee.

Fairly common permanent resident from 4,500 to 8,500 feet elevation in humid pine-oak forests of Sierra de Miahuatlán and Sierra de Yucuyacua arid pine-oak forest throughout Interior. Numbers augmented by winter residents from north. Rare winter visitant of lower elevations: one seen by the Berretts and Binford at 1,900 feet elevation 6 road miles southwest of Valle Nacional on 21 and 22 November 1961; specimen taken on 11 January at "Tapanatepec" and supposed to be in Moore Laboratory of Zoology (Miller, Friedmann, Griscom, and Moore, 1957: 85) cannot be located. Possibly a permanent resident east of Isthmus. Breeding evidence: nest with young. Elevations: 1,900 to 8,500 feet (record for Tapanatepec perhaps lower; see above).
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 humid gallery forests west at least to a point 11 road miles north of San Pedro Pochutla. One record for Interior, one bird collected (male, 11.9 grams, slightly fat, skull completely ossified, testes small, Wolf) in oak scrub at 6,100 feet elevation 4 road miles east of Santiago Matatlán on 9 May 1961. Dates: 29 September to 15 May. Elevations: 250 to 900 feet; 6,100 feet.

Empidonax traillii (Audubon). Traill's Flycatcher.

Transient migrant, fairly common in Pacific Region in tropical deciduous forest and arid tropical scrub, 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?, 11.6 grams, little fat) collected by Binford at Minitán on 26 February 1964 and another (male, 13.4 grams, little fat, testes small) taken by Binford 6 road miles 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 (testes small) secured by Lamb on 8 July 1957 in Pacific Region at
3,000 feet elevation at Rancho Las Animas. 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 feet.

Stein (1963) presents evidence that Traill's Flycatcher in reality comprises two biological species, *E. traillii* (Audubon) and *E. brewsteri* Oberholser, differing primarily in song, call-notes, habitat, and nesting behavior. A formula is presented to aid in distinguishing the two forms by morphology. Applying this formula to eleven of the seventeen specimens known from Oaxaca, I find that all eleven are *brewsteri*. *E. traillii* would also be expected, at least in the Atlantic Region. Until Stein's data have been substantiated by other investigators, I prefer to maintain the two forms as conspecific.

*Empidonax minimus* (Baird and Baird). Least Flycatcher.

Winter resident, common in both Atlantic and Pacific Regions and uncommon in the Interior, occurring in cloud forest, tropical evergreen forest, tropical semideciduous forest, tropical deciduous forest, arid tropical scrub, and arid temperate scrub. Should be sought in pine-oak forests at least on migration. Dates: 8 August to 21 May. Elevations: sea level to 6,000 feet (record for Amatepec perhaps higher but elevation of town and exact point of collection unknown).
Empidonax hammondii (Xantus). Hammond's Flycatcher.

Uncommon winter resident in pine-oak forests in all Regions west of Isthmus, usually at high elevations. One low elevation record, a female (MCZ 238295) taken by W. W. Brown on 15 February 1927 in Isthmus of Tehuantepec at "Chivela" (town at 689 feet but elevation at exact point of collection unknown). Should be sought east of Isthmus. Dates: 12 September to 26 April. Elevations: about 700 feet (see above); 6,500 to 9,300 feet (perhaps lower at Moctum, Tonaguía, and San Ildefonso Villa Alta but elevations of first two towns and all three points of collection unknown). See E. virescens in Hypothetical List.


Very uncommon winter resident in the Interior in pine-oak forests 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 Etila" [=San Pedro y San Pablo Etla]. Additional specimens examined from "Santos Reyes Pápalo" (female, USNM 154522, 19 October 1894, Nelson and Goldman, elevation at exact point of collection unknown),
"San Juan Bautista Cuicatlán" (female, USNM 154542, 6 October 1894, Nelson and Goldman, elevation at exact point of collection unknown). La Cumbre (male, MVZ 115442, 3 April 1948, C. G. Sibley, 9,000 feet elevation), and Huahuapan de León (5,510 feet elevation, male, MLZ 49234, 23 January 1949, Lamb).

*Empidonax wrightii* Baird. Gray Flycatcher.

One record, the southeasternmost in entire range of species, a male (LSUMZ 27503, 12.1 grams, moderately fat, skull ossified, testes very small) collected by D. G. Berrett on 22 September 1961 in the Interior in arid temperate scrub at 6,100 feet elevation 34 road miles north-northeast of Huajuapan de León (about 3 miles northeast of Santiago Chazumba). Possibly a regular winter resident in arid temperate scrub of northwestern Oaxaca.

*Empidonax affinis* (Swainson). Pine Flycatcher.

Rare permanent resident in the Interior in humid pine-oak forests of Sierra de Juárez and Sierra Altoapaneca, breeding east to Llano de las Flores and La Parada, the easternmost breeding localities in entire range of species. To be expected in similar habitats elsewhere in state. Breeding evidence: enlarged testes (8 x 5 mm). Elevations: 9,700 feet; probably lower at several localities where elevations at exact points of record are unknown.
Empidonax difficilis Baird. Western Flycatcher.

Permanent resident west of Isthmus, common in Pacific Region from 4,350 to 7,300 feet elevation in cloud forest and extreme upper reaches of tropical semideciduous forest and very uncommon in the Interior in humid pine-oak forest (La Cumbre, 9,000 feet). Probably a permanent resident in cloud forests of Atlantic Region, where so far recorded only in November. Winter resident west of Isthmus, common in Pacific Region in nearly all forest habitats from sea level to at least 6,600 feet and uncommon in Atlantic Region in tropical evergreen forest and cloud forest from lowlands (exact lower limit unknown) up to at least 4,850 feet. To be expected as a winter resident east of Isthmus. Breeding evidence: nest with young.

Phillips (1960: 362) advocates merging *E. difficilis* and *E. flavescens* Lawrence. I prefer to maintain the two as distinct species pending a thorough analysis of field biology.

*Empidonax flavescens* Lawrence. Yellowish Flycatcher.

Fairly common presumptive permanent resident from 4,900 to 5,200 feet elevation in cloud forest of Sierra Madre de Chiapas at a locality in Atlantic Region 12 airline miles north-northeast of Zanatepec. Breeding evidence: enlarged testes (7 x 4 mm); range, habitat, and probably dates.

All Oaxaca specimens (LSUMZ) were taken in 1964, as follows: 26 March, one male (13.4 grams, left testis 7 x 4
mm, right 6 x 2.5 mm, Morony) and one female (13.4 grams, largest follicle 1 mm, Morony); 1 April, male (12.4 grams, skull not completely ossified, testes 7 x 4 mm, Binford); 2 April, male (14.0 grams, skull not completely ossified, testes 7 x 3 mm, Binford); and 6 April, male (14.5 grams, testes 7 x 4 mm, Morony); all five possessed little fat. See *E. difficilis*.

**Empidonax albigularis** Sclater and Salvin. White-throated Flycatcher.

Very uncommon permanent resident, breeding in the Interior in arid temperate scrub (Oaxaca Valley and Tamazula-pan del Progreso), wintering at lower elevations in Atlantic Region (at a point 1 mile southwest of Valle Nacional), and occurring (exact status uncertain) elsewhere in Atlantic Region (Totontepec, April and May) and in Isthmus of Tehuantepec ("Tehuantepec" [=Tehuantepec City?], 7 October; Moore, 1940, p. 380). Breeding evidence: "nesting" (Miller, Friedmann, Griscom, and Moore, 1957: 94); enlarged testes (7 x 4 mm). Elevations: 300 to 6,000 feet (record for "Tehuantepec" perhaps lower; see above).

**Empidonax fulvifrons** (Giraud). Buff-breasted Flycatcher.

Rare breeding bird and probably a rare permanent resident in Pacific Region in pine-oak forests of Sierra de Miahuatlán, where recorded only at Río Molino (elevation 7,300 feet) as follows: one female (ARPC uncatalogued) collected by Schaldach on 9 November 1964; a nest containing
one infertile egg and one slightly incubated egg found on 22 May 1965 in second-growth oak association (Rowley, 1966: 168). Rare winter resident and probably a rare permanent resident in the Interior in pine-oak forests of Sierra Aloapaneca, recorded as follows: one male (MLZ 35141, 3 January 1943) and one female (MLZ 35144, 24 December 1942) both taken by Avilés at "San Pablo Villa de Mitla" (town at 5,412 feet but elevation at exact point of collection unknown) and one male (MLZ 47769, 19 February 1948) collected by Lamb at 5,700 feet elevation at San Felipe del Agua. Only other record is a specimen taken by Boucard in "Oaxaca" [=state of Oaxaca] (P. L. Sclater, 1859c: 442). Should be sought in similar habitats elsewhere in state.

**Aechmolophus mexicanus** Zimmer. Pileated Flycatcher.

Very uncommon permanent resident in the Interior in mesquite within arid temperate scrub, occurring southeast to Rancho Las Animas, the easternmost point in entire range of species. Records for "Tequisistlán" (Moore, 1953: 210) pertain to Rancho Las Animas. Breeding evidence: pre-juvenal. Elevations: 3,000 to 6,000 feet.

**Mitrephanes phaeocercus** (Sclater). Tufted Flycatcher.

Fairly common permanent resident west of Isthmus, breeding in the Interior in humid and semiarid (and arid?) pine-oak forests down to 4,350 feet elevation and wintering there and in Atlantic Region in tropical evergreen forest down to 300 feet. Breeding evidence: several active nests completed,
contents uncertain but probably young (Rowley, 1966: 169); enlarged testes (7 x 4 mm). Elevations: 300 to 7,500 feet (probably much higher on Cerro San Felipe but elevation at exact point of collection unknown).

*Myiobius sulphureipygius* (Sclater). Sulphur-rumped Flycatcher.

Fairly common permanent resident in Atlantic Region in heavy tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to "Escuilapa." Breeding evidence: "large ova" (Lamb specimen label); range, habitat, and dates. Elevations: 250 to 300 feet (records for Escuilapa and Tutla perhaps higher but elevations of towns and exact points of collection unknown).

*Onychorhynchus mexicanus* (Sclater). Northern Royal-Flycatcher.

Uncommon permanent resident of Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and in Pacific Region east of Isthmus in humid gallery forest (Punta Paloma, Rancho de Cacoprieto, Santa Figenia, and Tapanatepec). Breeding evidence: "large ova" (Lamb specimen label); range, habitat, and dates. Elevations: sea level to 800 feet.

*Platyrrinchus mystaceus* Vieillot. White-throated 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 San Miguel Soyaltepec. Breeding evidence: "testes about full size" (Lamb specimen label); range, habitat, and dates. Elevations: 200 to 4,900 feet.

*Tolmomyias sulphurescens* (Spix). Yellow-olive Flycatcher.

Common permanent resident of Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and of Pacific Region in humid gallery forest of foothills of Sierra Madre de Chiapas and Isthmus mountains west to Mezahuite. Breeding evidence: prejuvenile. Elevations: 150 to 4,100 feet.

*Rhynchocyclus brevirostris* (Cabanis). Eye-ringed Flatbill.

Fairly common permanent resident in Atlantic and Pacific Regions in cloud forest, tropical evergreen forest, tropical semideciduous forest, and in humid gallery forests within tropical deciduous and pine-oak forests, occurring throughout Atlantic Region and west in Pacific Region at least to Minitán and a point 1 mile east of Putla de Guerrero. Breeding evidence: nest with young. Elevations: sea level to 6,000 feet.

*Todirostrum cinereum* (Linnaeus). Common Tody-Flycatcher.

Very uncommon permanent resident in Atlantic Region in open scrubby situations within general range of tropical evergreen forest from San Miguel Soyaltepec southeast to a point 5 miles south of Loma Bonita. Should be sought in
suitable habitat elsewhere in lower portions of Atlantic Region. Breeding evidence: egg without shell in oviduct. Elevations: 100 to 500 feet.

**Todirostrum sylvia** (Desmarest). Slate-headed Tody-Flycatcher.

Uncommon permanent resident in Atlantic Region in guamil, and probably other types of dense undergrowth, within general range of tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Tehuantepec region to Guichicovi and La Rancheria (erroneously published by Ridgway [1907: 369] as "Santo Domingo"). Breeding evidence: range, habitat, and dates. Elevations: 100 to 1,500 feet.

**Oncostoma cinereiguilare** (Sclater). Northern Bentbill.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to a point 5 miles west of Temascal and in Pacific Region in humid gallery forest of Sierra Madre de Chiapas and adjacent coastal plain west to Santa Efigenia and Punta Paloma. Breeding evidence: enlarged testes (8 x 5 mm). Elevations: sea level to 1,900 feet (record for Tectalcingo perhaps higher but elevations of town and exact point of collection unknown).

**Elaenia flavogaster** (Thunberg). Yellow-bellied Elaenia.

Fairly common summer resident of Atlantic Region in edge situations within general range of tropical evergreen forest, occurring northwest at least to San Juan Bautista.
Tuxtepec and south in Isthmus to a point 4 miles north plus 2 miles east of Matías Romero. Record for 26 January (1961, male, HC uncatalogued, 24 road miles north of Matías Romero, K. Wolfe) suggests it is a rare permanent resident. Breeding evidence: "fledglings" observed (Schaldach specimen label); active nest completed but empty. Dates: 26 January; 21 February to 17 July; definite arrival date in 1961 at my collecting locality 1 mile southwest of Valle Nacional was 8 March. Elevations: 100 to 300 feet (doubtless higher at several localities where elevations at exact points of record are unknown).

Myiopagis viridicata (Vieillot). Greenish Elaenia.

Fairly common permanent resident, occurring in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest, humid gallery forest, and lower reaches of cloud forest, and extending along rivers into arid tropical scrub of Interior to San Pedro Juchatengo and a point near Tamazulapan del Progreso. Breeding evidence: prejuvenal. Elevations: sea level to 6,000 feet.

Camptostoma imberbe Sclater. Northern Beardless Flycatcher.

Common permanent resident in Pacific Region in tropical deciduous forest and arid tropical scrub and in the Interior in arid temperate scrub, ranging north to Isthmus to a point on the Río Sarabia 18 road miles north of Matías Romero (one record, female with large follicles, 27 April 1956, Lamb). Unrecorded, but probably occurs, in arid tropical scrub
valleys of Interior. Breeding evidence: nest with young. Elevations: sea level to 6,100 feet.

*Ornithion semiflavum* (Sclater and Salvin). Yellow-bellied Tyrannulet.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to Palomares. In vicinity of Valle Nacional it frequents patches of oaks within tropical evergreen forest. Breeding evidence: enlarged testes (right 6 x 4, left 7 x 3 mm). Elevations: 250 to 4,100 feet.

*Leptopogon amaurocephalus* Tschudi. Sepia-capped Flycatcher.

Fairly common permanent resident of Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to "Escuilapa." Breeding evidence: prejuvenal. Elevations: 250 to 300 feet (records for Escuilapa and Tutla perhaps higher but elevations of towns and exact points of collection unknown).

*Pipromorpha oleaginea* (Lichtenstein). Ochre-bellied Flycatcher.

Uncommon in Atlantic Region in tropical evergreen forest and cloud forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to Escuilapa; presumably a permanent resident but recorded only from 22 November to 28 April. Breeding evidence: moderately enlarged testes (6 x
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 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 southeasternmost definite locality for North American populations of species; not collected farther east but said to occur through Pacific lowlands as far as Chiapas border (Nelson, 1897: 54). All Oaxaca records of more northern races questionable. Breeding evidence: prejuvenal. Eleva­tions: sea level to 6,800 feet.

Family HIRUNDINIDAE

*Progne subis* (Linnaeus). Purple Martin.

Rare, but probably regular transient migrant through Pacific Region. Only two records: one bird collected (adult male, 52.5 grams, heavy fat, testes 3 x 1.5 mm, Wolf) and 13 others seen by Wolf and Binford on 18 May 1961 over mud flats at sea level 19 road miles southwest of Juchitán at southwestern edge of Laguna Superior; one adult male seen by the Berretts and Binford on 6 October 1961 at 600 feet elevation.
in tropical deciduous forest 3 road miles north of San Pedro Pochutla.

*Progne chalybea* (Gmelin). Gray-breasted Martin.

Locally a fairly common summer resident in lower portions of Atlantic and Pacific Regions, nesting in buildings and under bridges within general range of tropical evergreen forest, tropical deciduous forest, and arid tropical scrub. Uncommon and local winter resident in its summer habitats, occurring in Pacific Region from San Pedro Pochuntla 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. Breeding evidence: adults entering presumed nest cavities; enlarged testes (16 x 10 mm). Elevations: sea level to 2,400 feet.

*Petrochelidon 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 temperate scrub, Oaxaca breeding localities being southeastern-most in total range of species. Breeding evidence: 15 birds hovering next to a cliff at 5,050 feet elevation 1 mile west of Santa María del Tule on 27 May 1964 (Morony and Binford); "breeding" (Miller, Friedmann, Griscom, and Moore, 1957: 109); range, habitat, and probably dates. Extreme dates: 21 March to 26 October. Dates of known migrants: 21 March
to 19 May; 28 September to 22 October. Elevations: sea level to 8,950 feet.

*Hirundo rustica* Linnaeus. Barn Swallow.

Fairly common transient migrant in entire Atlantic Region and in Pacific Region from Tehuantepec City eastward; to be expected over any habitat. Only records for Interior: series of specimens (BMNH) collected by Trujillo in April 1889 at San Miguel Sola de Vega and San Pedro Juchatengo (A. R. Phillips, in litt.). To be expected as a transient migrant elsewhere in Pacific and Interior Regions. Observations by Coffey (1960: 295) on 2 December 1948 (eight seen at Salina Cruz) and 3 December 1948 (four seen northwest of Tehuantepec City) could pertain to either late migrants or winter residents. Possibly a rare summer resident. Dates: 20 March to 22 May; 17 to 22 October; 2 and 3 December; record for August (Ridgway, 1904: 83) apparently erroneous, since based on Lawrence (1876: 17), who does not mention August. Elevations: sea level to 9,300 feet.

*Stelgidopteryx ruficollis* (Vieillot). Rough-winged Swallow.

Very common transient migrant and common permanent resident throughout state, breeding from 300 to at least 8,000 feet elevation in virtually all terrestrial habitats and migrating over all habitats including open ocean. Breeding evidence: prejuvenal. Elevations: sea level to 8,950 feet.

Uncommon transient migrant over open ocean and in lowlands of Atlantic and Pacific Regions, recorded over 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 feet.

**Iridoprocne albilinea** (Lawrence). Mangrove Swallow.

Fairly common permanent resident in lowlands of Atlantic and Pacific Regions, occurring along large rivers, at coastal lagoons and lakes, and in open, short-tree mangrove swamp. One record for Interior: a bird seen by Wolf and Binford on 29 April 1961 at 6,300 feet elevation at Guelatao. Breeding evidence: nest under construction. Elevations: sea level to 300 feet (record for Tutla perhaps slightly higher but elevations of town and exact point of collection unknown); also 6,300 feet.

**Tachycineta thalassina** (Swainson). Violet-green Swallow.

Fairly common transient migrant and very uncommon permanent resident in the Interior, feeding over humid and arid pine-oak forests and arid temperate scrub. Only one summer record, a female (USNM 143514) taken by Nelson and Goldman on 28 June 1894 at San Pablo Villa de Mitla. Two lowland records, two birds seen by Wolf and Binford on 1 April and 25 seen on 2 April 1961 feeding over a river in Atlantic Region at 300 feet elevation 1 mile southwest of...
Valle Nacional. Oaxaca is southeasternmost breeding area in total range of species. Breeding evidence: range, habitat, and probably dates. Major migration periods: late March and early April; late September. Elevations: 300 feet; 5,250 to 9,300 feet.

Family CORVIDAE

**Corvus corax** Linnaeus. Common Raven.

Fairly common permanent resident in mountains of Interior and of Pacific Region in Sierra Madre de Chiapas, occurring in pine-oak forests, arid temperate scrub, and upland portions of tropical deciduous forest. Breeding evidence: courtship flights observed. Elevations: 1,000 to 9,700 feet (doubtless lower at several localities where elevations at exact points of record are unknown).

**Calocitta formosa** (Swainson). Magpie Jay.

Very common permanent resident, occurring in Pacific Region in tropical deciduous forest, arid tropical scrub, and extreme lower edge of tropical semideciduous forest (northwest in Río Tehuantepec basin to "San Juan del Río" and a point 2 road miles east of San Pedro Totolapan) and extending north across Isthmus into Atlantic Region as far as a point 2.3 miles north of Matías Romero. Breeding evidence: prejuvenal. Elevations: sea level to 3,200 feet (record for San Juan del Río perhaps higher but elevation at exact point of collection unknown).

Very common permanent resident at low elevations throughout Atlantic Region in tropical evergreen forest, occurring south in Isthmus to a point 4.1 miles north of Matías Romero. White-tipped phase recorded at Guichicovi (USNM 144601), in region of San Juan Bautista Tuxtepec, and along Trans-Isthmian Highway from a point 4.1 miles north of Matías Romero north to the Río Jumuapán; unrecorded in areas not also frequented by brown-phase birds. Breeding evidence: prejuvenal (brown phase). Elevations: 100 to 800 feet.

Although I follow R. K. Selander (1959) in treating P. mexicanus Rüppell as a color phase of P. morio, I do not consider the evidence conclusive. In my opinion, 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.

Cyanocorax yncas (Boddaert). Green Jay.

Permanent resident, common in Pacific Region in tropical semideciduous forest and fairly common in Atlantic Region in tropical evergreen forest. Breeding evidence: prejuvenal. Elevations: 250 to 5,000 feet.


Common permanent resident in cloud forest of Atlantic Region west of Isthmus. Breeding evidence: range, habitat, and dates. Elevations: 4,100 to 5,200 feet (records for Choapan and Tectalcingo probably lower but elevations of
towns and exact points of collection unknown).

*Cyanolyca mirabilis* Nelson. White-throated Jay.

Permanent resident in the Interior Region in Sierra de Miahuatlán and Sierra de Yucuyacua, occurring in humid pine-oak forest and probably cloud forest. Recorded in only three localities, the easternmost in total range of species, as follows: 1 mile north of San Andrés Chicahuaxtla at 8,000 feet elevation, where common; and at both Río Molino and "Río Guajolote," where very uncommon or rare. Breeding evidence: slightly enlarged follicle (3.5 mm); range, habitat, and dates. Elevations: 8,000 to 8,500 feet (lower for Río Guajolote record but elevation of locality and exact point of collection uncertain).

*Cyanolyca nana* (DuBus). 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 is easternmost locality in entire range of species. Breeding evidence: prejuvenal. Elevations: 9,000 to 9,700 feet (perhaps lower at several localities where elevations at exact points of record are unknown).


Common permanent resident west of Isthmus in all Regions, occurring in arid temperate scrub, arid pine-oak forest, oak scrub, and peripheral portions of humid pine-oak forest.
Easternmost localities in entire range of species are Moctum, Cerro Zempoaltepec, a point 10 road miles southeast (specimen mislabeled "south") of El Camaron, and a point about 1 mile north of Rio Guajolote. Breeding evidence: prejuvenal. Elevations: 4,000 to 10,800 feet.


Fairly common permanent resident in Atlantic and Interior Regions in cloud forest and adjacent lower reaches of humid pine-oak forest of Sierra de Juárez and Sierra de Zempoaltepec. To be expected in cloud forest east of Isthmus. Breeding evidence: prejuvenal. Elevations: 4,100 to 5,250 feet (definitely higher at several localities where elevations at exact points of record are unknown).

*Cyanocitta stelleri* (Gmelin). Steller's Jay.

Common permanent resident in the Interior, occurring in highland pine forest, humid pine-oak forest, and upper reaches of arid pine-oak forest adjacent to humid pine-oak. No Oaxaca record east of Isthmus. Breeding evidence: enlarged follicle (16 mm). Elevations: 6,200 to 10,800 feet (probably lower at several localities where elevations at exact points of record are unknown).

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. Easternmost localities in total range of species are at points 38 road miles southwest of Valle Nacional and 5 road miles south of San Miguel Suchixtepec. Breeding evidence: active nest, condition unknown. Elevations: 7,600 to 9,700 feet.

*Parus wollweberi* (Bonaparte). Bridled Titmouse.

Uncommon permanent resident in arid pine-oak forest in Pacific Region in Sierra de Yucuyacua (down to at least 6,400 feet elevation) and throughout the Interior, occurring east to a point 3 miles south of Nejapa, the easternmost locality in entire range of species. Breeding evidence: nest with eggs. Elevations: 1,850 to 8,000 feet.

*Psaltriparus minimus* (Townsend). Bushtit.

Permanent resident in Pacific Region west of Isthmus and in the Interior, 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. Breeding evidence: nest with eggs. Elevations: 5,800 to 9,700 feet (probably lower at several localities where elevations at exact points of record are unknown).

I consider *P. melanotis* (Hartlaub) conspecific with *minimus*. The race inhabiting Oaxaca is *P. minimus melanotis*.
A PRELIMINARY SURVEY OF THE AVIFAUNA OF THE
MEXICAN STATE OF OAXACA

Volume 2

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Zoology and Physiology

by

Laurence Charles Binford
B.S., University of Michigan, 1957
August, 1968

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Family SITTIDAE

*Sitta carolinensis* Latham. White-breasted Nuthatch.

Uncommon permanent resident in the Interior (except in mountains bordering Atlantic lowlands) in pine-oak forests east to La Parada and Río Molino, the southeasternmost localities in entire range of species. Breeding evidence: adult attending "fully-fledged juvenile" (Rowley, 1966: 172); soft egg in oviduct (*ibid.*); range, habitat, and dates. Elevations: 6,400 to 7,600 feet (probably higher on Cerro San Felipe but elevation at exact point of collection unknown).

Family CERTHIDAE


Uncommon permanent resident in humid pine-oak forest of Interior Region. Breeding evidence: adult feeding "fully-fledged juvenile" (Rowley, 1966: 173); inactive nest (*ibid.*); adult carrying presumed nest material (*ibid.*); enlarged testes (7 x 4 mm). Elevations: 6,300 to 9,700 feet (record for Totontepec perhaps lower but elevation at exact point of collection unknown).

Family CINCLIDAE

*Cinclus mexicanus* Swainson. American Dipper.

Very uncommon and local permanent resident in the Interior in Sierra de Zempoaltepec and in Pacific Region in...
Sierra de Miahuatlán, occurring along rushing mountain streams in humid pine-oak forest; recorded only in May and November and only at Río Jalatengo, Río Molino, and Totontepec. Breeding evidence: nest with young. Elevations: 4,500 to 7,300 feet.

Family TROGLODYTIDAE


One record, the southernmost for the species, a male (10.5 grams, little fat, skull completely ossified, testes 1 x 1 mm, molting) taken by Binford on 17 February 1964 at the weedy edge of a small pond situated in savanna within tropical deciduous forest in Pacific Region at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande. Probably a very rare winter resident in marshes west of Isthmus.


Common permanent resident in the Interior in humid pine-oak forest of Sierra Aloapaneca, Sierra de Juárez, and Sierra de Zempoaltepec, occurring east to Cerro Zempoaltepec, the easternmost locality in entire range of species. Breeding evidence: female specimen with one ruptured follicle and one enlarged follicle (11 mm). Elevations: 9,000 to 9,700 feet (probably lower at several localities where elevations at exact points of record are unknown).
Campylorhynchus zonatus (Lesson). Band-backed Wren.

Fairly common permanent resident in Atlantic Region in scrubby openings within tropical evergreen forest, occurring south in Isthmus to Chivela. Breeding evidence: prejuvenal. Elevations: 100 to 2,600 feet.

Campylorhynchus rufinucha (Lesson). Rufous-naped Wren.

Very common permanent resident in tropical deciduous forest and arid tropical scrub of entire Pacific Region, occurring northwest in Río Tehuantepec basin to San Juan del Río and a point 2 road miles northwest of San Pedro Totolapan and extending north in Isthmus to Chivela. Only definitely recorded race is C. r. humilis Sclater. Extension of range of C. r. rufinucha into Oaxaca apparently erroneous, being based on records from Playa Vicente (a town actually in state of Veracruz) and "Juquila" [=Santa Catarina Juquila] (P. L. Sclater, 1859b: 371), the latter a Boucard locality in southern Oaxaca within range of humilis; specimen from Santa Catarina Juquila should be reexamined if still in existence. Breeding evidence: nest with young. Elevations: sea level to 3,200 feet.

Campylorhynchus jocosus Sclater. Spotted Wren.

Permanent resident in the Interior, common in arid temperate scrub, uncommon in oak scrub and arid pine-oak forest, and of unknown abundance at "San Juan Bautists Cuicatlán" in arid tropical scrub, where its presence probably results from lack of competition with C. rufinucha.
Very uncommon permanent resident down to 6,250 feet elevation in Pacific Region in semiarid pine-oak forest of Sierra de Miahuatlán and Sierra de Yucuyacua. Easternmost localities in entire range of species are Ixtlán de Juárez and points 4 road miles southeast of Santiago Matatlán and 13 road miles south of San Miguel Suchixtepec. Breeding evidence: prejuvenal. Elevations: 5,050 to 8,500 feet (record for San Juan Bautista Cuicatlán much lower but elevation at exact point of collection unknown).

*Thryothorus modestus* Cabanis. Plain Wren.

Common in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas at a point 12 airline miles north-northeast of Zanatepec, where presumably a permanent resident. Recorded by Morony and Binford in 1964 as follows: 7 April, three birds seen; 8 April, seven seen, of which two were collected by Binford at 4,900 feet elevation (male, 21.3 grams, little fat, skull completely ossified, testes 4 x 3 mm; female, 17.4 grams, little fat, follicles not enlarged); 12 April, eight seen. Breeding evidence: range, habitat, and probably dates. Elevations: 4,400 to 4,900 feet.


Very common in Pacific Region in scrub situations within tropical semideciduous forest and tropical deciduous forest at points 1 mile east and 6 miles northeast of Putla de Guerrero, the southeasternmost localities in entire range of
species; presumably a permanent resident but recorded only in May and December. Breeding evidence: nest under construction. Elevations: 2,400 to 3,000 feet.

In 1964 Morony and I found the Bar-vented Wren to be one of the most common species in the valley of Putla de Guerrero. On 21 May we say 26 individuals, of which 10 were collected, as follows: three females weighing 15.4, 16.9, and 17.7 grams 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 grams and possessing testes measuring from 11 x 7 to 8 x 4 mm; all ten specimens had little fat and completely ossified skulls. On the same date I observed two nests under construction; in one case a male was collected just after it added a piece of lining material to a nearly completed nest; in the other case two adults, presumably male and female, were observed adding material to a nest in an early stage of construction. The next day Morony and I observed ten birds, of which one male was collected (20.0 grams, little fat, skull completely ossified, testes 8 x 4 mm, Binford). On 23 May at a point 6 road miles northeast of Putla de Guerrero we saw four Bar-vented Wrens. The only other record for Oaxaca is a specimen in the possession of R. W. Dickerman (in litt.) taken by his assistants at Putla de Guerrero on 17 December 1965.

**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, occurring northwest in Río Tehuantepec basin to "San Juan del Río" and a point 2 road miles northwest of San Pedro Totolapan and north in Isthmus to Guichicovi. Breeding evidence: prejuvenal. Elevations: sea level to 4,900 feet (record for San Juan del Río perhaps higher but elevation at exact point of collection unknown).

**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 11 road miles north of San Pedro Pochutla, the easternmost localities in entire range of species. Breeding evidence: nest with eggs. Elevations: sea level to 4,900 feet.

**Thryothorus maculipectus** Lafresnaye. Spot-breasted Wren.

Common permanent resident of Atlantic Region in tropical evergreen forest, occurring south in Isthmus to Escuilapa and Santo Domingo Petapa. Breeding evidence: prejuvenal. Elevations: 100 to 4,100 feet.

**Thryomanes bewickii** (Audubon). Bewick's Wren.

Fairly common permanent resident in the Interior in arid temperate scrub, oak scrub, and adjacent portions of arid pine-oak forest, occurring east to a point 5 road miles northwest of San Pedro Totolapan, the easternmost point in total range of species. Breeding evidence: prejuvenal. Elevations: 3,200 to 7,000 feet.
Troglodytes aedon Vieillot. Northern House-Wren.

T. a. brunneicollis Sclater. Common permanent resident in the Interior in humid pine-oak forest and adjacent semi-arid pine-oak forest, recorded east to Cerro Zempoaltepec and Río Molino, the easternmost points in total breeding range of species. Breeding evidence: nest with eggs. Elevations: 6,500 to 9,700 feet (record for Totontepec perhaps lower but elevation at exact point of collection unknown; elevation of 10,000 feet at La Parada (Salvin and Godman, 1879–1904 [1880]: 103) is erroneous.

T. a. parkmanii Audubon. Uncommon winter resident in Atlantic Region in tropical evergreen forest and in the Interior in arid temperate scrub, occurring east to Moctum and Rancho Las Animas, the southeasternmost localities in total range of race. Should be sought in lower portions of Pacific region south of Sierra de Yucuyacua and Sierra de Miahuatlán. Dates: 7 October to 14 March. Elevations: 250 to 6,000 feet.

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. See T. musculus for additional comments concerning this complex.

Troglodytes musculus Naumann. Southern House-Wren.

Uncommon permanent resident, recorded only in Atlantic
Region at Amatepec, Moctum, and Totontepec and in the Interior at Capulalpan, these localities apparently being northwestern-most in entire range of species; habitat unknown but probably brushy clearings. Breeding evidence: range, dates, and probably habitat. Elevations: exact elevations of town or points of collection unknown.

I have examined Oaxaca specimens of the Southern House-Wren from the following localities: Amatepec (male, USNM 462879, Avilés, 9 May 1949); Moctum (two females, 2 October and 20 December, respectively MLZ 38346 and 38334; and five males, 16 and 19 September, 21 November, and 9 and 15 December, respectively MLZ 38355, 38356, 38337, 38360, and 38362; all collected by Avilés in 1941); and Totontepec (one female, 14 July 1894, USNM 143039, Nelson and Goldman; and one female, 30 April, MLZ 38335, and one male, 8 April 1942, MLZ 38401, both collected by Avilés in 1942). P. L. Sclater (1862: 18) lists the localities "Capulalpam" [=Capulalpan] and Totontepec, presumably on the basis of specimens (some of which may still be in the British Museum). Baird (1864-1872 [1864]: 142) records a specimen (male, January 1858, USNM 29710, received from Sallé) that possibly is one of the same birds examined by P. L. Sclater (ibid.).

Several authorities (see Paynter, 1957, and Lanyon, 1960) have suggested merging T. musculus with T. aedon, pointing out that brunneicollis, known to interbreed with aedon, bridges the gap between phenotypes. However, because isolating mechanisms in wrens are often based on behavior
and voice rather than phenotype, I prefer to maintain *musculus* as a distinct species pending a thorough field study. Such study could be made either near Totontepec, where *brunneicollis* and *musculus* apparently 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). These are the only localities from which both species have been recorded.

On the other hand, I must question the statement by Miller, Friedmann, Griscom, and Moore (1957: footnote, p. 162) that "... *brunneicollis* and *musculus* are strongly differentiated where they closely approach geographically in the uplands of Oaxaca. ..." While such appears to be the case when one compares adult *musculus* 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. The collection of the Moore Laboratory of Zoology contains two *musculus* and two *brunneicollis* from Totontepec. The specimens of *brunneicollis* (MLZ 38372 and 39557), the only examples of this species known from Totontepec, are both in juvenal plumage, and while they appear to be typical of that form, they cannot be used for comparison with adult *musculus*. Of the two *musculus*, one (MLZ 38401) appears typical in all respects, comparing minutely with Tabasco specimens of the race *intermedius* Cabanis. The other specimen of *musculus* from Totontepec, however, is unusual in being very 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 musculus and the yellow-brown of brunneicollis. This unusual specimen indicates the need for additional study of this interesting wren complex.

**Henicorhina leucosticta** (Cabanis). White-breasted Wood-Wren.

Common permanent resident in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to Guichicovi. Occurs side-by-side with H. leucophrys at a point at 4,100 feet elevation 15 road miles southwest of Valle Nacional. Breeding evidence: "nestling" (Lamb specimen label); enlarged testes (5 x 3 mm). Elevations: 250 to 4,100 feet.

**Henicorhina leucophrys** (Tschudi). Gray-breasted Wood-Wren.

Common permanent resident in all Regions in cloud forest and humid pine-oak forest. Breeding evidence: nests (dormitory?) observed (Rowley, 1966: 178); female collected with plant down in bill (ibid.); enlarged testes (6 x 3 mm). Elevations: 4,100 to 9,700 feet. See H. leucosticta.

**Uropsila leucoqastra** (Gould). White-bellied Wren.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest, recorded south in Isthmus to a point 8 miles north of Matías Romero. Breeding evidence: prejuvenal. Elevations: 100 to 300 feet (record for Tutla perhaps higher but elevation of town and exact point of collection unknown).
Salpinctes obsoletus (Say). Rock Wren.

Uncommon permanent resident in the Interior in arid temperate scrub and steppe. Two records for lowlands, single specimens taken in Pacific Region 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). Breeding evidence: "laying" (Lamb specimen label); slightly enlarged follicle (2 mm); moderately enlarged testes (5 x 4 mm); range, habitat, and dates. Elevations: 5,050 to 7,300 feet (record for Rancho de Cacoprieto much lower but elevations of ranch and exact point of collection unknown).

Catherpes mexicanus (Swainson). Canyon Wren.

Fairly common permanent resident in Pacific Region southwest of San Andrés Chicahuartla, throughout Interior, and from Interior east through Río Tehuantepec basin and Isthmus mountains into Pacific foothills of Sierra Madre de Chiapas, occurring in hilly, arid, rocky situations within oak scrub, arid temperate scrub, arid tropical scrub, and arid pine-oak forest adjacent to the first three habitats. Breeding evidence: nest with young. Elevations: 800 to 6,400 feet (record for La Parada perhaps higher but elevation at exact point of collection unknown).

Hylorchilus sumichrasti (Lawrence). Slender-billed Wren.

Rare permanent resident in heavy tropical evergreen forest of extreme northwestern portion of Atlantic Region,
recorded only at San Miguel Soyaltepec (female, MLZ 31790, 6 November 1943, Avilés) and on an island 5 miles west of Temascal (two seen, 8 June 1964, Morony and Binford); L cannot locate a second specimen from San Miguel Soyaltepec said by Miller, Friedmann, Griscom, and Moore (1957: 169) to be in the Moore Laboratory of Zoology. Breeding evidence: range, habitat, and dates. Elevations: 250 feet; elevation of 600 meters (1,968 feet) given on Avilés specimen label probably much too high.

Family MIMIDAE

**Toxostoma ocellatum** (Sclater). Ocellated Thrasher.

Uncommon permanent resident in the Interior in oak scrub, in bushy areas within arid pine-oak and adjacent humid pine-oak forests, and in arid temperate scrub adjacent to first two habitats, occurring east to La Cumbre, "San Pablo Villa de Mitla," and a point 4 road miles east of Santiago Matatlán, the southernmost localities in entire range of species. Breeding evidence: "eggs laid" (Lamb specimen label); range, habitat, and dates. Elevations: 6,000 to 9,000 feet (records for San Pablo Villa de Mitla and Oaxaca City perhaps lower but elevations at exact points of collection unknown).

**Toxostoma curvirostre** (Swainson). Curve-billed Thrasher.

Common permanent resident in the Interior, occurring in arid tropical scrub in valley of San Juan Bautists Cuicatlán.
and throughout arid temperate scrub. Recorded east to a point at 3,200 feet elevation 2 road miles northwest of San Pedro Totolapan, the easternmost definite locality in entire range of species. Occurrence in Atlantic Region at Moctum (female specimen, MLZ 35520, 17 September 1941, Avilés) requires confirmation. Breeding evidence: prejuvenal. Elevations: 3,100 to 7,000 feet (record for San Juan Bautista Cuicatlán perhaps lower but elevation at exact point of collection unknown).

**Melanotis caerulescens** (Swainson). Blue Mockingbird.

Permanent resident west of Isthmus, common in Pacific Region in tropical semideciduous and cloud forests and in the Interior in oak scrub, arid temperate scrub adjacent to oak scrub, humid pine-oak forest, and brushy, arid pine-oak forest and uncommon and local in Atlantic Region in cloud forest (Moctum and Totontepec). Very rare winter visitant in lowlands of Atlantic Region in tropical evergreen forest (one record, male, 59.6 grams, testes tiny, 300 feet elevation 1 mile southwest of Valle Nacional, Wolf). Recorded east to Moctum and Zapotitlán, the easternmost localities in entire range of species. Breeding evidence: nest with young. Elevations: 300 feet; 2,400 to 9,700 feet.

**Dumetella carolinensis** (Linnaeus). Common Catbird.

Winter resident, fairly common in Atlantic Region in tropical evergreen forest and uncommon in Pacific Region in humid gallery forest of foothills of Sierra Madre de Chiapas.
(Santa Efigenia). Dates: 8 October to 20 April. Elevations: 200 to 800 feet (higher for Totontepec record but elevation at exact point of collection unknown).

*Mimus polyglottos* (Linnaeus). Common Mockingbird.

Uncommon permanent resident in the Interior in arid temperate scrub, adjacent oak scrub, and perhaps arid tropical scrub, breeding east at least to a point 4 road miles east of Santiago Matatlán. Hybrid between *M. polyglottos* and *M. gilvus* (male specimen, USNM 142603, San Mateo del Mar, 15 May 1895, Nelson and Goldman) indicates status as a rare permanent resident on Pacific side of Isthmus, but pure *polyglottos* apparently unrecorded in Isthmus during breeding season. Breeding range of species apparently ends at Isthmus of Tehuantepec. Very uncommon winter resident (24 February to 9 March 1961) in Atlantic Region in open scrubby areas within tropical evergreen forest southeast to a point 1 mile southwest of Valle Nacional and in Pacific Region in tropical deciduous forest (two records: female, 43.9 grams, little fat, ovary very small, skull completely ossified, 16 road miles northwest of Puerto Escondido 6 March 1964, Morony; and female, MLZ 45418, Rancho Las Animas, 3,000 feet elevation, 16 February 1947, Lamb). Uncommon winter resident (29 October to 11 March) in arid tropical scrub on Pacific side of Tehuantepec region from Chivela and Tehuantepec City east to Tapanatepec. Breeding evidence: nest with one egg (4 road miles east of Santiago Matatlán, 27 May 1964,
Binford); nest under construction (3 road miles southeast of Santiago Matatlán, 10 April 1961, Binford). Elevations: sea level to 6,100 feet.

Wetmore (1943: 302-303) discusses interbreeding between *M. polyglottos* and *M. gilvus* in the Isthmus of Tehuantepec but considers the crosses to be hybrids rather than intergrades and treats the two forms as separate species. Phillips (1962b: 346-347), on the other hand, merges the two forms on the basis of what he considers to be close similarity in morphology, songs, calls, and habits. I have seen only one definite hybrid from Oaxaca, the specimen from San Mateo del Mar mentioned above. Three specimens of *gilvus* from Tehuantepec City (USNM) exhibit minor characters that possibly are attributable to hybridization but may 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 are "forced" to 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 Niltepec west to Tehuantepec City and Chivela and very rare in openings within tropical evergreen forest in Atlantic Region (one record, male, AMNH 787562, testes 4 x 2 mm, little fat, near Mogoñé, 20 May 1962, Schaldach). Northwestern limit of total range of species is in Isthmus of Tehuantepec. Breeding evidence: prejuvenal. Elevations: sea level to 700 feet. See M. polyglottos.

**Family TURDIDAE**

**Turdus migratorius** Linnaeus. American Robin.

Fairly common permanent resident in humid and semiarid pine-oak forests of Interior, breeding east to Cerro Zempoaltepec and the region of San Miguel Suchixtepec, the easternmost breeding localities in entire breeding range of species. Numbers augmented by winter residents from north. Should be sought east of breeding range during winter. Breeding evidence: nest with eggs. Elevations: 6,000 to 9,700 feet.

**Turdus rufopalliatus** Lafresnaye. Rufous-backed Robin.

Common permanent resident west of Isthmus in tropical deciduous forest, arid tropical scrub, and humid gallery
forest, occurring in three disjunct populations, as follows: in the Interior at Teotitlán del Camino; 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. Two Interior populations apparently extend into Oaxaca from Balsas basin. Records for tropical evergreen forest at points 18 and 24 road miles north of Matías Romero (females; ovaries not enlarged; AMNH 776113, 14 March 1961; and AMNH 778379-778380, 22 March 1962; Schaldach) probably represent rare winter visitants. Oaxaca is easternmost extension of entire range of species. Breeding evidence: adults observed feeding prejuvenals; nest with eggs. Elevations: sea level to 6,000 feet.

_Turdus assimilis_ Cabanis. White-throated Robin.

Permanent resident in all Regions, very common in cloud forest, common in tropical evergreen forest above 1,900 feet and in tropical semideciduous forest, and rare in humid pine-oak forest (one record, female, USNM 142509, Cerro San Felipe, 23 June 1894, Nelson and Goldman). Uncommon winter resident or winter visitant in tropical evergreen forest from 1,900 to 250 feet elevation. Breeding evidence: prejuvenal. Elevations: 250 to 8,000 feet.


Common permanent resident in Atlantic Region in tropical evergreen forest, in Pacific Region in foothills of Sierra
Madre de Chiapas in humid gallery forest, and in the Interior in unknown habitat at Teotitlán del Camino, the last population probably an extension from Atlantic Region via Río Santo Domingo valley. Absent from Pacific Region west of Isthmus. Breeding evidence: prejuvenal. Elevations: 100 to 3,100 feet.

*Turdus infuscatus* (Lafresnaye). Black Robin.

Fairly common permanent resident in all Regions, occurring in cloud forest and humid pine-oak forest. Breeding evidence: prejuvenal. Elevations: 4,900 to 9,700 feet (record for Moctum perhaps slightly lower but elevations of town and exact point of collection unknown).


Permanent resident above 4,350 feet elevation, common in Pacific Region in tropical semideciduous forest of Sierra Madre de Chiapas and humid pine-oak forest of Sierra de Miahuatlán, fairly common in the Interior in humid and semi-arid pine-oak forests, and uncommon in Pacific and Interior Regions in arid pine-oak forest throughout state; visitant and perhaps a breeding bird in cloud forest and tropical semideciduous forest adjacent to pine-oak forest in Sierra de Miahuatlán; recorded in Atlantic Region in unknown habitat (cloud forest or humid pine-oak forest?) at Moctum and Totontepec. Breeding evidence: adult observed attending prejuvenal; nest with young. Elevations: 4,350 to 9,700 feet.
Myadestes unicolor Sclater. Slate-colored Solitaire.

Common permanent resident in Atlantic Region, breeding in cloud forests and adjacent upper limits of tropical evergreen forest and wintering in breeding range and down to lower elevations in tropical evergreen forest. Record from Zapotitlán (Sumichrast, 1881: 241) doubtless erroneous and probably pertains to M. obscurus, a species not listed by Sumichrast. Breeding evidence: nest with eggs. Elevations: breeds from 2,600 to 5,250 feet; winters down to 1,900 feet.

Hylocichla mustelina (Gmelin). Wood Thrush.

Fairly common winter resident in Atlantic Region in tropical evergreen forest and in Pacific Region in Sierra Madre de Chiapas in tropical semideciduous forest. 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 in cloud forest of Sierra Madre de Chiapas. Dates: 10 October to 6 April. Elevations: 100 to 4,900 feet.

Catharus guttatus (Pallas). Hermit Thrush.

Very uncommon winter resident in the Interior in arid pine-oak forest at Llano Verde (Lamb) and in Sierra Aloapaneca and Sierra de Juárez. Recorded in Atlantic Region only at "Moctum," the easternmost locality for Oaxaca. To be expected in arid pine-oak forest elsewhere in state at least as a migrant. Sight record for Atlantic side of Isthmus (Graber and Graber, 1959: 75) retracted by authors (in litt.).
Specimens from "Rio Tonto" (Pardiñas, 1946: 218) should be reexamined before identification is accepted. Dates: 10 October to 27 April. Elevations: 5,700 to 9,300 feet (records for Moctum, Rio Tonto [see above], and San Pablo Villa de Mitla perhaps lower but elevations of first two localities and all three points of collection unknown).

I agree with Dilger (1956a, 1956b) that Nylocichla, with the exception of mustelina, should be merged with Catharus.

*Catharus ustulatus* (Nuttall). Swainson's Thrush.

Transient migrant, common in Pacific Region in humid gallery and cloud forests of Sierra Madre de Chiapas, fairly common in Pacific Region west of Isthmus in cloud forest, tropical semideciduous forest, and humid gallery forest, and uncommon in Atlantic Region in tropical evergreen forest. Rare winter resident, recorded only at Tutla in Atlantic Region (male, FM 119764, 1 February 1941, Avilés) and Santa Efígenia in Pacific Region (male, MLZ 47745, and female, MLZ 47880, 30 January 1948, Lamb) but should be sought throughout both of these Regions. Migration periods: 3 October to 1 November; 28 February to 2 May. Elevations: sea level to 5,000 feet.

*Catharus dryas* (Gould). Spotted Nightingale-Thrush.

Fairly common in Atlantic Region in cloud forest of Sierra Madre de Chiapas at a point 12 airline miles north-northeast of Zanatepec, the westernmost locality of record
in entire range of species and the only point I have visited in these mountains; presumably a permanent resident, although recorded only from 30 March to 10 April. Breeding evidence: range, habitat, and probably dates. Elevation: 4,900 feet.

In the spring of 1964 Morony and I recorded this species as follows: 30 March, two individuals seen, of which one was collected (male, 41.1 grams, black testes 4 x 2 mm, Binford); 31 March and 1 April, one seen each day; 4 April, two seen, of which one was collected (female, 35.9 grams, ovary slightly enlarged, but largest follicle only 1 mm, Binford); 5 April, two seen; 7 April, one collected (male, 35.8 grams, black testes 3 x 2 mm, Morony); 10 April, two seen. All specimens possessed little fat and completely ossified skulls.

*Catharus mexicanus* (Bonaparte). Black-headed Nightingale-Thrush.

Breeding bird in cloud forest of Atlantic Region, common in Sierra Madre de Chiapas at a point 12 airline miles north-northeast of Zanatepec and uncommon in Sierra de Juárez at points 17 (Vista Hermosa) and 15 road miles southwest of Valle Nacional; presumably a permanent resident but recorded only from 25 March to 21 June and not seen 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. Breeding evidence: enlarged testes (11 x 6 mm). Elevations: 4,100 to 5,250 feet.
In 1961 at a point 15 road miles southwest of Valle Nacional, Wolf and I saw two on 23 April and six on 24 April; two of the latter were collected and proved to be males with skulls completely ossified (32.2 grams, Binford, and 32.6 grams, Wolf). From 25 March to 10 April 1964 at a locality 12 airline miles north-northeast of Zanatepec, Morony and I recorded from 1 to 26 individuals daily. Four specimens were taken as follows: 26 March, one male (32.8 grams, skull completely ossified, Binford); 1 April, one male (33.1 grams, Binford) and one sex? (32.9 grams, Morony); 6 April, one male (34.1 grams, Binford). All five sexable specimens possessed little fat and greatly enlarged testes. The only other Oaxaca record of which I am aware is a female specimen (UK uncatalogued) taken by D. M. Power at 1600 meters (5,248 feet) elevation at Vista Hermosa on 21 June 1964.

Catharus occidentalis Sclater. Russet Nightingale-Thrush.

Common permanent resident in Pacific and Interior Regions in humid pine-oak forest, recorded east to Cerro Zempoaltepec and Río Molino, the easternmost localities in entire range of species, and in Atlantic Region in uncertain habitat at "Moctum" and Totontepec. Very rare winter visi­tant to lowlands of Atlantic Region in tropical evergreen forest (female, MLZ 31301, San Miguel Soyaltepec, 4 February 1944, Avilés). Sympatric with C. frantzii at Río Molino and at a point 10 miles northeast of Cerro San Felipe. Record
from Zapotitlan (Lawrence, 1876: 11) probably belongs there but may refer to \textit{C. frantzii}. Abundance ratings for \textit{C. occidentalis} and \textit{C. frantzii} tentative since the two species can seldom be separated in field; their ratings here based solely on specimens. Breeding evidence: prejuvenal. Elevations: breeds from 5,800 to 10,800 feet (record for Moctum perhaps lower but elevations of town and exact point of collection unknown); winters down to lower elevations (San Miguel Soyaltepec; elevation probably much lower than the 600 meters [1,968 feet] recorded on specimen label).

\textbf{Catharus frantzii} Cabanis. Ruddy-capped Nightingale-Thrush.

Uncommon permanent resident in cloud forest and humid pine-oak forest, recorded in Atlantic Region in Sierra Madre de Chiapas and Sierra de Juárez, in Pacific Region in Sierra de Miahuatlán, and in the Interior in Sierra Aloapaneca. Breeding evidence: "juvenile" attended by adults (Rowley, 1966: 185); nest with eggs. Elevations: 4,850 to 9,000 feet. See \textit{C. occidentalis}.

\textbf{Catharus aurantiirostris} (Hartlaub). Orange-billed Nightingale-Thrush.

Common permanent resident in all Regions of state, breeding in 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 temperate scrub. Breeding evidence: nest with eggs. Elevations: breeds from 3,700 to 7,300 feet; winters
(and breeds?) down to 250 feet.

**Ridgwayia pinicola** (Sclater). Aztec Thrush.

Very uncommon permanent resident in the Interior in broadleaved portions of humid pine-oak forest of Sierra de Miahuatlán and Sierra Aloapaneca, recorded in only four localities, as follows: near Río Molino, above La Cima, and at points 7 road miles south of San Miguel Suchixtepec and 10 miles northeast of Cerro San Felipe. Should be sought in similar habitats elsewhere west of Isthmus. Oaxaca localities are easternmost in entire range of species. Breeding evidence: nest with eggs. Elevations: 6,500 to 9,000 feet.

**Sialia sialis** (Linnaeus). Eastern Bluebird.

Fairly common permanent resident in Pacific Region west of Isthmus and in the Interior, occurring in highland pine forest and open, arid pine-oak forest. Numbers slightly augmented by winter residents from north. Should be sought east of Isthmus. Breeding evidence: active nest, condition unknown. Elevations: 2,900 to 9,300 feet (record for Cerro San Felipe probably higher but elevation at exact point of collection unknown).

**Family SYLVIIDAE**

**Polioptila caerulea** (Linnaeus). Blue-gray Gnatcatcher.

Common winter resident throughout lower portions of Atlantic and Pacific Regions, occurring in tropical evergreen
forest, tropical semideciduous forest, tropical deciduous forest, arid tropical scrub, and humid gallery forest. Fairly common permanent resident in the Interior in arid temperate scrub and in adjacent portions of oak scrub, juniper scrub, and arid pine-oak forest. No Interior record for any race other than permanent resident *nelsoni* Ridgway. No evidence that any race other than *nelsoni* breeds in the state, although *deppei* van Rossem might be expected in the Atlantic Region. Breeding evidence: nest with eggs. Extreme dates for known winter residents: 30 September to 24 March. Elevations: permanent residents (*nelsoni*) recorded from 3,200 to 6,300 feet; definite winter residents noted from sea level to 4,100 feet.


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 temperate scrub near Santiago Chazumba, occurring north in Isthmus to Chivela. Geographic points of continuity (if any) between populations in valley of San Juan Bautista Cuicatlán and in Pacific Region are uncertain; probably connected via Balsas basin, but perhaps continuous through Oaxaca Valley. Breeding evidence: pre-juvenal. Elevations: sea level to 6,100 feet. See *P. plumbea* below and *P. nigriceps* in Hypothetical List.
*Polioptila plumbea* (Gmelin). Tropical Gnatcatcher.

Rare permanent resident in tropical evergreen forest of lowlands on Atlantic side of Isthmus of Tehuantepec, recorded at only four localities, points 18, 24, and 28 road miles north of Matías Romero and at a point 1 mile south of Loseta. Breeding evidence: range, habitat, and dates. Elevations: 250 to 300 feet.

I have examined four specimens and made one additional observation of the Tropical Gnatcatcher, a species not heretofore reported for Oaxaca. In the Moore Laboratory of Zoology are two male specimens taken by Lamb along the Río Sarabia 18 road miles north of Matías Romero on 1 June (MLZ 59658) and 10 June (MLZ 59657) 1955. Graber and Graber (1959: 75) collected a male (7 grams, skull not completely ossified, testes very small, GMSC uncatalogued) near the junction of the Río Jumuapán (erroneously published as "Río Jaltepec") and the Trans-Isthmian Highway 1 mile south of Loseta (specimen labeled 22 miles south of Jesús Carranza, Veracruz). This specimen was erroneously reported as *P. albiloris*. Sight records by the Grabers, published as "*P. albiloris* or *P. caerulea,*" doubtless represent a composite including *plumbea* and *caerulea*. On 28 March 1962 at Montebello, Schaldach took a female *plumbea* (skull ossified, ovary not enlarged, AMNH 778378). The only other record is my sighting of a single bird on 4 June 1964 at a point 28 road miles north of Matías Romero.
Ramphocaenus rufiventris (Bonaparte). Long-billed Gnatwren.

Fairly common permanent resident in Atlantic Region in dense scrub of tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to Escuilapa and a point 8 miles north of Matías Romero. Breeding evidence: slightly enlarged follicle (2 mm); greatly enlarged testes (Schaldach specimen label); range, habitat, and dates. Elevations: 250 to 1,900 feet.


One record, a male (USNM 148857) taken by Boucard in the Interior at "la Parada" [=La Parada] (town at 7,900 feet but elevation at exact point of collection unknown). Status uncertain; possibly a very rare permanent resident in fir forests throughout state.

Regulus calendula (Linnaeus). Ruby-crowned Kinglet.

Winter resident in Atlantic Region west of Isthmus and in the Interior, common in pine-oak forests (especially humid portions), uncommon in cloud forest and rare in tropical evergreen forest. Should be sought east of Isthmus and in Pacific Region. Dates: 10 October to 1 May. Elevations: 250 to 9,300 feet.

Family MOTACILLIDAE

Anthus spinoletta Linnaeus. Water Pipit.

Winter resident in savannas of Pacific and Interior
Regions, generally very uncommon but found to be common in February 1964 at a point 9 road miles 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, since 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 about 5,400 feet (San Pablo Villa de Mitla; town at 5,412 feet but elevation at exact point of collection unknown).

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 26 May. Elevations: sea level to 8,600 feet.

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 feet elevation in pine-oak forest and juniper scrub and occasionally wandering into both oak scrub and arid temperate scrub of Interior. Breeding evidence: nest with young. Elevations: 4,800 to 9,700 feet.
**Phainopepla nitens** (Swainson). Phainopepla.

Occurs in arid temperate scrub of extreme northwestern portion of Interior, where probably an uncommon and regular winter resident but possibly a permanent resident. Oaxaca records represent southeastern limits of entire range of species. Recorded by the Berretts and Binford in 1961 at a point at 6,100 feet elevation 34 road miles north-northeast of Huahuapan de León (about 3 miles northeast of Santiago Chazumba), as follows: 22 September, 12 seen, of which one male was collected (29.1 grams, little fat, skull completely ossified, testes small, Binford); 23 and 24 September, 2 seen each day. Record from "Tehuantepec (State of Puebla, near Mexico)" (Sumichrast, 1869: 548) apparently does not pertain to Oaxaca. Occurrence at San Pablo Villa de Mitla (ten specimens, MLZ, Avilés) questionable in view of erroneous locality data on other Avilés specimens supposedly taken at "Mitla."

**Family LANIIDAE**

**Lanius ludovicianus** Linnaeus. Loggerhead Shrike.

Winter resident, fairly common in the Interior in arid temperate scrub, arid tropical scrub, savanna, and cultivated land and uncommon in lowlands of Pacific Region in arid tropical scrub and savanna, occurring east to La Ventosa and Tehuantepec City, the easternmost localities in entire range of species. Uncommon permanent resident in the Interior in
arid temperate scrub and adjacent savanna and cultivated land, breeding east of a point 4 road miles east of Santiago Matatlán. Breeding evidence: range, habitat, and dates. Elevations: breeds from 5,000 to 7,900 feet; winters down to 100 feet.

**Family CYCLARHIDAE**

*Cyclarhis gujanensis* (Gmelin). Rufous-browed Peppershrike.

Uncommon permanent resident in Atlantic Region in scrub at edges of tropical evergreen forest, occurring south in Isthmus to Almoloya and a point 8 miles south of Matías Romero. Breeding evidence: enlarged testes (7 x 5 mm). Elevations: 100 to 1,500 feet (records for Amatepec and Lacova perhaps higher but elevations of towns and exact points of collection unknown).

**Family VIREOLANIIDAE**

*Vireolanius melitophrys* Bonaparte. Chestnut-sided Shrike-Vireo.

Uncommon permanent resident in Pacific Region west of Isthmus and in the Interior, occurring in oaks of humid pine-oak forest. Breeding evidence: prejuvenal; nest of species unknown. Elevations: 4,350 to 9,000 feet.
Smaragdolanius pulchellus (Sclater and Salvin). Green Shrike-Vireo.

Common permanent resident in Atlantic Region in cloud forest and tropical evergreen forest, recorded northwest to San Miguel Soyaltepec and south in Isthmus to Escuilapa. Breeding evidence: enlarged testes (11 x 8 mm). Elevations: 250 to 4,850 feet.

Family VIREONIDAE


Two specimens examined; also one sight record. Status uncertain; occurs in Pacific Region in tropical semideciduous forest of Sierra de Miahuatlán, where apparently a rare winter resident. A. R. Phillips (*in litt.*) informs me that he saw a single bird on 15 December 1966 at "Copalita" (town at 2,100 feet but elevation at exact point of observation unknown). The only other Oaxaca records are two adult females taken by Phillips 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 feet).

Vireo griseus Boddaert. White-eyed Vireo.

Winter resident, fairly common in Atlantic Region in tropical evergreen forest and uncommon in Pacific Region in tropical deciduous forest of foothills of Isthmus mountains.
and Sierra Madre de Chiapas from Chivela and a point 4 kilometers (2.5 miles) south of Chivela east at least to Santa Efigenia. Dates: 16 November to 22 March. Elevations: 100 to 1,900 feet.

**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 miles northeast of Cerro San Felipe. Breeding evidence: range, habitat, and dates. Elevations: 6,400 to 10,800 feet (records for Moctum and Totontepec perhaps lower but elevations of former town and both points of collection unknown).

**Vireo hypochryseus** Sclater. Golden Vireo.

Permanent resident west of Isthmus, common in Pacific Region in tropical semideciduous forest and uncommon in Pacific Region in tropical deciduous forest and in the Interior in arid tropical scrub, occurring east to Guelatao, Rancho Las Animas, and a point 3 road miles north of Pluma Hidalgo, the easternmost points in entire range of species. Unrecorded in Oaxaca Valley. Reaches Rancho Las Animas probably from southeast and enters valley at San Juan Bautista Cuicatlán and region of Tamazulapan del Progreso probably from Balsas basin. Breeding evidence: nest with young. Elevations: 100 to 6,300 feet.
**Vireo nelsoni** Bond. Dwarf Vireo.

Very uncommon breeding bird of Interior in arid temperate scrub in vicinity of Tamazulapan del Progreso, the eastern-most locality in entire range of species; presumably a permanent resident but recorded only from 1 June to 22 July. Should be sought in arid temperate scrub throughout Interior. Perhaps winters at elevations higher than those on breeding grounds (Phillips, 1962a: 308). Breeding evidence: nest with one egg. Elevation: 6,000 feet.

**Vireo bellii** Audubon. Bell's Vireo.

Winter resident, fairly common in Pacific Region in tropical deciduous forest and arid tropical scrub and rare in the Interior in arid temperate scrub (Huajuapan de León and Guelatao) and in Atlantic Region in tropical evergreen forest (points 1 mile southwest of Valle Nacional and 18 road miles north of Matías Romero). Dates: 24 September to 29 April. Elevations: sea level to 6,300 feet.

**Vireo flavifrons** Vieillot. Yellow-throated Vireo.

Uncommon winter resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semi-deciduous forest and adjacent humid gallery forest in lower portions of Sierra de Miahuatlán (Finca Mercedes and a point 11 road miles north of San Pedro Pochutla) 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, presumably in tropical deciduous forest or arid

**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 humid gallery forests of foothills of Sierra Madre de Chiapas and uncommon throughout Interior and remainder of Pacific Region in virtually all forest and scrub habitats. Uncommon permanent resident in the Interior in arid pine-oak forest and oak scrub, occurring east to a point 4 road miles east of Santiago Matatlán. Should be sought as a permanent resident east of Isthmus. Breeding evidence: nest with young. Extreme dates for known winter residents: 6 September to 4 May. Elevations: sea level to 9,300 feet.

**Vireo flavoviridis** (Cassin). Yellow-green Vireo.

In general a very common, and locally an abundant, summer resident, occurring in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical deciduous forest, mangrove swamp, and lower reaches of tropical semideciduous forest. Breeding evidence: prejuvenile. Dates: 29 March to 8 October. Elevations: sea level to 3,000 feet.

**V. olivaceus** (Linnaeus), unrecorded in Oaxaca, is considered by many to be conspecific with flavoviridis. Among members of the Vireonidae, however, general similarity in morphology or voice is not always adequate evidence for
conspecificity; compare, for example, *V. olivaceus* and *V. altiplanatus* (Vieillot). Pending a thorough study of isolating mechanisms, I prefer to retain *flavoviridis* and *olivaceus* as distinct species.

*Vireo philadelphicus* (Cassin). Philadelphia Vireo.

One record, a female (HC 3707) collected by Lamb on 26 April 1956 in Atlantic Region at a point on the Río Sarabia 18 road miles north of Matías Romero; elevation given on label as 400 feet but probably closer to 262 feet. Status uncertain; probably a very rare transient migrant.

*Vireo gilvus* (Vieillot). Warbling Vireo.

Common spring transient migrant in Atlantic Region in tropical evergreen forest. Fairly common transient migrant and winter resident throughout remainder of state, occurring in virtually all forest and scrub habitats. Uncommon permanent resident in pine-oak forests of Interior and in unknown habitat in Atlantic Region ("Moctum"); easternmost breeding localities in total range of species are "Moctum" and San Pablo Villa de Mitla. Breeding evidence: nest with young. Extreme dates for known winter residents: 12 October to 20 April. Migration period in Atlantic Region: 23 March to 20 April. Elevations: permanent residents recorded from about 4,600 feet (Moctum, exact elevations of town and point of collection uncertain) to 7,000 feet; winter residents and transient migrants recorded from sea level to 6,500 feet.

Fairly common presumptive permanent resident in Atlantic Region in cloud forest of Sierra Madre de Chiapas at a point at 4,900 feet elevation 12 airline miles north-northeast of Zanatepec, the only locality I have visited in these mountains; recorded there by Binford in 1964 as follows: 25 March, male specimen (12.8 grams, testes 7 x 3 mm); 26 March, female specimen (12.2 grams, follicles not enlarged); 30 March, male specimen (13.4 grams, testes 7 x 3 mm); 7 and 8 April, one seen each day. All specimens possessed little fat and completely ossified skulls. Should be sought in cloud forest of Atlantic Region west of Isthmus. Breeding evidence: enlarged testes (7 x 3 mm); range, habitat, and probably dates.

This species may well prove to be conspecific with *V. gilvus* and is so treated by some authors. However, because of differences in song and morphology between the two forms, together with the peculiar total distributional pattern exhibited by *leucophrys*, I prefer to recognize two species pending a thorough study.

*Neochloe brevipennis* Sclater. Slaty Vireo.

Very uncommon permanent resident in Atlantic Region west of Isthmus and in the Interior, occurring in oak scrub and in undergrowth of pine-oak forests and recorded east to "Moctum" and points near La Cima and 4 road miles east of Santiago Matatlán, the easternmost localities in entire
range of species. Breeding evidence: prejuvenile; nest with
eggs. Elevations: 5,800 to 6,100 feet; elevations unknown
at exact points of collection of Moctum and Totontepec
specimens; elevation of 2,100 meters (6,888 feet) given for
Amatepec specimens (Briggs, 1953: 157) is questionable.

**Hylophilus ochraceiceps** Sclater. Tawny-crowned Greenlet.

Fairly common permanent resident in Atlantic Region in
heavy tropical evergreen forest, recorded west to "Tutla"
and south in Isthmus to "Escuilapa." Records (cotypes of
species) from Playa Vicente, "Oaxaca" (Sclater, 1859b: 375)
pertain to Veracruz; the type locality should be so amended.
Breeding evidence: enlarged testes (6 x 3 mm). Elevations:
250 to 300 feet (records for Escuilapa and Tutla perhaps
higher but elevations of towns and exact points of collection
unknown).

**Hylophilus decurtatus** (Bonaparte). Gray-headed Greenlet.

Common permanent resident in Atlantic Region in tropical
evergreen forest and in Pacific Region in humid gallery
forest along foothills of Sierra Madre de Chiapas from above
Zanatepec east to Santa Efigenia. Breeding evidence:
enlarged testes (6 x 5 mm). Elevations: 250 to 4,100 feet.
Family COEREVIDAE

Diglossa baritula Wagler. Cinnamon-bellied Flower-piercer.

Fairly common permanent resident in humid pine-oak and cloud forests throughout state. Winter occurrence at low elevation in Atlantic Region (four specimens, San Miguel Soyaltepec, "600 meters," 16 and 17 January and 7 and 16 February 1944, MLZ 31674, 31272, 31521, and 31255, respectively, Avilés) needs confirmation in view of known inaccuracies in localities and elevations on Avilés labels. Breeding evidence: enlarged testes (7 x 4 mm). Elevations: 4,100 to 9,300 feet; see also above.

*Chlorophares spiza (Linnaeus). Green Honeycreeper.

Presumably, a rare permanent resident in tropical evergreen forest of Atlantic Region from Isthmus eastward. One certain record, a male (AMNH 778422, testes "not or slightly enlarged," moderate fat) collected by Schaldach on 20 March 1962 in a semi-open coffee finca in Atlantic Region at "Montebello" (ranch at 300 feet but elevation at exact point of collection unknown). Record from "Chinantla, May 3" (Miller, Friedmann, Griscom, and Moore, 1957: 235) questionable, as I can find no such town in Oaxaca and have seen neither the specimen nor any other published reference to it. Blake (1953: 457) lists Oaxaca in the range of this species but fails to give supporting data. Breeding evidence: range, habitat, and date.

Permanent resident in Atlantic Region in tropical evergreen forest, common from February through July and generally uncommon or locally absent at other times. Scarcity throughout state from August 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. Two records for Pacific Region: Rancho de Cacoprieto (Sumichrast, 1881: 244); and three seen by Binford (including one adult male collected, 14.2 grams, little fat, skull completely ossified, testes 8 x 5 mm) in tropical semideciduous forest at 4,350 feet elevation 16 road miles north of San Gabriel Mixtepec on 10 May 1964. Record for "Santo Domingo" (Miller, Friedmann, Griscom, and Moore, 1957: 236) pertains to La Rancheria. Breeding evidence: enlarged testes (9 x 6 mm). Elevations: 250 to 4,350 feet.

Coereba flaveola (Linnaeus). Bananaquit.

Fairly common permanent resident in Atlantic Region, occurring at edges of tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to a point on the Río Sarabia 18 road miles north of Matías Romero. Breeding evidence: slightly enlarged follicle (2 mm); enlarged testes (7 x 4 mm). Elevations: 250 to 2,600 feet.
Family PARULIDAE


Common transient migrant and winter resident below 5,000 feet in Atlantic and Pacific Regions, occurring in cloud forest, tropical evergreen forest, tropical semideciduous forest, tropical deciduous forest, dense arid tropical scrub, and humid gallery forest. Fairly common transient migrant above 5,000 feet in the same Regions and uncommon transient migrant in pine-oak forests of Interior. Dates: 19 August to 28 April; 12 May. Elevations: sea level to 9,000 feet; elevation of 10,000 feet for La Parada (W. W. Cooke, 1904: 22) is erroneous.

*Helmithetes vermivorus* (Gmelin). Worm-eating Warbler.

Very uncommon bird in lowlands and adjacent foothills of Atlantic and Pacific Regions, occurring in tropical evergreen, tropical semideciduous, and tropical deciduous forests; found west in Pacific Region at least to Minitán; probably a winter resident but recorded only from 4 October to 13 December and from 23 February to 2 April. Elevations: sea level to 2,400 feet.

[*Vermivora chrysoptera* (Linnaeus). Golden-winged Warbler.]

One record, a single bird seen at close range by Wolf on 22 April 1961 in Atlantic Region in tropical evergreen forest at 1,900 feet elevation 6 road miles southwest of Valle Nacional. Status uncertain; probably occurs as a very rare
transient migrant in Atlantic Region

*Vermivora pinus* (Linnaeus). Blue-winged Warbler.

Very uncommon bird in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous forest; probably a winter resident, but all records could pertain to transient migrants. Recorded as follows: single birds observed on 5 and 15 March and 1, 6, and 7 April and single specimens collected on 26 February (male, 7.9 grams, testes tiny, Wolf) and 16 March (sex?, 8.2 grams, slight fat, skull completely ossified, Binford) 1961 by Wolf and Binford at 300 feet elevation 1 mile southwest of Valle Nacional; one seen by Binford on 22 April 1961 at 1,900 feet elevation 6 road miles southwest of Valle Nacional; one male collected (ARPC 7049) by A. R. Phillips on 21 November 1963 just above San Gabriel Mixtepec (at about 2,400 feet elevation).


Transient migrant, common in Atlantic Region in tropical evergreen forest and cloud forest and very uncommon in Pacific Region in tropical semideciduous forest of Sierra de Miahuatlán (11 road miles north of San Pedro Pochutla, 2 and 6 October 1961, the Berretts and Binford) and in arid habitat on Plains of Tehuantepec (male, UMMZ 138804, Tehuantepec City, 24 October 1914, Shufeldt). Fairly common winter resident in Pacific Region in humid gallery forest of foothills of Sierra Madre de Chiapas (Santa Efigenia, 3 January to 5 February). One winter record west of Isthmus, a female
(ARPC 7363) taken by A. R. Phillips on 13 December 1963 in
Pacific Region above San Gabriel Mixtepec (at about 2,400
feet elevation). Possibly occurs in the Interior during
migration. Migration periods (including extreme dates for
winter residents): 12 March to 25 April; 2 to 24 October.
Elevations: migrants recorded from 100 to 4,900 feet; winter
residents noted from 800 to about 2,400 feet.

*Vermivora celata* (Say). Orange-crowned Warbler.

Uncommon winter resident in all Regions of State,
occurring in tropical evergreen forest, arid and humid pine-
oak forests, juniper scrub, oak scrub, arid temperate scrub,
and arid tropical scrub. Unrecorded in Pacific Region west
of Isthmus. Dates: 23 September to 28 April. Elevations:
sea level to 9,300 feet.


Common winter resident throughout state, occurring in
virtually all terrestrial habitats. Numbers augmented by
transient migrants. Dates: August (La Parada; P. L. Sclater,
1858: 298); 23 September to 8 May. Elevations: sea level
to 9,300 feet.

*Vermivora virginiae* (Baird). Virginia's Warbler.

Very uncommon winter resident in the Interior in arid
temperate scrub, occurring east to Rancho Las Animas, the
easternmost locality in entire range of species. One
record for Pacific Region, a single bird seen by the Berretts.
and Binford on 23 January 1962 at 500 feet elevation in tropical deciduous forest at San Pedro Pochutla. Dates: 22 September to 13 February. Elevations: 500 feet; 2,600 to 6,100 feet.

*Vermivora superciliosa* (Hartlaub). Cresent-chested Warbler.

Common permanent resident in oaks of humid and semiarid pine-oak forests of Interior. Breeding evidence: nest with eggs. Elevations: 6,400 to 10,800 feet (record for San Miguel Talea de Castro perhaps lower but elevation at exact point of collection unknown).

*Parula americana* (Linnaeus). Parula Warbler.

Uncommon transient migrant and very uncommon winter resident in lowlands and adjacent foothills, occurring in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous, tropical deciduous, and humid gallery forests; recorded west along Pacific coast at least to Minitán. To be expected as a rare transient migrant in the Interior. Dates: 20 October to 4 April. Elevations: sea level to 2,350 feet.


Uncommon permanent resident, occurring in Atlantic Region from 300 to 1,900 feet elevation in tropical evergreen forest (San Miguel Soyaltepec and a point 28 road miles north of Matías Romero) and oak patches within tropical evergreen forest (Valle Nacional area) and in Pacific Region west of
Isthmus from 2,900 to 4,900 feet elevation in oak patches within tropical semideciduous forest (from a point 9 road miles south of Putla de Guerrero east to region of San Gabriel Mixtepec). The one record from Pacific coastal lowlands (male specimen, 8.1 grams, moderate fat, skull completely ossified, testes small, at sea level in humid gallery forest at Minitán, 1 March 1964, Binford) may represent a migrant from northwestern México. Breeding evidence: enlarged testes (7 x 5 mm).

**Peucedramus taeniatus** (Du Bus). Olive Warbler.

Fairly common permanent resident in the Interior in humid and semiarid pine-oak forests east at least to Río Molino and a point 38 road miles southwest of Valle Nacional. Breeding evidence: adults observed attending "fully-feathered juvenile" (Rowley, 1966: 190); active nest, condition unknown. Elevations: 6,400 to 9,700 feet.

**Dendroica petechia** (Linnaeus). Yellow Warbler.

**D. petechia** ssp. *(aestiva group).*—Winter resident, very common along Pacific coast in mangrove swamp and humid gallery forest and in lower portions of remainder of Pacific Region in tropical deciduous forest and humid gallery forest, and fairly common in lower portions of Atlantic Region in tropical evergreen forest. Very uncommon transient migrant in the Interior in arid temperate scrub and arid tropical scrub. Dates: 20 August to 20 May; date of 1 June 1949 (female specimen, USNM 467965, Amatepec, Avilés) perhaps
doubtful in view of errors on data on other Avilés specimens. Elevations: recorded in winter from sea level to 1,600 feet; noted during migration from sea level to 5,600 feet.

*D. p. rhizophorae* van Rossem.—Fairly common bird along Pacific coast in mangrove swamps, recorded at Minitán, Punta Paloma, and a point 15 road miles south of Reforma; probably a permanent resident but recorded only from 9 February to 1 June. Breeding evidence: habitat and probably range and dates. Elevation: sea level.

Although present viewpoints dictate the conspecificity of *D. petechia* (Linnaeus), *D. aestiva* (Gmelin), and *D. erithachorides* Baird, a thorough analysis of the morphological and ethological differences is required before the case can be closed.


Winter resident, very common in Atlantic Region in tropical evergreen forest, fairly common in Pacific Region in humid gallery and tropical deciduous forests in foothills of Sierra Madre de Chiapas, uncommon on Plains of Tehuantepec in tropical deciduous forest, 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 humid gallery forest. Possibly a rare transient migrant in the Interior. Dates: 19 October to 23 April. Elevations: sea level to 5,000 feet.
Dendroica coronata Linnaeus. Myrtle Warbler.

D. coronata group.—Very uncommon winter resident in tropical evergreen and tropical deciduous forests, recorded in Atlantic Region from Temascal southeast to a point 3 miles north of Loma Bonita and in Pacific Region from a point 3.5 miles west of Tehuantepec City 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 state. Dates: 1 December to 31 March. Elevations: 100 to 5,050 feet.

D. auduboni group.—Transient migrant west of Isthmus, 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 temperate scrub. Uncommon winter resident in pine-oak forests of Interior and in tropical deciduous forest of Pacific Region from a point 9 road miles west-northwest of San José Estancia grande east to Minitán. To be expected elsewhere in winter and as a transient migrant east of Isthmus. Extreme dates: 14 October to 5 May; 21 May. Major migration periods: 1 April to 5 May; 14 to 25 October. Elevations: sea level to 9,700 feet.

I follow J. Hubbard (in litt.) in considering D. coronata and D. auduboni Townsend conspecific.
Dendroica nigrescens (Townsend). Black-throated Gray Warbler.

Uncommon winter resident in the Interior in arid temperate scrub, oak scrub, and lower reaches of arid pine-oak forest, recorded east to points 8 road miles south of San Andrés Miahuatlán and 4 road miles east of Santiago Matatlán. Dates: 22 September to 10 April. Elevations: 4,800 to 7,000 feet (record for La Parada perhaps higher but elevation of exact point of collection unknown).

Dendroica townsendi (Townsend). Townsend's Warbler.

Fairly common transient migrant and winter resident west of Isthmus in all Regions, occurring in humid pine-oak forest, cloud forest, and upper reaches of tropical evergreen forest. Uncommon transient migrant in the Interior in arid temperate scrub. One record for lower elevations, a female (MLZ 31391) taken by Avilés on 15 February 1944 in Atlantic Region at "San Miguel Soyaltepec" (elevation probably much lower than the 600 meters [1,968 feet] given on specimen label). Doubtless occurs in arid pine-oak forest west of Isthmus. To be expected in suitable habitats east of Isthmus. Dates: 27 August to 29 April. Elevations: 2,600 to 9,300 feet (probably lower at San Miguel Soyaltepec; see above).

A. R. Phillips (in litt.) informs me that on 22 November 1964 at Río Molino he collected an immature male (ARPC 7911) that he believes to be a hybrid between D. townsendi and D. occidentalis.
**Dendroica virens** (Gmelin). Black-throated Green Warbler.

Winter resident, very common in Atlantic Region in cloud forest and tropical evergreen forest, fairly common in Pacific Region east of Isthmus in humid gallery forest of foothills of Sierra Madre de Chiapas, and very uncommon in Pacific Region west of Isthmus in cloud forest and tropical semideciduous forest of Sierra de Miahuatlán west to a point about 36 kilometers (about 23 miles) by road north of San Gabriel Mixtepec. Very uncommon transient migrant 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 (P. L. Sclater, 1859b: 373). Bird banded at Overbrook, in Philadelphia, Pennsylvania, on 4 October 1934 shot by Indian at Tetela, Oaxaca, about 1 April 1936 (Lincoln, 1936: 170). Dates: 27 September to 27 April. Elevations: 250 to 9,300 feet.

**Dendroica occidentalis** (Townsend). Hermit Warbler.

Very uncommon winter resident in pine-oak forests of Interior, recorded east to points 37 road miles southwest of Valle Nacional and 15 miles southwest of Oaxaca City. Also occurs in arid temperate scrub of Interior, at least during migration. Dates: 20 August to 26 April. Elevations: 5,800 to 9,300 feet. See *D. townsendi*.

**Dendroica fusca** (Müller). Blackburnian Warbler.

Rare transient migrant in Atlantic Region west of Isthmus in tropical evergreen forest and humid pine-oak
forest (one each seen by Binford at points 6, 15, and 38 road miles southwest of Valle Nacional on 22, 24, and 27 April 1961, respectively) and in arid habitats of Plains of Tehuantepec, where recorded by Sumichrast at Tehuantepec City (Lawrence, 1876: 15) and Juchitán (Sumichrast, 1881: 243). Rare winter resident in Atlantic Region in tropical evergreen forest (Tutla, four male specimens, 4, 6, 7 and 21 February 1941, FM 119794-119797, respectively, Avilés).

Elevations: 50 to 9,300 feet.

**Dendroica dominica** (Linnaeus). Yellow-throated Warbler.

Very rare bird in Atlantic Region in tropical evergreen forest and in Pacific Region in unknown habitat in Sierra Madre de Chiapas; probably a winter resident, but only certain date is 24 March. Only four records: male specimen, "Oaxaca" [=state of Oaxaca?], Boucard (P. L. Sclater, 1859b: 374); "Santa Efigenia," elevation at exact point of record unknown, Sumichrast (1881: 243); female specimen (10.6 grams, moderate fat, skull completely ossified, ovary small), 1 mile southwest of Valle Nacional, 300 feet elevation, 24 March 1961, Binford; male specimen (USNM 467966), Amatepec, 2,100 meters (6,888 feet) elevation, 13 May 1949, Avilés (data, especially date, questionable in view of errors made by Avilés on labels of other specimens).

**Dendroica gracile Baird.** Grace's Warbler.

Uncommon permanent resident along entire length of Pacific Region and in Atlantic Region in Isthmus of Tehuante-
pec, occurring in pines of humid and arid pine-oak forests; recorded east to Chivela and perhaps "Chimalapa" (Griscom, 1935: 548) and north in Tehuantepec region to La Ranchería, to a locality 3 miles south of Nejapa, and to a point 4 miles north plus 2 miles east of Matías Romero. I have seen no specimen nor other published record for "Chimalapa." To be expected as a permanent resident in Sierra Madre de Chiapas. The foregoing account applies to the breeding race, D. g. decora Ridgway. The only records for Interior (Llano Verde, five specimens, MLZ, 25 to 28 February 1948, Lamb) appear to represent D. g. graciae Baird and hence are probably winter residents from north. D. graciae is one of the few pine-oak forest species able to cross lowland gap of Isthmus. Breeding evidence: adult attending "well-feathered fledgling" (Rowley, 1966: 190); slightly enlarged follicle (2 mm); enlarged testes (7 x 5 mm). Elevations: 700 to 7,600 feet.

**Dendroica pensylvanica** (Linnaeus). Chestnut-sided Warbler. Very uncommon transient migrant in Atlantic Region in tropical evergreen forest. Rare winter resident in Atlantic Region in tropical evergreen forest (one seen, 1 mile southwest of Valle Nacional, 15 and 19 February 1961, Wolf and Binford; one specimen, FM 119798, Tutla, 23 February 1941, Avilés) and in Pacific Region in tropical semideciduous forest of Sierra de Miahuatlán (female specimen, ARPC 7385, San Gabriel Mixtepec, 14 December 1963, Santos Farfán B.). Dates: 14 December to 22 April. Elevations: 300 to 2,600 feet.
Dendroica striata (Forster) 1  Black-polled Warbler.  

Accidental. 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 feet but elevation at exact point of collection unknown). Erroneously reported by Lawrence (1876: 15) and some subsequent authors as D. castanea.

*Dendroica discolor (Vieillot).  Prairie Warbler.

Two records, both for Pacific Region: one seen by the Berretts and Binford on 8 October 1961 in guamil within area of tropical deciduous forest at 350 feet elevation 3 road miles north of Puerto Angel; male species (7 grams, little fat, skull completely ossified, testes very small) collected by Morony on 19 February 1964 in tropical deciduous forest at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande. Status uncertain; apparently, a very rare transient migrant or winter resident in tropical deciduous forest of lowlands of Pacific Region west of Isthmus. Oaxaca records represent only occurrences in México outside of Quintana Roo.

*Dendroica palmarum (Gmelin).  Palm Warbler.

Very uncommon winter resident in extreme southwestern part of Pacific Region, occurring in arid tropical scrub in open mangrove swamp around edges of shallow, saline coastal lagoons, and in savanna within tropical deciduous forest. Recorded by Morony and Binford in 1964 as follows: a point
at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande, 12 February (one male collected, 9.9 grams, little fat, skull completely ossified, testes very small, Binford), 15 February (one bird seen), and 16 February (one seen); and sea level at Minitán, 22 February (one seen), 23 February (one seen), 24 February (two seen), and 26 February (two seen; another collected, female, 9.4 grams, little fat, skull completely ossified, ovary very small, Binford).

_**Seiurus aurocapillus** (Linnaeus). Ovenbird._

Winter resident, common in Atlantic Region in tropical evergreen forest and uncommon in Pacific Region in humid gallery forest and cloud forest. Possibly a rare transient migrant in the Interior. Data on two male specimens (USNM 467970 and 467968) allegedly taken by Avilés at Lacova on 9 and 31 July 1949 are of questionable validity in view of known errors in data on other Avilés specimens; very fresh plumage of both specimens belies July dates. Dates: 13 September to 1 May. Elevations: sea level to 5,000 feet.

_**Seiurus noveboracensis** (Gmelin). Northern Waterthrush._

Winter resident, common along Pacific coast from Minitán to Puerto Escondido in mangrove swamp and humid gallery forest, fairly common on remainder of Pacific coast in same habitats, and uncommon in Atlantic Region in tropical evergreen forest. Dates: 19 October to 5 May. Elevations: sea level to 800 feet.
Seiurus motacilla (Vieillot). Louisiana Waterthrush.

Uncommon winter resident in Atlantic and Pacific Regions in tropical evergreen forest, cloud forest, tropical semi-deciduous forest, and humid gallery forest, recorded west in Pacific Region to Río Ranas. One record for Interior, a female (USNM 143355) collected by Nelson and Goldman on 14 October 1894 at San Juan Bautista Cuicatlán. Dates: 22 September to 23 March; 13 April. Elevations: 300 to 7,300 feet.

Oporornis formosus (Wilson). Kentucky Warbler.

Fairly common winter resident in Atlantic Region in tropical evergreen forest, recorded northwest to San Miguel Soyaltepec and south in Isthmus to Escuilapa and Guichicovi. One record for Pacific Region, an immature male (ARPC 6028) collected by A. R. Phillips on 9 December 1961 at Finca Mercedes. To be expected elsewhere in Pacific Region, especially in Sierra Madre de Chiapas. Dates: 13 September to 8 April. Elevations: 250 to about 2,700 feet (Finca Mercedes; elevations of town and exact point of collection unknown).


Rare late May transient migrant in tropical evergreen forest on Atlantic side of Isthmus and in humid gallery forest of Pacific Region east of Tapanatepec. Only three acceptable records: male specimen (HC 3051) taken by Lamb on 11 May 1957 at 200 feet elevation at "Sarabia" [=Río
Sarabia], "20" [=18] miles by road north of Matías Romero; one bird seen and another collected (female, 10.0 grams, heavy fat, skull completely ossified, ovary not enlarged, Wolf) by Binford and Wolf on 20 May 1961 at 1,600 feet elevation 9 road miles east of Tapanatepec; one seen and two others collected (male, 10.3 grams, little fat, skull completely ossified, testes small, Wolf; female, 10.4 grams, little fat, skull completely ossified, ovary not enlarged, Wolf) by Binford and Wolf on 24 May 1961 at 300 feet elevation 28 road miles north of Matías Romero. Supposed winter record published by Miller, Friedmann, Griscom, and Moore (1957: 258) based on an unidentifiable immature female (MLZ 31526) collected by Avilés on 20 December 1943 at San Miguel Soyaltepec; measurements of specimen (wing chord, 60.2, tail, 50.1 mm) are intermediate but closest to \textit{O. tolmiei}.


Common winter resident in all Regions of state, occurring in all major terrestrial habitats except open savanna and highland pine forest. Dates: 25 September to 27 May. Elevations: sea level to 7,900 feet. See \textit{O. philadelphia}.

\textit{Geothlypis trichas} (Linnaeus). Common Yellowthroat.

Fairly common winter resident in all Regions of state 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, humid gallery forest, arid temperate scrub, and arid tropical scrub.
Perhaps a rare permanent resident in Pacific Region at Putla de Guerrero, where one male specimen of *G. t. melanops* Baird, the resident race of southern México, was taken on 16 December 1965 (R. W. Dickerman, *in litt.*). Possibly a permanent resident in marshes elsewhere in state. Dates: 2 October to 28 May. Elevations: sea level to 5,050 feet (record for Totontepec perhaps higher but elevation at exact point of collection unknown).

**Geothlypis nelsoni** Richmond. Hooded Yellowthroat.

Uncommon permanent resident in underbrush of humid pine-oak forest in the Interior (and apparently in Atlantic Region at Moctum), occurring east to "Moctum" and a point 3 kilometers (1.9 miles) south of San Miguel Suchixtepec, the easternmost localities in entire range of species. Breeding evidence: enlarged testes (7 x 5 mm). Elevations: 6,500 to 9,300 feet (record for Moctum perhaps lower but elevations of town and exact point of collection unknown).

**Geothlypis poliocephala** Baird. Gray-crowned Yellowthroat.

Uncommon permanent resident throughout lower portions of Atlantic Region and in Pacific Region at foot of Sierra Madre de Chiapas as well as in valley of Putla de Guerrero, occurring primarily in hedgerows, guamil, and natural scrubby clearings. Breeding evidence: egg without shell in oviduct. Elevations: 150 to 2,400 feet.

I agree with Eisenmann (1962) that the genua *Chamaethlypis* should be merged with *Geothlypis*. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
*Icteria virens* (Linnaeus). Yellow-breasted Chat.

Fairly common winter resident throughout lower portions of Atlantic and Pacific Regions, occurring in undergrowth within general ranges of tropical evergreen forest, humid gallery 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 900 feet (higher for Lachixola record if elevation of 500 meters [1,640 feet] given by Avilés on specimen label is correct).


Uncommon permanent resident along Pacific coastal lowlands, occurring in humid gallery forest and dense arid tropical scrub from Minitán west to Puerto Angel and in humid gallery forest of foothills of Isthmus mountains and Sierra Madre de Chiapas from a point 17 miles south of Matías Romero east to a point 9 road miles east of Tepanatepec. To be expected between Puerto Angel and Isthmus. Breeding evidence: enlarged follicles (Schaldach specimen label); enlarged testes (12 x 7 mm). Elevations: sea level to 1,600 feet.

*Granatellus sallaei* (Bonaparte). Gray-throated Chat.

Very uncommon permanent resident in lowest portions of Atlantic Region, occurring in guamil and natural scrubby clearings within tropical evergreen forest; recorded northwest to San Miguel Soyaltepec and south in Isthmus to a point
28 road miles north of Matías Romero. Breeding evidence: enlarged testes (7 x 4 mm). Elevations: 100 to 500 feet.

**Wilsonia citrina** (Boddaert). Hooded Warbler.

Fairly common winter resident in Atlantic Region in tropical evergreen forest, recorded 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 feet elevation at the Río Patos 6 miles west of Tapanatepec. Data on male specimen (USNM 467959) collected by Avilés supposedly at Lacova on 10 July 1949 of questionable validity in view of known errors on labels of other Avilés specimens (see *Seiurus aurocapillus*). Dates: 21 September to 31 March (exact departure date in 1961 at a point 1 mile southwest of Valle Nacional); 10 and 23 April (1941, "Tutla," Avilés, FM 119819 and 119820, respectively). Elevations: 150 to 300 feet (record for Tutla perhaps slightly higher but elevations of town and exact point of collection unknown).


Abundant to fairly common winter resident throughout state, occurring in all terrestrial habitats except open savanna; most numerous in humid forests and least numerous in arid scrub. Dates: 20 August to 11 May; dates of 2 and 4 June 1949 (two female specimens, USNM 467960 and 467961, Amatepec, Avilés) questionable in view of errors in data on other Avilés specimens. Elevations: sea level to 9,700 feet.
**Wilsonia canadensis** (Linnaeus). Canada Warbler.

Uncommon transient migrant in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical deciduous and humid gallery forests from Rancho Las Animas east to Tapanatepec. One winter record, a male (FM 119827) collected by Avilés in Atlantic Region at Tutla on 8 February 1941 (erroneously given as 28 February by Blake, 1950: 414, and subsequent authors). Dates: 14 to 25 April; 8 to 27 September; 8 February. Elevations: 150 to 4,100 feet.

**Cardellina rubrifrons** (Giraud). Red-faced Warbler.

Rare winter resident in the Interior in pine-oak forest and rare transient migrant in Pacific Region in cloud forest of Sierra Madre de Chiapas. Four records: male collected by Boucard at "Parada" [=La Parada] (elevation of town about 7,900 feet but elevation at exact point of collection unknown) in December 1857 (P. L. Sclater, 1858: 299); specimen taken by Boucard at Cinco Señores at unknown elevation (P. L. Sclater, 1859b: 374); female (MLZ 49214) collected by Lamb on 15 January 1949 on south side of Cerro San Felipe at 6,500 feet elevation; and female (9.4 grams, little fat, skull completely ossified, ovary very small) taken by Morony on 2 April 1964 at a point 12 airline miles north-northeast of Zanatepec in cloud forest at 4,900 feet elevation during an influx of transient migrant passerines.
Setophaga ruticilla (Linnaeus). American Redstart.

Winter resident below 4,100 feet elevation in Atlantic and Pacific Regions, very common in tropical evergreen forest, common in tropical semideciduous forest and humid gallery forest, fairly common in cloud forest and tropical deciduous forest, and uncommon in arid tropical scrub. Rare transient migrant in the Interior in arid temperate scrub and arid tropical scrub (two records, one seen by Wolf and Binford on 6 May 1961 at a point 6 road miles east of Santa María del Tule and one unsexable specimen, MLZ 31801, collected 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 feet; noted during migration up to 5,100 feet.

Myioborus pictus (Swainson). Painted Redstart.

Fairly common permanent resident in Pacific Region in Sierra de Yucuyacua and in the Interior, occurring in arid and semiarid pine-oak forests east to Totontepec and points 10 road miles southeast (given on specimen label as "south") of El Cameron and 8 road miles south of San Andrés Miahuatlán. Breeding evidence: nest with one egg. Elevations: 4,000 to 9,000 feet (record for 3 miles south of Nejapa probably lower but exact elevation unknown).

I agree with Parkes (1961) that the Painted Redstart belongs in the genus Myioborus, not in Setophaga.
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) and in cloud forest of Atlantic 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, very uncommon in arid pine-oak forest adjacent to humid pine-oak forest in Pacific and Interior Regions, and rare in Atlantic Region in tropical evergreen forest (11 road miles southwest of Valle Nacional, 2,600 feet elevation; and San Miguel Soyaltepec, elevation perhaps lower than the 600 meters [1,968 feet] given on specimen label). Breeding evidence: nest with eggs. Elevations: breeds from 4,900 to 10,800 feet; winters down to at least 2,600 feet (see above).

Euthlypis lachrymosa (Bonaparte). Fan-tailed Warbler.

Permanent resident, fairly common in Pacific Region in tropical semideciduous forest, uncommon in same Region in humid gallery forest (down to lower foothills, nearing coast at a point 16 road miles northwest of Puerto Escondido and extending across Isthmus through Chivela), and very uncommon in Atlantic Region in tropical evergreen forest at San Miguel Soyaltepec and a point 5 miles west of Temascal. Breeding evidence: enlarged testes (11 x 7 mm). Elevations: 250 to 5,000 feet.
**Ergaticus ruber** (Swainson). Red Warbler.

Common permanent resident in humid and semiarid pine-oak forests of the Interior, occurring east to Cerro Zempoaltepec and Río Molino, the easternmost localities in entire range of species. Breeding evidence: nest with eggs. Elevations: 7,100 to 9,700 feet (perhaps higher and lower at several localities where elevations at exact points of record are unknown).

**Basileuterus culicivorus** (Deppe). Golden-crowned Warbler.

Permanent resident, very common in Pacific Region in tropical semideciduous forest and common in Atlantic Region in tropical evergreen forest except below 1,500 feet elevation west of Isthmus (where apparently only a winter visitant, 12 November to 3 March), occurring south in Tehuantepec region to La Ranchería and Escuilapa. Record for "Santo Domingo" (Ridgway, 1902: 754) pertains to La Ranchería. Breeding evidence: nest with young. Elevations: 200 to 5,000 feet.

**Basileuterus belli** (Giraud). Golden-browed Warbler.

Common permanent resident in all Regions of state, occurring in cloud forest and in dense oak patches within humid pine-oak forest. Breeding evidence: prejuvenal. Elevations: breeds from 4,900 to 9,300 feet; winters (and breeds?) down to 4,100 feet in Atlantic Region west of Isthmus.
**Basileuterus rufifrons** (Swainson). Rufous-capped Warbler.

Common permanent resident in all Regions of state, recorded in all major terrestrial habitats except open savanna and tropical deciduous forest; hence, absent from Pacific Region below 2,400 feet elevation. Breeding evidence: nest with eggs. Elevations: 100 to 9,000 feet.

**Family PLOCEIDAE**

*Passer domesticus* (Linnaeus). House Sparrow.

Common permanent resident in towns and nearby cultivated fields within general ranges of arid temperate scrub of Interior and arid tropical scrub and tropical deciduous forest of Pacific Region and Isthmus portion of Atlantic Region, occurring north in Isthmus to Matías Romero. Recorded at Juchitán, Matías Romero, Oaxaca City, Pinotepa Nacional, Putla de Guerrero, San Andrés Miahuatlán, San Pedro Pochutla, San Pedro y San Pablo Teposcolula, Santiago Yolomécatl, and Tehuantepec City, and at points 2 road miles east of Oaxaca City, 1 mile south of Tehuantepec City, and northeast of Santiago Yolomécatl. Should be sought in remainder of Atlantic Region. First recorded for state on 10 April 1961; year of original invasion unknown. Breeding evidence: adult female carrying presumed nest material; egg without shell in oviduct. Elevations: 50 to 7,900 feet.
Family Icteridae

Gymnostinops montezuma (Lesson). Montezuma Oropendola.

Fairly common permanent resident in lower portions of Atlantic Region in tropical evergreen forest, recorded northwest to a point 5 miles west of Temascal and south in Isthmus to Escuila. Breeding evidence: range, habitat, and dates. Elevations: 250 to 700 feet.

Cassiculus melanicterus (Bonaparte). Yellow-winged Cacique.

Common permanent resident in tropical deciduous forest and humid gallery forest, occurring along entire length of Pacific Region, and thence northwest through Río Tehuantepec basin to Rancho Las Animas, and north across Isthmus into Atlantic Region to El Barrio and a point 7.5 miles south of Matías Romero. Breeding evidence: nest with young. Elevations: sea level to 3,000 feet.

Amblycercus holosericeus (Deppe). Yellow-billed Cacique.

Permanent resident in Atlantic Region in tropical evergreen forest, common below 1,900 feet to very uncommon at 4,900 feet elevation; uncommon permanent resident in Pacific Region in humid gallery forest of foothills of Sierra Madre de Chiapas (Santa Efigenia and a point 4 miles west-northwest of Tapanatepec). Breeding evidence: enlarged testes (7 x 5 mm). Elevations: 250 to 4,900 feet.
Scaphidura oryzivora (Gmelin). Giant Cowbird.

Very rare presumptive permanent resident in lower portions of Atlantic Region in tropical evergreen forest. Only three records: single males collected by Shufeldt on 4 April 1909 at "Jalahuy" [=Jalahui] (UMMZ 139077) and 23 February 1914 at "La Trinidad" [=Trinidad] (UMMZ 139078); one male (FM 119836) taken by Avilés on 3 March 1941 at "Tutla." Elevations of towns and exact points of collection unknown. Breeding evidence: range, habitat, and probably dates.

For use of generic name Scaphidura, see Parkes (1954).

Molothrus aeneus (Wagler). Bronzed Cowbird.

Common permanent resident, occurring 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 temperate 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 feet elevation in humid pine-oak and cloud forests of Sierra de Miahualtán. Breeding evidence: nest of Cyanocorax yncas with one nestling M. aeneus. Elevations: sea level to 7,300 feet.

For use of genus Molothrus, see Parkes and Blake (1965).

Molothrus ater (Boddaert). Brown-headed Cowbird.

Winter resident along Pacific coast east to southwestern corner of Laguna Superior 19 road miles southwest of Juchitán,
the southeasternmost locality in entire range of species; recorded infrequently but sometimes in large flocks. Probably a rare permanent resident in arid temperate scrub of northwestern part of Interior (one record, male, UK 37371, testes 5 mm, 2 miles northwest of "Tamazulapan" [=Tamazulapan del Progreso], 22 June 1955, A. A. Alcorn; collecting locality probably at about 6,000 feet elevation). The only other record for Interior, a male (USNM 144478) collected by Nelson and Goldman on 12 October 1894 at "Cuicatlán" [=San Juan Bautista Cuicatlán] (town at 1,952 feet but elevation of exact point of collection unknown) may also represent a permanent resident. No record for Atlantic Region. Breeding evidence: slightly enlarged testes (5 mm); range, habitat, and probably dates. Dates for known winter residents: 20 October to 10 March. Elevations along Pacific coast: sea level to 100 feet.

Cassidix mexicanus (Gmelin). Great-tailed Grackle.

Permanent resident, locally very common in Atlantic and Pacific Regions in guamil, 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 temperate scrub, steppe, and arid tropical scrub. Unrecorded, but doubtless occurs, between Puerto Angel and Tehuantepec City. Breeding evidence: prejuvenal observed; nest with young. Elevations: sea level to 7,000 feet.
I follow Selander and Giller (1961) in considering C. mexicanus and C. major (Vieillot) as separate species.

Euphaqus cyanocephalus (Wagler). Brewer's Blackbird.

Irregular winter resident. Recorded with no stated locality by Fenochio (adult female; P. L. Sclater, 1886: 391) and Deppe (October, 1825; Stresemann, 1954: 90). Total of eight specimens (UMMZ) collected by Shufeldt on Pacific side of Isthmus at "Tehuantepec City" (town at 115 feet but elevation at exact points of collection unknown) on 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.

Dives dives (Deppe). Melodious Blackbird.

Fairly common to locally very common permanent resident in Atlantic Region in tropical evergreen forest, occurring 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. Breeding evidence: enlarged testes (10 x 5 mm). Elevations: 100 to 800 feet.

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 humid gallery forests.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Very uncommon transient migrant in the Interior in arid temperate scrub. Late summer records for Santa Efigenia (sex?, USNM 144433, 30 July 1895, Nelson and Goldman) and a point 3 miles west of San Pablo Villa de Mitla (male, UK 37380, 8 August 1955, J. R. Alcorn) probably represent very early migrants. Possibly a very rare permanent resident. Dates: 30 July; 8 August; 1 September to 28 April. Elevations: sea level to 6,100 feet.

_Icterus prosthemelas_ (Strickland). Black-cowled Oriole.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest, occurring northwest to a point 5 miles west of Temascal and south in Tehuantepec region to La Ranchería (erroneously given as "Santo Domingo" by Ridgway, 1902: 270) and a point 4 miles north plus 2 miles east of Matías Romero. Only record for Pacific Region (male?, USNM 57593, Chihuitán, 1 December 1868, Sumichrast) of unknown significance but perhaps represents a winter visitant. Nelson and Goldman specimen from "Totontepec" (Ridgway, 1902: 270) actually taken at a point 6 miles east of Totontepec. Breeding evidence: slightly enlarged follicle (3 mm); enlarged testes (10 x 5 mm). Elevations: 250 to 3,700 feet.

_Icterus wagleri_ Sclater. Black-vented Oriole.

Fairly common permanent resident in the Interior in arid temperate scrub, recorded east to San Ildefonso Villa Alta and a point 2 road miles west of San Pedro Totolapan. Should be sought east of Isthmus in winter. Breeding
evidence: enlarged testes (11 mm). Elevations: 3,200 to 7,300 feet (perhaps to 10,800 feet on Cerro Yucuyacua if elevation on specimen label is correct).

*Icterus parisorum* Bonaparte. Scott's Oriole.

Uncommon winter resident in the Interior in arid temperate 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, occurring east to points 4 road miles east of Santiago Matatlán and 7 road miles south of San Miguel Suchixtepec, the southeasternmost localities in entire range of species. Probably breeds sparingly in arid temperate scrub throughout Interior, but recorded as breeding only at Rancho de las Rosas (7,000 feet elevation, male prejuvenal, MLZ 38282, 20 July 1943, Lamb), the southeasternmost breeding locality for species. Elevations: 6,100 to 8,400 feet (lower on Pacific side of Sierra de Miahuatlán but elevation at exact point of collection unknown).

*Icterus cucullatus* Swainson. Hooded Oriole.

Very rare winter resident and possibly a rare permanent resident. Only three records: male collected in September 1937 in the Interior at La Hacienda, a village at about 5,250 feet elevation near Huajuapan de León (Martin del Campo, 1942: 354); male (MLZ 31487) taken by Avilés on 6 January 1944 in Atlantic Region at "San Miguel Soyaltepec" (elevation of exact point of collection probably much lower than
the 600 meters [1,968 feet] recorded on label); one seen by A. R. Phillips (*in litt.*) on 10 December and again on 13 December 1964 in Pacific Region in guamil at a point 36 kilometers (22.4 miles) by road north of San Gabriel Mixtepec. Major habitats concerned in these records unknown but probably arid temperate scrub, tropical evergreen forest, and humid pine-oak forest, respectively.

*Icterus mesomelas* (Wagler). Yellow-tailed Oriole.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to Guichicovi and a point 8 miles north of Matías Romero. Breeding evidence: prejuvenal. Elevations: 100 to 800 feet.


Permanent resident, common in tropical semideciduous and cloud forests of Pacific Region west of Isthmus, uncommon in unknown habitat (humid pine-oak forest?) in the Interior in Sierra de Zempoaltepec (Totontepec and Cerro Zempoaltepec), and very uncommon in low-elevation, arid pine-oak forest in Pacific Region from Lajarcia east to Chivela and thence north across Isthmus into Atlantic Region to Guichicovi and three points located 17 miles south, 2 miles north plus 2 miles east, and 4 miles north plus 2 miles east of Matías Romero. Two Richardson specimens of the race *richardsoni* W. L. Sclater (male and female, probably in BMNH, 28 March 1890) from "Chimalapa, 9,000 feet" (W. L. Sclater,
1939: 141) may have come from either Santa María Chimalapa or (as W. L. Sclater thought) San Miguel Chimalapa; elevation of 9,000 feet is incorrect, being much too high for any locality in eastern Oaxaca. To be expected east of Isthmus. Breeding evidence: prejuvenal. Elevations: 650 to 8,000 feet; see above.


Permanent resident in lower portions of Pacific Region, common in humid gallery forest and uncommon in tropical deciduous forest. Occurrence at "Putla de Guerrero," based on specimen (AMNH 521930) taken by Rébouch, needs substantiation by additional field work. Type locality, based on a male specimen (BM) collected by Deppe in October 1825 at "Totolapa," perhaps not San Pedro Totolapan, Oaxaca, as generally believed; absence of additional records and unlikelihood of occurrence there indicates another Totolapa possibly not in Oaxaca. Breeding evidence: nest with eggs. Elevations: sea level to 900 feet (records for "Putla de Guerrero" and "Totolapa" higher if localities correct).


Very common permanent resident in humid gallery forest, tropical deciduous forest, and arid tropical scrub, occurring in Pacific Region west at least to a point 6 road miles south of Pinotepa Nacional and northwest in Río Tehuantepec basin to a point 2 road miles northwest of San Pedro Totolapan, and extending north into Atlantic portion of
Isthmus as far as Matías Romero. Very uncommon permanent resident in lowland tropical evergreen forest mixed with savanna in northwestern part of Atlantic Region from Temascal east to a point 3 miles north of Loma Bonita. Should be sought in the area between Isthmus and Loma Bonita. Breeding evidence: "laying" (Lamb specimen label); enlarged testes (11 x 8 mm). Elevations: sea level to 3,200 feet.

*Icterus galbula* (Linnaeus). Baltimore Oriole.

* I. g. galbula.—Winter resident in Atlantic and Pacific Regions, common at low elevations in tropical evergreen forest, tropical semideciduous forest, and humid gallery 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 feet elevation), in the Interior in arid temperate scrub, and in Pacific Region in arid tropical scrub. Dates: 12 September to 28 April. Elevations: sea level to 5,250 feet.

* I. g. bullockii* (Swainson).—Uncommon winter resident west of Isthmus in all Regions, occurring in arid and humid pine-oak forests of highlands and in arid temperate scrub; one record for lowlands, a female (MLZ 45461) taken by Lamb on 1 February 1947 in Pacific Region at 135 feet elevation 5 miles west of Zanatepec at the Río Ostuta. Dates: 4 September to 1 May. Elevations: 135 feet; 4,800 to 7,900 feet.
I. g. abeillei (Lesson).—The only records, four birds (MLZ 35116-35119) collected by Avilés on 8 January 1943 and 15, 18, and 21 December 1942 in the Interior at "Mitla" [=San Pablo Villa de Mitla] are highly questionable in view of known errors in data on other Avilés specimens labeled "Mitla" (see Agelaius phoeniceus and Pipilo fuscus).

I follow Sibley and Short (1964) in considering I. galbula and I. bullockii conspecific.

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 arid tropical scrub near Tamazulapan del Progreso and at San Juan Bautista Cuicatlán and Teotitlán del Camino, occurring north in Isthmus to Chivela and northwest in Río Tehuantepec basin to San Juan del Río and a point at 3,200 feet elevation 2 road miles northwest of San Pedro Totolapan. The two populations in northwestern Oaxaca probably continuous with each other and with Pacific coast populations and probably connecting through Balsas basin rather than Oaxaca Valley. Record from La Parada, an immature collected by Boucard in October 1857 (P. L. Sclater, 1858: 303), if correct, probably represents a migrant from farther north. Breeding evidence: nest with eggs. Elevations: sea level to 6,000 feet.

I consider I. pustulatus conspecific with the group of races known as I. sclateri Cassin (including I. formosus
Lawrence), which inhabit the area from southeastern Oaxaca to Costa Rica. A series of ten specimens (LSUMZ) taken near the Pacific coast between Puerto Angel and a point 9 road miles west-northwest of San José Estancia Grande shows almost even intergradation between I. p. pustulatus of Guerrero and formosus of the Isthmus region. The sharpest break occurs between Puerto Escondido and San José Estancia Grande; specimens from the former locality are closest to formosus in back color but have small dimensions, while birds from the latter area are nearest pustulatus in size but have broader back streaks.

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 miles west of Loma Bonita. Also recorded in September at Huajuapan de León (Martin del Campo, 1942: 354), where perhaps only a winter visitant. Possibly a permanent resident elsewhere in state. Avilés specimens (MLZ) supposedly taken at "Mitla" [=San Pablo Villa de Mitla] in June 1942 are not the resident race, A. p. gubernator (Wagler), and probably were taken outside Oaxaca, perhaps in Puebla. Breeding evidence: enlarged testes (12 x 7 mm). Elevations: 100 to 5,250 feet.
*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: one bird collected (immature male, 82.7 grams, very fat, skull very poorly ossified, testes small, Binford) on 18 October 1961 at a point 12 road miles southwest of Juchitán; one seen by the Berreotts and Binford in a large flock of *Cassidix mexicanus* on 19 October 1961 at a point 17 road miles southwest of Juchitán; one collected (immature female, 47.9 grams, little fat, skull not completely ossified, ovary very small, Binford) on 20 October 1961 near southwestern corner of Laguna Superior 19 road miles southwest of Juchitán; and one seen by the Berreotts and Binford on 9 January 1962 at the last locality. Mounted albino specimen in U. S. National Museum, supposed to have been 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. Since 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 feet.

**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, and on both Atlantic and Pacific sides of Tehuantepec region from Salina Cruz and Tapanatepec north to Santa Efigenia, Sarabia, and Tutla. Breeding evidence: nest with eggs. Elevations: sea level to 5,400 feet.

**Family THRAUPIDAE**

**Chlorophonia occipitalis** (Du Bus). Blue-crowned Chlorophonia.

Common permanent resident in cloud forest of Atlantic Region northwest at least to a point 15 road miles southwest of Valle Nacional. The one record for low elevations, a male (HC uncatalogued) taken by Schaldach on 19 February 1960 in the Isthmus of Tehuantepec at a point 18 road miles south of Matías Romero, probably represents a casual winter visitant from nearby Oaxaca breeding grounds. Breeding evidence: nest under construction. Elevations: 4,100 to 5,250 feet (see above).

**Tanaqra elegantissima** (Bonaparte). Blue-hooded Euphonia.

Fairly common permanent resident, occurring in Atlantic Region in cloud forest of Sierra de Juárez (Vista Hermosa), in the Interior (east to Amatepec and Rancho Las Animas) in
humid pine-oak forest, arid pine-oak forest, and oak scrub, and in Pacific Region in tropical semideciduous and cloud forests of Sierra Madre de Chiapas and arid pine-oak forest of Sierra de Yucuyacua (11 road miles southwest of San Andrés Chicahuaxtla, 6,400 feet elevation) and Sierra de Miahuatlán (Santa Catarina Juquilla). One record at low elevations, a male (MLZ 31413) taken by Avilés on 3 February 1944 in Atlantic Region at "Soyaltepec" [=San Miguel Soyaltepec], where probably only a winter visitant. Only constant elements in wide variety of habitats appear to be oaks and epiphytes. Breeding evidence: nest with eggs. Elevations: 3,000 to 9,700 feet (record for San Miguel Soyaltepec probably lower than the 600 meters [1,968 feet] given on specimen label).

In view of the minor variations that differentiate known species in this genus, I prefer to consider T. elegantissima specifically separate from the morphologically distinct T. musica (Gmelin) of the West Indies.

_**Tanagra affinis** Lesson. Scrub Euphonia._

Fairly common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region in tropical semideciduous, tropical deciduous, and humid gallery forests west at least to Minitán and Putla de Guerrero and northwest along Río Tehuantepec to Las Tejas. Breeding evidence: active nest completed, contents unknown. Elevations: sea level to 2,900 feet (record for Moctum perhaps higher but elevations of town and exact point of collection unknown).
All Oaxaca records pertain to *T. a. affinis*. *T. godmani* (Brewster), sometimes considered a race of *affinis*, has not been recorded in Oaxaca but should be sought in the extreme southwestern corner of the state.

*Tanagra lauta* Bangs and Penard. Yellow-throated Euphonia.

Common permanent resident in Atlantic Region in tropical evergreen forest, breeding south in Isthmus at least to Escuilapa and Matías Romero. Uncommon in Pacific Region in tropical deciduous forest and humid gallery forest, occurring from Rancho Las Animas and Las Tejas east at least to Santa Efigenia and Punta Paloma; perhaps only a winter resident, being recorded only from 20 October to 18 February. Meager data for Atlantic Region indicate numbers greater in spring and summer than in winter. Breeding evidence: nest under construction. Elevations: sea level to 3,000 feet.

*Tanagra gouldi* (Sclater). Olive-backed Euphonia.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to a point 18 road miles north of Matías Romero. Breeding evidence: slightly enlarged testes (4 x 3 mm); range, habitat, and dates. Elevations: 250 to 4,100 feet.

*Tangara larvata* (Du Bus). Golden-masked Tanager.

Permanent resident in Atlantic Region in tropical evergreen forest, fairly common east of Trans-Isthmian Highway.
and very uncommon from Isthmus west to a point 6 road miles southwest of Valle Nacional, occurring south in Isthmus to Escuilapa. Breeding evidence: enlarged testes (8 x 7 mm). Elevations: 250 to 1,900 feet (records for Lacova and Moctum perhaps higher but elevations of towns and exact points of collection unknown).

*Thraupis episcopus* (Linnaeus). Blue-gray Tanager.

Common permanent resident in Atlantic Region at edges of tropical evergreen forest, occurring south in Isthmus to Escuilapa. Breeding evidence: prejuvenal. Elevations: 100 to 350 feet (probably much higher at several localities where elevations at exact points of record are unknown).

*Thraupis abbas* (Deppe). Yellow-winged Tanager.

Common permanent resident in Atlantic Region at edges of tropical evergreen forest and lower reaches of cloud forest, occurring south in Isthmus to Escuilapa and Río Grande. Breeding evidence: nest with eggs. Elevations: 100 to 5,250 feet (records for Amatepec and Totontepec perhaps higher but elevations of former town and both points of collection unknown).

*Phlogothraupis sanguinolenta* (Lesson). Crimson-collared Tanager.

Fairly common permanent resident in Atlantic Region in guamil and second growth forest within general range of tropical evergreen forest, occurring northwest at least to a
point 5 miles west of Temascal and south in Isthmus to Escuilapa and a point 3 miles east of Matías Romero. Breeding evidence: large egg in oviduct (Schaldach specimen label); enlarged testes (10 x 6 mm). Elevations: 100 to 1,900 feet (record for Lacova perhaps higher but elevations of town and exact point of collection unknown).

**Piranga rubra** (Linnaeus). Summer Tanager.

Winter resident, common in Atlantic and Pacific Regions in tropical evergreen forest, tropical semideciduous forest, tropical deciduous forest, arid tropical scrub, and humid gallery forest and very uncommon in the Interior in arid temperate scrub and juniper scrub. Dates: 2 October to 25 April. Elevations: sea level to 7,500 feet.

**Piranga flava** (Vieillot). Hepatic Tanager.


**Piranga leucoptera** (Trudeau). White-winged Tanager.

Uncommon permanent resident in Atlantic Region in tropical evergreen forest and lower reaches of cloud forest and in Pacific Region in tropical semideciduous and cloud forests of Sierra Madre de Chiapas. Breeding evidence: adults observed copulating. Elevations: 250 to 4,900 feet.
Piranga ludoviciana (Wilson). Western Tanager.

Fairly common transient migrant and uncommon winter resident, occurring in all Regions of state and inhabiting tropical evergreen forest, tropical semideciduous forest, tropical deciduous forest, arid tropical scrub, arid temperate scrub, and (to a lesser degree?) pine-oak forests. Dates: 23 September to 5 May; movement of transient migrants noted from 1 to 7 April 1961 at a point 1 mile southwest of Valle Nacional. Elevations: 50 to 7,900 feet.

*Piranga bidentata* (Swainson). Flame-colored Tanager.

Rare permanent resident in Atlantic and Pacific Regions, occurring in cloud forest and upper reaches of tropical evergreen forest of Sierra de Juárez and in cloud forests of Sierra Madre de Chiapas and Sierra de Miahuatlán. Breeding evidence: enlarged testes (12 mm). Elevations: 2,900 to 5,250 feet.

The Flame-colored Tanager has been recorded in Oaxaca as follows: male collected (ARPC 7219), El Carrizal, 2 December 1963; one bird seen on 26 March, two on 27 March, two on 28 March, and three on 29 March 1964 (including one male collected, 37.5 grams, little fat, testes 8 x 5 mm, Binford) in cloud forest at 4,900 feet elevation 12 airline miles north-northeast of Zanatepec, Morony and Binford; one adult male seen at 4,300 feet elevation 16 road miles southwest of Valle Nacional, 10 June 1964, Morony and Binford; male collected *(UK uncatalogued, largest testis 12 mm)* at 1,600...
meters (5,248 feet) elevation at Vista Hermosa, 23 June 1964, D. M. Power; female? collected (UK uncatalogued) at 880 meters (2,886 feet) elevation 12 kilometers (7.5 miles) by road north of Vista Hermosa, 24 June 1964, J. Cole; male collected (ARFC 8111, little fat, testes not enlarged, skull ossified), 36.5 kilometers (22.7 miles) by road north of San Gabriel Mixtepec, 7 December 1964, Juan Nava S.

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 miles north of Pluma Hidalgo) and rare in Sierra Aloapaneca (Cerro San Felipe) and Sierra de Zempoaltepec (Moctum and Totontepec), occurring in humid pine-oak forest and in adjacent cloud forest and upper reaches of tropical semideciduous forest. Oaxaca localities are easternmost in entire range of species. Breeding evidence: adult observed attending "fully-feathered juvenile" (Rowley, 1966: 195); female specimen with three ruptured follicles, including one for egg without shell in oviduct. Elevations: 4,350 to 5,800 feet (probably above 10,000 feet on Cerro San Felipe but elevation at exact point of collection unknown).

Habia rubica (Vieillot). Red-crowned Ant-Tanager.

Fairly common permanent resident in Atlantic Region in tropical evergreen forest and in Pacific Region west of Isthmus in humid gallery forests within general range of tropical deciduous forest, occurring south in Tehuantepec
region to La Rancherfa and Escuila and east in Pacific 
Region to a point 1 mile north of San Pedro Pochutla. 
Record for "Santo Domingo" (Miller, Friedmann, Griscom, and 
Moore, 1957: 307) pertains to La Rancherfa. Breeding evi­

dence: prejuvenal. Elevations: sea level to 2,900 feet in 
Pacific Region; 250 to 4,100 feet in Atlantic Region.

**Habia fuscicauda** (Cabanis). Red-throated Ant-Tanager.

Permanent resident, very common in Atlantic Region in 
tropical evergreen forest and rare in Pacific Region in 
humid gallery forest east of Isthmus (Tapanatepec and Punta 
Paloma). Breeding evidence: egg without shell in oviduct. 
Elevations: sea level to 1,900 feet.

I follow Meyer de Schauensee (1966: 485) in treating 
this species as separate from *H. gutturalis* (Sclater).

**Lanio aurantius** (Lafresnaye). Black-throated Shrike-Tanager.

Uncommon permanent resident in Atlantic Region in 
tropical evergreen forest northwest to San Miguel Soyaltepec 
and south in Isthmus to Escuila and Guichicovi. Breeding 
evidence: range, habitat, and dates. Elevations: 200 to 
1,900 feet.

**Eucometis penicillata** (Spix). Gray-headed Tanager.

Permanent resident in tropical evergreen forest on 
Atlantic side of Isthmus, where apparently very rare. Only 
two records, one male (MLZ 26278) taken by Avilés on 15 
April 1939 at "Escuila" (elevations of town and exact
point of collection unknown) and one male (location of specimen unknown) and one female (egg 21 mm in diameter and without shell in oviduct, little fat, AMNH 787588) collected by Schaldach on 8 May 1962 at "Montebello" (ranch at about 300 feet but elevation at exact point of collection unknown).

**Chlorospingus ophthalmicus** (Du Bus). Common Bush-Tanager.

Very common permanent resident in all Regions, breeding from 4,100 to 9,300 feet elevation in cloud and adjacent humid pine-oak forests of Sierra Madre de Chiapas, Sierra de Juárez, Sierra de Zempoaltepec, Sierra de Miahuatlán and Sierra de Yucuyacua. Very uncommon winter visitant between 4,100 and 300 feet elevation in tropical evergreen forest of Atlantic Region west of Isthmus (San Miguel Soyaltepec and points 1 and 6 road miles southwest of Valle Nacional). Breeding evidence: active nest completed, contents unknown.

**Family FRINGILLIDAE**

**Saltator atriceps** (Lesson). Black-headed Saltator.

Permanent resident, common in Pacific Region west of Isthmus in tropical semideciduous and humid gallery forests, occurring east to a point 3 road miles 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 humid gallery forest of foothills of Sierra Madre de Chiapas. Breeding evidence: prejuvenile. Elevations: sea level to 5,000 feet.
Saltator maximus (Müller). Buff-throated Saltator.

Common permanent resident in Atlantic Region in guamal and natural scrubby areas within tropical evergreen forest, occurring northwest at least to San Miguel Soyaltepec and south in Isthmus to Escuilapa. Record for "Santo Domingo" (Ridgway, 1901: 664) pertains to La Ranchería. Breeding evidence: large egg in oviduct (Schaldach specimen label); enlarged follicle (5 mm). Elevations: 100 to 2,600 feet.

Saltator coerulescens Vieillot. Grayish Saltator.

Permanent resident, common in Pacific Region in humid gallery and dense tropical deciduous forests from Guerrero border east to region of Puerto Escondido, fairly common in Atlantic Region in open scrub situations and guamal, and uncommon in Pacific Region in gallery and dense tropical deciduous forests in foothills of Sierra Madre de Chiapas and between points 8 road miles northwest of Puerto Escondido and 13 road miles north of Puerto Angel. Unrecorded in Río Tehuantepec basin except at Tehuantepec City, where probably a rare permanent resident. To be expected between Puerto Angel and Tehuantepec City. Breeding evidence: prejuvenal. Elevations: sea level to 3,000 feet.

Caryothraustes poliochaster (Du Bus). Black-faced Grosbeak.

Permanent resident in Atlantic Region in tropical evergreen forest, common east and uncommon west of Trans-Isthmian Highway, occurring northwest at least at a point 5 miles west of Temascal and south in Isthmus to a point 8 miles north of

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Matías Romero. Breeding evidence: enlarged testes (12 x 7
mm). Elevations: 250 to 2,600 feet (records for Choapan
and Teotalcingo perhaps slightly higher but elevations of
towns and exact points of collection unknown).

Richmondena cardinalis (Linnaeus). Common Cardinal.

Permanent resident; fairly common in Pacific Region in
tropical deciduous forest and arid tropical scrub, ranging
in these habitats east to Tehuantepec City and northwest in
Río Tehuantepec basin to Rancho Las Animas; uncommon in
Atlantic Region in scrubby openings within tropical evergreen
forest from Temascal east to a point 4 miles south of Loma
Bonita; and very uncommon elsewhere in low portions of
Atlantic Region, occurring south in Isthmus to a point 3
miles north of Matías Romero. To be expected between Matías
Romero and Tehuantepec City and in low portions of Pacific
Region east of Isthmus. Breeding evidence: nest with eggs.
Elevations: sea level to 3,000 feet in Pacific Region; 100
to 500 feet in Atlantic Region (record for Trinidad perhaps
slightly higher but elevations of town and exact point of
collection unknown).

Pheucticus ludovicianus (Linnaeus). Rose-breasted Grosbeak.

Common transient migrant and uncommon winter resident,
occuring in Atlantic Region in tropical evergreen forest
and in Pacific Region in tropical semideciduous sorest,
tropical deciduous forest, arid tropical scrub, humid pine-
oak forest, and humid gallery forest, recorded west in
Pacific Region to a point 16 road miles northwest of Puerto Escondido. One record for Interior Region, a specimen (ARPC) taken on 20 November 1964 slightly northwest of San José del Pacifico (A. R. Phillips, in litt.). Should be sought elsewhere in the Interior at least during migration. Dates: 19 October to 30 April. Elevations: sea level to 5,000 feet (record for near San José del Pacifico higher but exact elevation unknown).

*Pheucticus melanocephalus* (Swainson). Black-headed Grosbeak.

Common permanent resident above 6,000 feet elevation in the Interior, occurring in pine-oak forests (especially humid portions), oak scrub, and extreme upper limits of arid temperate scrub. Rare winter visitant in Atlantic Region, occurring down to 4,100 feet elevation into upper limits of tropical evergreen forest. Recorded east to Moctum, Totontepec, Río Molino, and a point 4 miles east of Santiago Matatlán, the easternmost points in entire range of species. Breeding evidence: nest with young. Elevations: 4,100 to 10,800 feet.

*Guiraca caerulea* (Linnaeus). Blue Grosbeak.

Mainly a transient migrant, common in arid tropical scrub on Pacific side of Isthmus from Tehuantepec City east to a point 8 miles southeast of Tapanatepec and very uncommon in Atlantic Region in open situations within tropical evergreen forest from Trans-Isthmian Highway northwest to a point 1 mile southwest of Valle Nacional. No definite migration.
records for Interior. Uncommon permanent resident of Interior Region in arid temperate scrub and of Pacific Region in arid tropical scrub from Tehuantepec City east probably into Chiapas. Status in Pacific Region west of Isthmus uncertain (three sight records by Morony and Binford in 1964 in guamil: 3 birds on 9 March and 17 on 10 March at points 16 and 6 road miles northwest of Puerto Escondido, respectively; 6 on 28 April at mouth of Río Tonameca). Breeding evidence: nest with eggs. E Elevations: sea level to 7,300 feet.

*Cyanocompsa cyanoides* (Lafresnaye). Blue-back Grosbeak. Fairly common permanent resident in Atlantic Region in tropical evergreen forest northwest at least to San Miguel Soyaltepec and south in Isthmus to Palomares. Breeding evidence: nest with eggs. Elevations: 250 to 1,900 feet.

*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 in tropical evergreen forest. In Isthmus, range extends south from Atlantic side to the Río Sarabia and north from Pacific side to Chivela and a point 17 miles south of Matías Romero. Breeding evidence: enlarged testes (9 x 8 mm). Elevations:
sea level to 5,000 feet (records for Totontepec and a point 36 kilometers [22.4 miles] by road north of San Gabriel Mixtepec perhaps higher but elevations at points of collection unknown).

**Passerina cyanea** (Linnaeus). Indigo Bunting

Common winter resident in lower portions of Atlantic and Pacific Regions, occurring in natural openings, guamil, grazed land, and cultivated land wherever these habitats occur within general ranges of tropical evergreen forest, tropical deciduous forest, 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" (P. L. Sclater, 1859b: 379) doubtfully pertains to the city. Dates: 20 October to 28 April. Elevations: sea level to 3,000 feet (records for Moctum and Totontepec perhaps higher but elevations of former town and both points of collection unknown).

**Passerina versicolor** (Bonaparte). Varied Bunting.

Very uncommon permanent resident in the Interior in arid temperate scrub, recorded from "San Francisco Tlapancingo" and Teotitlán del Camino southeast through Oaxaca Valley to Rancho Las Animas. Breeding evidence: enlarged testes (11 x 7 mm). Elevations: 3,000 to 5,100 feet (records for San Francisco Tlapancingo and San Pablo Villa de Mitla probably slightly higher but elevations at exact points of collection unknown).
Passerina rositae (Lawrence). Rose-bellied Bunting.

Locally common permanent resident in Pacific Region in Isthmus, occurring in humid gallery forest and denser portions of tropical deciduous forest from Rancho Sol y Luna, Rancho de Cacoprieto, and a point on Pan-American Highway 0.7 miles from Chiapas border west through foothills of Sierra Madre de Chiapas to Chivela and three points 17 and 18 miles south of Matías Romero and 13 miles east of Juchitán. Breeding evidence: a female with enlarged follicle (4 x 3 mm) and "large egg in oviduct" (Schaldach specimen label). Elevations: 700 to 1,600 feet (perhaps lower at several localities where elevations at exact points of record are unknown).

Passerina ciris (Linnaeus). Painted Bunting.

Winter resident, common in Atlantic and Pacific Regions in natural openings, guamil, 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 temperate scrub (San Felipe del Agua). Dates: 5 October to 30 April. Elevations: sea level to 5,700 feet.

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 miles northwest of Puerto Escondido and northwest in Río Tehuantepec basin to "San Juan del Río" and a point 2 road miles northwest of San Pedro Totolapan; extends north across Isthmus into Atlantic Region as far as Almoloya. Breeding evidence: "testes full size" (Lamb specimen label); enlarged testes (5 x 3 mm). Elevations: sea level to 3,200 feet (record for San Juan del Río perhaps higher but elevation at exact point of collection unknown).

_Tiaris olivacea_ (Linnaeus). Yellow-faced Grassquit.

Permanent resident in guamil, cultivated land, and grazed land, occurring in Atlantic Region within general ranges of tropical evergreen forest from a point 1 mile southwest of Valle Nacional southeast to Totontepec and in the Interior within general ranges of arid tropical and arid temperate scrub habitats in valley of San Juan Bautista Cuicatlán (Santiago Dominguillo and Guelatao); locally fairly common (Moctum and Totontepec) but in general very uncommon. Should be sought elsewhere in Atlantic Region. Breeding evidence: enlarged testes (right, 3 x 3, left, 6 x 4 mm). Elevations: 300 to 6,300 feet.

_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 Escuilapa, Guichicovi, and a point 18 road miles north of Matías Romero southwest to Tehuantepec.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
City and southeast to Rancho de Cacoprieto; occurs in savanna and in openings within tropical evergreen forest and arid tropical scrub. Status as a transient migrant elsewhere in state unknown. Very uncommon winter resident in Pacific coastal lowlands between points 9 road miles west-northwest of San José Estancia Grande (14 February) and 6 road miles northwest of Puerto Escondido (10 March), occurring in savanna and in openings within tropical deciduous forest. Migration periods (including extreme dates for winter residents): August; 2 September to 27 October; 2 to 30 April. Elevations: sea level to 800 feet.

**Hesperiphona vespertina** (Cooper). Evening Grosbeak.

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 to be a permanent resident, but perhaps is only a visitant. Should be sought in humid pine-oak forest elsewhere in state west of Isthmus.

**Hesperiphona abeillei** (Lesson). Hooded Grosbeak.

Two records, both for Atlantic Region, single males taken by Avilés on 28 April 1942 at an unknown elevation at "Totontepec" (MLZ 34098) and by D. M. Power on 16 June 1964 in cloud forest at 5,250 feet elevation at Vista Hermosa (UK uncatalogued, 46.6 grams, largest testis 8 x 4 mm). Status and preferred habitat uncertain; probably a rare permanent
resident; probably occurs throughout all humid pine-oak forest and adjacent cloud forest of state. Record from Coatepec (Lantz, 1899: 222), which is erroneously ascribed to Oaxaca by Ridgway (1901: 45) and subsequent authors, pertains to Veracruz. Breeding evidence: range and probably habitat and dates.

**Carpodacus mexicanus** (Müller). House Finch.

Common to fairly common permanent resident throughout most of Interior, occurring primarily in arid temperate scrub but breeding also in adjacent arid pine-oak forest and in arid tropical scrub of valley of San Juan Bautista Cuicatlán. Recorded east to Guelatao, San Miguel Sola de Vega, and a point 4 road miles east of Santiago Matatlán, the south-easternmost localities in entire range of species. Breeding evidence: prejuvenal. Elevations: 2,950 to 8,000 feet.

**Sporophila schistacea** (Lawrence). Slate-colored Seedeater.

No specimens examined; two published specimen records; no sight records. Known only from two specimens in the Muséum National in Paris, an adult male (type of race subcon-color Berlioz) and a "female" [=immature male according to Meyer de Schauensee, 1966: 506] taken by Avilés 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 airline miles east-northeast of Palomares. Species otherwise unknown north of Costa Rica. Status uncertain; presumably, a very rare permanent resident. Habitat...
apparently edges of tropical evergreen forest. Breeding evidence: habitat and probably dates but not range. Elevation: given by Avilés as 150 meters (492 feet) but probably closer to 200 feet.

This bird was originally described by Berlioz (1959) as "Sporophila (?schistacea) subconcolor" and later definitely relegated to subspecific rank by Mayer de Schauensee (ibid.).

*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, recorded in the Interior north and east to Santiago Miltepec, Guelatao, Capulalpan, Totontepec, and a point 12 road miles east of Oaxaca City and in Pacific Region from Minitán and Putla de Guerrero east to a point 4 road miles southeast of Puerto Escondido. Records for "Tehuantepec" (Lawrence, 1874, p. 276, and subsequent authors) probably pertain to *S. t. moreletti* or *S. minuta*. Breeding evidence: "laying" and "testes full size" (Lamb specimen labels); range, habitat, and dates. Elevations: sea level to 6,300 feet.

*S. t. moreletti* (Bonaparte).—Common permanent resident in habitats similar to those of *S. t. torqueola*, occurring within general range of tropical evergreen forest and adjacent extreme lower reaches of cloud forest along entire length of Atlantic Region south and west to San Miguel Soyaltepec, Vista Hermosa, Moctum, Tutla, and Escuilapa.
Should be sought in Pacific Region east of Isthmus. Breeding evidence: "laying" (Lamb specimen label); enlarged testes (7 x 6 mm). Elevations: 100 to 4,900 feet.

I am by no means convinced that *torqueola* and *moreletti* are conspecific, as 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 Totontepec, Oaxaca, and between Atlixco and Huauchinango, Puebla.

*Sporophila aurita* (Bonaparte). Variable Seedeater.

Very uncommon permanent resident in Atlantic Region in tropical evergreen forest, recorded northwest to a point 1 mile southwest of Valle Nacional and south in Isthmus to "Escuilapa." Ridgway (1901: 572) misquotes Lawrence (1876: 20) as listing this species from Guichicovi. Breeding evidence: slightly enlarged testes (4 x 3 mm); range, habitat, and dates. Elevations: 300 feet; record for Escuilapa perhaps higher but elevations of town and exact point of collection unknown).

*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 (fresh-water only?), recorded only at Tepanatepec, Tehuantepec City, and mouth of Río Tonameca.
To be expected elsewhere in lowlands of Pacific Region.
Breeding evidence: enlarged testes (6 x 4 mm). Elevations: sea level to 100 feet.

Amaurospiza relicta (Griscom). Slate-blue Seedeater.

One specimen examined, a female taken by Avilés on 13 December 1941 in Atlantic Region at Moctum; two additional 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, a point 36 kilometers (22.4 miles) by road north of San Gabriel Mixtepec, 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 kilometers farther north. Status uncertain; probably a rare permanent resident in humid pine-oak forest of Atlantic and Pacific Regions west of Isthmus. Should be sought in the Interior. Breeding evidence: habitat and probably range and dates. Elevations: not known with exactitude but roughly estimated as from 4,600 to 5,300 feet.

Oryzoborus funereus Sclater. Thick-billed Seed-Finch.

Two records, both for Atlantic Region, one adult male (type of species, presumably in BMNH) taken by Boucard in April 1859 at an unknown elevation at "Suchapam" (P. L. Sclater, 1859b: 378) and another specimen (ARPC 5442, sex?) collected by Schaldach on 12 December 1959 (at about 300 feet elevation) at a point 26 road miles north of Matías
Romero. Status uncertain; probably, a rare permanent resident in Atlantic Region in tropical evergreen forest. Breeding evidence: range, habitat, and probably dates.

*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 temperate 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). Breeding evidence: nest with one egg. Elevations: sea level to 5,050 feet.

*Spinus notatus* (Du Bus). Black-headed Siskin.

Permanent resident from Isthmus westward in all Regions, fairly common in humid pine-oak forest and uncommon in arid pine-oak forest, for the most part occurring at higher elevations but ranging down to 4,350 feet in Pacific Region in Sierra de Miahuatlán and to 700 feet in Isthmus (Chivela and La Ranchería). To be expected in similar habitats east of Isthmus. Specimens from San Miguel Soyaltepec (two males and two females, 3 and 6 January and 15 and 17 February 1944, respectively, MLZ, Avilés) probably represent winter visitors to tropical evergreen forest if data on labels are correct. Breeding evidence: range, habitat, and dates. Elevations: 700 to 9,000 feet.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Spinus psaltria (Say). Lesser Goldfinch.

Common permanent resident in the Interior, occurring primarily in arid temperate scrub and associated guamil, 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 miles west of San Pedro Totolapan and 8 road miles south of San Andrés Miahuatlán. Recorded in Atlantic Region only at Moctum (female, MLZ 34921, 12 December 1941, probably collected by Avilés). Two records for Pacific Region, one bird seen and another collected (male, 10.0 grams, little fat, skull completely ossified, testes small) by Morony on 22 May 1964 at 2,400 feet elevation 1 mile east of Putla de Guerrero, and one seen by Binford on 20 February 1964 at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande. Should be sought east of Isthmus. Breeding evidence: nest with eggs (26 September). Elevations: Pacific Region, 300 feet and 2,400 feet; Interior Region, 3,200 to 7,000 feet.

*Loxia curvirostra* Linnaeus. Red Crossbill.

Occurs in humid pine-oak forest in Pacific Region in Sierra de Miahuatlán and in the Interior in Sierra Aloapaneca; probably an uncommon permanent resident. Only four records: species seen by R. H. Long on 28 August 1954 at La Cumbre (L. L. Short, in litt.); one juvenal female (ARPC 6147, ovary undeveloped, skull all unossified, rather little fat) collected by A. R. Phillips and J. S. Rowley from flock of four
birds at Río Jalatengo on 11 May 1962; one immature male (39.8 grams, little fat, testes minute, Morony) collected from flock containing one adult male, one adult female, and four immatures found by Morony and Binford on 14 May 1964 at 4,350 feet elevation 16 road miles north of San Gabriel Mixtepec; one adult male (ARPC 7702, little fat, left testis 4.2 x 3, right 3.2 x 3 mm, skull completely ossified) and one adult female (ARPC 7706, ovary and oviduct not enlarged) collected by A. R. Phillips on ridge above Río Molino on 11 November 1964 (A. R. Phillips, in litt.). To be expected in suitable habitat elsewhere in state, at least west of Isthmus. Breeding evidence: range, habitat, and possibly dates. Elevations: 4,350 to 9,000 feet.

Atlapetes pileatus Wagler. Rufous-capped Brush-Finch.

Common permanent resident in humid pine-oak forest west of Isthmus in all Regions, occurring east to "Moctum," Cerro Zempoaltepec, and Río Molino, the easternmost points in entire range of species. Breeding evidence: "fledgling" [=prejuvenal?] collected (Rowley, 1966: 197); nest with eggs. Elevations: 5,800 to 10,800 feet (records for Moctum and a point above San Gabriel Mixtepec perhaps lower but elevations of localities and exact points of collection unknown).

Atlapetes albinucha (Lafresnaye and D'Orbigny). White-naped Brush-Finch.

Fairly common permanent resident in Atlantic Region in undergrowth of cloud forests of Sierra de Juárez (Vista
Hermosa and a point 15 road miles southwest of Valle Nacional) and Sierra de Zempoaltepec ("Amatepec," Moctum, and "Totontepec"). Breeding evidence: enlarged testes (8 x 4 mm).

Elevations: 4,100 to 4,900 feet (records for Amatepec and Totontepec probably higher but elevations of former town and both points of collection unknown).

Atlapetes brunneinucha (Lafresnaye). Chestnut-capped Brush-Finch.

Common to locally very common permanent resident in undergrowth of humid pine-oak and cloud forests throughout state. Occurrence below 4,100 feet elevation, based on nine specimens (MLZ) taken by Avilés between 5 January and 14 February 1944 at "[San Miguel] Soyaltepec, 600 m.,” needs substantiation; specimens probably collected in mountains well above town but if taken at town, must represent winter visitants only. Breeding evidence: prejuvenal. Elevations: 4,100 to 9,300 feet (but see above).

Arremon aurantiicrostris Lafresnaye. Orange-billed Sparrow.

Fairly common permanent resident in Atlantic Region in underbrush of tropical evergreen forest, recorded northwest to San Miguel Soyaltepec and south in Isthmus to Escuilapa. Breeding evidence: enlarged testes (8 x 5 mm). Elevations: 250 to 1,900 feet.
Arremonops rufivirgatus (Lawrence). Olive Sparrow.

Common to locally very common permanent resident in underbrush and guamil within general ranges of tropical evergreen and tropical deciduous forests, occurring in two allopatric and racially distinct populations, one in Atlantic Region south in Isthmus to Sarabia and the other in Pacific Region east to Huamelula. Breeding evidence: prejuvenal. Elevations: sea level to 2,400 feet.

Pipilo ocai (Lawrence). Collared Towhee

Fairly common to very common permanent resident in humid pine-oak forests of Atlantic and Interior Regions, occurring east to Moctum, Cerro Zempoaltepec, and mountains near Santa María Ozolotepec (at La Cieneguilla), the easternmost localities in entire range of species. Sympatric with P. erythrophthalmus, without interbreeding, on Cerro San Felipe and perhaps elsewhere in state. Unrecorded in Sierra de Cuatro Venados. Breeding evidence: nest with eggs. Elevations: 7,100 to 10,800 feet (records for Moctum, Tonaguía, and Totontepec perhaps lower but elevations of first two towns and all three points of collection unknown). See P. erythrophthalmus.

Pipilo erythrophthalmus (Linnaeus). Rufous-sided Towhee.

Common to very common permanent resident in the Interior, occurring primarily in oak scrub and arid pine-oak forest but also extending into adjacent arid temperate scrub and humid pine-oak forest; recorded east to Totontepec, Cerro Zem-
poaltepec, a point 4 road miles east of Santiago Matatlán, and a point slightly northwest of San José del Pacifico. Generally occurs at lower elevations and in more arid habitats than *P. ocai*, although the two frequently overlap. Breeding evidence: "Laying" and "breeding" (Miller, Friedmann, Griscom, and Moore, 1957: 355); enlarged testes (11 x 6 mm). Elevations: 5,100 to 10,800 feet.

*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, an adult male (USNM 50235) said to have been 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, as the range of this subspecies does not approach the borders of the state.


Fairly common permanent resident in northwestern portion of Interior in arid temperate scrub and adjacent oak scrub, recorded with certainty only at the following localities: at Tamazulapan del Progreso, at points 2 miles west, 3 miles northwest, 8 miles east-southeast, and 9 miles south of that town, and at points 16 and 34 road miles north-northeast of Huajuapan de León. Oaxaca localities are southeasternmost.
in entire range of species. At first three and last of
these localities, *P. fuscus* is sympatric with *P. albicollis.*
In the opinion of J. T. Marshall (*in litt.*) and myself,
twenty-four specimens (MLZ) taken by Avilés, supposedly at
"Mitla" [=San Pablo Villa de Mitla] in 1942 and 1943, prob­
ably came from the state of Puebla, for intensive field work
has failed to disclose substantiating records from Oaxaca
Valley. Since the race *toroi* Moore was described from these
"Mitla" specimens, its range and type locality become
Elevations: 5,600 to 7,100 feet.

*Pipilo albicollis* Sclater. White-throated Towhee.

Common permanent resident in the Interior, occurring
primarily in arid temperate scrub but occasionally extending
through oak scrub up to lower limit of arid pine-oak forest.
Recorded from Huajuapan de León, a point 34 road miles north­
northeast of that town, and Santos Reyes Pápalo (sight record,
October 1894, original field notes of Nelson and Goldman in
USNM) south to San Miguel Sola de Vega and a point 3 miles
southeast of Santa María Asunción Tlaxiaco and east to
Moctum, Cerro Zempoaltepec, and points 2 road miles east of
Santiago Matatlán and just northwest of San José del Pacifico,
the easternmost localities in entire range of species.
Breeding evidence: prejuvenal. Elevations: 3,700 to 7,300
feet (probably higher at a point 3 miles southeast of Santa
María Asunción Tlaxiaco but exact elevation unknown). See *P.
fuscus.*
Melozone kieneri (Bonaparte). Rusty-crowned Ground-Sparrow.

Very uncommon permanent resident in Pacific Region west of Isthmus and in the Interior, Oaxaca localities being easternmost in entire range of species. Preferred habitats uncertain; occurs in arid scrub, oak scrub, and perhaps other habitats. Only five definite records: adult male (probably in BMNH) collected by Boucard on 1 May 1871 at Putla de Guerrero (Sharpe, 1888: 732); female (USNM 136118) taken by Nelson and Goldman on 14 October 1894 at [=above?] San Juan Bautista Cuicatlán; male (ARPC 6747) collected by A. R. Phillips on 22 May 1964 at a point "4 miles by road southeast of pass southwest of Sola de Vega" (approximately 17 road miles southwest of San Miguel Sola de Vega); one seen by G. H. Lowery, Jr., on 19 March 1965 at 5,800 feet elevation along Pan-American Highway between Puebla border and a point 7.8 miles into Oaxaca; nest with two eggs found by Roland Galley on 20 June 1965 at 4,600 feet elevation on main road above Putla de Guerrero (Rowley, 1966: 198).

Oriturus superciliosus (Swainson). Striped Sparrow.

Locally a fairly common permanent resident in the Interior, occurring in scrubby and grassy openings in or near humid pine-oak forest. Found in only three localities, the southeasternmost in entire range of species, where recorded as follows: "common in wet meadows above 9,000 feet" (original field notes of Nelson and Goldman in USNM) at a point 15 miles southwest (given no specimen label as "west")
of Oaxaca City, where a male prejuvenal (USNM 144015) taken on 12 September 1894; four seen by Morony and Binford on 16 May 1964 at 7,500 feet elevation 6 road miles southwest of San Andrés Chicahuaxtla; one seen on 24 May and four seen and two others collected on 25 May 1964 (41.1 grams, largest follicle 5 mm, Morony; 36.9 grams, largest follicle 1 mm, Binford; both birds females with little fat and completely ossified skulls) at 8,000 feet elevation at a point 1 mile north of San Andrés Chicahuaxtla.

*Passerculus sandwichensis* (Gmelin). Savannah Sparrow.

Winter resident, common in savanna of lowlands of Pacific Region from Guerrero border east to mouth of Río Tonameca. One certain record for Interior, a male taken by Boucard in October 1857 at "Parada" [=La Parada] (P. L. Sclater, 1858: 303). Two certain 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 Avilés supposedly on 8 June 1942 at "Mitla" [=San Pablo Villa de Mitla] presents an unlikely combination of date and locality, especially doubtful in view of known errors on other Avilés specimens labeled "Mitla" (see *Agelaius phoeniceus* and *Pipilo fuscus*). Listed by Miller, Friedmann, Griscom, and Moore (1957: 365) as breeding in Oaxaca, probably on basis of doubtful Mitla record; absence of additional summer records indicates nonbreeding status.
Dates: October; 9 November to 28 April; possibly 8 June (see above). Elevations: sea level to 300 feet; about 7,900 feet (La Parada, elevation at exact point of collection unknown).

*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 miles west-northwest of San José Estancia Grande), fairly common in remainder of lower portions of Pacific Region and thence north across Isthmus into Atlantic Region as far as Sarabia, and uncommon in the Interior (Oaxaca City, San Felipe del Agua, and San Miguel Sola de Vega). Apparently a rare and local permanent resident; one definite summer record, a male (MLZ 26125) taken by Avilés on 15 June 1939 in Atlantic Region at Tutla; specimens in BMNH taken in the Interior at "Sola" [=San Miguel Sola de Vega] and Oaxaca City said to represent breeding birds (van Rossem, 1934a: 360), but dates not given. Breeding evidence: range, habitat, and probably dates. Dates of known winter residents: 22 October to 22 March; 21 April (1962, Sarabia, adult female, AMNH 778461, very fat, ovary not enlarged, Schaldach, "one of many seen"). Elevations for winter residents: sea level to 5,700 feet.

*Poecetes gramineus* (Gmelin). Vesper Sparrow.

Very uncommon winter resident in the Interior in arid temperate scrub and adjacent savanna, recorded east to a
point 3 road miles east of Santa María del Tule. Dates: 26 October to 8 May. Elevations: 5,100 to 5,600 feet.

*Chondestes grammacus* (Say). Lark Sparrow.

Occurs in savanna, cultivated land, and guamil within general ranges of tropical deciduous forest, arid temperate 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. One record for Atlantic Region, a female (MLZ 34954) taken by Avilés on 6 November 1941 at Moctum. Dates: 22 September to 29 April. Elevations: sea level to 6,300 feet.

*Aimophila mystacalis* (Hartlaub). Bridled Sparrow.

Common permanent resident in the Interior primarily in arid temperate scrub but also in adjacent oak scrub and adjacent arid tropical scrub, recorded from Teotitlán del Camino and points 34 road miles north-northeast of Huajuapan de León (3 miles northeast of Santiago Chazumba) and 4.5 road miles west-northwest of Tamazulapan del Progreso southeast through San Juan Bautista Cuicatlán and San Pablo Villa de Mitla to San Juan del Río, Santa María Coyotepec, and a point 1.3 miles northwest of Lajarcia, the southeasternmost localities in entire range of species. Specimen from "San
Juan Bautista Cuicatlán" (Nelson and Goldman) perhaps taken in arid tropical scrub, although original field notes (USNM) state "dry hillslopes at the border of the valley." Breeding evidence: egg without shell in oviduct. Elevations: 3,000 to 6,100 feet (record for San Juan Bautista Cuicatlán perhaps lower but elevation at exact point of collection unknown; see also above).

*Aimophila humeralis* (Cabanis). Black-chested Sparrow.

Common presumptive permanent resident in Pacific Region in arid tropical scrub at edges of savanna at a point at 300 feet elevation 9 road miles west-northwest of San José Estancia Grande, where Morony and Binford recorded 3 to 12 individuals daily from 13 through 20 February 1964. Female (21.9 grams, little fat, follicles not enlarged) taken by Binford on 14 February is only specimen for state. Oaxaca records are southeasternmost in entire range of species. Breeding evidence: range, habitat, and probably dates.


Permanent resident in arid tropical scrub in parts of Atlantic and Pacific Regions, common in Isthmus region from Pacific coast west to Tehuantepec City, east to Chiapas border, and north to Santa Efigenia and a point 3 miles north of Matías Romero and uncommon in western part of Pacific Region from Guerrero border east to a point 16 road miles northwest of Puerto Escondido. Should be sought between Puerto Escondido and Tehuantepec City and in upper portion of
Rio Tehuantepec basin. Breeding evidence: enlarged testes (8 x 5 mm). Elevations: sea level to 800 feet.

*Aimophila sumichrasti* (Lawrence). Cinnamon-tailed Sparrow.

Common permanent resident in arid tropical scrub on Pacific side of Isthmus, recorded east to Santa Efigenia, west to Las Tejas and through Rio 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. Breeding evidence: prejuvenal. Elevations: sea level to 3,000 feet.

*Aimophila notosticta* (Sclater and Salvin). Oaxaca Sparrow.

Very uncommon permanent resident in the Interior in oak scrub and adjacent arid temperate scrub, recorded only at "Ejutla de Crespo," at Tamazulapan del Progreso, on Cerro San Felipe, and at a point 4 road miles east of Santiago Matatlán (same locality as recorded on some specimen labels as "4½ mi. SE Matatlan"). Probably endemic to Oaxaca but perhaps occurring in Puebla as well. Breeding evidence: "large eggs" (Lamb specimen label); enlarged testes (7 x 5 mm). Elevations: 6,000 to 6,100 feet (probably higher on Cerro San Felipe and lower for Ejutla de Crespo record but elevations at exact points of collection unknown).
Aimophila rufescens (Swainson). Rusty Sparrow.

Occurs primarily in arid pine-oak forest of Atlantic and Pacific Regions, but also found in parts of the Interior in arid pine-oak forest and in Atlantic and Pacific Regions in oak patches, brushy openings, and at edges of savanna as these habitats occur within general ranges of tropical evergreen forest, tropical semideciduous forest, humid pine-oak forest, and tropical deciduous forest. Common permanent resident throughout foothills and mountainsides of Atlantic and Pacific Regions. Found in Pacific Region west of Isthmus from Putla de Guerrero east to Santa Lucía, occurring between 900 and at least 5,300 feet elevation, primarily in arid pine-oak forest but also in oak patches and brushy openings in extreme upper reaches of tropical deciduous forest (rarely) and within general ranges of tropical semideciduous forest and humid pine-oak forest. Found in Atlantic Region from 250 to 1,900 feet elevation (records for "Moctum" and "Totontepec" undoubtedly much higher but elevations of former town and both points of collection unknown), occurring in oak patches, at edges of savanna, and in brushy openings within tropical evergreen forest, recorded south in Isthmus at least to a point 3 miles east of Matías Romero. Also recorded in foothills on Pacific side of Sierra Madre de Chiapas at Tapanatepec and Rancho Sol y Luna, occurring probably in arid pine-oak forest, the population there most likely being continuous with Atlantic Region populations through low gaps at eastern end of Oaxaca portion.
of Sierra Madre de Chiapas but perhaps also connecting at western end of this mountain chain. Recorded in Río Tehuantepec basin only at points 3 miles south of Nejapa and 4.6 miles southeast of El Cameron, presumably in arid pine-oak forest. Locally fairly common permanent resident in the Interior at a point 25.5 kilometers (15.8 miles) south of San Pedro Juchatengo and at 7,000 feet elevation on ridge above San Miguel Sola de Vega, these populations probably continuous with birds in Pacific Region in Sierra de Miahuatlán. Breeding evidence: prejuvenal. Elevations: 250 to 7,000 feet.

Aimophila ruficeps (Cassin). Rufous-crowned Sparrow.

Fairly common permanent resident in oak scrub, adjacent upper limits of arid temperate scrub, and adjacent lower limits of arid pine-oak forest, occurring in Pacific Region at a point 11 road miles southwest of San Andrés Chicahuaxtla and throughout most of Interior east to Los Bichones and a point 3 miles south of Nejapa, the easternmost localities in entire range of species. Breeding evidence: prejuvenal. Elevations: 4,000 to 7,000 feet (perhaps slightly lower at a point 3 miles south of Nejapa but exact elevation unknown).

Aimophila botterii (Sclater). Botteri's Sparrow.

Locally a fairly common permanent resident in savanna within arid temperate scrub and pine-oak forest, recorded in the Interior in Oaxaca Valley from Oaxaca City east to a point 3 road miles east of Santa María del Tule and in
Pacific Region at Chivela, Rancho de Cacoprieto, Tapanatepec, and a point about 2 miles north of Rancho Sol y Luna. Also recorded by Rébouch from Putla de Guerrero (Salvin and Godman, 1879-1904 [1886]: 390), where occurring presumably in savanna. Breeding evidence: "nest" (Webster, 1959: 137); enlarged testes (10 x 6 mm). Elevations: 1,000 to 5,150 feet (doubtless much lower in easternmost localities, but exact elevations there unknown).

A. b. petenica (Salvin) is listed for northern Oaxaca by Miller, Friedmann, Griscom, and Moore (1957: 378) on the basis of a specimen (MLZ) taken by Lamb on 18 February 1951 at 450 feet elevation at a point 7 miles southeast of Loma Bonita. This record, however, pertains to Arroyo Claro, state of Verazruz (Lamb, original field notes and pers. comm.). I follow Webster (1959) in considering petenica a race of A. botterii.


Permanent resident in the Interior, common in more open portions of humid pine-oak forest and uncommon in adjacent arid pine-oak forest, occurring east to Cerro Zempoaltepec, a point 6 miles east of San Pablo Villa de Mitla, and a point near Río Molino, the easternmost localities in entire range of species. Breeding evidence: nest with one young and one egg. Elevations: 6,500 to 9,300 feet (probably lower at several localities where elevations at exact points of record are unknown).
**Spizella passerina** (Bechstein). Chipping Sparrow.

Fairly common winter resident and uncommon to locally fairly common permanent resident, breeding in arid pine-oak forest from northern portion of Interior east through Isthmus mountains to Pacific side of Sierra Madre de Chiapas and extending during nonbreeding season into Interior humid pine-oak forest (where also breeding?) and arid temperate scrub. Recorded in Tehuantepec region from Chivela north to La Ranchería, Guichicovi, and a point 4 miles north plus 2 miles east of Matías Romero. Should be sought throughout Interior, but so far recorded south only to San Francisco Tlapancingo, a point 3 miles northwest of Tamazulapan del Progreso, Llano Verde (Lamb), and San Pablo Villa de Mitla. Unrecorded in either Atlantic or Pacific Regions west of La Ranchería. Breeding evidence: enlarged testes (9 x 5 mm). Elevations: 600 to 9,000 feet.

**Spizella pallida** (Swainson). Clay-colored Sparrow.

Very uncommon winter resident in the Interior in arid temperate scrub, recorded only at Huajuapan de León, Guelatao, San Pablo Villa de Mitla, and a point 6 road miles east of Santa María del Tule. Dates: 19 November to 6 May. Elevations: 5,100 to 6,300 feet.

**Spizella atrogularis** (Cabanis). Black-chinned Sparrow.

Very uncommon permanent resident in the Interior in arid temperate scrub and steppe, recorded with certainty only from Tamazulapan del Progreso and points 34 road miles north-
northeast of Huajuapan de León (or 3 miles northeast of Santiago Chazumba), 6 road miles northeast of San Pedro y San Pablo Teposcolula, and 2 road miles southeast of Asunción Nochixtlán, the latter point the easternmost definite locality in entire range of species. Occurrence at "Mitla" [=San Pablo Villa de Mitla] (male specimen, MLZ 34993, 4 June 1942, Avilés) needs substantiation by additional data in light of known errors on other Avilés "Mitla" specimen labels (see *Agelaius phoeniceus* and *Pipilo fuscus*). Breeding evidence: "large eggs" and "testes full size" (Lamb specimen labels); range, habitat, and dates. Elevations: 6,000 to 7,300 feet.


Fairly common winter resident in all Regions, occurring in tropical evergreen forest, arid and humid pine-oak forests, tropical deciduous forest, humid gallery forest, and arid temperate scrub. Recorded east to a point 18 road miles north of Matías Romero but to be expected also east of Isthmus. Dates: 13 October to 5 May. Elevations: sea level to 9,700 feet.
Phaethon aethereus Linnaeus. Red-billed Tropicbird.

On 20 April 1964 about 3 miles offshore from Puerto Angel, the Berretts and I observed a solitary tropicbird circling high above the water. Although identified at the time as aethereus, it possibly was one of the other two species, P. lepturus Daudin or P. rubricauda Boddaert.

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.

Plegadis chihi (Vieillot). White-faced Ibis.

Although on geographical grounds the White-faced Ibis might be expected as a winter resident or even a permanent resident, the only reference that I can find is made by Friedmann, Griscom, and Moore (1950: 35), who fail to give supporting data in listing the state of Oaxaca as within the range of this species.
Chen caerulescens (Linnaeus). Blue Goose.

The only Oaxaca reference to the Blue Goose is the statement by Leopold (1959: 129): "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 or over Oaxaca, such a record is not sufficient to warrant inclusion of either species on the main list.

Evidence indicates that the Snow and Blue geese are color phases, or perhaps subspecies, of a single species, C. caerulescens (see Parkes, 1958); but for the purposes of the present survey, I prefer to maintain the two as separate species.

Chen hyperborea (Pallas). Snow Goose.

Friedmann, Griscom, and Moore (1950: 37) and Blake (1953: 44) list the state of Oaxaca in the range of the Snow Goose. I cannot, however, find any definite data to substantiate these assertions and, therefore, consider them doubtful. See preceding account regarding Leopold's reference to this species.

Anser albifrons (Scopoli). 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 [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. Since 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 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.

*Anas cyanoptera* Vieillot. Cinnamon Teal.

Although the Cinnamon Teal probably is a winter resident on the Pacific coast and perhaps elsewhere, I can find no reliable records for the state. Friedmann, Griscom, and Moore (1950: 41) claim that this species is "recorded from all states except Durango, Querétaro, Campeche, Yucatán, and Quintana Roo." I am, however, unable to find any Oaxaca record prior to 1950 and must assume that failure to exclude Oaxaca was an error. 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. No specific Oaxaca record, however, is mentioned in the text,
and inclusion of the state on the range map should not be construed as a definite 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 listing implies the presence of both teal species, in my opinion mere implication is not sufficient basis for inclusion of the Cinnamon Teal on the main list.

**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. Until records with more specific details are forthcoming, I prefer to relegate the Redhead to the Hypothetical List.

**Oxyura dominica** (Linnaeus). Masked Duck.

Rojas (1955: Map 12, p. 153) includes the entire Pacific Region of Oaxaca within the general range of this species but gives no specific data for support.

**Ictinia misisippiensis** (Wilson). Mississippi Kite.

Mere listing of the state of Oaxaca by Beristain and Laurencio (1894: 223) and by Friedmann, Griscom, and Moore (1950: 50) is not, in my opinion, sufficient basis for inclusion of *Ictinia misisippiensis* on the main list, even
though the species 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 records.

**Buteo harlani** (Audubon). Harlan's Hawk.

P. L. Sclater (1859b: 389) records as this species 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 Harlan's Hawk. This species has not otherwise been recorded in México (American Ornithologists' Union Committee on Classification and Nomenclature, 1957: 106). Although I have not seen the specimen that formed the basis for Sclater's statement, I strongly suspect that it is a dark-phase example of *B. jamaicensis*.

**Falco mexicanus** Schlegel. Prairie Falcon.

In the published minutes of a meeting of the Deutsche ornithologische Gesellschaft en Berlin held on 6 November 1871 (Jour. f. Orn., 20: 156, 1872) is the statement that Cabanis 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 amended 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. Pending a search of the collections of the Berlin Museum, I see no course but to consider F. mexicanus as of hypothetical occurrence in Oaxaca.

Oreophasis derbianus Gray. Horned Guan.

Thomas MacDougall (pers. comm.) informs me that natives from Zanatepec have seen the "faisan de cuerno rojo" in cloud forest at high elevation at the western end of the Sierra Madre de Chiapas. Certainly the occurrence of the Horned Guan in this area would not be unexpected, as 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 airline miles north-northeast of Zanatepec; the highest elevation at that point, however, was less than 5,200 feet, slightly below the lowest elevation (1,600 meters or 5,248 feet) from which this species has been reported in Chiapas. A search should be made on the higher slopes of Picacho Prieto.

Meleagris gallopavo Linnaeus. Common Turkey.

I can find no unquestionable Oaxaca record for the Common 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. I am told by Thomas

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
MacDougall (in litt.) that a few years ago he saw several turkeys in oaks of the slopes of the Sierra Madre de Chiapas and that the inhabitants of this area claim to have seen others near the headwaters of the Río Ostuta in June 1964. A specimen is needed to substantiate these records and to determine if the birds are of wild or domestic stock.

**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, Griscom, and Moore (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 actual specimens or literature references to any, I must assume that Sumichrast's records are based on observations alone and therefore may involve misidentification.

**Larus argentatus** Pontoppidan. Herring Gull.

The Herring Gull has been recorded in Guerrero and Chiapas (Friedmann, Griscom, and Moore, 1950: 104) and therefore would be expected in Oaxaca. The only possible record, however, is the observation of several gulls in 1939 by F. W. Loetscher (in litt.), who makes the following statement: "On both March 21 and 22 at Salina Cruz waterfront five gulls believed to be of this species were closely observed. Both
days at least one (according to my field notes) was an adult, definitely not *californicus* or *delawarensis*. The other four may have been *californicus*." The difficulties of identifying gulls in the field lead me to relegate the Herring Gull to the Hypothetical List until a specimen is procured.

*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 U. S. National Museum, I found a badly worn immature example of *L. delawarensis* (USNM 58953) that at one time in the past had been called *L. californicus*. Whether or not this is the specimen on which Lawrence based his Oaxaca record of *californicus* cannot be determined, as both species were supposed to have been taken by Sumichrast at "San Mateo" [=San Mateo del Mar] 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 southwest of Colima shed considerable doubt on the Oaxaca record.
Sterna dougallii Montagu. Roseate Tern.

Lawrence (1876: 51) records a Sumichrast specimen supposed to be $S. \text{dougallii}$ taken at "Ventosa Bay" [=Bahia 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 United States National Museum, 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 in light of Lawrence's misidentification of other terns (see Sterna hirundo).

Columba leucocephala Linnaeus. White-crowned Pigeon.

The only supposed record for the White-crowned Pigeon is given by Friedmann, Griscom, and Moore (1950: 114), who 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, Harvard University, and that the authors were not informed as to what type of data formed the basis for it. R. A. Paynter (in letter 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 American Ornithologists' Union Committee on Classification and Nomenclature (1957: 258), presumably following Friedmann, Griscom, and Moore
(ibid.), also list Salina Cruz. In view of the facts that such an unusual record was not published prior to 1950 and Paynter could locate no supporting data in the Museum of Comparative Zoology, I must relegate Columba leucocephala to the Hypothetical List.

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." In view of the known range of this species and the author's failure to mention the state of Oaxaca or give substantiating data, I place the Thick-billed Parrot on the Hypothetical List.

Otus flammeolus (Kaup). Flammulated Owl.

A map presented by Hasbrouck (1893: 260) includes Oaxaca in the range of this species, but no specific Oaxaca 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 feet elevation at La Cumbre. Two of these birds were calling "boop," and the third gave a "bootle-oop-poop." Although the La Cumbre record sounds convincing, I prefer to relegate the Flammulated Owl to the Hypothetical List until a specimen is secured.
Streptoprocne semicollaris (De Saussure). White-naped Swift.

On 3 June 1959 G. L. Brody, J. Hubbard, D. A. Zimmerman, and I saw a flock of 75 large swifts swirling low over humid gallery forest in the Pacific Region 8.9 road miles east of Tapanatepeck along the Pan-American Highway. Although we were convinced at the time of observation that these were White-naped Swifts, the rarity of this species now causes me to question our identification.

Selasphorus floresii Gould.

The type locality of Selasphorus floresii, a 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 (DuBus). Keel-billed Motmot.

Two specimens in the American Museum of Natural History are labeled "Tolosa, Mexico." One of these (AMNH 74634) is a female collected by A. E. Colburn and P. W. Shufeldt (original number 446) on 21 December 190? (date obscured but probably 1900). The other specimen (AMNH 74635) is a male and bears no data other than sex and locality. Ridgway (1914: 475) lists Tolosa, Veracruz, as a locality for Electron but fails to cite any reference for this record; 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 concur. However, until
such time as these specimens of *Electron* can be shown definitely to have come from the Oaxaca locality or additional records are obtained in the state, the species must remain on the Hypothetical List.

**Piculus aeruginosus** (Malherbe). Bronze-winged Woodpecker.

This species is recorded by Miller, Friedmann, Griscom, and Moore (1957: 28) from "Oaxaca (western mountains)" and "Guerrero (Atoyac, intermediate)." The latter record is based on a specimen of *P. aeruginosus* taken by H. H. Smith at "Atoyac" and listed by Salvin and Godman (1888-1904 [1895]: 406) without state and as an intermediate between *P. aeruginosus* and *P. rubiginosus* (see *P. rubiginosus* for discussion of alleged intermediacy of this specimen). This Atoyac record, however, definitely pertains to Atoyac, Veracruz, a small town about 10 miles east of Córdoba along the railroad to the city of Veracruz. That such is the case is indicated by the statement made by Salvin and Godman (1888-1904 [1892]: 233) that "Mr. Herbert Smith [found *Formicarius*] at Atoyac, near the foot of the mountains between Vera Cruz and the plateau." Further, of the eight additional specimens 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 México 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. The locality Teotralcingo listed by P. L. Sclater (1859b: 388) pertains to P. rubiginosus. P. aeruginosus should be sought in extreme northern Oaxaca in the vicinity of Cosolapa.

**Empidonax virescens** (Vieillot). Acadian Flycatcher.

Miller, Friedmann, Griscom, and Moore (1957: 86) record as *E. virescens* a female specimen (MLZ 36136) taken by Avilés on 11 December 1941 in the Atlantic Region at Moctum. A. R. Phillips, N. K. Johnson, and I have examined this specimen and find it to be a typical example of *E. hammondii* (Xantus).

**Iridoprocne bicolor** (Vieillot). Tree Swallow.

Records from "Cacoprieto" [=Rancho de Cacoprieto] (Sumichrast, 1881: 243) and the state of Oaxaca (Miller, Friedmann, Griscom, and Moore, 1957: 114) lack specific details and probably are not based on specimens. The observations of a single bird in the Interior at Monte Albán on 16 May 1957 (Coffey, 1960: 294) is doubtful in light of the unusual date and locality. Because of the difficulty of separating bicolor from *I. albilinea* (Lawrence) and *Tachycineta thalassina* (Swainson) in the field, I prefer to disregard records not definitely based on specimens.
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 at a point 1 mile 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 all of their thrush records doubtful.


Numerous authors, apparently beginning with Lawrence (1876: 12), have listed P. nigriceps for Oaxaca. All such records are based on misidentifications of P. albiloris vanroossemi Brodkorb.

Dendroica chrysoparia Sclater and Salvin. Golden-cheeked Warbler.

P. L. 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 (Townsend).

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.
Icterus chrysater (Lesson). Yellow-backed Oriole.

Blake (1953: 515) extends the range of this species "... north to Oaxaca and Veracruz." In answer to my query, Blake (in litt.) informs me that his listing of Oaxaca was evidently an error, as he can now find no basis for his published statement.

Sturnella neglecta Audubon. Western Meadowlark.

Brigham (1963) heard what he believed to be the song of a Western Meadowlark on 13 August 1953 in the Interior 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 magna, which is somewhat similar to that of neglecta.

Piranga olivacea (Gmelin). Scarlet Tanager.

Lenna (1963: 8; and 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.

Chlorura chlorura (Audubon). Green-tailed Towhee.

Miller, Friedmann, Griscom, and Moore (1957: 351) extend the range of this species to Oaxaca on the basis of three specimens taken by Avilés supposedly at "Mitla" [=San Pablo Villa de Mitla] on 5 January (male, MLZ 35029), 6
January (female, MLZ 35030), and 23 January 1943 (female, MLZ 35031). Erroneous locality data on other Avilés specimens labeled "Mitla" (see Agelaius phoeniceus and Pipilo fuscus) and absence of additional records southeast of the states of Hidalgo and Morelos cast doubt on the Oaxaca records.
ANALYSIS OF THE AVIFAUNA

In this chapter I analyze the current distribution of the Oaxaca avifauna in relation to major habitats and present a probable explanation for current distributional patterns exhibited by the various elements within each habitat. Special emphasis is given to the effects of the Isthmus of Tehuantepec on the distribution of the birds today and in the past.

The physiography, climate, and habitats of the Isthmus of Tehuantepec, as well as the remainder of the state, have already been discussed in previous chapters. To summarize the major points, the Isthmus is a lowland gap extending from the Gulf of México to the Pacific Ocean and separating the mountains of the Mesa del Sur of Oaxaca from the highlands of Chiapas. The Atlantic side is humid tropical in climate and is covered primarily with tropical evergreen forest, while the Pacific side is arid tropical and supports arid tropical scrub, tropical deciduous forest, and extensive savanna. Semiarid, tropical pine-oak forest extends on an east-west axis across the Isthmus through the highest portions of the Isthmus mountains, but subtropical cloud forests, arid temperate scrub, and temperate and subtropical pine-oak
forests, while occurring on both sides, are absent from this tropical low area.

The Isthmus region has long been the subject of speculation among zoologists and geologists. Although some authors disagree, the bulk of evidence supports Schuchert's (1935) theory that there was a Cenozoic (Miocene or Pliocene) seaway extending across the Isthmus between the Pacific Ocean and the Gulf of México. Such a water gap appears to me to be the only way one can account for the evolution of species on one side or the other. That the time factor (Miocene-Pliocene) is the same for both the theoretical water gap and the period of evolution generally conceived for most birds (at least passerines) is especially significant.

The seaway theory, however, can explain only the isolation of a species on one side of the Isthmus or the other; it cannot account for those species that today occur on both sides of the Isthmus in habitats that are now separated by the Isthmus. Thus other factors must be partially responsible for current distributional patterns.

Duellman (1960), working with amphibians, used a theory based on the premise that "climatic fluctuation during the Pleistocene was of sufficient magnitude to cause vegetational shifts, both vertically and latitudinally, resulting in the establishment of alternating continuous and discontinuous lowland and highland environments, although this climatic fluctuation was not so great as to eliminate tropical lowland environments from the region" (p. 45).
This "climatic fluctuation" theory, as presented by Duellman and refined by me, is consistent with the current distribution of amphibians and birds and with the few facts and hypotheses available concerning the effects of climatic variations in southern México during the Pleistocene.

It seems likely that variations in the intensity of the four glaciations produced different effects in southern México. During the glacial maxima, temperatures in the Isthmus mountains were much lower than today, reaching subtropical and occasionally temperate ranges. The presence of glaciers on the high mountains of Costa Rica and México at that time attest to the lower temperatures. Subtropical conditions also existed throughout the lowlands of both slopes except for the immediate coastal areas. In the coastal areas, the warming effects of the Gulf of México and the Pacific Ocean prevented the complete removal of tropical conditions. But since conditions were also arid, humid tropical forests of the Atlantic slope were reduced to isolated pockets where a high water table could provide moisture. Arid tropical vegetation on the Pacific slope, however, was affected only by lower temperatures and hence remained relatively extensive.

In order to account for the apparent movement of cloud forest birds across the Isthmus during maximum glacial advance, periods of greater aridity than today, it is necessary to theorize that humid subtropical forests existed in the Isthmus mountains. Such forests could easily have
developed if the mountains were 2,000 feet or so higher than today. They would then have been in a position to intercept moisture-laden clouds sweeping in off the Gulf of México (and to a lesser extent the Pacific Ocean), while the lowlands would have remained arid, a set of conditions that can be seen today along the Pacific slope of Oaxaca outside the Isthmus. During the strongest glaciations, the Isthmus mountains probably supported temperate pine-oak forest. That neither habitat was absolutely continuous but was narrowly discontinuous, being restricted to the highest peaks, will be seen later. Also during glacial maxima, at least during the height of the Illinoian (third) Glacial Period, the seas were much lower than today, probably by some 300 feet. Thus the lowlands were more extensive and the Isthmus wider.

In summary, during glacial maxima, climatic conditions were cooler and drier, and the lowlands much wider. Humid tropical vegetation occurred in isolated patches confined to the immediate Atlantic coast, humid subtropical or temperate vegetation existed on the highest peaks of the Isthmus mountains, arid tropical habitats occupied a belt along the Pacific coast, and arid subtropical conditions prevailed elsewhere. Probably, the Pacific coast supported mostly arid tropical scrub, with tropical deciduous forest largely disappearing in response to more arid conditions.

During glacial recessions, according to the climatic fluctuation theory, the coastal lowlands of the Isthmus
were completely inundated, since evidence indicates that the seas were some 275 feet higher than today, at least during the Aftonian Interglacial Period. Climatic conditions were warmer and more humid than at present. Hence, the Isthmus mountains could support only humid tropical forest. Such a situation would allow free dispersal of the humid tropical avifauna across the Isthmus on an east-west axis. The avifauna in the arid habitats on the Pacific side, however, probably were isolated east and west of the Isthmus. In making this conjecture, I am assuming that because of physiography, the Isthmus mountains could not support arid habitats. These mountains rise very abruptly from the Pacific lowlands and then descend gradually to the Atlantic lowlands, and so it seems likely that the rains coming off the Gulf of México would overlap the peaks enough to produce humid forest even on the steep Pacific side. Rain from the Pacific would only further these conditions. Such an overlap can be observed today in the Sierra de Tuxtla of Veracruz and to a lesser extent in the Sierra Madre de Chiapas of Oaxaca. This situation might help to explain why many species are endemic to northwestern México and have not spread to Costa Rica (although differences in dispersal rates probably account for most of the variations).

During inundation of the coastal lowlands (below 275 feet), the arid tropical biota could simply have moved slightly higher into the foothills. Although conditions apparently were more humid throughout México and Central
America during glacial recessions, weather patterns were much the same. Hence, the Pacific slope, while receiving more rain, was still under the influence of monsoonal climate, so that arid vegetation remained.

An analysis of the Oaxaca avifauna by habitat cannot be complete because of our still fragmentary knowledge of the composition and distribution of the habitats and the ranges of their avian inhabitants. Therefore, only the most extensive terrestrial habitats and certain aquatic habitats will be treated separately.

Matters are further complicated by winter residents from outside Oaxaca and by wandering or altitudinal migration within the state, making difficult or impossible the task of determining whether or not the presence of a bird in a particular habitat indicates breeding. The following analysis attempts to place bird species in their characteristic breeding habitats, that is, those habitats in which a species breeds most abundantly and which it occupies most extensively. Species that only possibly or probably breed are not included. The total number of species accepted as breeding in the state and hence treated in this analysis is 456.

Many species exhibit a wide tolerance for environmental conditions and cannot be classified as to habitat. These species will be discussed at the outset.

Five species of birds are virtually ubiquitous, occurring in almost all terrestrial habitats from sea level to the tops of high peaks:
Coragyps atratus
Cathartes aura
Myiarchus tuberculifer
Stelgidopteryx ruficollis
Basileuterus rufifrons

The breeding distributions of the five species of swifts believed to nest in the state are too poorly known to allow allocation to habitat. These five species are therefore listed separately:

Streptoprocne zonaris
Chaetura vauxi
Cypseloides rutilus
C. niger
Aeronautes saxatalis

The first three species of swifts listed above occur widely over many habitats in both the Atlantic and Pacific Regions but are rare or uncommon in the Interior. Cypseloides niger and Aeronautes saxatalis, on the other hand, are found only in the Interior, the former over all habitats and the latter only over arid temperate scrub.

Fifty-five species occur in a variety of terrestrial habitats, both humid and arid, and have a wide distribution in México. Many reach the United States and Central America. These species show some segregation according to range. The 34 birds primarily restricted to tropical environments (below about 5,000 feet) of the Atlantic and Pacific Regions are:

Ictinea plumbea
Chondrohierax uncinatus
Buteo magnirostris
B. nitidus
Buteogallus anthracinus
B. urubitinga
Geranospiza caerulescens
Herpetotheres cachinnans
Micrastur semitorquatus
Falco rufigularis
Colinus virginianus
Columba flavirostris
Columbigallina talpacoti
Otus guatemalae
Glaucidium minutissimum
G. brasilianum
Ciccaba virgata
Chlorostilbon canivetii
Dryocopus lineatus
Centurus aurifrons
Phloeoeceastes guatemalensis
Xiphorhynchus flavigaster
Tityra semifasciata
Myiodynastes luteiventris
Myiozetetes similis
Vireo flavoviridis
Geothlypis poliocephala
Icterus gularis
Tanagra affinis
Habia rubica
Saltator coerulescens
Richmondena cardinalis
Cyanocompsa parellina
Arremonops rufivirgatus

The remainder of the 55 species of widespread distribution not only occur in both coastal regions but also enter the arid Interior valleys. Those marked with an asterisk (*) also extend into the lower portions of arid subtropical areas in the Oaxaca Valley and in a few instances near Huajuapan de León and Tamazulapan del Progreso as well. Interestingly enough, all but one (Volatinia jacarina) of the 13 species marked with an asterisk extend north into the southern United States, where they again occupy marginally temperate regions. The 21 species are:

* Polyborus cheriway
* Leptotila verreauxi
  Piaya cayana
* Crotophaga sulcirostris
  Chordeiles acutipennis
  Nyctidromus albicollis
* Dendrocopos scalaris
  Attila spadiceus
  Platypsaris aqlaiae
* Savornis nigricans
* Pyrocephalus rubinus
*Tyrrannus melancholicus  
Megarhynchus pitangua  
*Pitangus sulphuratus  
*Myiarchus tyrannulus  
Myiopagis viridicata  
*Molothrus aeneus  
*Cassidix mexicanus  
*Sporophila torqueola  
*Volatinia jacarina  
Aimophila refescens

Although these 55 species occur in both the humid Atlantic Region and the arid Pacific Region, with some entering the Interior, they present a thought-provoking picture. Many of these species are either somewhat spotty in their distribution or have evolved different races in separate Regions. Some (e.g., Habia rubica, Richmondena cardinalis, and Arremonops rufivirgatus) have evolved very strongly marked races on each slope and are conspicuously absent from the Plains of Tehuantepec, even though the habitat there would seem to be suitable. Some species occupy all of the Pacific Region but are local in the Atlantic Region (e.g., *Icterus gularis*), while many more inhabit all of the Atlantic Region but have disjunct populations in the Pacific Region (e.g., *Ictinea plumbea*, *Glaucidium minutissimum*, and *Geothlypis poliocephala*). The last three species are represented on both slopes by the same race, while some other birds with similar distributions have
evolved races that are well-marked (*Centurus aurifrons*) or faintly marked (*Phloeoecestes guatemalensis*). Still other species are known to inhabit all the tropical lowland areas, some exhibiting racial variation and others not.

Thus the situation is extremely complex. When the distribution of each of these 55 species is known in greater detail, when racial variation is considered, and when due allowance is given to variations in dispersal rates, I suspect that the climatic fluctuation theory will explain most or all of the complexities. Thus *Icterus gularis* could have reached extreme northern Oaxaca when arid conditions extended into the Atlantic lowlands during glacial advance, only to be isolated by dense tropical evergreen forest when the climate became more humid. Species with disjunct populations on the Pacific slope probably were affected by the inundation of much of the Pacific lowlands, especially the Isthmus portion, during extensive glacial recession. Some of these birds have since spread back into the Isthmus, while others have not yet done so.

A number of other species demonstrate wide tolerance for temperature but are primarily restricted to the arid portions of the Interior and Pacific Regions (in savannas, arid tropical scrub, arid temperate scrub, and tropical deciduous forest) and are usually absent from the humid Atlantic Region and the humid forests of the other two Regions. These eight species are:

*Buteo albicaudatus*
Parabuteo unicinctus  
Zenaida asiatica  
Scardafella inca  
Columbiqallina passerina  
Geococcyx velox  
Camptostoma imberbe  
Guiraca caerulea

As would be expected, the Isthmus today presents no barrier to the dispersal of these eight species on an east-west axis along the Pacific lowlands but presents a complete barrier to south to north movement because of the humid tropical evergreen forest on the Atlantic slope.

Tropical evergreen forest, which is confined to the Atlantic Region, contains the largest assemblage of species of any major habitat in Oaxaca. One hundred and forty species are basically inhabitants of tropical evergreen forest, although eight of these also extend into cloud forest and 46 are shared with tropical semideciduous forest, a habitat confined to the Pacific Region.

Species restricted to tropical evergreen forest are presented in the following list. Those followed by a locality name have been recorded from eastern Oaxaca northwest to the stated place, where their ranges in Oaxaca apparently end. In most cases these range terminations correspond to those in southern Veracruz. The remainder of the species occur throughout the length of the Atlantic Region or at least to San Miguel Soyaltepec or Temascal, the northernmost
collecting localities in Oaxaca. The "Valle Nacional area" as used herein includes San Juan Bautista Tuxtepec. The 86 species restricted to tropical evergreen forest are:

- **Tinamus major** (Valle Nacional area)
- **Crypturellus soui**
- **Leucopternis albicollis**
- **Ortalis vetula**
- **Odontophorus guttatus** (Teotalcingo)
- **Columba speciosa** (Valle Nacional area)
- **C. nigrirostris** (Lalana)
- **Claravis pretiosa** (Valle Nacional area)
- **Leptotila plumbeiceps**
- **Aratinga astec**
- **Pionus senilis**
- **Amazona autumnalis**
- **A. farinosa** (Trans-Isthmian Highway)
- **Rhinoptynx clamator** (Trans-Isthmian Highway)
- **Phaethornis longuemareus**
- **Campylopterus curvipennis**
- **Florisuga mellivora**
- **Paphosia helenae** (Valle Nacional area)
- **Amazilia cyanocephala**
- **A. tzacatl**
- **Eupherusa eximia**
- **Trogon massena**
- **T. melanocephalus**
- **Hylomanes momotula**
Momotus momota
Galbula ruficauda
Ramphastos sulfuratus (Valle Nacional area)
Celeus castaneus
Centurus pucherani
Veniliornis fumigatus
Dendrocincla anabatina (Valle Nacional area)
Glyphorhynchus spirurus
Synallaxis erythrothorax
Automolus ochrolaemus
Xenops minutus
Sclerurus guatemalensis (Trans-Isthmian Highway)
Taraba major
Thamnistes anabatinus (Trans-Isthmian Highway)
Microrhopias quixensis
Cercomacra tyrannina
Pipra mentalis
Manacus candei
Schiffornis turdinus (Tutla)
Cotinga amabilis (Valle Nacional area)
Lipaugus unirufus (Valle Nacional area)
Pachyramphus cinnamomeus
Legatus leucophaius
Myiodynastes maculatus
Contopus cinereus
Myiobius sulphureipygis
Todirostrum cinereum
T. sylva
Elaenia flavogaster (Valle Nacional area)
Ornithion semiflavum
Leptopoqon amaurocephalus
Psilorhinus morio
Campylorhynchus zonatus
Thryothorus maculipectus
Henicorhina leucosticta
Uropsila leucoagastra
Hylorchilus sumichrasti
Poliopitila plumbea (Trans-Isthmian Highway)
Ramphocaenus rufiventris
Cyclarhis gujanensis
Hylophilus ochraceiceps (Tutla)
Chlorophanes spiza (Trans-Isthmian Highway)
Coereba flaveola
Granatellus sallaei
Gymnostinops montezuma
Scaphidura oryzivora (Jalalui)
Dives dives
Icterus prosthemelas
I. mesomelas
Tanagra Gouldi
Tangara larvata (Valle Nacional area)
Thraupis episcopus
Phlogothraupis sanguinolenta
Lanio aurantius
Eucometis penicillata (Trans-Isthmian Highway)
Saltator maximus
Caryothraustes polioqaster
Cyanocompsa cyanoides
Tiaris olivacea
Sporophila schistacea (isolated population just east of Trans-Isthmian Highway)
S. aurita (Vanne Nacional area)
Arremon aurantiirostris

Other species are basically inhabitants of tropical evergreen forest but also occur up to about 5,250 feet elevation in adjacent cloud forests of the Atlantic Region. These species have much the same distribution as the 86 species restricted to tropical evergreen forest. Again the northwestern terminations of ranges in Oaxaca are indicated by town names, while those species not so marked are found throughout. These eight species are:

Pionopsitta haematotis (Valle Nacional area)
Campylopterus hemileucurus
Formicarius analis
Pipromorpha oleaginea
Troglodytes musculus (Moctum)
Smaragdolanius pulchellus
Traupis abbas
Piranga leucoptera

A number of species are primarily inhabitants of tropical evergreen forest but also occur in the tropical
semideciduous forests or humid gallery forests on the Pacific side of the Sierra Madre de Chiapas, where most of these species are restricted to the hillsides but some enter the lowlands near the Chiapas border and extend all the way to the coast. Possibly, some of these species are only winter residents or visitants on the Pacific slope. Again the northwestern limits of distribution in the Atlantic Region tropical evergreen forests are indicated by town names. These 30 species are:

Crypturellus boucardi
C. cinnamomeus
Sarcoramphus papa (Valle Nacional area)
Leptodon cavanensis
Harpaqus bidentatus (Valle Nacional area)
Accipiter bicolor
Spizaetus ornatus
Crax rubra
Tapera naevia
Lophostrix cristata (San Ildefonso Villa Alta)
Pulsatrix perspicillata
Ciccaba nigrolineata
Anthracothorax prevostii
Trogon violaceus
Notharchus macrorhynchos
Pteroglossus torquatus
Piculus rubiginosus
Dendrocincla homochroa (Valle Nacional area)
Thamnophilus doliatus
Rhytipterna holerythra (Valle Nacional area)
Tityra inquisitor
Onychorhynchus mexicanus
Platyrinchus mystaceus
Tolmomyias sulphurescens
Oncostoma cinereigulare
Hylophilus decurtatus
Amblycercus holosericeus
Tanagra lauta
Habia fuscicauda
Turdus grayi

Another element consists of species that occur throughout the tropical evergreen forests of the Atlantic Region and in the tropical semideciduous forests of both the Sierra Madre de Chiapas and the Pacific Region west of the Isthmus (in the Sierra de Miahuatlán or Sierra de Yucuyacua). These 11 species are:

Dromococcyx phasianellus
Phaethornis superciliosus
Amazilia candida
Heliomaster longirostris
Trogon collaris
Sittasomus griseicapillus
Cyanocorax yncas
Cyanerpes cyaneus
Euthlypis lachrymosa
A final group of tropical evergreen forest species consists of those occurring throughout the tropical evergreen forests of the Atlantic Region and disjunctly in the tropical semideciduous forests of the Sierra de Miahuatlán or Sierra de Yucuyacua. None has been recorded on the Pacific side of the Sierra Madre de Chiapas, although they may well be found there in the future. These five birds are:

- *Micrastur ruficollis*
- *Geotrygon montana*
- *Dendrocolaptes certhia*
- *Lepidocolaptes souleyetii*
- *Parula pitiayumi*

Before discussing the tropical evergreen forest avifauna, I shall list those species confined to the Pacific slope in tropical semideciduous forest, a habitat that not only presents an ecological situation similar to tropical evergreen forest but also shares 46 species with that habitat. Tropical semideciduous forest has few species restricted to it, most of the birds occurring there being derived either from the tropical evergreen forests or from adjacent cloud forests and tropical deciduous forests. Tropical semideciduous forest supports the following eight species not shared with tropical evergreen forest or to any great degree with any other habitat:

- *Dactylortyx thoracicus*
**Brotogeris jugularis**  
**Eupherusa poliocerca**  
**E. cyanophrys**  
**Chiroxiphia linearis**  
**Thryothorus modestus**  
**T. sinaloa**  
**T. felix**

The first two of the above eight species are restricted in Oaxaca to the Sierra Madre de Chiapas, although both occur to the northwest of the state along the Pacific slope of México. **Chiroxiphia linearis** and **Thryothorus modestus** do not extend west of the Isthmus anywhere in México. The remaining four are endemic to western México and thus do not occur in the Sierra Madre de Chiapas. One of these four, **Eupherusa cyanophrys**, is endemic to Oaxaca.

A number of observations can be made concerning tropical evergreen forest species. The Atlantic slope of the Isthmus today presents no barrier to dispersal of these species on an east-west axis. The forests are continuous from Central America to northeastern México. The only possible barriers are rivers, which in México are too narrow to cause anything but temporary pauses in dispersal. Of the 140 species primarily inhabiting tropical evergreen forest, 31 apparently end their Atlantic slope ranges in Oaxaca or the adjacent part of Veracruz. While at first glance this number may seem large, it is consistent with the progressive termination of ranges to the north in México (toward the end
of tropical evergreen forest) and the progressive addition of species to the south of Oaxaca. As far as is known, the ranges of only eight species apparently terminate at the Isthmus, 16 end in the region of Valle Nacional, and seven stop in between.

Exchange of fauna between the Atlantic tropical evergreen forests and the Pacific tropical semideciduous forests west of the Isthmus is today impossible because of the intervention of the arid habitats in the Interior, in the Río Tehuantepec basin, and on the Pacific side of the Isthmus. The arid habitats in the Isthmus also prevent contact between the tropical semideciduous forest birds of the Sierra Madre de Chiapas and those of the Sierra de Miahuatlán and the remainder of western México.

Tropical evergreen forest shares 41 species with the tropical semideciduous forests of the Sierra Madre de Chiapas. This fact, together with the absence of the remainder of the tropical evergreen forest birds, suggests that only those species tolerant to widely differing environmental conditions could reach the Pacific forests and survive there. Whether or not the Atlantic and Pacific forests are actually connected today is unknown; they could be at the extreme western end of the Sierra Madre de Chiapas or possibly through valleys within this range.

Similar conditions must have existed west of the Isthmus between the tropical evergreen forests and the tropical semideciduous forests of the Sierra de Miahuatlán, since 16
species are shared by both areas. That only 16 species occur in both regions is probably due to the intervention of the arid Río Tehuantepec basin. Probably, the connection existed a long time ago when the tropical evergreen forests were populated by fewer species. That the connection was made via dense humid forests is suggested by the presence on the Pacific side of such species as Micrastur ruficollis and Dendrocolaptes certhia, which normally are restricted to the heaviest forests. The early date of connection is supported by the fact that many of the 16 species have evolved very distinct races in the two areas.

During glacial maxima, the tropical semideciduous forest avifauna probably was little affected, since these forests would have existed in the mountains in spite of the generally more arid conditions. On the other hand, evidence indicates that, except for patches on the immediate coast, tropical evergreen forest was replaced by arid subtropical habitats. The arid conditions would have caused extinction of the tropical evergreen forest avifauna that should have evolved north of the Isthmus seaway. This would account for the small number of endemic species in the humid tropics northwest of the Isthmus. Thus such endemic genera as Hylorchilus in Oaxaca and Veracruz and Rhodothraupis in northeastern México, as well as such species as Amazona viridigenalis, might have evolved in humid lowland forests north of the seaway and then during glaciation have been forced into the isolated areas of suitable habitat along the coast, while
the remainder of the avifauna was exterminated or pushed into lower latitudes. The humid tropical climate of glacial recessions would have allowed dispersal on an east-west axis across the Isthmus, although movement might have been somewhat slowed by inundation of the lowlands.

Tropical deciduous forest and arid tropical scrub will be discussed as a single unit, since the avifauna is still not well enough known to determine which birds are restricted to one or the other habitat. Some of the species on the following three lists range into humid gallery forest or tropical semideciduous forest but are considered characteristic of the two arid tropical habitats.

Thirty-six species are restricted in Oaxaca to arid tropical habitats. These may be divided into three categories based on over-all ranges of the species. An asterisk (*) marks those species extending into the arid tropical Interior valleys; the remainder occur only in the Pacific Region.

Some of the 36 species are restricted in Oaxaca to all or a part of the Pacific Region, have wide distributions on both slopes elsewhere in México, and extend south at least to Chiapas or Central America, with some reaching South America. These seven species are:

- **Buteo brachyurus**
- **Ara macao**
- **Aratinga holochlora**
- **Amazona ochrocephala**
- **Coccyzus minor**
Otus asio

Cyananthus latirostris

Of the seven species listed above, *Ara macao* and *Aratinga holochlora* occur in Oaxaca only east of the Isthmus, while *Coccyzus minor* is found only there and in the Río Tehuantepec basin. The remaining four extend the length of the Pacific Region.

Other arid tropical species extend from western México to Costa Rica. These 14 species are:

*Aratinga canicularis*

*Amazona albifrons*

*Morococcyx erythropygus*

*Caprimulgus ridgwayi*

*Amazilia rutila*

*Heliomaster constantii*

*Myiarchus nuttingi*

*Calocitta formosa*

*Campylorhynchus rufinucha*

*Thryothorus pleurostictus*

*Polioptila albiloris*

*Icterus pectoralis*

*I. pustulatus*

*Aimophila ruficauda*

Another group is comprised of species endemic to the area from western México to Guatemala, and all but one (*Momotus mexicanus*) end their ranges before reaching the latter country. Seven of these birds have one end of their
over-all range in Oaxaca; these are designated on the following list by locality names indicating the range limits. These 15 species are:

**Ortalis poliocephala**
**Amazilia viridifrons**
**Trogon citreolus**
**Momotus mexicanus**
**Centurus chrysogenys** (east to Tehuantepec City)
**Tyrannus crassirostris** (east at least to Tamazula-pan del Progreso)
**Deltarhyynchus flammulatus**
**Turdus rufopalliatus** (east to Tehuantepec City)
**Vireo hypochryseus** (east to Rancho Las Animas)
**Granatellus venustus**
**Cassiculus melanicterus**
**Passerina rositeae** (west to Chivela)
**P. leclancherii**
**Aimophila humeralis** (east to region of San José Estancia Grande)
**A. sumichrasti** (west to Rancho Las Animas)

The data concerning the avifauna of tropical deciduous forest and arid tropical scrub present several interesting facts. Arid tropical habitats in northwestern México contain many more endemics than do humid tropical habitats of northeastern México. Furthermore, the line of progressive termination of ranges is exactly reversed, with humid tropical species dropping out toward the north and arid
tropical birds disappearing to the south. One possible explanation of this phenomenon is that climatic fluctuation during Pleistocene glaciation, while reducing the humid Atlantic forests to mere isolated patches and thus exterminating many of the species that presumably evolved there, had less effect on the species that evolved on the Pacific slope of México. While the Atlantic lowlands were subjected to a cool arid climate, suitable for humid forest species only where a high water table and the warming effect of the Gulf of México left pockets of dense forest, the arid conditions of glaciation had much less effect on the habitat or avifauna of the Pacific lowlands. The colder temperatures probably restricted the vegetation and birds to the coastal plain, where the warming effect of the ocean retained a tropical climate. But since these forests were not restricted to areas of high water table, they remained fairly extensive and probably were continuous from northwestern México to Costa Rica. Thus more endemics survive on the Pacific slope of México than on the Atlantic slope.

That all the Pacific slope species have not yet occupied all the coast as far as Costa Rica could be a result of differences in dispersal rates, with additional hinderance from conditions existing during glacial recessions. At these times, the lowlands of the Isthmus were inundated and the Isthmus mountains supported only humid tropical forests, thus allowing Atlantic slope birds to cross but confining the arid Pacific avifauna to northwestern México.
The Isthmus today presents little apparent barrier to movement of arid tropical species on an east-west axis. The fact that seven of the 36 species in this habitat terminate their over-all ranges at various points in Oaxaca is not a result of Isthmus conditions as they exist today, for other species terminate in Chiapas, still others in Guatemala, and the remainder in Costa Rica, while to the north of the Isthmus additional birds, not occurring in Oaxaca, are added to the avifauna. These differences in range would seem to be a reflection of environments in the geological past, as indicated in the paragraphs above.

The Isthmus of Tehuantepec does today present a complete barrier to dispersal on a north-south axis for species adapted to arid tropical habitats, since they cannot enter the humid tropical evergreen forests of the Atlantic Region. The few that are isolated in arid habitats in western Vera-cruz and in the Yucatan Peninsula perhaps reached there during glacial advances, when arid conditions were widespread in lowlands of both slopes and probably were continuous through low valleys in the Isthmus mountains.

The restriction of *Passerina rositae* and *Aimophila sumichrasti* to Isthmian Oaxaca and adjacent Chiapas suggests evolution on islands. While islands were undoubtedly formed during Pleistocene inundation because of glacial recession, the rate of evolution would have to have been very rapid to have produced such well-marked species in so short a time. More likely, these species evolved on islands formed by a
seaway during Miocene-Pliocene times.

The Interior arid tropical scrub valleys are too poorly known to allow detailed comparison with one another. Apparently, however, more species can enter the valleys of San Miguel Sola de Vega and Huajuapan de León than can reach the San Juan Bautista Cuicatlán valley. All these valleys are populated primarily from the Pacific slope avifauna, although at least two species (Turdus grayi and Tiaris olivacea) apparently invade the valley of San Juan Bautista Cuicatlán through the chasm of the Río Santo Domingo. The San Miguel Sola de Vega valley receives its birds from the Pacific lowlands of Oaxaca, while the other two valleys mentioned above derive their avifauna from the Balsas basin. That the valley of Huajuapan de León supports more Pacific slope species is not surprising, for in order to reach the San Juan Bautista Cuicatlán valley birds must cross some of the uplands of Puebla, while birds in the Huajuapan de León valley have a direct connection with the Balsas basin. The valley of Hidalgo Yalalag apparently supports only species derived from the Atlantic lowlands, although more thorough exploration may determine otherwise.

The cloud forests of Oaxaca support 25 species that are virtually absent from other habitats. In addition to these, cloud forest shares eight species with tropical evergreen forest (listed previously) and 19 with humid pine-oak forest (presented beyond). Oddly enough, none of the birds of widespread distribution (except the five ubiquitous species and
three of the swifts) are characteristic of cloud forest, although some wander into or through this habitat, and a few breed at its periphery. The cloud forests of the Sierra de Huautla are ornithologically unexplored. Probably the avifauna there is much like that in the neighboring Sierra de Juárez, at least on the specific level.

The 25 species restricted to cloud forest may be divided into three groups according to their general distributions. Because the cloud forests of Oaxaca are still imperfectly known, particularly those of the Sierra Madre de Chiapas, I have taken into account in the following lists not only Oaxaca distribution but also over-all distribution.

Nine species occur east of the Isthmus as well as on both slopes west of the Isthmus:

- Geotrygon albifacies
- Lampornis amethystinus
- Aulacorhynchus prasinus
- Xiphorhynchus erythropygius
- Anabacerthia variegaticeps
- Automolus rubiginosus
- Icterus graduacauda
- Piranga bidentata
- Chlorospingus ophthalmicus

Another group is confined to the Atlantic Region on both sides of the Isthmus. These 10 species are:

- Strix fulvescens
- Sclerurus mexicanus
Empidonax flavescens
Cyanolyca cucullata
Aphelocoma unicolor
Catharus mexicanus
Vireo leucophrys
Chlorophonia occipitalis
Atlapetes albinucha

Another six species are found in Oaxaca only in the Sierra Madre de Chiapas, where they all reach the extreme western end of their entire breeding ranges:

Penelopina nigra
Campylopterus rufus
Lampornis viridipallens
Pharomachrus mocinno
Aspatha gularis
Catharus dryas

Today the cloud forests of the Sierra Madre de Chiapas are widely separated from those of the Sierra de los Mijes and even farther from those of the Sierra de Miahuatlán, the lowlands of the Isthmus posing an impenetrable tropical barrier. The cloud forests of the Atlantic Region west of the Isthmus are separated from those of the Pacific Region by the Río Tehuantepec basin and the Mesa del Sur. The fact that not one species is confined to the area west of the Isthmus suggests a predominantly southern origin for these species and a Pleistocene connection across the Isthmus during glacial maxima. The restriction of six species to
the east side of the Isthmus indicates that this connection was not broad and continuous but that cloud forests existed only on the higher peaks of the Isthmus mountains—peaks able to intercept moisture-laden clouds rolling in off the Gulf of México and, to a lesser extent, the Pacific Ocean. Hence, while 19 species were able to cross, six could not. This theory of narrowly discontinuous cloud forests is consistent with the general hypothesis that while conditions were colder, at least subtropical and at times temperate, they were also more arid. Thus the Atlantic and Pacific lowlands (with the exception of coastal areas) and the lower valleys in the Isthmus mountains probably supported only arid subtropical biota.

Another interesting point concerning cloud forest species is that while 10 are shared by only the Sierra Madre de Chiapas and the Atlantic Region west of the Isthmus, none is found only in the Sierra Madre de Chiapas and the Pacific Region west of the Isthmus. Apparently, the nine that reached the Pacific forests did so via the western Atlantic Region forests and during an early glacial advance, but by the time of later glaciations the Río Tehuantepec and its tributaries had worn down the eastern end of the Mesa del Sur to such a point that it could not develop cloud forest, as there were no longer any high mountains to intercept the moisture-laden clouds from the Pacific. This theory is supported by the fact that most of the species in the Pacific cloud forests have developed well-marked races, while those
of the western Atlantic forests are subspecifically similar to the birds in the Sierra Madre de Chiapas. This same phenomenon has already been noted with respect to the tropical semideciduous forest avifauna. That the Sierra Madre de Chiapas was never connected to the Pacific mountains alone is indicated by the fact that no species is shared by only these two areas. See also the discussion of pine-oak forest species.

Nineteen species occur with equal abundance in both cloud forest and humid pine-oak forest, and a few of these sometimes enter arid pine-oak forest. All but two of the 19 are found on both sides of the Isthmus. These 17 species are:

- **Colibri thalassinus**
- **Lamprolaima rhami**
- **Eugenes fulgens**
- **Lepidocolaptes affinis**
- **Grallaria guatimalensis**
- **Pachyramphus major**
- **Empidonax difficilis**
- **Henicorhina leucophrys**
- **Turdus assimilis**
- **T. infuscatu**
- **Catharus frantzii**
- **C. aurantiirostris**
- **Diglossa baritula**
- **Myioborus miniatus**
Basileuterus belli
Tanagra elegantissima
Atlapetes brunneinucha

The remaining two species have their entire ranges confined to the west side of the Isthmus and terminating in Oaxaca:

Dendrotryx macroura
Melanotis caerulescens

As might be expected, the ranges of the above 19 species correspond to the distribution of humid pine-oak forest, as well as cloud forest, all having been recorded in the Sierra Aloapaneca, a mountain range without broad-leaved cloud forest. Further discussion will follow the listing of species characteristic of pine-oak forest alone.

The avifauna of Oaxaca pine-oak forests is second only to that of tropical evergreen forest in total number of species. Excluding the 19 also inhabiting cloud forest, 72 species are here considered characteristic of pine-oak forests. In the following lists, I have made no attempt to allocate species to the various subdivisions of pine-oak forest, since our knowledge of avian distribution in this habitat in Oaxaca is still too fragmentary. A few species (e.g., Toxostoma ocellatum and Aimophila notosticta) appear to be most numerous in oak scrub. A larger number of species (e.g., Cyanolyca nana and Campylorhynchus megalopterus) are confined to humid pine-oak forest. While most species occur in both arid and humid pine-oak forests, the humid areas
tend to be centers of abundance and dispersal. Highland pine forest has no birds restricted to it but because of its open character can support some species otherwise found only in open arid pine-oak forest (e.g., *Sialia sialis*).

In preparing the following lists, while treating only the species recorded for Oaxaca, I have taken into account over-all ranges. Thus, a species such as *Vireolanius melitophrys*, although not actually recorded east of the Isthmus within Oaxaca, is known from localities farther south-east and hence is included in the list of species occurring on both sides of the Isthmus.

Nearly half of the 72 species characteristic of pine-oak forests in Oaxaca (excluding those shared with cloud forest) are widely distributed in all three Regions west of the Isthmus and also occur in the Sierra Madre de Chiapas of Oaxaca, in the mountains of Chiapas, or in those of northern Central America. These 35 species are:

- *Buteo jamaicensis*
- *Columba fasciata*
- *Otus trichopsis*
- *Glaucidium gnomon*
- *Aegolius acadicus*
- *Caprimulgucc vociferus*
- *Hylocharis leucotis*
- *Amazilia beryllina*
- *Lampornis clemenciae*
- *Trogon mexicanus*
Colaptes auratus
Melanerpes formicivorus
Dendrocopos villosus
Xiphocolaptes promeropirhynchus
Contopus sordidulus
C. pertinax
Mitrephanes phaeocercus
Corvus corax
Cyanocitta stelleri
Psaltriparus minimus
Certhia familiaris
Cinclus mexicanus
Myadestes obscurus
Sialia sialis
Ptilogonys cinereus
Vireolanius melitophrys
Vireo huttoni
V. solitarius
Vermivora superciliosa
Peucedramus taeniatus
Myioborus pictus
Piranga flava
Spinus notatus
Pipilo erythrophthalmus
Spizella passerina

Other pine-oak forest species occur in all three Regions of Oaxaca west of the Isthmus but terminate their over-all
breeding ranges there and thus do not occur anywhere east of the Isthmus. These 21 species are:

Atthis heloisa
Trogon elegans
Tachycineta thalassina
Aphelocoma coerulescens
Parus sclateri
P. wollweberi
Troglodytes aedon
Toxostoma ocellatum
Turdus migratorius
Catharus occidentalis
Ridgwayia pinicola
Neochloe brevipennis
Geothlypis nelsoni
Ergaticus ruber
Piranga erythrocephala
Pheucticus melanoccephalus
Atlapetes pileatus
Pipilo ocai
Aimophila notosticta
A. ruficeps
Junco phaeonotus

Three species occur in the Pacific mountains west of the Isthmus (Sierra de Miahuatlán or Sierra de Yucuyacua) and have also been recorded in or beyond Oaxaca east of the Isthmus. None has been found in the Sierra Aloapaneca or
Atlantic mountains west of the Isthmus. These three species are:

Tilmatura dupontii
Empidonax fulvifrons
Dendroica graciae

Another group consists of species that terminate their over-all breeding ranges west of the Isthmus and are restricted in Oaxaca to the Pacific mountains and the Sierra Aloapaneca; birds found in the latter range are marked with an asterisk (*). These eight species are:

*Cyrtonyx montezumae
Amazona finschi
Piculus auricularis
*Lepidocolaptes leucogaster
*Sitta carolinensis
Cyanolyca mirabilis
*Vireo gilvus
Oriturus superciliosus

Four species terminate their entire breeding ranges west of the Isthmus and are restricted to the Atlantic mountains (Sierra de Juárez and Sierra de Zempoaltepec) or the Sierra Aloapaneca. One (Strix varia) has been recorded only in the Sierra Aloapaneca, while the other three occur in both areas. These four species are:

Strix varia
Empidonax affinis
Cyanolyca nana
Campylorhynchus megalopterus

The pine-oak forests of the Chiapas highlands support a number of species that do not extend west of the Isthmus or even into eastern Oaxaca (e.g., Turdus rufitorques and Ergaticus versicolor). Only one species endemic to pine-oak forests west of the Isthmus has been recorded in Oaxaca:

Cyrtonyx ocellatus

The Isthmus of Tehuantepec today presents a fairly strong barrier to dispersal on an east-west axis for species occurring in pine-oak forests. A few species (Buteo jamacensis, Melanerpes formicivorus, Contopus sordidulus, Dendroica graciae, Piranga flava, Spinus notatus, and Spizella passerina) are adapted to both temperate and tropical conditions; hence their ranges are continuous across the Isthmus through the tropical pine-oak forests of the Isthmus mountains. The remainder of the 72 pine-oak birds, as well as the 19 shared with cloud forest, apparently are adapted only to temperate or humid subtropical conditions; for these the Isthmus today presents a complete barrier.

Most pine-oak species of birds are of boreal affinities and probably evolved west of the Isthmus during Miocene-Pliocene times, when a seaway existed across the Isthmus. The few species of tropical affinities (e.g., Trogon elegans, Amazona finschi, and Piranga erythrocephala) probably also evolved west of the Isthmus as evidenced by the fact that they are endemic to that area, while some other birds of tropical affinities could have evolved on either side. Some

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
species (*Cyrtonyx ocellatus* and Chiapas highland species) are endemic to the area east of the Isthmus and hence probably evolved there.

Although a Miocene-Pliocene Isthmus seaway can account for species being endemic to one side or the other, it cannot explain the occurrence of 38 species on both sides. For an explanation we must again turn to the Pleistocene climatic fluctuation theory. The fact that 38 species occur on both sides of the Isthmus indicates that temperate pine-oak forest existed in the Isthmus mountains. Temperatures probably were not cold enough to allow this vegetation to descend to the lowlands. On the other hand, the fact that 34 species occur only on one side or the other suggests that the temperate pine-oak forests were restricted to the highest portions of the Isthmus mountains and hence were narrowly discontinuous, allowing only about half of the species to bridge the gap. Probably, such conditions did not exist during all four glacial advances but were confined to the more severe. Usually, temperatures were only low enough to produce subtropical conditions. Thus a smaller percentage of the temperate pine-oak forest birds, as compared with cloud forest species, were able to cross the Isthmus.

The 12 species endemic to the west side of the Isthmus but restricted either to the Pacific mountains or the Atlantic mountains (or Sierra Aloapaneca) present an interesting picture. Probably all evolved in either the Sierra Madre Occidental or Sierra Madre Oriental of México or else
invaded one or the other range from points of origin in the United States. Since these two ranges essentially unite in the Mesa del Sur of Oaxaca, one would expect to find all 12 species occurring throughout the state. That such is not the case can be explained by the physiography of the Mesa del Sur, the distribution of humid pine-oak forest, and the requirements of the individual species.

Four species, Cyrtonyx montezumae, Lepidocolaptes leucogaster, Sitta carolinensis, and Vireo gilvus, have a fairly wide tolerance for variations in humidity and temperature. These birds occur in the Pacific mountains and Sierra Aloapaneca but have not been able to spread to the Atlantic mountains because of the lowland gaps of the valleys of San Juan Bautista Cuicatlán and Hidalgo Yalalag. Another two, Amazona finschi and Piculus auricularis, are confined to humid pine-oak forests of the Pacific mountains and hence could not bridge the arid pine-oak forests even as far as the Sierra Aloapaneca. Two more species, Cyanolyca mirabilis and Oriturus superciliosus, are adapted to humid and strongly temperate conditions and are found only in the Sierra de Yucuyacua at high elevations (O. superciliosus is unrecorded below 7,500 feet and C. mirabilis below 8,000 feet). All four of the species restricted to the Atlantic mountains and the Sierra Aloapaneca are adapted to humid forests at high elevations, above 9,000 feet, and hence cannot reach the Pacific mountains because of the lower elevation arid pine-oak forests. That these four have reached the Sierra Aloapaneca
suggests that they did so a long time ago and that the avifauna of the Sierra Aloapaneca is more closely related to that of the Atlantic mountains than to that of the Pacific mountains.

A comparison of the species restricted to cloud forest with those restricted to pine-oak forest brings to light a remarkable dissimilarity. All cloud forest species occur east of the Isthmus, but many do not extend west of the Isthmus; in other words, there are no endemic species on the west side but many on the east side. Nearly the exact opposite is true of pine-oak birds. Almost all species are found west of the Isthmus, but many do not occur on the east side; that is, many species are endemic to the west side and only a few (one in Oaxaca) to the east side. The only explanation that accounts for the distributions in both habitats is the climatic fluctuation theory. Species restricted to temperate pine-oak forest could cross the Isthmus only during the most severe glacial advances, and even then only about half of the species could cross because of the discontinuity of the forests. On the other hand, 19 of the 25 cloud forest birds got across, an indication that this habitat was somewhat more extensive or was present during more of the glacial advances. Of the 19 species frequenting both habitats, 17 crossed, in this respect nearly paralleling the avifauna of cloud forests.

The avifauna of arid temperate scrub is difficult to assess because some species extend into arid tropical scrub
of the Interior or Isthmus region and thus may more properly belong to tropical habitats. Nevertheless, it is possible to list 31 species that, in Oaxaca at least, are characteristic primarily of arid temperate scrub. These may be divided into two groups. The first group consists of 20 species that have their distribution centered in México or farther north and do not cross the Isthmus:

- Cynanthus sordidus
- Amazilia violiceps
- Centurus hypopolius
- Sayornis saya
- Tyrannus vociferans
- Aechmopouhus mexicanus
- Petrochelidon pyrrhonota
- Campylorhynchus jocosus
- Thryomanes bewickii
- Toxostoma curvirostre
- Mimus polyglottos
- Lanius ludovicianus
- Vireo nelsoni
- Icterus parisorum
- Carpodacus mexicanus
- Pipilo fuscus
- P. albicollis
- Melozone kieneri
- Aimophila mystacalis
- Spizella atrangularis
The remaining species are, in Oaxaca, characteristic primarily of the Interior arid temperate scrub but also occur east of the Isthmus, either in the state or farther southeast. These 11 species are:

- **Falco sparverius**
- **Zenaidura macroura**
- **Bubo virginianus**
- **Calothorax pulcher**
- **Empidonax albigularis**
- **Salpinctes obsoletus**
- **Catherpes mexicanus**
- **Polioptila caerulea**
- **Icterus wagleri**
- **Passerina versicolor**
- **Spinus psaltria**

The tropical conditions in the Isthmus today present a complete barrier to movement on an east-west axis for most species in arid temperate scrub. Three species, **Bubo virginianus**, **Salpinctes obsoletus**, and **Catherpes mexicanus**, however, are known from the Pacific lowlands of the Tehuantepec region, and a fourth, **Spinus psaltria**, may well occur there.

According to the climatic fluctuation theory, arid subtropical conditions existed in the lowlands of both slopes during glacial maxima. Hence, the 11 species that occur on both the east and west sides of the Isthmus could have crossed at that time. The reason why 20 species failed to
cross, despite the wide distribution of arid subtropical habitat, is probably that these species are adapted to arid temperate conditions, which apparently have never existed continuously across the Isthmus. Thus I am assuming that 11 supposedly temperate species were able to adapt to subtropical conditions.

An evaluation of these 11 species tends to bear out my assumption. As already mentioned, three species and probably a fourth today extend into the arid lowland tropics of the Pacific slope of the Isthmus and hence must be widely tolerant to variations in temperature. The remaining species occur in tropical or subtropical situations in their ranges inside or outside Oaxaca and thus could have traversed the arid subtropical environments of the Pleistocene Isthmus.

Steppe habitat supports very few species of any kind. Those present appear to be derived from savannas (e.g., *Eremophila alpestris*) or arid temperate scrub (e.g., *Spizella atrogularis*).

A total of 13 species are characteristic primarily of savanna. Most also occur in similar habitats such as cultivated land and grazed land. These 13 species are:

- **Cathartes burrovianus**
- **Elanus leucurus**
- **Falco femoralis**
- **Burhinus bistriatus**
- **Columbigallina minuta**
- **Nyctibius griseus**
Caprimulgus maculicaudus
Eremophila alpestris
Mimus gilvus
Sturnella magna
Sporophila minuta
Ammodramus savannarum
Aimophila botterii

Some of these species occur only in the Pacific Region, others only in the Atlantic Region, and still others in both Regions. A few extend into the Interior. Five (Cathartes burrovianus, Burhinus bistriatus, Columbigallina minuta, Caprimulgus maculicaudus, and Mimus gilvus) reach their northern limits in Oaxaca and adjacent Veracruz. The great variation in ranges appears to be a reflection of the disjunct distribution of the habitat. Species today restricted to the Pacific Region have not been able to penetrate the tropical evergreen forests of the Atlantic Region. The presence of Burhinus bistriatus throughout the savannas on the Pacific side of the Isthmus and also in an isolated population in southern Veracruz suggest that at one time arid tropical conditions existed continuously through the Isthmus mountains. Such conditions could have occurred since the last glacial advance, after subtropical climates gave way to tropical climates and before humid tropical evergreen forest could spread far enough to isolate the savannas of southern Veracruz.

Restricted terrestrial habitats in Oaxaca are very

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
poorly known. Humid gallery forest apparently has no endemic species but derives its avifauna from the surrounding tropical deciduous forest or adjacent tropical semideciduous forest. The importance of this habitat, however, should not be overlooked. Isolated patches along the coast can support species otherwise found only in tropical evergreen forest on the Atlantic slope or in humid habitats at higher elevations in the adjacent mountains. Consequently, such species as Pteroglossus torquatus and Oncostoma cinereigulare are able to occupy the Pacific coastal plain near the Chiapas border, and Rhynchocyclus brevirostris can penetrate the lowlands of southwestern Oaxaca. Humid gallery forests along rivers provide mesic highways through otherwise arid country and thus are important avenues for dispersal of humid forest birds.

Pure palm forest is ornithologically unexplored in Oaxaca. Probably it has few species of any kind. Fir forest is also little known. Regulus satrapa, if ever discovered breeding in the state, probably will be found to be restricted to this habitat. Some of the high elevation owls may possibly also occur only in fir forest. The few species known from juniper scrub are characteristic inhabitants of adjacent pine-oak forest and arid temperate scrub.

The avifauna of man-made terrestrial habitats is usually derived from the nearby natural habitats. Man-made structures, however, are today the primary haunts of three species: Columba livia
Progne chalybea
Passer domesticus

Birds occurring in fincas are those left over from the forests from which the fincas were made. Guamil probably does have some characteristic species, since this habitat is similar to natural brush in clearings. However, the avifauna characteristic of guamil is not well enough known to permit separate listing. Cultivated land and grazed land are populated by savanna species and a few birds derived from adjacent habitats.

Thirty-six species are here considered typical of aquatic environments. Because the location of breeding sites for many species of birds occurring in aquatic environments is poorly known in Oaxaca, the following account must necessarily deal primarily with distribution in relation to areas of occurrence and abundance.

Some aquatic species are widespread in the lower portions (usually below 1,000 feet elevation) of both the Atlantic and Pacific Regions, occurring in all shallow aquatic habitats, be they fresh-water, brackish, or saline. Nine species fall into this category:

Phalacrocorax olivaceus
Anhinga anhinga
Butorides virescens
Casmerodius albus
Leucophoyx thula
Hydranassa tricolor
Megaceryle torquata  
Chloroceryle amazona  
Iridoprocne albilinea

Three other species also occur primarily in the Atlantic and Pacific Regions but are restricted to shallow fresh-water habitats:

Podiceps dominicus  
Podilymbus podiceps  
Chloroceryle americana

Another element, consisting of six species, is found in Oaxaca for the most part on saline and brackish lagoons along the Pacific coast:

Freqata magnificens  
Dichromanassa rufescens  
Mycteria americana  
Endocimus albus  
Ajaia ajaja  
Himantopus mexicanus

Two of the above six species, Freqata magnificens and Dichromanassa rufescens, are definitely restricted to these habitats and have been found nesting only in mangroves. Of the remaining four birds, Mycteria americana and Ajaia ajaja have been recorded in the Atlantic Region but perhaps only as visitants. All six species are widespread along the Pacific and Atlantic coasts of México.

Two species are restricted to ponds and streams within tropical evergreen forest of the Atlantic Region:
**Heliornis fulica**

**Chloroceryle aenea**

Six birds are confined to marsh:

**Aramus quarauna**

**Pardirallus maculatus**

**Laterallus ruber**

**Porphyrula martinica**

**Jacana spinosa**

**Agelaius phoeniceus**

As might be expected in such a disjunct habitat as marsh, the distributions of marsh birds show little uniformity. The first three species listed above occur in the Pacific Region of Oaxaca and on the Atlantic slope elsewhere in México but do not extend northwest of Oaxaca on the Pacific slope of México. This distribution and the fact that the Oaxaca populations of none of the three species is subspecifically distinct from populations on the Atlantic slope of México indicates that the Oaxaca birds have arrived in the Pacific Region via the Isthmus and have done so fairly recently. **Laterallus ruber** also occurs in the Atlantic Region of Oaxaca. The last three species listed above are widespread in the Atlantic and Pacific Regions of Oaxaca and on both slopes throughout México. **Agelaius phoeniceus** extends also into marshes of the Interior of Oaxaca and of the plateau of México.

Seven species are characteristic of swamps, although they usually also occur along the forested edges of other
aquatic habitats:

   Nyctanassa violacea
   Heterocnus mexicanus
   Cochlearius cochlearius
   Dendrocygna autumnalis
   Cairina moschata
   Amaurolimnas concolor
   Aramides cajanea

One of the above species, Amaurolimnas concolor, has been found in México only in fresh-water swamps on the Atlantic slope of the Isthmus. Aramides cajanea occurs throughout much of the Atlantic slope of México but is unknown on the Pacific slope northwest of Oaxaca. The race on the Pacific coast of the Isthmus is the same as found on the Atlantic slope, rather than the form occurring in coastal Chiapas. Hence, this species, like some of the marsh birds, may have arrived in the Pacific Region of Oaxaca during recent times probably from the Atlantic Region via the Isthmus. However, the possibility also exists that these species crossed the Isthmus along the edges of a Miocene-Pliocene seaway and simply have not evolved races. The remaining five swamp species are widespread on both slopes of México and Central America.

Mud flats, sand beaches, and river bars have only three characteristic breeding species:

   Charadrius alexandrinus
   C. collaris
**Sterna albifrons**

*Charadrius alexandrinus* is limited to mud flats on the Pacific coast. *Sterna albifrons* has been found breeding only on river bars near Tehuantepec City but probably occurs on sand beaches of the entire coast. *Charadrius collaris* breeds in all three habitats at lower elevations in the Pacific Region and is to be expected in the Atlantic Region.

No species are known to be restricted to mangrove swamp, rocky seashores, or coastal bays and harbors. Indeed, in the last three habitats, no aquatic species breed. Mangrove swamp is inhabited primarily by species also found in freshwater swamps and the forested edges of other aquatic habitats, although *Dendroica petechia rhizophorae*, if found breeding in the state, would be restricted to mangrove swamp.

The distributional patterns exhibited by birds inhabiting aquatic environments have interesting aspects. All the species in the first three categories and many of the birds in the other subdivisions are widespread on the Atlantic and Pacific coasts of México and Central America, and some extend even farther north and south. Between the coastal areas, however, intervene the highlands of northern Central America, the central plateau of México, and the arid expanse of the southwestern United States, areas where most of these widespread species are present only as visitants or are absent all together.

The only place in México where these species can cross...
from one coast to the other is the Isthmus of Tehuantepec, in which some aquatic habitats are fairly continuous. That the Isthmus today is a major route of dispersal between the coasts is indicated by the fact that most species have been observed in both Atlantic and Pacific Regions or well inland on one slope or the other. Even *Fregata magnificens*, a strongly coast-oriented species, has been observed apparently crossing the Isthmus. In addition, 10 of the wide-ranging species have subspecies confined to northwestern México, while in all 10 cases the races occurring on both slopes of Oaxaca are the same as found widely distributed on the Atlantic slope of México. As would be expected, the Isthmus is no barrier at all to the distribution of these wide-ranging species on an east-west axis.

All but one (*Amaurolimnas concolor*) of the marsh species and many of the swamp species have spread across the Isthmus from the Atlantic slope onto the Pacific slope, again indicating the role of the Isthmus as a north-south dispersal route. But upon reaching the Pacific coast, four species (*Aramus guarauna*, *Pardirallus maculatus*, *Laterallus ruber*, and *Aramides cajanea*) have been unable to spread outside Oaxaca because of the disjunct distribution of their habitats. This same phenomenon occurs on the Atlantic slope, but to a lesser degree, since *Laterallus ruber* and *Aramides cajanea* extend well north in México. The absence of *Heliornis fulica* and *Chloroceryle aenea* on the Pacific slope of México is a reflection of habitat distribution, these two species being unable to penetrate the arid Pacific lowlands.
SUMMARY AND CONCLUSIONS

This survey presents separate accounts for the 669 species of birds of undoubted occurrence in Oaxaca and for 34 species and one hybrid of questionable occurrence. All available information concerning the hypothetical birds is incorporated. For the remaining accounts, information is presented regarding relative abundance, seasonal occurrence, habitat preference, geographical and elevational ranges, and breeding evidence. Some accounts incorporate taxonomic discussions. All Oaxaca data are given in the case of certain rare species and for the 76 species for which there are no previous acceptable published records for the state. A new scheme for abbreviated presentation of breeding data is discussed and is used in the species accounts.

Chapters are devoted to general physiography and climate. The major avian habitats of Oaxaca are mapped and outlined, and their distribution, structure, composition, and climate are discussed. A gazetteer includes all Oaxaca ornithological localities that have been mentioned in the literature or used on specimen labels. A bibliography of the literature cited in this survey is also given.

Finally, a lengthy chapter is devoted in part to an
analysis of the avifauna in relation to habitats and in part to a discussion of Pleistocene climatic fluctuation as it may have affected the vegetation in the past and the current distributional patterns exhibited by the avifauna.

An analysis by habitat of the 456 species believed to breed in the state shows that five species of swifts are too poorly known to allocate to any habitat, five birds are virtually ubiquitous, 55 are widespread in both the humid and arid tropics, and eight are widespread in temperate and tropical arid habitats. Tropical evergreen forest supports a characteristic avifauna of 140 species, of which 46 are shared with tropical semideciduous forest and eight demonstrate wide tolerance for temperatures and are found also in cloud forest. Tropical semideciduous forest supports only eight characteristic species, the remainder of its avifauna consisting of the 46 species shared with tropical evergreen forest and a number derived from adjacent habitats.

Our knowledge of bird and habitat distributions is too imperfect to allow separate analysis of the avifaunas of arid tropical scrub and tropical deciduous forest. Thirty-six species are restricted to these habitats. Cloud forests contain 25 species restricted to that habitat. An additional 19 occur with equal frequency and abundance in both cloud forest and humid pine-oak forest.

The avifauna of pine-oak forests is considered as a whole and not distributed among the various subdivisions of the habitat. Restricted to pine-oak forest are 72 species,
a number second only to that in tropical evergreen forest. The arid temperate scrub element of the Oaxaca avifauna consists of 31 species, while tropical and temperate savannas support 13 characteristic birds.

Steppe and the various types of restricted terrestrial habitats have no known species confined to them but derive their birds from adjacent habitats. Three species nest exclusively on structures, but the other man-made terrestrial habitats have no characteristic species, again deriving their avifauna from surrounding natural habitats.

Thirty-six birds are considered typical of aquatic environments: nine widespread in the lowlands; three widespread in fresh-water habitats; six restricted primarily to the Pacific coastal area in Oaxaca but widespread elsewhere; two confined to aquatic habitats in the Atlantic tropical evergreen forests; six occurring only in marsh; seven found primarily in swamps; and three characteristic of mud flats, sand beaches, or river bars. Other aquatic habitats, such as mangrove swamp, apparently have no birds restricted to them.

The Isthmus today presents a barrier to east-west dispersal only for those species whose habitats are discontinuous because of the lowland gap. It presents no barrier to any of the 60 widespread or ubiquitous species. A mere eight of the 140 tropical evergreen forest species terminate their ranges in the Isthmus proper, a fact that is indicative only of the evenly progressive termination of ranges from
Central American to northern México. Of the 36 species restricted to arid tropical habitats, five extend from the north and reach the vicinity of the Isthmus without crossing. This number is consistent with the progressive loss of arid tropical species from north to south and does not demonstrate any barrier in the Isthmus today.

On the other hand, the 25 species confined to cloud forest are prevented from crossing the Isthmus by the discontinuity of this habitat created by the lowland gap. The same holds true for the 19 species occurring in both cloud forest and humid pine-oak forest, for most of the 31 species characteristic of arid temperate scrub, and for all but six of the 72 birds confined to pine-oak forests. These six (and perhaps a few more to be discovered in the future) are adapted to tropical pine-oak forest and cross by way of this habitat in the Isthmus mountains.

On a north-south axis, the Isthmus presents a strong barrier to tropical evergreen forest birds, since these cannot penetrate the arid situations on the Pacific slope, and to birds of arid tropical scrub and tropical deciduous forest, which cannot enter the humid forests of the Atlantic slope. On the other hand, the Isthmus provides an important corridor for exchange between the Atlantic and Pacific slopes for the 55 lowland species adapted to both humid tropical and arid tropical conditions. Aquatic species also utilize this lowland corridor. The Isthmus may in addition act as a place of contact between the tropical evergreen forest on
the Atlantic slope and the tropical semideciduous forests on the
Pacific side of the Sierra Madre de Chiapas. To the west of
the Isthmus, the arid Río Tehuantepec basin widely sepa­rates tropical evergreen forest from the tropical semidecid­uous forests of the Sierra de Miahuatlán.

A theory has been advanced by Schuchert (1935) and
others that a seaway existed across the Isthmus during Miocene-
Pliocene times and that this alone would account for the cur­rent distributional patterns of animals. Evidence gleaned
from the Oaxaca avifauna supports the presence of such a
seaway at that time, for it seems to be the best way to
explain the evolution of those species endemic to one side
or the other of the Isthmus.

The seaway theory, however, cannot account for the
presence of many cloud forest, pine-oak forest, and arid
temperate scrub birds on both sides of the Isthmus. The
climatic fluctuation theory can explain such distribution.
This theory provides that during glacial maxima, as compared
with conditions today, the oceans were much lower, and the
climate was drier and colder. Tropical environments existed
only along the immediate coasts in response to the warming
effects of the Gulf of México and the Pacific Ocean, while
subtropical or temperate conditions existed elsewhere.

The effects of such climatic shifts produced humid sub­
tropical vegetation (cloud forest) and occasionally humid
temperate vegetation (pine-oak forest) in the Isthmus
mountains, which were then slightly higher and could
intercept the moisture-laden clouds rolling in from the seas. These habitats, however, were confined to the higher peaks and thus were narrowly discontinuous because of the arid subtropical conditions existing in the valleys. The lowlands for the most part likewise supported arid subtropical vegetation. Tropical evergreen forest was not completely eliminated but was reduced to patches on high water tables along the coast of the Gulf of México.

During glacial recessions, water levels were higher than today, and the climate was warmer and more humid. Thus the lowlands of the Isthmus were inundated, and the Isthmus mountains supported only tropical evergreen forest. Arid tropical forests of the Pacific slope outside the Isthmus were not greatly changed, since the monsoonal climate would have negated the effects of additional rainfall. Because the Isthmus lowlands were inundated, however, arid habitats probably became discontinuous, the theory being that the Pacific slope of the Isthmus mountains is so steep that humid forests probably overlapped from the Atlantic side all the way to the Pacific shore. On the other hand, tropical evergreen forest, occupying the Isthmus mountains, was connected with the semideciduous forests of the Sierra Madre de Chiapas and perhaps, at the beginning of the Pleistocene, with the Sierra de Miahuatlán.

The effects on the avifauna apparently went hand in hand with the vegetational shifts. Some cloud forest species and, occasionally, some temperate pine-oak forest birds were...
able to cross the Isthmus during glacial advances. That not all species in these two habitats got across is a reflection of the narrow discontinuity of the forests. Among arid temperate scrub birds, only those that could adapt to the lowland arid subtropical conditions could cross, leaving those adapted to temperate conditions stranded on the west side.

Tropical evergreen forest birds apparently were widely exterminated or pushed to lower latitudes, with only a few relict forms surviving in the pockets of humid forest along the Atlantic coast. The avifauna of the arid Pacific lowlands was less affected, since this habitat was not restricted to pockets but was present as a relatively broad and continuous strip along the coast. Probably, however, some species did disappear.

In summary, distributional patterns exhibited by the Oaxaca avifauna reflect the distribution of habitats today and in the past and support both the seaway theory and the climatic fluctuation theory.
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 specimen labels. In addition, I have included all localities outside Oaxaca erroneously referred to the state. Although I have succeeded in tracing most localities, the location of a few 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. In addition, I have relied heavily on the "Comision Maps" (scale, 1:500,000), a series published by the Comision Intersecretarial Coordinadora del Levantamiento de la Carta de la Republica Mexicana (1958), map numbers 14Q-VI, 14Q-VIII, 14P-II, 15Q-V, 15Q-VII, and 15P-I. Because of its more accurate contours and larger scale, this series was used as the base map in the preparation of the habitat map presented herein. Certain information has also been taken from the series (scale, 1:1,000,000) prepared by the Secretaria de Agricultura y Ganaderia, Direcccion 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 (1956, No. 15) was used as a source of coordinates for many localities. Gazetteers by Duellman (1960), Selander and Vaurie (1962), and Rowley (1966) were also helpful. Finally, much pertinent information was obtained from the original field notes of collectors, through correspondence with interested parties, and from itineraries reconstructed by me from information on specimen labels.

In the present gazetteer, preferred names are presented in their Spanish form except where there are no Spanish names (e.g., Screech Owl Camp) or in cases of well-known towns or...
geographic features (e.g., Gulf of Tehuantepec, Isthmus of Tehuantepec, Pacific Ocean, Oaxaca Valley, Oaxaca City, Tehuantepec City).

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 bahía (bay), cañon (canyon), cerro (mountain), golfo (gulf), 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., "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.

Localities with names beginning with a term denoting a natural geographic feature but which are actually towns or other man-made entities are indexed in this manner. Such terms include many of those noted above as well as cumbre (summit), 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), estancia (country dwelling), finca (plantation), hacienda (a large farm or the owner's house), km. (kilometer), portillo (narrow pass), presa (a dam and its impounded waters, pueblo (town, village), puente (bridge), puerto (port), ranchería, rancho (usually a small farm), san, santa (including sta.), santo (including sto.), 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 "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 located 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 at 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.
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 miles west of Oaxaca City; site of the Zapotec ruins of the same name. [17°02', 96°46']

Almoloya (Almaloya, Amloloya, Amolóya).—Apparently the small town 6 miles northwest of Chivela, not the station of the same name located on the railroad about 1 mile to the southeast. Erroneously listed by Friedmann (1950: 434) as "Almaloya, Veracruz." [16°45', 95°04'; 754 ft.]

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 miles east of Santiago Dominguillo. Highest peak is Cerro San Felipe at 10,204 feet. See Sierra Madre de Oaxaca.

Alotengo, Laguna de (Lake Alotengo).—A large saline lagoon paralleling the Pacific Ocean about 10 miles southwest of Santiago Pinotepa Nacional. [16°12', 98°07'; sea level]

Amapan.—A border village located where the road to Temascal crosses the Río Amapa 20 miles northwest of San Juan Bautista Tuxtepec. [18°19', 96°18'; about 250 ft.]

Amatepec.—A village 8 miles north-northwest of summit of Cerro Zempoaltepec. Briggs (1953: 157) and all 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). Avilés specimens probably taken at a variety of elevations in vicinity of town. [17°15', 96°02'; about 6,900 ft.]

Amatingo: see San Augustín Amatengo.

Amloloya, Amolóya: see Almoloya.

Angeles Harbor: see Puerto Angel.
Anhuitlán: see Yanhuitlán.

Animas, Las: see Rancho Las Animas.

Arenal, Cerro (Cerro de Arenal).—A ridge with its highest point located at 3,034 ft. elevation 20 miles west of Tehuantepec City. [Highest point at about 16°018', 95°32']

Arroyo Claro [state of Veracruz]: A railroad station in the state of Veracruz 6 miles 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, Friedmann, Griscom, and Moore (1957) as in Oaxaca. Howell (1965) refers the same records to Oaxaca but without giving an exact locality. [18°09', 95°48'; 131 ft.]

Asunción Nochixtlán (Nochistlan, Nochixtlan).—A town on the Pan-American Highway 27 miles southeast of Tamazulapan del Progreso. [17°28', 97°13'; 7,216 ft.]

Atlixco [state of Puebla] (Atlisco).—A large town in the state of Puebla 19 miles 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 miles east of Cordoba. Ridgway (1916: 173) erroneously quotes Salvadori (1891: 193) as referring this locality to Oaxaca. [18°54', 96°46'; 1,512 ft.]

Atoyac, Río.—A large river originating northwest of San Pablo Huitzo, coursing south through the Oaxaca Valley, and then turning west to join with the Rio Verde at a point 24 miles northeast of Santiago Jamiltepec.

Atravesado, Cerro.—One of the higher peaks in the Oaxaca portion of the Sierra Madre de Chiapas, with its summit located at about 6,600 ft. elevation 18 miles slightly west of north of Zanatepec and just east of Picacho Prieto. Contours on the "Millionth Map" are grossly inaccurate for this part of Oaxaca. [Summit at about 16°46', 94°23']

Azul, Cerro: see Picacho Prieto.

Barrio, El (Barrio).—A small town in the Isthmus of Tehuantepec 7 miles southwest of Matías Romero. Sumichrast locality in January 1862 and September and October 1868. [16°50', 95°07'; 1,030 ft.]
Baúl, Cerro.—A high mountain in the Sierra Madre de Chiapas, its summit located at 6,750 feet elevation 14 miles northeast of Zanatepec. [Summit at 16°36', 94° 11']

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 Totolopan and San Carlo Yautpec. Nelson and Goldman specimens taken here were labeled "Near Totolapa." [16°38', 96°12'; 4,000 ft. (Goldman, 1951: 228)]

Boca Río Serabia: see Rancho Boca del Río Sarabia.

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."

Cacoprieto, Cacoprieto Ranch: see Rancho de Cacoprieto.

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.

Camarón, El.—A village on the Pan-American Highway 4 miles southwest of Nejapa. [16°37', 96°01'; about 1,850 ft.]

Camotlán: see San Lucas Camotlán and Santa María Comotlán.

Campamento Vista Hermosa: see Vista Hermosa.

Candelaria Loxicha (Candelaria, La Candelaria).—A small town on Federal Route 175 at a point 13 miles north of San Pedro Pochutla. [15°56', 96°28'; about 2,625 ft.]

Capulalpan (Capulalpam, Cayuilalpan?).—A village 3 miles 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 "Cayuilalpam" may pertain to Capulalpam, Oaxaca. [17°18', 96°27'; 6,494 ft.]

Cardón, Arroyo.—The arroyo in eastern Oaxaca formed by tributary of the Río Porta Moneda. 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 (MacDougall, in litt.).
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 ranch about 7 miles southeast of San Gabriel Mixtepec. [16°03', 97°01']

Cayuilalpan: see Capulalpan.

Chacuhua, Laguna de.—A large lagoon near the Pacific coast in southwestern Oaxaca about 6 miles east of the mouth of the Río Verde. Site of a national park known as Lagunas de Chacahua. [15°59', 97°43'; sea level]

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 Federal Route 175, located 5 miles north of San Pedro Pochutla. [15°49', 96°28'; about 650 ft.]

Chahuites.—A town located on a railroad at a point 5 miles south of Tapanatepec. [16°18', 94°11'; 52 ft.]

Chichuaxtla: see San Andrés Chicahuaxtla.

Chicapa de Castro (Chicapa).—A small town 15 miles east of Juchitán near the northern end of Laguna Superior. [16°26', 94°49'; about 20 ft.]

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.

Chihuitán (Chihintan, Chihuatan). A small town in the Isthmus of Tehuantepec 14 miles northwest of Juchitán. [16°37', 95°10']

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).

Chimalopa, Chimalpa, Chimilapa: see Santa María Chimalapa.

Chinantla.—Mentioned by Miller, Friedmann, Griscom, and
Moore (1957: 235) as a Oaxaca locality for a specimen of *Chlorophanes spiza* taken on 3 of May. Location unknown and probably not in Oaxaca. I can find only one Chinantla in México, a village in southern Puebla in an arid habitat unsuitable for *Chlorophanes*.

**Chinela, plateau of:** see Plains of Chivela.

**Chivela (Chivelas).**—A village on the Trans-Isthmian Railroad 19 miles north of Juchitán. [15°42', 95°00'; 689 ft.]

**Chivela, Plains of (plateau of Chinela).**—A rather flat area of palm savanna in the south-central portion of the Isthmus of Tehuantepec, extending eastward for about 10 miles 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.

**Choapan (Choapam, Coapám, Santiago Choapan).**—A mountain village in the former District of Choapan on the Atlantic side of the Sierra de Zempoaltepec 35 miles east of Ixtlán de Juárez. Erroneously listed by Ridgway (1911: 409) as in the state of Veracruz. See District of Choapan. [17°20', 95°57']

**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.

**Chuialapa:** see Santa María Chimalapa.

**Cienega, La.**—A small grassy and marshy clearing above Jamaica Junction. A. R. Phillips collecting locality. [About 16°09', 97°06' (coordinates of Jamaica Junction)]

**Cieneguilla (Cienaguilla).**—A village 13 miles south of Santiago Dominguillo on the old trail from Oaxaca City to San Juan Bautista Cuicatlán. [17°29', 96°57'; about 7,500 ft.]
Cieneguilla, La.—A ranch about 3 miles north of Santa María Ozolotepec. Nelson and Goldman specimens taken here labeled "Mts. near Ozolotepec." [16º10', 96º22'; about 10,000 ft.]

Cienguilla: see Cieneguilla.

Cima, La (La Cima Camp).—A collecting station for J. S. Rowley, located at a divide on State Route 131 about 6 miles north of San Gabriel Mixtepec. Rowley specimens labeled "La Cima, Sierra Madre del Sur, Oaxaca." [16º12', 97º07'; 5,800 ft. (Rowley, 1966: 110)]

Cinco Señores.—A Boucard locality high in mountains in pine-oak forest. Exact location unknown but probably northeast of Oaxaca City near La Parada.

City of Oaxaca, Ciudad Oaxaca: see Oaxaca City.

Coapam: see Choapan and District of Choapan.

Coatepec [state of Veracruz].—A large town in the state of Veracruz 5 miles southwest of Jalapa. All literature references to "Coatepec, Oaxaca" pertain to this town. [19º27', 96º58'; 4,107 ft.]

Coatlán.—A small town in the Sierra de Choapan 28 miles west of Matías Romero. [16º53', 95º28']

Coatzacoalcos, Río (Río Coatzocoalcos, 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 México at Coatzacoalcos, Veracruz.

Cocoprieto: see Rancho de Cacoprieto.

Coicoyan, 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.

Coixtlahuaca: see San Juan Bautista Coixtlahuaca.

Colotepec: see Santa María Colotepec.

Colotepec, Río.—A short river draining the Sierra de Miahuatlán and emptying into the Pacific Ocean 4 miles southeast of Puerto Escondido.

Comaltepec: see San Juan Comaltepec.
Compañía, La (La Compania).—A village in the Oaxaca Valley 7 miles west of Ejutla de Crespo. A. S. Leopold specimens give an elevation of 4,000 ft. [16°38', 96°50'; 4,789 ft.]

Copalita (Portillo de Copalita).—A small settlement in southern Oaxaca on Federal Route 175 at a point 3 miles northeast of Candelaria Loxicha. [15°57', 96°28'; about 2,100 ft.]

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 miles east of Puerto Angel.

Córdoba [state of Veracruz].—A large town in the state of Veracruz about 56 miles west of the city of Vera Cruz. Some D. McH. Forbes specimen labels locate points in Oaxaca with reference to Córdoba, Veracruz. [18°53', 96°56'; 3,041 ft.]

Cosamaloapán [state of Veracruz] (Cosamaloapam).—A city in the state of Veracruz 39 miles 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 50 miles northeast of San Juan Bautista Tuxtepec. [18°36', 96°39'; about 650 ft.]

Cova, La: see Lacova.

Coyotepec: see Santa María Coyotepec.

Coyul, Río.—A small river intersecting the Pan-American Highway at a road camp just northeast of Lajarcia. W. B. Davis specimens from near this road camp were labeled "Río Coyul, 70 mi, NW Tehuantepec, 2600'."

Cozoaltepec: see San Francisco Cozoaltepec.

Cuajimoloya (Guahamaloya).—A mountain village 18 miles 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°27']

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.
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.

Cues, Los; see San Juan Los Cues.

Cuicatlán; see 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 (Cuilapan).—A town in the Oaxaca Valley 8 miles southwest of Oaxaca City. [17°00', 96°46'; 5,202 ft.]

Cuicatln; see San Juan Bautista Cuicatlán.

Cumbre, La.—A group of about five houses on State Route 175 at a point 5 miles northeast of the summit of Cerro San Felipe. [17°09', 96°37'; about 9,000 ft.]

Cycad Camp.—A collecting station for J. S. Rowley along State Route 131 about 3 miles south-southeast of San Gabriel Mixtepec. [About 16°01', 97°05'; 1,900 ft. (Rowley, 1966: 110)]

Dominguillo; see Santiago Dominguillo.

Donají.—A village at kilometer marker 155 on the Trans-Isthmian Highway 24 airline miles and 31 road miles north of Matías Romero. [17°13', 95°04'; 295 ft.]

Dondominguillo, Dondominguillo: see Santiago Dominguillo.

Durasnál (Durasnil).—Location unknown. Boucard took Geococcyx velox there in September 1857 (P. L. Sclater, 1858: 305).

Ejutla de Crespo (Ejutla).—A town in the Oaxaca Valley 34 miles south of Oaxaca City. [16°34', 96°44'; 4,723 ft.]

Escondida, Bahía (Escondida B., Escondido B., Escondido Bay).—The small, deep Pacific coast bay and harbor 16 miles 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.—A village in the Isthmus of Tehuantepec 19 miles east of Matías Romero. Avilés collecting locality. [16°52', 94°45'; about 738 ft.]

Escurano.—A ranch about 16 miles 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 American Museum of Natural History). [16°25', 95°27'; 1,640 ft.]

Esperanza, La.—A settlement in the Sierra de Choapan 5 miles south on Coatlán on the trail to Lachiguiri and about 22 miles west of Santo Domingo Petapa. [About 16°48', 95°28']

Esquilapa: see Escuilapa.

Estancia Grande: see San José Estancia Grande.

Etiia: see San Pedro y San Pablo Etiia.

Federal Route 125.—The road extending from Tehuacán, Puebla, southwest to Huahuapan de León, Oaxaca, and passing through the Oaxaca towns of Santiago Chazumba and Santiago Miltepec.

Federal Route 175.—The road extending from Oaxaca City south through Ejutla de Crespo, San Andrés Miahuatlán, and San Miguel Suchixtepec to Puerto Angel.

Federal Route 185: see Trans-Isthmian Highway.

Federal Route 190: see Pan-American Highway.

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 miles from the Oaxaca border. Lamb specimens, labeled "Finca Cacahuatl, 15 mi. NE Tapanatepec, Oax.," do not mention Chiapas. Miller, Friedmann, Griscom, and Moore (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 State Route 131 at a point 3.7 road miles north of San Gabriel Mixtepec. [16°09', 97°06'; 2,400 ft. (Rowley, 1966: 110)]
Finca Mercedes.—A coffee finca on the Pacific side of the
Sierra de Miahuatlán about 2 miles north of Candelaria
Loxicha. [15°56', 96°28'; about 2,700 ft.]

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, Montañas 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 north­
est 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 latitude 16°29' north, longi­
tude 94°08' west, 8 miles northeast of Tapanatepec and
near or on the Oaxaca-Chiapas border.

Much confusion has surrounded the various names
used for the Sierra de la Gineta. Sumichrast col­
clected 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)," while Sumichrast himself (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), to Oaxaca. I have
examed both specimens and find that originally the
labels said only "Gineta Mounts." A new label affixed
to the American Museum bird reads "[near Santa Efigenia,
Oaxaca]," while on the National Museum 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, the 1880 records
might have come 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 since they all concern the specimens of Dactylorhynchus 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 Avilés locality "Montañas Gineta, Oax." is unknown; Avilés supposedly collected here a specimen of Atthis heloisa, a species otherwise unknown from east of the Isthmus.

Givicia, Río.—A collecting locality for J. H. Batty in March 1906. Exact location unknown. Undoubtedly located in the Atlantic Region in tropical evergreen forest, as indicated by the species of birds collected. 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 about 20 miles north of Niltepec and about halfway between Scarces and Santa María Chimalapa. Collecting locality for T. MacDougall (not F. A. Pitelka, who is erroneously given as collector on labels of some specimens in the American Museum of Natural History). [About 16°51', 94°37'; about 1,500 ft. (MacDougall, in litt.)]

Goatzacoalcos, Río: see Río Coatzacoalcos.

Golán.—I can find no such locality anywhere in México. Listed without state by P. L. Sclater (1857: 254) as a locality for Momotus mexicanus, a record attributed to Delattre and referred by Ridgway (1914: 466) to Oaxaca.

Grande, Río.—A large upper tributary of the Río Santo Domingo, originating near Capulalpan and flowing northward 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 two towns called Río Grande.

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 two towns called Río Grande.

Guachicovi: see Guichicovi.

Guahamaloya: see Cuajimoloya.

Guajolote, Río (Río Guajalote).—A small tributary of the Río Jalatengo, located south of San Miguel Suchixtepec. Also the name of a collecting locality for A. R. Phillips and J. S. Rowley, located near this river at an abandoned camp on State Route 131 between Río Molino and Río Jalatengo. [Camp at about 16°00', 96°28']

Gaumol, El.—A collecting locality on the Río Guamol at kilometer marker 889 on the Pan-American Highway 9.5 miles west of Zanatepec and 8 miles east of Niltepec. Schaldach incorrectly used "6 mi. W Zanatepec" on his 1961 specimens. [16°33', 94°29']

Guamol, Río.—A small river crossing the Pan-American Highway 8 miles east of Niltepec at El Guamol. Used as a locality name by R. K. Selander. [Junction of river and Pan-American Highway: 16°33', 94°29']

Guatulco Harbor: see Puerto de Huatulco.

Guchitan: see Juchitán.

Guelatao.—A village on State Route 175 at a point 1 mile southwest of Ixtlán de Juárez. [17°18', 96°29'; 6,300 ft. by my altimeter]

Guichicovi (Guachicovi, San Juan Guichicovi).—An old and ornithologically important town in the Isthmus of Tehuantepec 7 miles 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.]

Guichilona (Guichiloma).—A village in the Isthmus of Tehuantepec 14 miles 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 harpija 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 collected a Harpy Eagle "en el cerro de
Guichilona." Undoubtedly he meant that he collected it south of Almoloya on the hill on which Guicholona is located, which was known to him as "el cerro de Guichilona." [16°42', 95°07'; about 2,000 ft.]

Guichilona, Cerro de (cerro de Guichilona).—Apparently, the hill on which the village of Guichilona is located. See discussion under Guichilona.

Hacienda, La.—A collecting locality for P. Roveglia and Martin del Campo on the outskirts of Huajuapan de León. [17°48', 97°46'; 5,238 ft.]

Hacienda Santa Efigenia: see Santa Efigenia.

Hidalgo Yalalag (Villa Hidalgo, Yalalag).—A town in the upper portion of the valley of the Río Cajones, located 26 miles northeast of Tlacolula de Matamoros. Elevation given erroneously as 3,000 ft. by Goldman (1951: 229). [17°11', 96°11'; 3,800 ft. (Goldman, 1951: 230)]

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.

Hoya, La.—Location unknown. Sumichrast took Geococcyx velox there on 11 August 1868.

Huajuapan de León (Huajualpam, Huajuapam, Huajuapan).—A large town on the Pan-American Highway 16 miles northwest of Tamazulapan del Progreso. [17°48', 97°47'; 5,238 ft.]

Huajuapan 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 Huajuapan de León.

Huallaga (Huallago).—A Sumichrast locality for Cassiculus melanicterus and Cyanocompsa parellina. Exact location unknown but probably synonymous with Laollago, a town 2 miles west of Sumichrast's locality Chihuitán. Sumichrast (in Lawrence, 1876: 23) states that Cassiculus is "especially abundant near Chihuitán and Huallaga."

Huamelula (Huamela).—A town on the Pacific side of the Sierra de Miahuatlán 33 miles 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 miles north-northwest.
of Huamelula. Some Sumichrast specimens are labeled "Zapotitlan, cerca de Huamelula." [16°02', 95°40'; 295 ft.]

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.

Hueytamalco [state of Puebla] (Hueytalco).--A town in the state of Puebla near the Veracruz border 49 miles northwest of Jalapa, Veracruz. Mentioned without state under Thamnophilus dolius 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']

Huilotepec.—A small Indian town on the eastern shore of the Río Tehuantepec 8 miles southeast of Tehuantepec City. [16°14', 95°09'; 98 ft.]

Hule, El.--Location unknown. M. T. Cooke (1946: 254) lists a record of a banded Ardea herodias recovered "at El Hule, Oaxaca, México."

Ianhuiatlan, Ianhuitlán: 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 Leopole (1959: 137, 141) as in Chiaspas. [16°20', 94°40'; sea level]

Ingenio Santo Domingo.—A village on the Pan-American Highway 10 miles west of Niltepec. [16°36', 94°45'; 295 ft.]

Isthmus: see Isthmus of Tehuantepec.

Ixhuatan (Ishuatán, Ishuatlan, Ixhuatlan).--A small town 11 miles southwest of Zanatepec. [16°22', 94°29'; about 75 ft.]

Ixtaltepec.—A town on a railroad 6 miles north of Juchitán. [16°35', 95°03'; 105 ft.]
Ixtepec (Ixtapec, San Gerónimo, San Geronomo, San Jerónimo Ixtepec).—A town on the Trans-Isthmian Railroad 11 miles north-northwest of Juchitán. Should not be confused with San Gerónimo, Guatemala. [16°34', 95°06'; 187 ft.]

Ixtlán de Juárez (Ixtlán).—A town on Federal Route 175 at a point 25 miles northeast of Oaxaca City. [17°20', 96°30'; 5,576 ft.]

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 México.

Izúcar de Matamoros [state of Puebla].—A large town in the state of Puebla 22 miles 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 miles northeast of Choapan. [17°27', 95°46']

Jalapa.—Formerly a small town on the Río Tehuantepec 18 miles northwest of Tehuantepec City. This site no longer in existence, 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. 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].—City in the state of Veracruz 43 miles 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 Federal Route 175 about 16 miles north of San Pedro Pochutla. Also, the name used by A. R. Phillips and J. S. Rowley for their collecting locality at this junction of road and river. [Collecting locality: 15°58', 96°028'; 4,500 ft. (Rowley, 1966: 110)]

Jaltepec, Río.—A large river on the Atlantic side of the Isthmus of Tehuantepec, originating in the vicinity of Tutla and joining the Río Sarabia just east of Jesús
Carranza, Veracruz. Since the Oaxaca-Veracruz border intersects the Trans-Isthmian Highway 2.4 miles 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 Jumuapán.

Jamaica Junction.—A collecting locality for J. S. Rowley, et al., at Kilometer marker 212 at a point 3.7 miles north of San Gabriel Mixtepec at the intersection of State Route 131 and the road into Finca Jamaica. [16°09', 97°06'; 2,400 ft. (Rowley, 1966: 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 miles north of the Oaxaca border. Graber specimens taken in Oaxaca 1 mile south of Loseta on the Río Jumuapan were labeled "22 mi. S. Jesús Carranza." [17°26', 95°02'; 85 ft.]

Jícaro, El (Jícaro).—A Schaldach collecting locality along the Pan-American Highway a few miles west of Tapanatepec at a point where a trail leads off to Rancho Sol y Luna.

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.

Juchatenango, Juchatengo, Juchatingo, Juchetengo: see San Pedro Juchatengo.

Juchitán (Guchitan, Juchintan).—A large town on the Pacific coastal plain in the Isthmus of Tehuantepec 15 miles east-northeast of Tehuantepec City. See District of Juchitán. [16°26', 95°01'; 46 ft.]
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, Friedmann, Griscom, and Moore (1957: 60) came from La Gloria, District of Juchitán.

Juchitán, Río (Juchitán 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.

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 mile north of Tollosa, and then flowing north into Veracruz to join with the Río Coatzaocolcos. The town of Loseta is located on this river, not on the Río Jaltepec as erroneously stated by Graber and Graber (1959: 66).

Juniper Camp.—A collecting station for J. S. Rowley at kilometer marker 124 on State Route 131 about 7 miles north of San Pedro Juchatengo. [About 16°29', 97°03'; 5,000 ft. (Rowley, 1966: 110)]

Juguila: see 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.

Juquilla: see Santa Catarina Juquila.

Km. 123 Camp.—A collecting station for J. S. Rowley at kilometer marker 123 about 7 miles northeast of Putla de Guerrero on the road to Santa María Asunción Tlaxiaco. [About 17°06', 97°52'; 4,600 ft. (Rowley, 1966: 109)]

Km. 135 Camp.—A collecting station for J. S. Rowley at kilometer marker 135 about 3 miles northeast of Putla de Guerrero on the road to Santa María Asunción Tlaxiaco. [About 17°03', 97°54'; 3,200 ft. (Rowley, 1966: 109)]

Lachao Nuevo: see San Juan Lachao Pueblo Nuevo.

Lachiguiri.—A small town at the south end of the Sierra de Choapan 29 miles northwest of Tehuantepec City. [16°42', 95°28']

Lachixola.—A village 13 miles north of Choapan. Avilés specimens taken in 1949 give an elevation of 500 m. (1,640 ft.). [17°31', 95°56']

Lacova (La Cova).—An Avilés locality 9 miles north of Choapan; Avilés specimen labels give an evaluation of 1,000 m. (3,280 ft.). [17°28', 95°56']

Lagartero, Laguna (Lake Lagartero).—A large, deep saline lagoon that opens into the Pacific Ocean 12 miles west-northwest of Puerto Escondido. [15°57', 97°12'; sea level]

Lagunas.—A town on the Trans-Isthmian Railroad 6 miles south of Matías Romero. Visited by W. W. Brown and by Nelson and Goldman. The "Lagunas" at which Deppe secured specimens is, in my opinion, in Veracruz, despite the statement to the contrary by van Rossem (1934b: 474). [16°48', 95°04'; 840 ft.]

Lajarcia (Portillo Nejapa, S. Juan La Garcia).—A small town on the Pan-American Highway 8 miles southeast of El Camaron. [16°31', 95°56'; 3,608 ft.]

Lalana (La Lana, Lana).—A small town 10 miles north-northeast of Choapan. [17°28', 95°53'; about 2,300 ft.]

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 with the Río Trinidad in Veracruz to form the Río San Juan, a tributary of the Río Papaloapan.

Laollago.—A small town 17 miles north of Tehuantepec City. See Huallaga. [16°36', 95°12']

Latani.—A Boucard locality. Exact location unknown. Judging from Boucard's reconstructed itinerary and from the one species taken at Latani (Geotrygon albifacies), this locality is probably in cloud forest on Atlantic side of Sierra de Zempoaltepec between Totontepec and Choapan.
León, Cerro.--One of the highest mountains in Oaxaca, its summit located in the Sierra de Miahuatlán 14 miles east of San Miguel Suchixtepec. [Summit: 16°05', 96°15'; 10,296 ft.]

Llano de las Flores.--A ranch in a large meadow along State Route 175 about 12 miles 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, Museum of Natural History. [About 17°25', 96°25'; about 9,200 ft.]

Llano Grande.--A village in extreme southwestern Oaxaca 18 miles northwest of Santiago Pinotep Nacional. [16°29', 98°17'; 197 ft.]

Llano Verde.--A Lamb collecting locality on the Pan-American Highway 45 road miles northwest of Oaxaca City or about 18 airline miles southwest of Asunción Nochixtlan and about 1 mile southeast of Rancho de las Rosas. Not the same as Boucard's Llano Verde (see next entry). [17°15', 97°03'; about 7,000 ft.]

Llano Verde (Llano verde).--A Boucard locality, exact location unknown. Judging from certain species collected (*Sphyrapicus varius*, *Phloeoeastes guatemalensis*, *Cyanolyca nana*, *Campylorhynchus megalopterus*, *Hemicorhina leucosticta*, *Ergaticus ruber*, and *Basileuterus belli*), must be located on 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 feet elevation. Could not be the same as Lamb's Llano Verde (see preceding entry).


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 15 miles east of San Juan Bautista Tuxtepec. Lamb specimens from points 3 miles north, 4 miles south, and 6 miles south. Lamb specimens from "Arroyo Claro, 7 mi. SE Loma Bonita, Oax." were taken in Veracruz (see Arroyo Claro, state of Veracruz). [18°17', 95°53'; 89 ft.]
Loseta.--A Graber locality in the Isthmus of Tehuantepec near the junction of the Río Jumuapán and the Trans-Isthmian Highway about 23 miles 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 Tollosa. [17°13', 95°04'; about 300 ft.]

Lucapa (Lucappa).--I can find no such locality anywhere in México. Listed as "Lucappa," without mention of state, by P. L. Sclater (1857: 254) in range of Momotus mexicanus and later listed under the same species 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.

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 Chaapán.

Madre del Sur, Sierra (Sierra del Sur).--As here defined, that portion of the southern México 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 eastward, entering Oaxaca via the Sierra de Yucayacua, and thence extending both eastward to embrace the Sierra Aloapanca north of Oaxaca City and southeastward to include the Sierra de Miahuatlán.

Madre Oriental, Sierra.--The chain of mountains bordering the eastern side of the central plateau of México. 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.--A tributary of the Río Coatzacoalcos, originating in the Sierra de Choapan west of Santo Domingo Petapa, crossing the Trans-Isthmian Highway
14.5 road miles north of Matías Romero in the vicinity of Mogóñé, and joining the Río Sarabia at the Veracruz border.

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 kilometers (12.4 miles), north and 10 kilometers (6.2 miles) 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 miles 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 miles north of Juchitán. [16°39', 95°01'; 243 ft.]

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 miles north of Juchitán. The railroad station serving Matías Romero formerly was called Rincón Antonio. [16°53', 95°02'; 659 ft.]

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 miles north of La Ventosa. "Mazahua," a Graber locality supposed to be 11.5 miles north of Juchitán according to a specimen label, may be synonymous with Mezahuite. [16°41', 94°56']

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.
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 southern ends of the Sierra de Zempoaltepec and the Sierra de Choapan. Maximum elevation 7,623 ft.

Miltepec: see Niltepec.

Miltepec, Río: see Río Niltepec.

Minas, Arroyo Las.—An arroyo that is crossed by the Pan-American Highway about 8 miles east of Tepanatepec.

Minatitlán [state of Veracruz].—A town in the state of Veracruz 14 miles southwest of Coatzacoalcos. Ridgway (1902: 306) erroneously records a specimen of Icterus mesomelas from "Oaxaca (Minatitlan)." [17°59', 94°31'; 210 ft.]

Minitán.—A tiny fishing and salt manufacturing village on Laguna de Alotengo 10 airline miles or 22 road miles south of Santiago Pinotepa Nacional. [16°13', 98°08'; sea level]

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 Huahuapan de León, Tamazulapan del Progreso, and Santa María Asunción Tlaxiaco.

Moctum (San Marcos Moctun).—A village 9 miles south-southwest of Choapan. Avilés specimens labeled "Moctum," 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.]

Mogoñé.—A small town on the Trans-Isthmian Railroad 8 miles north of Matías Romero. [16°59', 95°03'; about 300 ft.]

Molino, Río.—A small upper tributary of the Río Copalita, crossing State Rouge 175 at a point 3 miles south of San Miguel Suchixtepec. Also a locality name for specimens collected by J. S. Rowley and A. R. Phillips at the intersection of road and stream. Rowley specimens taken between 7,300 and 8,500 ft. elevation. [Collecting locality: 16°04', 96°28'; 7,300 ft. (Rowley, 1966: 110)]

Montebello (Monte Bello).—A Schaldach locality on the Trans-Isthmian Highway 24 road miles (about 20 airline miles) north of Matías Romero and just north of Palomares. [16°11', 95°03'; about 300 ft.]

Monte Verde.—Location unknown. Noted on a specimen of Chlorophonia occipitalis (FM 27051) taken in June 1888 by an unknown collector.

Muerto, Mar.—A large Pacific coast lagoon some 42 miles long and 7 miles wide, located in extreme southeastern Oaxaca and adjacent to Chiapas. Erroneously listed by Leopold (1959: 137) as entirely within Chiapas, although more than half its length is in Oaxaca.

Nacaltepec: see Santiago Nacaltepec.

Negro, Volcán.—While on the trail between San Juan Bautista Cuicatlán and Santos Reyes Papalo, 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 Papalo. Possibly Goldman was looking southeast to Cerro Pelón.

Nejapa.—A small town about 5 miles north of El Camaron and the Pan-American Highway. [16°37', 95°59'; 1,870 ft.]

Nevería Herrera.—A Nelson and Goldman locality on the western slope of the Sierra de Cuatro Venados 15 miles southwest of Oaxaca City. Nelson and Goldman specimens, taken between 8,800 and 9,500 ft. elevation 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 miles east-northeast of Juchitán. [16°34', 94°37'; 298 ft.]

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.

Nochistlán, Nochixtlan: see Asunción Nochixtlán.
Nopala: see Santos Reyes Nopala.

Nuevo Uvero: see Uvero.

Oajaca, Oaxaca: see state of Oaxaca.

Oaxaca City (City of Oaxaca, Ciudad Oaxaca, Oaxaca, Oaxada 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 and by Nelson and Goldman, labeled simply "Oaxaca," are from the city. Most Boucard specimens recorded by P. L. Sclater (1858 and 1859b) as from "Oaxaca" probably were taken at or near the city, but since 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.]

Oaxaca Mountains, Sierra de Oaxaca, Sierra of Oaxaca: see Sierra Madre de Oaxaca.

Oaxaca, state of (Oajaca, Oaxaca, Oaxaco, State of Oaxaco, Oaxcaca, Ozxaca).—A state in southern México, 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 miles, or about that of Indiana. Elevations extend from sea level to 11,138 ft. Population (1960) 1,727,266 inhabitants, eighth largest total in México, or 47.5 per square mile, fifteenth greatest density in México. 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 miles 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 Pablo Huitzo 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.

Oaxaco, State of Oaxaco, Oaxaca: see state of Oaxaca.
Ocotlán de Morelos.— A town and meteorological station in the Oaxaca Valley 9 miles southeast of Zimatlán de Alvarez. [16°48', 96°40'; 5,005 ft.]

Omealca [state of Veracruz].— A small town in the state of Veracruz 15 miles southeast of Córdoba, Veracruz. Listed by Ridgway (1914: 440) as an 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']


Oriental, Laguna.— A large lagoon along the Pacific coast of the Isthmus, centered 8 miles 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 miles 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°31', 94°26'; about 135 ft.]

Ostuta, Río (Ostuta 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 miles 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 135 ft.]

Ozocotepec, Ozolotepec: see Santa María Ozolotepec.

Ozzxaca: see state of Oaxaca.

Palo Blanco.— A locality 1.9 miles west of San Juan Bautista Tuxtepec. [18°06', 96°08'; about 100 ft.]


Palomares.— A village and railroad station, located near the junction of the Trans-Isthmian Highway and Railroad 18
miles north of Matías Romero. Palomar may be a synonym. \([17^\circ 09', 95^\circ 04'; 335 \text{ ft.}]\)

Pan-American Highway (Federal Route 190).--The major highway from México City southeast to the Guatemala border. Enters Oaxaca northwest of Huajuapan de León; passes through Tamazulapan del Progreso, Asunción Nochixtlán, Oaxaca City, San Pedro Totolapan, Tehuantepec City, La Ventosa, and Tapanatepec; and enters Chiapas northeast of the last town.

Panislahuaca, Panistlahuaca, Panixtlahuaca: see San Miguel Panixtlahuaca.

Papaloapan.--A small town on the Río Papaloapan 3 miles north of San Juan Bautista Tuxtepec. \([18^\circ 19', 96^\circ 06'; \text{ about 82 ft.}]\)

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 México at Alvarado, Veracruz.

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 miles northeast of Cerro San Felipe. Direction from Cerro San Felipe given erroneously as west by R. B. Selander and Vaurie (1962: 37). Elevation given erroneously as 10,000 ft. by Salvin and Godman (1897-1904 [1902]: 243). \([\text{About } 17^\circ 12', 96^\circ 36'; 7,900 \text{ ft.} \text{ (Goldman, 1951: 215)}]\)

Pastoria, Laguna de.--A large coastal lagoon 34 miles west of Puerto Escondido and connected with the ocean via Laguna de Chacahua. \([15^\circ 59', 97^\circ 35'; \text{ sea level}]\)

Patanatepec: see Tapanatepec.

Patos, Río.--A small river that crosses the Pan-American Highway 6 miles west of Tapanatepec. \([\text{Intersection of river and highway: } 16^\circ 27', 94^\circ 15'; \text{ about } 150 \text{ ft.}]\)

Pelón, Cerro.--A high mountain at the western end of the Sierra de Juárez, with its summit located 8 miles east-southeast of San Juan Bautista Cuicatlán and, according to some maps, attaining an elevation of over 10,500 ft. \([\text{Summit: } 17^\circ 47', 96^\circ 50']\)

Petapa: see Santo Domingo Petapa.
Petlalcingo [state of Puebla].—A small town in the state of Puebla, located on the Pan-American Highway 22 miles northwest of Huahuapan 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.]

Piedra Blanca.—A settlement on the Trans-Isthmian Highway just south of the Río Malatengo and about 9 airline miles (about 14 road miles) north of Matías Romero. [About 17°01', 95°01'; about 300 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 miles southeast of San Juan Bautists Tuxtepec, Oaxaca, and 2.5 miles east of the Oaxaca state border. P. L. Sclater (1859a), 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 México. In my opinion, all records from Playa Vicente, including Sclater's types, should be referred to the state of Veracruz. [17°50', 95°49'; 312 ft.]

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.

Pluma Hidalgo (Pluma).—A small Indian town on the Pacific side of the Sierra de Miahuatlán 13 miles north-north-east of San Pedro Pochutla. [15°55', 96°25'; 4,428 ft.]

Pluma, Sierra de.—A southeastward extension of the Sierra de Miahuatlan, 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 Puebla Viejo, which border Cerro Ball on its east and west sides. 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 miles west-northwest of the town of Río Grande. [16°05', 97°56'; near sea level]

Presa Benito Juárez (Presa El Marqués).—A large reservoir at the confluence of the Río Tehuantepec and the Río Tequisistlán 16 miles northwest of Tehuantepec City. Capacity 33,268 cubic feet. [16°30', 95°25'; about 350 ft.]

Presa Miguel Alemán (Presidente Aleman Reservoir).—A large reservoir formed from the impounded waters of the Río Tonto at Temascal in northern Oaxaca. Second largest reservoir in México, with a capacity of 282,528 cubic feet. [16°18', 95°30'; about 200 ft.]

Prieto, Picacho (Cerro Azul).—The highest peak in the Oaxaca portion of the Sierra Madre de Chiapas, with its summit located 17 miles northeast of Niltepec and just west of Cerro Atravesado. [Summit: 16°46', 94°27'; about 7,900 ft.]

Progresso.—Location unknown. Species (MVZ) taken by R. H. Palmer in April 1924 at "Progresso, 2500'" indicate location is probably on Pacific side of Sierra de Miahuatlán. Correct spelling probably is "Progreso."

Puebla Nuevo: see Pueblo Nuevo.

Pueblo Laguna.—A settlement about 2 miles southeast of Putla de Guerrero. [17°01', 97°55']

Puente Las Minas (Puenta Las Minas).—A bridge over the Arroyo Las Minas on the Pan-American Highway about 8 miles east of Tapanatepec (P. R. Lenna, in litt.) A locality for sight records by Lenna and L. F. Kibler. [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 miles south of San Pedro Pochutla. [15°39', 96°30'; 141 ft.]
Puerto de Huatulco (Guatulco Harbor, Huatulco, Huatulco B., Port Guatulco, Puerto Guatulco).—A small bay and harbor on the Pacific coast 25 miles 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 María Huatulco" some 13 miles inland, while other maps place the latter town on the coast. [15°44', 96°08'; sea level]

Puerto Escondido (Escondido).—A town on a small bay on the Pacific coast 15 miles south of San Gabriel Mixtepec. [15°51', 97°05'; near sea level]

Puerto Guatulco: see Puerto de Huatulco.

Punta Paloma.—A fishing village on the north shore of Mar Muerto 7 miles southeast of Chahuites. [16°15', 94°10'; sea level]

Putla de Guerrero (Putla).—A town in western Oaxaca at the foot of the Pacific side of the Sierra de Yucuyacua 24 miles southwest of Santa María Asunción Tlaxiaco. Erroneously recorded by Saunders and Salvin (1896: 22) as in Veracruz and by Wetmore (1947: 103) as in Puebla. [17°02', 97°56'; about 2,400 ft.]

Quicaltan, Quicatlan: see San Juan Bautista Cuicatlán.

Quiengola, Cerro de (Cerro de Giengola, Quiengola Mountain).—A hill on the southwestern bank of the Río Tehuantepec 8 miles 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.]

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.

Ranas, Río.—A small river about 2 miles north of San Gabriel Mixtepec near Federal Route 175. Also the name used by J. S. Rowley and A. R. Phillips for their collecting locality along this river and near the road. [Collecting locality: 16°07', 97°06'; 2,100 ft. (Rowley, 1966: 110)]

Ranchería, La.—A summer camp of the Santo Domingo Indians, located on a river about 12 miles by trail (about 9
airline miles) 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 Rancheria. [16°56', 95°14'; 1,500 ft. (Goldman, 1951: 224)]

Rancheria la Candelaria.—An Avilés locality, exact position unknown. Since the label of one Avilés specimen says "Rancheria la Candelaria, Tuxtepec," the locality must be located in the former District of Tuxtepec in northern Oaxaca.

Rancho Boca del Río Sarabia (Boca Río Serabia).—A rancho on the Río Coatzacoalcos 0.6 miles south of its junction with the Río Sarabia or about 9 miles east-northeast of Palomares. Graber specimens taken here were labeled "Boca Río Serabia." [17°12', 94°55'; about 200 ft.]

Rancho Crisantha.—A rancho about 17 miles southeast of Ixtlán de Juárez in the vicinity of San Pedro Cajonos. [About 17º11', 96º17'; 8,000 ft. (Goldman, 1951: 223)]

Rancho de Cacoprieto (Cacoprieto, Cocoprieto, Cacoprieto Ranch, Icacoprieto).—A former rancho visited by Sumichrast in the 1870's 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 miles 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 miles northwest of Oaxaca City or about 17 airline miles southeast of Asunciôn Nochixtlán. [17º16', 97º06'; 7,000 ft. (Lamb specimen labels)]

Rancho El Ocote.—A rancho in the Sierra de Miahuatlán, located along the trail between Santos Reyes Nopala and kilometer marker 186 on State Rouge 131.

Rancho Las Animas (Las Animas).—A rancho on the Pan-American Highway 2 miles west of Nejapa and 3 miles northwest of El Camaron. [About 16º38', 96º03'; about 3,000 ft.]

Rancho Las Cruces (R. Las Cruces).—A rancho in the Isthmus of Tehuantepec near Donaji. [17º13', 95º04'; 295 ft.]
Rancho Santa Efigenia, Rancho Santa Ephigenia: see Santa Efigenia.

Rancho Sol y Luna.—A rancho on a stream about 6 miles northwest of Tapanatepec and about 3 miles north of El Jicaro. Collecting locality for Schaldach and T. MacDougall. [About 500 ft. (MacDougall, in litt.)]

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 3 miles northeast of Ixhuatán. [16°26', 94°27'; 75 ft.]

Reyes, Reyes Pápalo: see Santos Reyes Pápalo.

Rincón (Rincón Bamba).—A village 9 miles west of Salina Cruz. A T. MacDougall locality given on specimens as "Rincón Bamba." [16°11', 95°20']

Rincón Antonio: see Matías Romero.

Rincón Bamba: see Rincón.

Río Grande.—A small town near the Trans-Isthmian Highway 4 miles southeast of Matías Romero. A locality for both Sumichrast and Schaldach but not Boucard. Listed on Schaldach specimens variously as "6 mi. S" and "8 mi. S" of Matías Romero. See the next entry and the two rivers with this name. [16°52', 94°59']

Río Grande.—A town near the Pacific coast 26 miles 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 or Schaldach. See preceding entry and the two rivers with this name. [15°59', 97°27'; about 500 ft.]

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 miles (by trail east of the former town. An overnight stopping place for Nelson and Goldman.

R. Las Cruces: see Rancho Las Cruces.

Roatina: see Santa Catarina Roatina.

Sacatepec: 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.

Salazar.—A rancho on the Río Tehuantepec 9 miles northwest of Tehuantepec City. [16°26', 95°20'; 148 ft.]

Salina Cruz.—The major seaport in Oaxaca, located 12 miles south of Tehuantepec City. [16°10', 95°12'; 184 ft.]

Salina Marquéz.—A Shufeldt locality in the Isthmus of Tehuantepec, exact position unknown. Possibly synonymous with Salina Cruz.

Salomé.—A village on the main trail between Oaxaca City and Tehuacán, Puebla, 10 miles south of Santiago Dominguillo. Very close to and perhaps synonymous with Santiago Nacaltepec. [17°32', 96°51'; 6,600 ft. (Goldman, 1951: 213)]

San Agustín Amatengo (Amatingo).—A small town in the Oaxaca Valley, located on the Río Atoyac 5 miles southwest of Ejutla de Crespo. [16°31', 96°47'; 4,913 ft.]

San Andrés Chicahuaxtla (Chicahuaxtla).—A small Indian town 13 miles southwest of Santa María AsunciÓN Tlaxiaco at the highest point on the road between that town and Putla de Guerrero. [17°10', 97°50'; 7,900 ft. according to my altimeter]

San Andrés Miahuatlán (Miahuatlan).—A large town at the southern extremity of the Oaxaca Valley 18 miles south-southeast of Ejutla de Crespo. [16°20', 96°36'; 5,270 ft.]

San Andrés Tuxtla [state of Veracruz] ("San Andres, Ticatla"; Tuxtla).—A large town in the state of Veracruz 40 miles east-northeast of Cosamaloapan. Friedmann (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 Augustín.—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 Augustín (Puebla Nuevo)," also a Forbes locality.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
San Augustín Pueblo Nuevo (San Augustin [Puebla Nuevo]).
—See San Augustín.

San Bartolo Yautepec (San Bartolo).—A small town on the old main trail between Tehuantepec City and Oaxaca City 25 miles west of Tequisistlán. San Bartolomo may be a synonym. \([16^026', 95^059'; 2,854 \text{ ft.}]\)

San Bartolomé (San Bartolomo).—Location unknown. Possibly synonymous with San Bartolo Yautepec. Under Centurus aurifrons, Ridgway (1914) lists "San Bartolomé" in the range (p. 79) and "San Bartolomo" in synonymy (p. 80).

San Carlos Yautepec (San Carlos, Yantepec).—A small town on the old main trail between Tehuantepec City and Oaxaca City 17 miles southeast of San Pedro Totolapan. \([16^030', 96^006'; 3,280 \text{ ft.}]\)

San Domingo, Río: see Río Santo Domingo.

San Domingo, Sierra, Sierra de San Domingo: see Sierra Santo Domingo.

San Felipe, Cerro (Cerro de San Felipe, San Felipe).—One of the highest mountains in the state, with its summit located at 10,204 ft. elevation in the Sierra Aloapaneca 8 miles 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 miles (by trail) north of Oaxaca City and 3 miles 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 mass. Leopold specimens are from 7,000 ft., 6 kilometers (3.7 miles) north of Oaxaca City. \([\text{Summit: } 17^010', 96^041']\)

San Felipe del Agua.—A village 3 miles north of Oaxaca City at the base of Cerro San Felipe. \([17^006', 96^043'; \text{about 5,700 ft.}]\)

San Felipe Ixtapa.—A village 2.5 miles west-southwest of San Pedro y San Pablo Teposculula. Site of a meteorological station. \([17^030', 97^031']\)

San Felipe, Sierra: see Sierra Aloapaneca.

San Francisco: see San Francisco del Mar.

San Francisco Cozoaltepec (Cozoaltepec).—A village 17 miles west-northwest of San Pedro Pochutla. \([15^043', 96^035']\)
San Francisco del Mar (San Francisco).—A village on the southwestern shore of Laguna Oriental 14 miles southwest of Ixhuatán. A Sumichrast locality in 1869 is recorded by Lawrence (1876: 46) as simply "San Francisco." Another town called "San Francisco," located 6 miles west of San Francisco del Mar, is shown on only one of my six maps and is so small that it probably is not Sumichrast's locality, despite the similarity in names. [16°15', 94°38'; about 100 ft.]

San Francisco Telixtlahuaca (Huitzo, San Francisco Huitzo, Telixtlahuaca).—A town on the railroad to Tehuacán, Puebla, 20 miles 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 (R. B. Selander and Vaurie, 1962: 34). Sumichrast's locality "Huitzo, near Oaxaca" is also presumed to be the same as San Francisco Telixtlahuaca, although there is a San Pedro Huitzo located 4 miles to the southeast. [17°18', 96°54'; 5,668 ft.]

San Francisco Tlapancingo (Tlapancingo).—A small town in extreme western Oaxaca 35 miles 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.]

San Gabriel Mixtepec (San Gabriel, San Gabriel Mixtepec, San Miguel Mixtepec).—A small town on Federal Route 175 at the junction of the side road to Santos Reyes Nopala 18 miles south of San Pedro Juchatengo. [16°05', 97°06'; about 2,350 ft.]

San Gerónimo, San Geronomo: see Ixtepec.

San Ildefonso Villa Alta (Villa Alta).—A small town 14 miles north of Hidalgo Yalalag. [17°21', 96°09'; 3,733 ft.]

San Jerónimo Ixtepec: see Ixtepec.

San José Chiltepec (Chiltepec).—A small town on State Route 175 at a point 10 miles south-southeast of San Juan Bautista Tuxtepec. A Deppe locality for Dives dives. [17°57', 96°11'; 853 ft.]

San José del Pacifico.—A mountain village on Federal Route 175 at a point 6 miles north of San Miguel Suchixtepec. [16°10', 96°30']

San José Estancia Grande (Estancia Grande).—A village on
the road between Acapulco, Guerrero, and Santiago Pinotepa Nacional, Oaxaca, 11 miles west of the latter town. [16°21', 98°12'; 230 ft.]

San Juan: see San Juan del Río.

San Juan Bautista Coixtlahuaca (Coixtlahuaca).—A small town 16 miles east-northeast of Tamazulapan del Progreso. [17°43', 97°19'; 6,560 ft.]

San Juan Bautista Cuicatlán (Cuicatlán, Cuicuitlán, Cuitcatlán, Quicaltan, Quicatlan).—A town on both the railroad and main trail between Oaxaca City and Tehuacán, Puebla, 41 miles east-northeast of Tamazulapan del Progreso. See District of Cuicatlán. [17°48', 96°58'; 1,952 ft.]

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 Tomellín, Río Quiotepec, Río Grande, and the Oaxaca portion of the Río Salado.

San Juan Bautista Tuxtepec (Tustepec, Tuxtepec, Tuxtupec).—A large town on the Río Santo Domingo near the Veracruz border 81 miles northeast of Oaxaca City. Nelson and Goldman specimens taken at the town and at a point 10 miles 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.]

San Juan Comaltepec (Comaltepec).—A small town in north-central Oaxaca 3 miles southwest of Choapan. Nelson and Goldman specimens labeled "Comaltepec" taken between 1,900 and 3,500 ft. [17°18', 95°59'; 2,624 ft.]

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 16 miles east-southeast of Tlacolula de Matamorosa. 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.

Tébouch collected the following birds at this town: Morococcyx erythropygus, Centurus aurifrons, Myiarchus cinerascens, Thyrothorus pleurostictus, Turdus rufopalliatus, Icterus pustulatus formosus, and Passerina leclancherii. I have observed all of 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. P. L. Sclater and
Salvin (1870: 550) say that San Juan del Río is located "in the centre of the state of Oaxaca." [16°54', 96° 16'; 5,018 ft.]

San Juan Guichicovi: see Guichicovi.

San Juan Lachao: see San Juan Lachao Pueblo Viejo.

San Juan Lachao Pueblo Nuevo (Lachao Nuevo).—A village and collecting locality for J. S. Rowley. Exact location unknown. According to Rowley (1966: 110), it is located 30 kilometers (18.6 miles) west of Cerro Verde and about midway between La Cima Camp and San Gabriel Mixtepec.

San Juan Lachao Pueblo Viejo (San Juan Lachao).—A small town in the Sierra de Miahuatlán a few miles west of State Route 131 and 9 miles north of San Gabriel Mixtepec. [16°14', 97°09'; 5,576 ft.]

San Juan Los Cues (Los Cues).—A village on the main trail between Oaxaca City and Tehuacán, Puebla, 17 miles north-northwest of San Juan Bautista Cuicatlán. [18°03', 97°03'; 2,899 ft.]

San Juan Quiotepec (Quiotepec).—A small town on the railroad and main trail between Oaxaca City and Tehuacán, Puebla, 7 miles north of San Juan Bautista Cuicatlán. Sumichrast locality in 1868. Not the town of the same name located 22 miles north-northwest of Ixtlán de Juárez. [17°54', 96°59'; 1,758 ft.]

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 27 miles northeast of Nejapa. Records mentioned by Pardiñas (1946: 217) as obtained by Avilés at "Camotlán" in 1943 probably pertain to this locality and not to Santiago Camotlán, which is located about 8 miles north of San Ildefonso Villa Alta. [16°57', 95°47'; 5,543 ft.]

San Marcos Moctun: see Moctum.

San Marcos Zacatepec (Sacatepec, Xacatepec).—A small town in southwestern Oaxaca 8 miles southwest of Santa Catarina Juquila. P. L. Sclater's reference (1859b: 388) to "Sacatepec" 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 "Xacaltepec" and "Xacautepec," probably pertain to a different locality (see Xacatepec). [16°09', 97°22'; about 3,300 ft.]

San Martín Lachilá (San Martin).—A small town on State Route 131 at a point 11 miles northeast of San Miguel Sola de Vega. [16°37', 96°51'; 4,845 ft.]

San Mateo del Mar (San Mateo).—A small fishing town on a narrow strip of land between the Gulf of Tehuantepec and a western arm of Laguna Inferior 19 miles southeast of Tehuantepec City. [16°13', 94°59'; 49 ft.]

San Mateo Río Honda ("San Mateo (Río Honda)," "San Mateo (Río Honde)."
Location unknown. Collection by Francis de Maeyer of three specimens of Passerina rositae (FM) at "San Mateo (Río Honde); 10 mi. South" indicates position in Pacific Region in or east 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 miles 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" (P. L. Sclater, 1859b: 381) is doubtfully referable to the present locality. [17°45', 96°24']

San Miguel Albarradas (San Miguel Albarrados).—A village 13 miles east-northeast of Tlacolula de Matamoros. [17°00', 96°17'; 6,500 ft. (Goldman, 1951: 222)]

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 miles northwest of Niltepec. See discussion under Santa María Chimalapa. [16°43', 94°44'; 400 ft.]

San Miguel de las Peras: see San Miguel Peras.

San Miguel Huautla Nochistlán (San Miguel Huautla).—A small town 10 miles southwest of San Juan Bautista Cuicatlán on the trail to San Juan Bautista Coixtlahuaca. Goldman (1951: 211) erroneously records the direction of San Juan Bautista Cuicatlán as northwest and the elevation as 6,300 ft. [17°46', 97°06'; 7,583 ft.]
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 22 miles northwest of San Gabriel Mixtepec. [16°15', 97°23'; 1,968 ft.]

San Miguel Peras (San Miguel de las Peras).—A mountain town 21 miles 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 P. L. Sclater (1858: 295) is only "two leagues" from Oaxaca City. That Boucard's locality is synonymous with San Miguel Peras is only surmise. [16°57', 97°00'; 6,724 ft.]

San Miguel Sola de Vega (Sola, Sola de Vega).—A town on State Route 131 at a point 13 miles northeast of San Pedro Juchatengo. [16°31', 96°59'; 5,182 ft.]

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.

San Miguel Soyaltepec (Soyaltepec).—A small town 25 miles west-northwest of San Juan Bautista Tuxtepec. Now located on a small island in the middle of Presa Miguel Alemán. Avilés specimens labeled "Soyaltepec" were taken in 1944 before filling of the reservoir. His specimen labels give an elevation of 600 meters (1,968 ft.), which is much too high for the town. Miller, Friedmann, Griscom, and Moore (1957) frequently quote this elevation from Avilés specimens. Probably, birds were taken near the town, not at 1,968 ft. elevation above the town. [18°12', 96°29'; about 250 ft.]

San Miguel Suchixtepec (San Miguel Suchistepec, San Miguel Suchixtepec, San Pedro Suchistepec, Suchistepec, Suchixtepec).—A small Indian town on Federal Route 175 at a point 19 miles southeast of San Andrés Miahuatlán. [16°05', 96°28']

San Miguel Talea de Castro (Talca, Talea).—A small town 15 miles east of Ixtlán de Juárez. [17°22', 96°15'; 5,510 ft.]

San Pablo Villa de Mitla (Metla, Mitla).—A town in an eastern arm of the Oaxaca Valley 24 miles east-southeast of Oaxaca City. Site of Zapotec Indian ruins. [16°55', 96°24'; 5,412 ft.]
San Pablo Yaganiza (Yaganiza).--A small town 5 miles southwest of Hidalgo Yalalag. [17°08', 96°14']

San Pedro.--Hellmayr (1934: 59) lists "San Pedro," Oaxaca, as a locality for Aphelocoma unicolor on the basis of the original description by Du Bus. Zimmer (1948: 127) states that the same specimen was originally reported as from "San Pedro, pres de Oaxaca." I am 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 11 miles northeast of Santiago Pinotepa Nacional. Never visited by an ornithologist. Reference by Miller, Friedmann, Griscom, and Moore (1957: 28) to the "western mountains" of Oaxaca may stem from their erroneous allocation to San Pedro Atoyac, Oaxaca, of a specimen of Piculus aeruginosus taken at Atoyac, Veracruz. [16°31', 97°05']

San Pedro Cajonos (San Pedro Cajones).--A small town 7 miles west of Hidalgo Yalalag. Nelson and Goldman stayed overnight at Rancho Crisantha near San Pedro Cajonos. [17°10', 96°17'; 5,550 ft.]

San Pedro Etla: see San Pedro y San Pablo Etla.

San Pedro Juchatengo (Juchatenango, Juchatengo, Juchatingo, Juchetengo).--A town at the intersection of State Route 131 and the Río Atoyac 19 miles north of San Gabriel Mixtepec. [16°21', 97°06']

San Pedro Mixtepec.--A small town on the Pacific side of the Sierra de Miahuatlán, located on State Route 131 at a point 7 miles south of San Gabriel Mixtepec. [16°00', 97°07']

San Pedro Pochutla (Pochutla).--A large town on Federal Route 175 at a point 5 miles north of Puerto Angel. [15°44', 96°28'; 535 ft.]

San Pedro Suchistepec: see San Miguel Suchixtepec.

San Pedro Totolapan (Totolapa, Totolapan, Totolopa).--A small town on the Pan-American Highway 13 miles southeast of Santiago Matatlán. Nelson and Goldman specimens labeled "Near Totolapa" were taken at Los Bichones. [16°40', 96°18']

San Pedro y San Pablo Etla (Etla, San Pedro Etla, Villa de Etla).--A small town on the Pan-American Highway 10 miles northwest of Oaxaca. Formerly an important
stopping place on the railroad and main trail between Oaxaca City and Tehuacán, Puebla. [17°12', 96°48'; 5,379 ft.]

San Pedro y San Pablo Teposcolula (Teposcolula).—A town on the road to Santa María Asunción Tlaxiaco 12 miles south-southeast of Tamazulapan del Progreso. [17°31', 97°09'; 7,147 ft.]

Santa Catarina Juquila (Juquila, Juquila, Juquilla).—A small town near the western end of the Sierra de Miahuatlán 16 miles northwest of San Gabriel Mixtepec. A locality for Boucard and Nelson and Goldman. See District of Juquila. [16°14', 97°18'; 4,920 ft.]

Santa Catarina Roatina (Roatina).—A village 6 miles southeast of San Andrés Miahuatlán. [16°18', 96°32'; about 6,500 ft.]

Santa Cruz, Bahía (Santa Cruz Bay, Santa Cruz Harbor).—A bay on the Pacific coast about 26 miles east-northeast of Puerto Angel. [15°45', 96°07'; sea level]

Santa Domingo: see Santo Domingo Petapa.

Santa Domingo, Sierra: see Sierra Santo Domingo.

Santa Efigenia (Hacienda Santa Efigenia, Rancho Santa Efigenia, Rancho Santa Ephigenia, Sta. Efigia, Sta. Efigenia).—A former hacienda in the Pacific foothills of the Sierra Madre de Chiapas 5 miles north-northwest of Tapanatepec; now abandoned. [16°27', 94°13'; 800 ft.]

Santa Fe.—An uninhabited trail junction on the Pan-American Highway 1.2 miles southwest of the Chiapas border. An A. R. 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 mile southwest of Valle Nacional along State Route 175. Specimens taken here 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 miles southwest of Oaxaca City. [16°56', 96°51']

Santa Lucía (Sta. Lucía).—A former rancho on the east slope of Cerro Tres Cruces 16 miles west-southwest of
Tehuantepec. A collecting locality for T. MacDougall (not F. A. Pitelka, who is erroneously listed as collector on some specimens in the American Museum of Natural History). [16°18', 95°28'; 2,624 ft. (Duellman, 1960: 35)]

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 miles 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 Huahuapan de León. As there are several towns with this name in the vicinity of Huahuapan de León, I cannot be sure to which these records apply. [Huahuapan de León: 17°48', 97°46'; 5,156 ft.]

Santa María Asunción Tlaxiaco (Tlaxiaco).—A large town on the main highway 24 miles northeast of Putila de Guerrero. [17°16', 97°41'; 6,553 ft.]

Santa Maria Camotlan (Camotlán).—A small town on Federal Route 125 at a point 8 miles northeast of Huajuapan de León. R. K. Selander specimens from here labeled "Camotlán, 5100 ft." [17°54', 97°41'; about 5,250 ft.]

Santa María Chimalapa (see below).—A small town on the Atlantic side of the Isthmus 24 miles east of Matías Romero and 14 miles 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; Chualalapa; Santa Maria, Chimalapa; and Santa Maria (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 the preponderance of tropical evergreen forest species collected. W. L. 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°41'; 973 ft.]

Santa María Colotepec (Colotepec).—A small town on the Rio Colotepec 18 miles southeast of San Gabriel Mixtepec. [15°53', 96°55']

Santa María Coyotepec (Coyotepec).—A small town on the main highway 7 miles south of Oaxaca City. [16°57', 96°42'; 5,202 ft.]

Santa María del Mar.—A village on a narrow strip of land between Laguna Inferior and the Gulf of Tehuantepec 26 miles east-southeast of Tehuantepec City. [16°14', 94°51'; 39 ft.]

Santa María del Tule (El Tulé).—A small town in the Oaxaca Valley 7 miles east of Oaxaca City. Site of a famous Bald Cypress (Taxodium mucronatum) with a trunk about 170 ft. in circumference. [17°02', 96°37'; 5,150 ft.]

Santa María Ozolotepec (Ozocotepec, Ozolotepec).—A small mountain town 22 miles southeast of San Andrés Miahuatlan. Nelson and Goldman specimens labeled "Mts. near Ozolotepec" were taken about 3 miles north around La Cieneguilla. [16°08', 96°21']

Santa María Petapa.—A small town in the Isthmus of Tehuantepec 6 miles southwest of Matías Romero and 2 miles east of Santo Domingo Petapa. The only records definitely pertaining to this Petapa are those in 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.]

Santa María Tonameca (Tonameca, Tonemeca).—A village on the Rio Tonameca 6 miles 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 Rio Tonameca rather than at the town. [15°44', 96°33']

Santiago Chazumba.—A small town on Federal Route 125 near the Puebla border 27 airline miles north-northeast of Huahuapan de León. Specimens taken by Binford and the Berretts about 3 miles northeast of town were labeled "Huajuapan de León, 34 rd. mi. NNE on road to Tehuacán, 6100'." [18°12', 97°40']

Santiago Choapan: see Choapan.
Santiago Dominguillo (Dominguillo, Dondominguillo, Dondominguillo).—A village on what was formerly the main trail between Oaxaca City and Tehuacán, Puebla, 11 miles south-southeast of San Juan Bautista Cuicatlán. [17°39', 96°55'; about 2,400 ft.]

Santiago Jamiltepec (Jamiltepec).—A large town 16 miles east-southeast of Santiago Pinotepa Nacional. [16°017', 97°49'; 787 ft.]

Santiago Matatlán (Matatlán).—A small town on the Pan-American Highway at the extreme northeastern end of the Oaxaca Valley 27 miles southeast of Oaxaca City. [16°52', 96°23'; 5,438 ft.]

Santiago Miltepec.—A small town on Federal Route 125 at a point 14 miles north-northeast of Huahuapan de León. [17°59', 97°41'; about 5,600 ft.]

Santiago Nacaltepec (Nacaltepec).—A small town on what was formerly the main trail between Oaxaca City and Tehuacán, Puebla, 21 miles south of San Juan Bautista Cuicatlán. [17°31', 96°56'; about 6,900 ft.]

Santiago Pinotepa Nacional (Pinotepa, Pinotepa del Estado, Pinotepa Nacional).—A town in extreme southwestern Oaxaca on the road between Puerto Escondido and Acapulco, Guerrero, 16 miles west-northwest of Santiago Jamiltepec. [16°20', 98°03'; 623 ft.]

Santiago Yolomécatl.—A small town on the road to Santa María Asunciôn Tlaxiaco 6 miles southwest of San Pedro y San Pablo Teposcolula. [17°28', 97°34'; 6,990 ft.]

Santo Domingo Petapa (Petapa, Santa Domingo, Santo Domingo, S. Domingo, S. Dom. Petapa, Sto. Domingo, Sto. D. Petapa).—A town in the Isthmus of Tehuantepec 8 miles west-southwest of Matías Romero and 2 miles 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," while their birds labeled "Mts. near Santo Domingo" were taken 9 miles 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.]

Santo Domingo, Río (Río San Domingo).—A very large river in northern Oaxaca, extending from the confluence of the Río Salado and the Río Quioptepec near San Juan Quioptepec east through a deep canyon and joining with the Río Tonto near San Juan Bautista Tuxtepec to form the Río Papaloapan.
Santo Domingo, Sierra (Sierra San Domingo, Sierra de San Domingo, Sierra Santa Domingo, Sierra de Santo Domingo, Sierra S. Domingo, Sierra de S. Domingo). A W. B. Richardson 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 5 miles west of San Gabriel Mixtepec. [16°06', 97°10'; about 1,500 ft.]

Santos Reyes Pápalo (Reyes, Reyes Pápalo).—A village in the western end of the Sierra de Juárez 7 miles east-northeast of San Juan Bautista Cuicatlán. Nelson and Goldman specimens labeled "Reyes" taken between 6,700 and 10,200 ft. elevation. [17°52', 96°51'; 6,700 ft. (Goldman, 1951: 220)]

Sarabe, Río: see Río Sarabia.

Sarabia.—A small town on the Trans-Isthmian Railroad and Highway about 13 airline miles north of Matías Romero and 3 miles by road south of the Río Sarabia. Schaldach specimens taken here labeled "Sarabia" or "16 mi. N Matías Romero." All Lamb specimens from this region, including those labeled "Sarabia, 20 mi. N Matías Romero," taken where the Trans-Isthmian Highway crosses the Río Sarabia, not at the town. All specimens from "18 mi. N Matías Romero" also taken at the river. [17°04', 95°02'; 305 ft.]

Sarabia, Río (Río Sarabe, Sarabia River, Río Serabia).—An upper tributary of the Río Coatzacoalcos, originating in the Sierra de Choapan west of Santo Domingo Petapa 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 14 airline miles north of Matías Romero (see Sarabia). Graber specimens labeled "Boca Río Serabia" taken along the Río Coatzacoalcos 0.6 mile south of its junction with the Río Sarabia at Rancho Boca del Río Sarabia. [Junction of river and highway: 17°07', 95°01'; 262 ft. (Duellman, 1960); 35]

Scarces.—A rancho in the western part of the Sierra Madre de Chiapas 11 miles north of Niltepec. [16°43', 94°35'; 1,378 ft.]

Screech Owl Camp.—A collecting station for J. S. Rowley, located on State Route 131 just northeast of the
highest divide south of San Pedro Juchatengo and about 7 miles north of San Gabriel Mixtepec. \([16^\circ13', \ 97^\circ07'; \ 6,300 \text{ ft.}] (\text{Rowley, 1966: 109})\]

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 miles west of Tehuantepec City. MacDougall specimens from Río Saco in the American Museum of Natural History erroneously ascribed to F. A. Pitelka. Should not be confused with Río Seco, Veracruz (see next entry). \([16^\circ21', \ 95^\circ17'; \ 150 \text{ 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 Oaxaca by Brodkorb (1940: 1). Should not be confused with the "Río Seco" in Oaxaca (see preceding entry).

Sedas, Las.—A railroad station on the continental divide 15 miles northwest of San Pedro y San Pablo Etla. \([17^\circ20', \ 96^\circ57'; \ about \ 6,000 \text{ ft.}]\]

Serabia, Río: see Río Sarabia.

Silacayoapan.—A town in extreme western Oaxaca 6 miles northeast of San Francisco Tlapancingo. \([17^\circ30', \ 98^\circ09'; \ 5,642 \text{ ft.}]\]

S. Juan, S. Juan del Río: see San Juan del Río.

S. Juan La Garcia: 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 Quatro Venados and flowing southeast to join with the Río Atoyac at a point 9 miles southeast of San Miguel Sola de Vega.

Solasita.—A small town visited by Lamb, located on a small river 30 road miles (about 23 airline miles) north of Matías Romero. Possibly synonymous with Loseta or Tollosa. \([17^\circ13', \ 95^\circ04'; \ about \ 200 \text{ ft.}]\)
Soledad.—A village on Federal Route 175 at a point 16.2 road miles north of Candelaria Loxicha. [About 4,700 ft.]

Sol y Luna, Laguna.—A small lake on the Pacific side of the Sierra Madre de Chiapas about 1 mile north of Ranch Sol y Luna and about 4 miles north of El Jicaro. [About 1,500 ft. (T. MacDougall, in litt.)]

Sordo, Río.—A large river draining the interior valleys east of the Sierra de Yucuyacua and joining with the Río Atoyac 24 miles northeast of Santiago Jamiltepec to form the Río Verde.

Soyaltepec: see San Miguel Soyaltepec.

S. Efig^a, Sta Efigenia: see Santa Efigenia.

Sta. Lucía: see Santa Lucía.

State Route 175.—The road extending from the Veracruz border near San Juan Bautista Tuxtepec southwest through Valle Nacional and Ixtlán de Juárez to Oaxaca City.

State Route 131.—The road extending from Oaxaca City to Puerto Escondido, passing through Zimatlán de Álvarez, San Miguel Sola de Vega, San Pedro Juchatengo, and San Gabriel Mixtepec. Probably will be extended north through San Juan Bautista Cuicatlán to Teotitlán del Camino.

Suchapam (Suchuapan).—A Boucard locality for Oryzoborus funereus in April 1859. 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 (et al.) 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]

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.—M. T. Cooke (1938: 187) records the recovery of a banded Zenaidura macroura at "Tamazola," possibly San Juan Tamazola, a village located at latitude 17°11' north, longitude 97°03' west, or about 23 miles west-northwest of Oaxaca City.

Tamazulapan del Progreso (Tamasulapa, Tamazulapa, Tamazulapam, Tamazulapan).—A town on the Pan-American Highway 16 miles southeast of Huajuapan de León. [17°41', 97°34']

Tanatepec: see Zanatepec.

Tangola Tangola, Bahía (Tangola-Tangola).—A small Pacific coast bay about 23 miles east-northeast of Puerto Angel. [About 16°43', 96°09'; sea level]

Tapanatepec (Japana, Patanatepec, Tapan, Tapanatapec, Tapanipec, Tapantepec, Tapántepec, Tepanatepec, Tepenatepec, Tupana).—A town on the Pan-American Highway 19 miles east of Ixhuatán. [16°21', 94°12']

Tehuantepec, Tehuant.: see Tehuantepec region.

Tehuantepec (see also Tehuantepec City, District of Tehuantepec, Tehuantepec region, and state of Tehuantepec).—The locality "Tehuantepec" can refer to Tehuantepec City, the former District of Tehuantepec, the Isthmus of Tehuantepec proper (including a portion of Veracruz), the former state of Tehuantepec, or to a general region somewhat larger than all these combined. Records not definitely restricted to the city, district, state of Oaxaca, or a particular town within the region have usually been disregarded, as they may pertain to the state of Veracruz.

Tehuantepec, Bay of: see Gulf of Tehuantepec.

Tehuantepec City (Tehuantepec, Tehuantepec City, Tehuantepec city, City of Tehuantepec, villa de Tehuantepec).—A large town on the Pan-American Highway and Trans-Isthmian Railroad 15 miles west-southwest of Juchitán. Sumichrast records from "Tehuantepec" pertain to the region, as he apparently invariably wrote "Tehuantepec City" when he meant the town, or followed the general term with a restricted locality in parentheses. Nelson and Goldman, as well as Shufeldt, used "Tehuantepec" to indicate the town. Nelson and Goldman specimens from "near Tehuantepec" were taken 8 miles west-northwest of the city on Cerro de Quiengola. Other records from "Tehuantepec" may refer to the city, district, state,
Isthmus, or region, and since the last two include portions of Veracruz, such records must be disregarded unless otherwise restricted. \[16^\circ 20', 95^\circ 14'; 115 \text{ ft.}\]

Tehuantepec, District of (Tehuantepec).—A former, major political subdivision of the state of Oaxaca, oriented on a north-south axis on the western side of the Isthmus of Tehuantepec and extending roughly north to Uvero and the Río Jaltepec, east to Chihuitán, south to the Pacific Ocean, and west to Huamelula, Tequisistlán, and Tutla. See Tehuantepec.

Tehuantepec, Gulf of (Bay of Tehuantepec).—A large, relatively shallow extension of the Pacific Ocean formed by a broad indentation in the coast line at the Isthmus of Tehuantepec and extending from west of Salina Cruz to the Chiapas border. In the species accounts, the gulf is considered part of the open ocean unless otherwise noted.

Tehuantepec, Isthmus of (Isthmus, Tehuantepec, Istmo de Tehuantepec).—No clear-cut boundaries delimit this area. As defined herein, the Isthmus of Tehuantepec is a physiographic region, the Oaxaca portion of which is a north-south strip of land extending between the Veracruz line and the Gulf of Tehuantepec and bordered on the west by the foothills of the Sierra de Choapan (approximately longitude 95°10' west) and on the east by the foothills of the Sierra Madre de Chiapas (approximately longitude 94°40' west). Also included is the lowland area west past Tehuantepec City to the eastern base of the Sierra de Miahuatlán. A more general definition of the Isthmus, which herein applies to what I call the Tehuantepec region, encompasses the Pacific lowlands of Oaxaca from near Salina Cruz westward, the Sierra Madre de Chiapas within Oaxaca, the Isthmus proper, Tehuantepec City, the District of Tehuantepec, and an indeterminable portion of Veracruz. References to the \"Isthmus of Tehuantepec\" may pertain to Veracruz and must be disregarded unless restricted to Oaxaca. Sumichrast and other authors have referred to the Atlantic and Pacific sides of the Isthmus as east and west, respectively, so caution must be exercised when dealing with directions in this region. I consider the Gulf of México as north, the Sierra Madre de Chiapas as east, the Sierra de Choapan as west, and the Gulf of Tehuantepec as south.

Tehuantepec, Plains of.—A term for that portion of the Pacific coastal lowlands in the western end of the Isthmus of Tehuantepec, extending from the 300 ft. level at the base of the Isthmus mountains south to the northern edges of the large coastal lagoons and from just west of the Río Tehuantepec to just east of the Río Chicapa.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Tehuantepec region (Tehuantepec, Tehuantepec, Tehuantepeque, Tuhuantepec).—Many literature references and specimen labels give merely "Tehuantepec" as a locality. It is often impossible to determine to which specific locality such records pertain, to the Isthmus of Tehuantepec proper (including part of Veracruz), the former state of Tehuantepec, the District of Tehuantepec, Tehuantepec City, or a more general area somewhat larger than all these combined. To embrace all 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.

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.

Tehuantepec, state of (Tehuantepec).—Ridgway (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 Tejas, Los Tejedos).— A Lamb and T. MacDougall locality 9 road miles (about 7 airline miles) 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.]

Temascal.—A new town 22 miles northwest of San Juan Bautista Texepec at the site of Presa Miguel Alemán (the dam). [18°15', 96°24'; about 250 ft.]

Temascaltepec [state of México] (Temiscaltepec).—A town in the state of México 39 miles southwest of Toluca. Ridgway (in Ferrari-Perez, 1886: 148) erroneously refers a specimen of Pipilo fuscus (USNM) to "Temiscaltepec, Oaxaca." [19°02', 100°03']

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Teotalcingo.—A mountain village on the eastern side of the Sierra de Zempoaltepec 6 miles north of Choapan. 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°25', 95°58'; about 3,000 ft.]

Teotitlán del Camino (Teotitlan).—A small town near the Puebla border 24 miles 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.]

Tepanatepec, Tepenatepeec: see Tapanatepec.

Tepetlapa [state of Guerrero].—A small town in the state of Guerrero, located on a railroad near the Morelos border. P. Vaurie (1958: 293) considers H. H. Smith locality for insects to be Tepetlapa, Oaxaca, a town located 16 miles northwest of San Francisco Tlapancingo. However, Salvin and Godman (1888-1904 [1889]) list Myiarchus tuberculifer (p. 94) and Empidonax minus (p. 72) from "Tepetlapa . . . in Guerrero (Mrs. H. H. Smith). . . ." I have little doubt 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 miles northeast of Hidalgo Yalalag. [17°18', 96°02']

Teposcolula: see San Pedro y San Pablo Teposcolula.

Tequisistlán (Tequesixtlan, Tequistlán, Tequixistlán, Tequixistlan).—A small town just south of the Pan-American Highway 25 miles west of Tehuantepec City. [16°25', 95°37'; 623 ft.]

Tequisistlán, Río (Tequixistlán 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.

Tequistlán, Tequisistlán: see Tequisistlán.

Tequixistlan River: see Río Tequisistlán.

Tequixistlan: see Tequisistlán.
Tetela.—A railroad station in extreme northern Oaxaca 36 miles northwest of San Juan Bautista Tuxtepec. [18°32', 96°27'; about 200 ft.]

Tierra Blancas, Río.—A small tributary of the Río Tonameca. Also the name used by A. R. Phillips for his collecting locality where the river intersects Federal Route 175 at a point about 4 miles north of Chacalapa.

Tlacolula de Matamoros (Tlacolula, Tlalcolula).—A large town in an eastern arm of the Oaxaca Valley 18 miles east-southeast of Oaxaca City. [16°57', 96°29'; 5,314 ft.]

Tlapancingo: see San Francisco Tlapancingo.

Tlaxiaco: see Santa María Asunción Tlaxiaco.

Tolosa (Tollocita, Tollocito, Tollosa, Tollosuo, Tolocita, Tolosita).—A small town 22 miles 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 Phloeocastes 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 may pertain to Oaxaca. Tolosa possibly synonymous with Loseta or Solasita. [17°12', 95°03'; 207 ft.]

Tomatlán [state of Veracruz] (Tomatla).—A small town in the state of Veracruz on a railroad 11 miles 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. As I can find neither a "Tomatla" in México 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.

Tonaguía (Tonagnia, Toniaguia).—A village on the eastern slope of the Sierra de Zempoaltepec about 13 miles northeast of Hidalgo Yalalag and just north of Tepitongo. [17°19', 96°02']

Tonalá [state of Chiapas] (Tonila).—A small town on the Pacific coastal plain of southwestern Chiapas about 35 miles southeast of Tapanatepec, Oaxaca. Salvin and Godman (1879-1904 [1884]: 328) record Saltator coerulescens from "Tonila (Sumichrast)," while 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 miles west of Puerto Angel. A small brackish lagoon has formed at its mouth.

Tonemeca: see Santa María Tonameca.

Toniaguia: see Tonaguía.

Tonila: see Tonalá [state of Chiapas].

Totontepec: see Totontepec.

Tonto, Arroyo.—A Schaldach locality near Sarabia. [17°04', 95°02'; about 300 ft.]

Torto, 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.

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, Totolapan, Totolopa: see San Pedro Totolapan.

Totontepec (Tontepec, Mount Totontepec, Totontepeque, Totontepec).—An Indian village on the northwestern slope of Cerro Zempoaltepec 10 miles east-northeast of Hidalgo Yalalag. Nelson and Goldman specimens labeled "Near Totontepec" were taken at a group of Indian ranchos 6 miles 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. Avilés specimens from "Totontepec," judging from the species involved, must have been taken at various elevations and in a number of different habitats. [17°13', 96°03'; 6,068 ft.]

Trans-Isthmian Highway (Federal Route 185).—A highway extending across the Isthmus of Tehuantepec from its intersection with the Pan-American Highway (Federal Route 190) at La Ventosa, Oaxaca, north through Matías Romero to Acayucan, Veracruz, where it ends at Federal Route 180.

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 México at Coatzacoalcos.

Tres Cruces, Cerro (C. Tres Cruces).—The mountain located about 16 miles west-southwest of Tehuantepec City. The former rancho of Santa Lucía was located on this mountain. [Coordinates of Santa Lucía: 16°18', 95°28'; summit at about 4,000 ft. (T. MacDougall, in litt.)]

Trinidad (La Trinidad).—A settlement on the Río Trinidad 26 miles east-northeast of Choapan. [17°26', 95°35'; about 700 ft.]

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.

Tuhuánatepec: 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 21 miles west of Palomares. The Millionth Map gives an altitude of 1,478 m. (4,847 ft.), but other maps indicate an elevation of under 600 ft. [17°10', 95°26']

Tuxtepec: see 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.

Uvero (Nuevo Uvero, Ubero).—A station on the Trans-Isthmian Railroad 12 miles 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 several miles east of the true Uvero but herein treated as synonymous. [17°17', 95°01'; 98 ft.]

Vacas, Las.—A ranch on the Pan-American Highway 12 miles west of Tequisistlán. [16°25', 95°47'; 2,434 ft.]

Valle Nacional (Villa Nacional).—A town at the northeastern foot of the Sierra de Juárez on the Río Valle Nacional 26 miles southwest of San Juan Bautista Tuxtepec. Some specimens taken by Rook, T. Sims, et al. erroneously locate Valle Nacional as "60 mi. SE Tuxtepec." See Valle Real. [17°47', 96°19'; 213 ft.]

Valle Nacional, Río.—A large river originating in the northeastern section of the Sierra de Juárez and joining the Río Santo Domingo southwest of San Juan Bautists Tuxtepec. See Valle Real.

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 may be an old name for Valle Nacional. Other species recorded from Valle Real are Hylomanes momotula, Myiobius sulphureipygius, Phlogothraupis sanguinolenta, and Dives dives. I have recorded the last four at Valle Nacional, and Aulacorhynchus at higher altitudes 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 miles northeast of Valle Nacional, and a Cosamaloapan, 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 14 miles west of Niltepec. [16°34', 94°49'; 89 ft.]

Ventosa (La Ventosa).—A village about 3 miles 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 say simply "Ventosa." Should not be confused with the La Ventosa northeast of Juchitán. [16°11', 95°10'; near sea level]

Ventosa, Bahía (Bahía de la Ventosa, Ventosa Bay, Bay of Ventosa).—The bay on the Pacific coast just east of Salina Cruz into which the Río Tehuantepec empties. [16°11', 95°08'; sea level]

Ventosa, La.—A village 10 miles northeast of Juchitán at the junction of the Pan-American and Trans-Isthmian Highways. Schaldach specimens taken on 27 February 1961 and labeled "La Ventosa, 5 km. E Salina Cruz" pertain to the town of Ventosa, as do all Sumichrast specimens labeled "Ventosa." [16°33', 94°57'; 82 ft.]

Verde, Cerro.—A mountain in the Sierra de Miahuatlán 11 miles east-northeast of San Gabriel Mixtepec. Rowley specimens taken here at an elevation of 7,600 ft.
Rowley (1966: 110) gives an elevation of 10,600 ft. at the summit, but various maps show elevations ranging from 8,660 ft. to more than 11,152 ft. [Summit: 16°10', 97°02']

Verde, Río.—A very large river formed by the confluence of the Río Atoyac and the Río Sordo at a point about 24 miles northeast of Santiago Jamiltepec. It enters the Pacific Ocean 20 miles south of the same town.

Vigas, Las.—A Schaldach locality 5 miles 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 included 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 Alta, Prov.: see District of Villa Alta.

Villa de Etla: see San Pedro y San Pablo Etla.

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 State Route 175 at a point 17 road miles (about 6 airline miles) southwest of Valle Nacional. [17°43', 96°22'; 4,800 ft. by my altimeter]

Vueltas, Río de la: see Río Quiotepec.

Xacaltepec: see Xacatepec.

Xacatepec (Xacaltepec, Xacautepec).—Exact location unknown. Must be in the Atlantic Region west of the Isthmus of Tehuantepec, judging from the three species taken there. P. L. 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
"Xacautepec." Since Deppe was involved in all three of these records, I believe that 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 P. L. Sclater (1859b: 388), the latter apparently being in the Pacific Region southwest of Santa Catarina Juquila (see San Marcos Zacatepec).

Yacochi.—An Indian village on the western slope of Cerro Zempoaltepec 12 miles 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°01'; 7,700 ft. (Goldman, 1951: 209)]

Yaganiza: see San Pablo Yaganiza.

Yalalag: see Hidalgo Yalalag.

Yalina.—A village 7 miles northwest of Hidalgo Yalalag. [17°15', 96°16', 5,576 ft.]

Yanhuitlán (Anhuitlan, Ianhuiatian, Ianhuitlán, Janhuiatlan, Janhuitalan, Yauhuitlan). A village on the Pan-American Highway 8 miles northwest of Asunciôn Nochixtlán. Although there may be some doubt, all the above names are in my opinion synonyms of the Yanhuitlán near Asunciôn 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, "Ianhuitalan (?)" (p. 162); Platysarps aglaiae, "Yanhuitlan?" (p. 156); Cassiculus melanicterus, "Yanhuitlan?" (p. 149); Icterus pustulatus, "Ianhuitalan" (p. 150) and "Anhuitlan" (editor's note by Ridgway, p. 151); and Saitator atriceps, "Janhuitlan (?)" (p. 141). Of these species, only Icterus pustulatus could have been found at the Yanhuitlán near Asunciôn 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 "Yauhuitlan" is definitely a misquote in subsequent literature. [17°32', 97°20'; 7,039 ft.]

Yantepec: see San Carlos Yautepec.

Yauhuitlan: 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 12 miles north-northwest of San Gabriel Mixtepec. Boucard locality in May 1858. [16°15', 97°11'; about 8,850 ft.]

Yucuyacua, Cerro.—The second highest mountain in Oaxaca, its summit located in the Sierra de Yucuyacua 9 miles south of Santa María Asunción Tlaxiaco. [Summit: 17°07', 97°40'; 11,074 ft.]

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 borders. Highest point is Cerro Yucuyacua, cresting at 11,074 ft. elevation.

Zampoaltepec, Mount: see Cerro Zempoaltepec.

Zanatepec (Tanatepec, Zonátepec).—A small town on the Pan-American Highway 13 miles northwest of Tapanatepec. [16°29', 94°21'; 276 ft.]

Zapotitlán (Zapotlán).—A village on the Pacific side of the Sierra de Miahuatlán 8 miles 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 "Zapotitlán, 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°43'; 5,739 ft.]

Zempoaltepec, Cerro (Mount Zempoaltepec, Zempoalquepec, Mount Zempoaltepec, Mt. Zempoaltepec, Cerro de Zempoaltepetl).—The highest mountain in Oaxaca, with its summit located 13 miles 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°10', 95°59'; 11,138 ft.]

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 east of the arid valley formed by the Río Cajones (Hidalgo Yalalag Valley).

Zempoaltepetl, Cerro de: see Cerro Zempoaltepec.

Zimatlán de Álvarez.—A town in the Oaxaca Valley on State Route 131 at a point 14 miles south of Oaxaca City. Site of a meteorological station. [16°52', 96°47'; 5,143 ft.]

Zonátepec: see Zanatepec.
LITERATURE CITED


Blake, Emmet R.

Bravo, Helia.

Briggs, Marjorie A.

Brigham, Edward M., III.

Brodkorb, Pierce.

Carr, Archie F., Jr.

Coffee, Ben B., Jr.

Conzatti, C.

Cooke, May Thacher.

Cooke, Wells W.
Dalquest, Walter W.

Davis, L. Irby.

Deignan, Herbert G.

Dickey, Donald R., and A. J. van Rossem.

Dilger, William C.

Duellman, William E.

Edwards, Ernest Preston.

Eisenmann, Eugene.

Ferrari-Perez, Fernando.

Friedmann, Herbert.
1950. Distributional check-list of the birds of Mexico.  

1957. Some noteworthy reptiles and amphibians from the 
states of Oaxaca and Veracruz. Herpetologia, 13:  
103-108.

Goldman, Edward Alphonso.  
1951. Biological investigations in Mexico. Smithsonian 

Graber, Jean W., and Richard R. Graber.  
1959. Winter observations of birds in Oaxaca, Mexico.  
Southwestern Natur., 4: 66-82.

Griscom, Ludlow.  
1932. The distribution of bird-life in Guatemala.  
1935. Critical notes on Central American birds in the 

Hasbrouck, Edwin M.  

Hellmayr, Charles E.  

Hellmayr, Charles E., and Boardman Conover.  
Nat. Hist., Zool. Ser., no. 13, pt. 1, no. 1, vi +  
636 pp.


Holdridge, L. R.  
1947. Determination of world plant formations from 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Howell, Thomas R.

Lantz, D. E.

Lanyon, Wesley E.

Lawrence, George N.

Lenna, Philip R.

Leopold, A. Starker.

Lincoln, Frederick C.

MacDougal, D. T.

Marshall, Joe T., Jr.
Martin del Campo, Rafael.

Martínez, Maximino.

Mayr, Ernst.

Meyer de Schauensee, Rodolphe.


Miller, Loye.

Miranda, F.

Miranda, F., and E. Hernández X.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Miranda, F., and A. J. Sharp.

Moore, Robert T.
1953. Notes on two rare tyrannids of Mexico. Auk, 70: 210-211.

Moore, Robert T., and Don R. Medina.

Moore, Robert T., and James L. Peters.

Mullerried, Federico K. G.

Nelson, E. W.
1897. Preliminary descriptions of new birds from Mexico and Guatemala in the collection of the United States Department of Agriculture. Auk, 14: 42-76.

Nutting, C. C.

Oberholser, Harry C.

Oswald, Felix L.

Pardiñas, Alicia.
Parkes, Kenneth C.

Parkes, Kenneth C., and Emmet R. Blake.

Paynter, Raymond A.

Peters, James Lee, and Ludlow Griscom.

Phillips, Allan R.

Pitelka, Frank A.

Rickett, H. W.

Ridgway, Robert.

Ridgway, Robert, and Herbert Friedmann.

Rojas, Paulino.

Rowley, J. Stuart.


Salvadori, T.

Salvin, Osbert, and Frederick Ducane Godman.

Salvin, Osbert, and Ernst Hartert.

Saunders, Howard, and Osbert Salvin.

Schuchert, Charles.
Schultes, Richard Evans.

Sclater, Philip Lutley.

Sclater, Philip Lutley, and Osbert Salvin.

Sclater, Philip Lutley, and G. E. Shelley.

Sclater, W. L.

Selander, Robert K.

Selander, Robert K., and Donald R. Giller.


Sumichrast, F.
1881. De las aves observadas en el territorio de la Republica Mexicana. La Naturaleza, 5: 227-250.

Taylor, Walter P.

Todd, W. E. Clyde.

United States Board on Geographical Names.

van Rossem, A. J.

Vaurie, Charles.

Vivó, Jorge A., and José C. Gómez.
1946. Climatología de Mexico. Instituto Panamericano de Geografía e Historia, Dirección de Geografía, Meteorología e Hidrología, México, D. F.

Webster, J. Dan.

Wernstedt, Frederick L.

West, Robert C.
1964. Surface configuration and associated geology of Middle America. In Handbook of Middle American
Wetmore, Alexander.  

Zimmer, J. T.  
VITA

Laurence Charles Binford was born on 11 January 1935 in Chicago, Illinois. He received his elementary education in Glencoe, Illinois, and graduated from New Trier High School in Winnetka, Illinois, in June 1953. In September 1953 he entered the University of Michigan at Ann Arbor and in June 1957 graduated with a Bachelor of Science degree in Zoology. In September 1959, after two years of active service in the United States Army, he entered graduate school at Louisiana State University, where he became a candidate for the degree of Doctor of Philosophy in Vertebrate Zoology in February 1964.
EXAMINATION AND THESIS REPORT

Candidate: Laurence Charles Binford

Major Field: Vertebrate Zoology

Title of Thesis: A Preliminary Survey of the Avifauna of the Mexican State of Oaxaca

Approved:

[Signature]
Major Professor and Chairman

[Signature]
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signature]
H. B. Bond

[Signature]
W. J. Hamman

[Signature]
R. J. Newman

[Signature]
J. H. Roberts

[Signature]
Douglas A. Rossman

Date of Examination:

16 July 1968