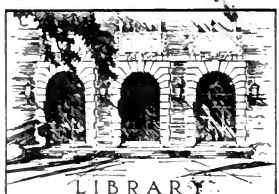

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NOTES ON A COLLECTION OF BIRDS FROM MICHOACAN, MEXICO

BY EMMET R. BLAKE AND HAROLD C. HANSON

The following paper is based on a series of 481 Michoacan birds collected for Field Museum during the summers of 1940 and 1941 by two Mexican expeditions led by Mr. Harry Hoogstraal of the University of Illinois.

Preliminary faunal surveys undertaken by Mr. Hoogstraal during two previous field trips in northern and eastern Mexico had indicated the desirability of making comparative studies, of a more detailed nature, in a southwestern state. Michoacan was selected because its geographical position and varied topography afforded unlimited opportunities for the ecological and faunistic studies desired. A representative portion of the state, incorporating most of the physical and climatic features of the Mexican plateau and of the Pacific lowlands, was found in the region lying between the Rio Tepalcatepec and the summit of Cerro de Tancítaro. Several specialists, including a botanist, an ornithologist, a mammalogist, a herpetologist and an entomologist, were enlisted to make collections in their respective fields as a means of determining the faunal affinities and the vertical extent of life zones in this area. The present report on the bird life of the Rio Tepalcatepec–Cerro de Tancítaro transect, despite limitations of data, is presented as a basis for more ambitious investigations in southwestern Mexico.

HISTORY

Michoacan occupies a region of considerable interest to the naturalist because of its relationship to the central plateau, but biologically it is today one of the least-known of the Mexican states. Its ornithology, particularly, has been neglected and the student can, with few exceptions, search the literature in vain for more than casual reference to specimens collected within its borders. Some indication of the status of Michoacan ornithology is shown by the fact that no less than 75 forms, or 52 per cent of the 144 treated in the present paper, apparently constitute new state records. Fifteen of these may be considered definite extensions of range but the majority involve common species of general distribution in southwestern Mexico.

The first and perhaps largest representative collection of Michoacan birds ever made was obtained by Edward W. Nelson and Edward A. Goldman fifty years ago during the course of their extensive Mexican explorations for the Biological Survey. This collection,

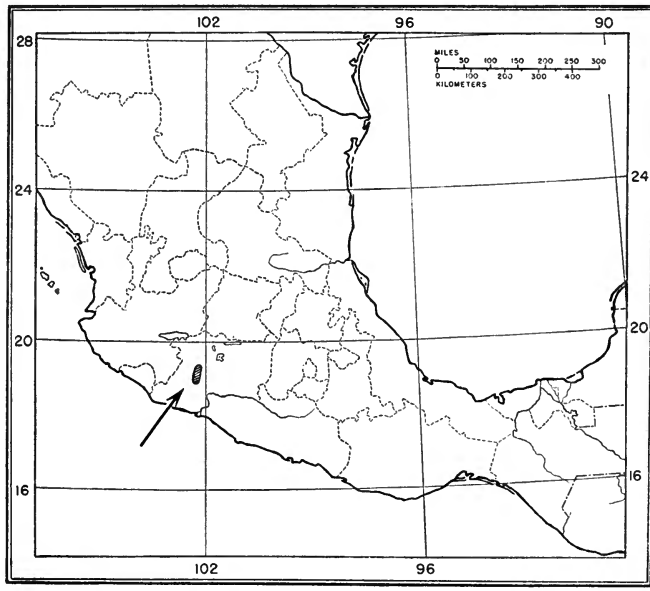

FIG. 39. Map of Mexico, showing location of Rio Tepalcatepec–Cerro de Tancítaro transect.

totaling approximately 500 specimens, has not been worked up as a unit but was the source of most of Ridgway's Michoacan records.

The Mexican itinerary of Nelson and Goldman has not been published, but the following details of their travels in Michoacan have been assembled at our request from the records of the United States Fish and Wildlife Service, by Dr. John W. Aldrich.

1892. Edward W. Nelson:
July 14–August 4; October 15–16. Patzcuaro.
August 4–10. Querendaro.
October 8–15. Nahuatzin.

1893. Edward W. Nelson and Edward A. Goldman:
January 11–25. Zamora.
January 27–February 5. Cerro Patamban and Tinguindin.
February 5–19. Los Reyes.
February 20–March 4. Cerro de Tancítaro and Perivan.
March 9–24. La Salada and Uruapan.
March 24–30. Route from La Huacana and Volcan de Jorullo to Balsas; also in the vicinity of Ahuacana.

Scarcely less extensive are the collections made for Field Museum by the recent Hoogstraal expeditions. The village of Tancítaro, which is located on a plateau adjacent to the southern base of Cerro de Tancítaro, served as headquarters for both expeditions. A total of 481 specimens representing 140 forms was obtained along a transect between the Rio Tepalcatepec and the summit of Cerro de Tancítaro by the junior author (1940) and by Dr. Reed W. Fautin (1941). The list of localities visited by them is as follows:

1940. Harold C. Hanson; 232 specimens, 96 species.
July 14–19. Tancítaro.
July 20–22. Upper slopes and summit of Cerro de Tancítaro.
July 23–25. Tancítaro.
July 26–August 1. Cloud forest of Cerro de Tancítaro.
August 2–8. Tancítaro.
August 9–14. Vicinity of Apatzingan.
August 15–17. Tancítaro.

1941. Reed W. Fautin; 249 specimens, 112 species, including 44 additions to the 1940 collection.
June 23–28. Tancítaro.
June 29–July 7. Cloud forest of Cerro de Tancítaro.
July 8–9. Tancítaro.
July 10–25. Cloud forest to summit of Cerro de Tancítaro.
July 26–August 7. Tancítaro.
August 8–27. Vicinity of Apatzingan and Acahuato.

Additional Michoacan birds have been collected at random by various travelers, but these are widely scattered and details of their present disposition are not available. The veteran collector Chester C. Lamb has worked more or less extensively in the state and certain of his specimens have been preserved in the collection of Robert T. Moore. It is evident, however, that far more field work must be carried out before a satisfactory list of Michoacan forms can be prepared.

SPECIES NOT PREVIOUSLY RECORDED IN MICHOACAN

Heterocnus mexicanus fremitus
Cochlearius cochlearius zeledoni
Plegadis (falcinellus?) guarauna
Cairina moschata
Coragyps atratus
Cathartes aura aura
Chondrohierax uncinatus subsp.
**Accipiter striatus suttoni*
Buteo jaimaicensis costaricensis
Buteo brachyurus
Buteo nitidus plagiatus
Parabuteo unicinctus harrisi
Micrastur semitorquatus naso
Polyborus cheriway audubonii
Falco albigularis albigularis
Ortalis vetula poliocephala
Actitis macularia
Leptotila verreauxi angelica
Aratinga canicularis eburnirostrum
**Rhynchopsitta pachyrhyncha*
Crotophaga sulcirostris sulcirostris
Tyto alba pratincola
**Nyctibius griseus mexicanus*
Nyctidromus albicollis yucatanensis
**Aëronautes saxatalis nigrior*
**Lampornis amethystinus brevirostris*
Megaceryle torquata torquata
Chloroceryle amazona
Chloroceryle americana septentrionalis
**Dryobates arizonae fraterculus*
Attila spadiceus pacificus
Tyrannus melancholicus occidentalis
Tyrannus crassirostris crassirostris
Myiodynastes luteiventris luteiventris
Pitangus sulphuratus derbianus
Iridoprocne albilinea albilinea
Corvus corax sinuatus
Calocitta formosa formosa
Cyanocitta stelleri coronata
Parus sclateri sclateri
Sitta carolinensis mexicana
**Certhia familiaris guerrerensis*
Cinclus mexicanus mexicanus
**Thryothorus pleurostictus nisorius*
**Thryomanes bewickii percnus*
**Turdus migratorius permixtus*
Polioptila plumbea bairdi
**Regulus regulus clarus*
Ptilogonys cinereus pallescens
**Vireolanius melitophrys goldmani*
**Vireo bellii medius*
Vireo solitarius repetens
Vireo virescens flavoviridis
Vireo gilvus subsp.
Mniotilta varia
**Compsothlypis pitiayumi pulchra*
Peucedramus olivaceus olivaceus
Dendroica occidentalis
Myioborus miniatus miniatus
Cassiculus melanicterus
Icterus spurius
Icterus wagleri wagleri
Icterus pustulatus pustulatus
Tanagra musica elegantissima
Piranga flava hepatica
Piranga bidentata bidentata
Passerina versicolor subsp.
Passerina leclancherii leclancherii
**Hesperiphona abeillei abeillei*
Volatinia jacarina diluta
Spinus notatus griscomi
Loxia curvirostra stricklandi
Arremonops rufivirgatus sumichrasti
Aimophila humeralis humeralis
Aimophila ruficauda acuminata

* Indicates extension of range.

TOPOGRAPHY AND LIFE ZONES[1]

The transect chosen for intensive study in Michoacan extends approximately thirty-seven miles from the sweltering valley of the Rio Tepalcatepec northward to the summit of Cerro de Tancítaro[2]

[1] Botanical determinations employed throughout this report were made by Paul C. Standley and Julian A. Steyermark, Curator and Assistant Curator of the Herbarium in Field Museum, from specimens and field studies prepared by William Leavenworth, expedition botanist. Certain physical and botanical data, particularly those pertaining to plant associations, have been drawn freely from notes prepared by Mr. Hoogstraal. The authors assume full responsibility, however, for their arrangement of life zones and for all ornithological data.

[2] This transect lies within one of the most poorly mapped regions of Mexico. Maps which have been consulted vary considerably in their estimates of the altitudes of Cerro de Tancítaro and other Michoacan localities. Therefore, all elevations discussed in this report are based upon aneroid readings obtained, and repeatedly checked, by members of the 1941 expedition.

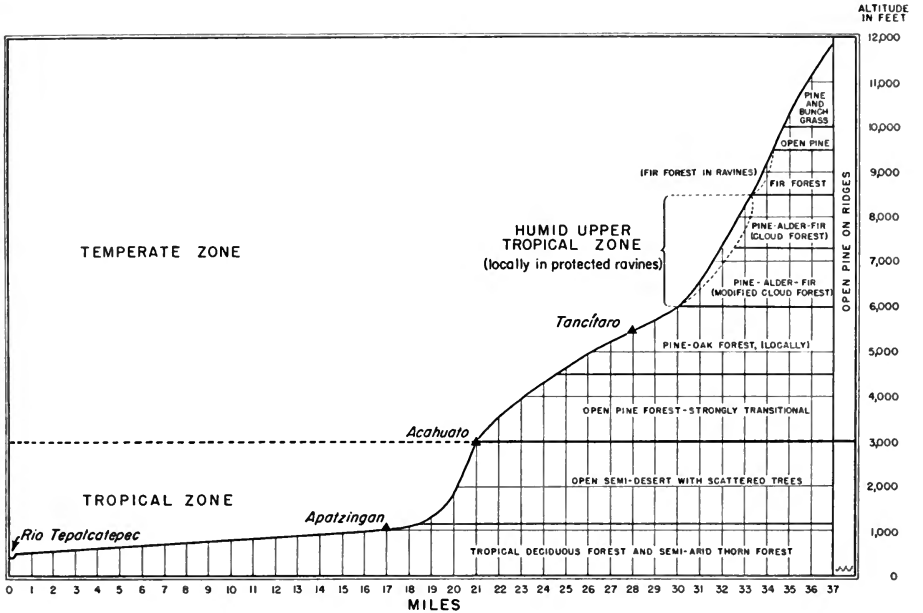

FIG. 40. Diagram of life-zone subdivisions of the Rio Tepalcatepec–Cerro de Tancítaro transect. Vertical exaggeration ×16.

and embraces an ascent of some eleven thousand feet. Not included in the area of investigation, but nevertheless exerting considerable influence on its rainfall and plant associations, is a spur of the Sierra Madre del Sur of Guerrero, which extends about seventy-five miles along the coast of Michoacan south of the Rio Tepalcatepec.

North of Cerro de Tancítaro, and adjacent to the vast, triangular-shaped inland plateau, or *mesa central* of Mexico, is a rugged area of mountain masses. Cerro de Tancítaro is an outlier of the mountains bordering the plateau, and is at the western end of a short, apparently isolated range running east and west for twenty miles or more. The mountains of this area are a part of the row of recent volcanoes which lie along the nineteenth parallel from Colima to the vicinity of Mexico City and which comprise one of the most actively volcanic regions on the continent.

The biotic and climatic characteristics of the transect may be outlined as follows:

I. Arid Tropical Zone (Tierra Caliente). Rio Tepalcatepec to the lower (southern) slope of the Tancítaro plateau at Acahuato (500–3,000 ft.).
   - A. Tropical Deciduous Forest.
   - B. Arid and Semi-Arid Thorn Forest (semi-desert scrub).
   - C. Open Semi-Desert with scattered trees (1,200–3,000 ft.).

II. Humid Upper Tropical Zone[1] (6,000–8,500 ft.).
   - A. Cloud Forest (locally, in humid ravines).
     1. Transitional or Modified Pine–Alder–Fir Association (6,000–7,300 ft.).
     2. Typical Pine–Alder–Fir Association (7,300–8,500 ft.).

III. Temperate Zone (Tierra Templada). Lower (southern) slope of the Tancítaro plateau above Acahuato to the summit (3,000–11,800 ft.).
   - A. Open Pine Forest, strongly transitional (3,000–4,500 ft.).
   - B. Pine–Oak Forest (4,500–6,000 ft., locally).
   - C. Fir Forest (8,500–9,500 ft.).
   - D. Open Pine Forest, almost purely temperate (4,500–11,800 ft.).
     1. High Bunch Grass (10,000–11,800 ft., locally).

ARID TROPICAL ZONE

The Arid Tropical Zone, known locally as the tierra caliente, occupies a wide, arid valley having an average altitude of approximately 1,200 feet. There is little seasonal variation in temperature. Some rain falls during the summer months but it quickly drains and is of little value to agriculture, which depends on irrigation to a considerable extent. Leguminous and other thorn-studded bushes

[1] Subtropical Zone or "Mountain Rain Forest" of Chapman.

and cacti are often present, and there are numerous climbing cacti, hanging vines and impenetrable thickets. No humid tropical jungle exists in this region but along the river and other permanent sources of water there is a well-developed deciduous forest. This becomes more arid in general aspect as one leaves the river, its undergrowth is less luxuriant, and a tall fig tree (*Ficus*) often becomes dominant.

Several distinct plant associations may be recognized in this zone. A thorn forest or semi-desert scrub varies, depending on aridity, from open plain with scattered thorn trees and few herbs to dense stands of thorny trees with a light ground cover of herbs and shrubs. These trees, which include such common genera as *Acacia*, *Mimosa*, and *Caesalpinia*, range from eight to twenty feet in height and tend to grade into the tropical deciduous forest near water. Just north of Apatzingan, on the slope leading up to the Tancítaro plateau, there is a strip of even greater aridity. It is a pronounced semi-desert and supports only widely scattered trees, principally of non-leguminous genera.

SPECIES CHARACTERISTIC OF THE ARID TROPICAL ZONE

Ortalis vetula poliocephala
Amazona finschi finschi
Piaya cayana mexicana
Trogon citreolus
Momotus mexicanus mexicanus
Centurus chrysogenys flavinuchus
Xiphorhynchus flavigaster mentalis
Tyrannus crassirostris crassirostris
Calocitta formosa formosa
Turdus rufo-palliatus rufo-palliatus
Cassiculus melanicterus
Icterus pustulatus pustulatus
Passerina leclancherii leclancherii
Arremonops rufivirgatus sumichrasti
Aimophila humeralis humeralis
Aimophila ruficauda acuminata

Bird life in the Arid Tropical Zone is rather limited in species but individuals are often surprisingly abundant locally. Distribution depends primarily upon the habitat requirements of the various species, altitude being of little or no direct consequence. Approximately 43 per cent of the 144 forms collected or identified by sight were recorded only below 3,000 feet, which may be regarded as the upper limits of this zone. Analysis of these, after eliminating species of no faunal significance, indicates a preponderance of forms characteristic of the West Mexican Arid Tropical Fauna only partially suggested by the preceding list.

HUMID UPPER TROPICAL ZONE

Above the Tancítaro plateau certain valleys and protected slopes support a generally dense and humid forest which is basically homologous to the characteristic subtropical vegetation of mountainous regions to the southward. The subtropical or cloud forest is dis-

tributed locally from 6,000 to 8,500 feet and probably this is its northernmost appearance in western Mexico.

Two divisions of the Humid Upper Tropical Zone may be identified botanically. From approximately 6,000 to 7,300 feet there is a somewhat open and modified pine–alder–fir association with heavy, though not impenetrable undergrowth. A more typical cloud forest, characterized by excessive humidity and an extremely heavy growth of epiphytic bryophytes, pteridophytes and lichens, extends upward to 8,500 feet. It consists of a dense pine–alder–fir forest and numerous herbs and shrubs.

Cloud forests are indicative of the Humid Upper Tropical Zone and attain their maximum development in the central and northern Andes of South America. They become progressively less extensive and luxuriant as one proceeds northward through Central America to southern Mexico and there is a parallel decline in distinct faunal representatives. Cerro de Tancítaro supports only a meager northern outpost of cloud forest and lacks even the characteristic tree ferns and large bromeliads. The relative barrenness and insignificance of this zone in Michoacan is indicated by the fact that only two birds which may be regarded as indicators were found in the transect as compared with twenty-one recorded in Guerrero (nine endemic), forty in Guatemala, and forty-five in El Salvador.

SPECIES CHARACTERISTIC OF THE HUMID UPPER TROPICAL ZONE

Henicorhina leucophrys festiva *Basileuterus belli clarus*

TEMPERATE ZONE

Proximity to the central Mexican plateau, which serves as a vast reservoir of Temperate Zone life, is reflected in every aspect of the Cerro de Tancítaro area. Plants and animals of temperate or even boreal affinities dominate the upper slopes of the mountain. Many forms overflow across the Tancítaro plateau to approximately 3,000 feet altitude where the moderating effects of the Arid Tropical Zone are manifested. There is no sharp line of demarcation between the two but the lower or southern slope of the Tancítaro plateau above Acahuato may be designated arbitrarily as the point at which the temperate element finally disappears.

The climate of the plateau[1] is relatively cool throughout the year, being hottest in April and May and coldest in December and January, when light snow occasionally falls. During the summer

[1] Refers to the Tancítaro plateau unless otherwise designated.

months the temperature ranges from 59° to 68° F. during the daytime and from 57° to 61° at night. Rain falls almost daily between June and October and is particularly heavy at the northern end of the plateau in the vicinity of Tancítaro. The upper slopes of the mountain receive less rainfall but are considerably colder.

A pine forest (*Pinus ayacahuite* and/or *P. montezumae*) of varying density covers the plateau and extends upward on exposed ridges to the summit of Cerro de Tancítaro. Herbs and shrubs which grow on the fairly steep slope between 3,000 and 4,500 feet are markedly transitional in character and include both tropical and temperate species. The flora becomes increasingly temperate above 4,500 feet, and oaks, willows, lindens, haws, ashes, and alders appear locally. Shrubs of the genera *Viburnum, Ceanothus, Solanum, Tournefortia, Lythrum, Cornus, Lobelia, Salvia, Arctostaphylos,* and *Cassia* are common. Herbs are particularly abundant and include *Piqueria, Drymaria, Cuphea, Borreria, Euphorbia, Ranunculus, Thalictrum, Verbena, Physalis, Plantago, Oxalis, Sisyrinchium, Hypoxis, Cynoglossum, Phaseolus,* and *Crotalaria.* Close stands of fir (*Abies religiosa*) become locally dominant between 8,500 and 9,500 feet and the ground cover is more limited.

The flora is less varied above 10,000 feet and vegetation becomes relatively sparse. With the disappearance of alders and firs only pines (*Pinus montezumae* var. *rudis*) and a few junipers (*Juniperus mexicanus*) remain as arboreal representatives. High, tough bunch grasses cover the ground and several herbs, including lupine (*Lupinus persistens*), are common. Only one shrub (ericaceous *Pernettia ciliata*) is found in the open pine forest of the upper slopes. Cerro de Tancítaro has no timberline, and hence lacks a true sub-alpine forest.

The influence of the central Mexican plateau, with its wealth of Temperate Zone life, is no less apparent in the avifauna of the Cerro de Tancítaro area. Approximately 62 per cent of the species which were restricted to that part of the transect characterized by predominantly temperate flora are true indicators of that zone. None of these were reported below 3,000 feet and it is probable that many do not occur even in the area of transition at the southern or lower end of the plateau.

SPECIES CHARACTERISTIC OF THE TEMPERATE ZONE

Buteo jaimaicensis costaricensis
Columba fasciata fasciata
Otus trichopsis trichopsis
Otus minutissimum gnoma
Aëronautes saxatalis nigrior
Hylocharis leucotis leucotis

Lampornis amethystinus brevirostris
Trogonurus mexicanus
Balanosphyra formicivora formicivora
Dryobates villosus jardinii
Myiochanes pertinax pertinax
Empidonax difficilis occidentalis
Empidonax fulvifrons rubicundus
Corvus corax sinuatus
Aphelocoma sordida sieberii
Cyanocitta stelleri coronata
Parus sclateri sclateri
Sitta pygmaea flavinucha
Certhia familiaris guerrerensis
Cinclus mexicanus mexicanus
Heleodytes megalopterus megalopterus
Troglodytes brunneicollis colimae
Turdus migratorius permixtus
Myadestes obscurus occidentalis
Catharus occidentalis fulvescens
Regulus regulus clarus
Ptilogonys cinereus pallescens
Vireolanius melitophrys goldmani
Vireo huttoni mexicanus
Diglossa baritula baritula
Vermivora superciliosa palliata
Peucedramus olivaceus olivaceus
Myioborus miniatus miniatus
Ergaticus ruber ruber
Icterus wagleri wagleri
Piranga flava hepatica
Piranga bidentata bidentata
Hesperiphona abeillei abeillei
Spinus pinus macropterus
Spinus notatus griscomi
Loxia curvirostra stricklandi
Pipilo ocai nigrescens
Atlapetes pileatus pileatus
Atlapetes torquatus virenticeps
Plagiospiza superciliosa superciliosa

Distribution of birds in the Temperate Zone is more circumscribed than in the Arid Tropical Zone where altitude is a minor factor and plant associations are less differentiated. Two species, *Sitta pygmaea flavinucha* and *Plagiospiza s. superciliosa,* apparently are restricted to the pine–bunch grass association near the summit of the mountain. Several species other than the two indicators of the Humid Upper Tropical Zone already mentioned were recorded only in the cloud forest. Among these were *Cyanocitta stelleri coronata, Cinclus m. mexicanus, Heleodytes m. megalopterus, Catharus occidentalis fulvescens, Ergaticus r. ruber,* and *Atlapetes torquatus virenticeps.*

Birds that occupied a considerable vertical range in the transect were more or less closely associated with the coniferous forests. A few of these also occurred in deciduous forests and areas of mixed growth but it is notable that only *Empidonax difficilis occidentalis* was equally at home in the cloud forest. The following species have an extensive vertical distribution in the Temperate Zone: *Hylocharis l. leucotis, Lampornis amethystinus brevirostris, Colaptes cafer mexicanus, Balanosphyra f. formicivora, Dryobates villosus jardinii, Empidonax difficilis occidentalis, Aphelocoma sordida sieberii, Parus s. sclateri, Certhia familiaris guerrerensis, Troglodytes brunneicollis colimae, Sialia mexicana australis, Peucedramus o. olivaceus, Junco phaeonotus australis.* Two species, *Cathartes a. aura* and *Rhynchopsitta pachyrhyncha,* occur at all altitudes from the tierra caliente to the upper slopes of the mountain.

An indication of the composition and relative importance of the three life zones included in the Rio Tepalcatepec–Cerro de Tancítaro transect may be found in the following numerical analysis of their respective bird populations.

	No. of species in zone	% of total no. in transect	Indicator Species: No. in zone	Indicator Species: % of total no. in zone	Indicator Species: % of total no. in transect
Arid Tropical Zone	63	43.8	16	25	11.0
Humid Upper Tropical Zone	8	5.5	2	25	1.3
Temperate Zone	73	50.7	45	62	32.0
Total number in transect	144				

Comparison with the ornithology of adjacent areas is essential in any local study of birds. Griscom's (1934) pioneering work in Guerrero constitutes the only modern and reasonably complete Mexican state list available and hence is of inestimable value to the student of bird life in southwestern Mexico.

The limited scope of the present report prohibits extensive or precise comparisons between the avifaunas of Michoacan and Guerrero. However, there are sufficient data to indicate basic differences between the two. No less than sixty-four species and subspecies recorded in this transect, i.e., 44 per cent of the total, are unknown in Guerrero. These sixty-four forms, representing fifty-nine genera, include twenty-seven genera and twenty species absent in Guerrero (other genera and species being represented in that state by different species or subspecies). Additional field work in Guerrero can be expected to reduce this apparent discrepancy considerably.

Analysis of the Michoacan faunal and life zone indicators which are unrecorded in Guerrero is no less interesting. Twenty-four birds, including eighteen species and ten genera, which are characteristic of the Temperate Zone in Michoacan, are not known from Guerrero. The valley of the Rio Balsas undoubtedly excludes many temperate species from that state but evidently a much closer affinity exists between Michoacan and the central Mexican plateau. On the other hand, the West Mexican Arid Tropical Fauna is almost continuous in Michoacan and Guerrero. Only three characteristic birds, including two species, which occur in the former state are lacking in the latter. Attention has been called previously to the poverty of the Humid Upper Tropical Zone on Cerro de Tancítaro, which lacks a single endemic bird as compared with nine found in the cloud forests of Guerrero.

The authors are indebted to several individuals and institutions for assistance and co-operation in the preparation of this report. Much credit is due Mr. Harry Hoogstraal for his capable leadership of the expeditions which collected all the specimens listed. We are

particularly grateful to him for so generously making his extensive field notes available to us. Numerous species were added to the Michoacan list through the diligence of Dr. Reed W. Fautin, ornithologist of the 1941 expedition, and certain field observations made by him have been most useful in corroborating or supplementing those of the junior author. Valuable assistance in the field was also given by Dr. Kenneth Knight and Mr. Jerome Van Gorkom in 1940 and by Mr. Ralph Haag in 1941.

For the loan of comparative material we are indebted to Dr. John W. Aldrich, of the Fish and Wildlife Service; Dr. Herbert Friedmann, of the United States National Museum; Mr. Robert T. Moore, of Pasadena, California; Mr. James L. Peters, of the Museum of Comparative Zoology; and Mr. John T. Zimmer, of the American Museum of Natural History. Dr. Aldrich and his assistant, Mr. Allen J. Duvall, have been most helpful in working out the Michoacan itinerary of Nelson and Goldman, and in making a survey of their bird collections. We are indebted also to Mr. Rudyerd Boulton, of Field Museum, for much valuable advice and assistance.

LIST OF SPECIES

Heterocnus *mexicanus fremitus* van Rossem and Hachisuka

Apatzingan: 2 females, August 19 and 24.

Cochlearius cochlearius zeledoni Ridgway

El Capiere, Rio Tepalcatepec: 1 male, August 2.

Plegadis (falcinellus?) guarauna Linnaeus

A number of glossy ibis were observed along the Rio Tepalcatepec in August, 1940, by Kenneth Knight. None were collected.

Cairina moschata Linnaeus

Apatzingan: 1 female, August 10.

Muscovy ducks were found only in the tierra caliente. They were most numerous in ponds and along streams in the tropical deciduous forest. A family of flightless birds was observed by Fautin on August 18.

Coragyps atratus Bechstein

Black vultures were limited to the tierra caliente and were frequently seen soaring over the arid slopes leading to the plateau where the ascending currents of hot air facilitated flight. They

1

2

3

LOWLAND IN VALLEY OF RIO TEPALCATEPEC

Fig. 1. Tropical deciduous forest. Fig. 2. Semi-desert scrub with columnar cactus.
Fig. 3. View toward Cerro de Tancitaro from the valley.

1

2

TANCÍTARO PLATEAU, TEMPERATE ZONE

Fig. 1. Pine-oak association; altitude about 5,000 feet.
Fig. 2. Cultivated land near village of Tancítaro.

were most abundant in the Apatzingan area in which they exceeded turkey vultures to a considerable extent.

Cathartes aura aura Linnaeus

Apatzingan: 1 male, August 8.

Cerro de Tancítaro, 1 male, July 18.

The western turkey vulture, *Cathartes aura teter*, ranges southward over the Mexican plateau to Michoacan but is replaced by the nominate race on Cerro de Tancítaro and in the adjacent lowlands. Measurements of the Apatzingan and Cerro de Tancítaro specimens: wing 500 and 487, tail 254 and 240, as compared with the extremes of 480–528 (wing) and 252–282 (tail) designated for *teter*.

Turkey vultures occurred in the lowlands south and west of Cerro de Tancítaro in company with the ubiquitous black vulture but were far more numerous on the plateau. Although none were seen on the upper slopes of the mountain, it is probable that these vultures occur at random wherever food is available, for there is no evidence that altitude acts as a limiting factor in their vertical distribution.

Chondrohierax uncinatus subsp.

Apatzingan: 1 male, August 15.

The complicated plumages of the hook-billed kites, involving varieties within phases, have been discussed in detail by Friedmann (1934), who recognizes two races in Mexico. Michoacan lies between the known ranges of these forms. The present specimen, with badly worn primaries and rectrices, constitutes the first specific record of the occurrence of *uncinatus* in that state. As might be expected, the characters of *aquilonis* and of the nominate race are so combined in this bird that it could be regarded as an individual variant of either. In darkness of plumage it resembles the former, but the white ventral bars are even narrower than are those of South American specimens of *uncinatus* which we have examined. The measurements are wing 302, tail 215, culmen from cere 33.

Accipiter striatus suttoni van Rossem

Cerro de Tancítaro: 1 male, August 13.

This specimen, in immature plumage, is readily separable from typical *velox* of comparable age both on the basis of size (wing 179, tail 142) and of color. The under parts are somewhat paler and in general much redder than in *velox*, and broad linear stripes obscure

the pectoral area. The immaculate chestnut or reddish thighs and lower flanks which characterize *suttoni* are particularly well marked in the Cerro de Tancítaro specimen.

Buteo jaimaicensis costaricensis Ridgway

Between Patzcuaro and Comanje: 1 male, July 10.

Cerro de Tancítaro: 1 female, 2(?), July 20–August 3.

Two of the four resident red-tailed hawks collected in the vicinity of Cerro de Tancítaro are melanistic and have their sub-terminal tail bands more pronounced than in any other specimens of *costaricensis* examined. The other two agree with typical specimens from Honduras and El Salvador in being uniformly dark above, sparsely marked below, and in having their abdomens and thighs washed with immaculate reddish ochraceous.

The stomach of one hawk contained the remains of a small unidentified bird and a partially formed hair pellet of a rodent.

Buteo brachyurus Vieillot

Cerro de Tancítaro: 1(?), July.

A single immature short-tailed hawk collected by Ralph Haag on the plateau exhibits a striking degree of erythrism. The natural color of the head and dorsal parts is considerably intensified and flushed with reddish brown. The flanks, thighs and under wing coverts are so thoroughly washed with reddish chestnut as to obscure the normal streaks and spots of the under parts.

Buteo nitidus plagiatus Schlegel

Apatzingan: 3 females, August 12–21.

This form is included in the genus *Buteo* for reasons which have been advanced by van Rossem (1934, p. 429).

Parabuteo unicinctus harrisi Audubon

Apatzingan: 1 male, August 22.

Micrastur semitorquatus naso Lesson

Apatzingan: 1 female, August 24.

Polyborus cheriway audubonii Cassin

Apatzingan: 1 male, August 24.

Falco albigularis albigularis Daudin

Ten miles south of Cerro de Tancítaro: 1 female, August 8.

There seem to be insufficient grounds for resurrecting the northern race *petoensis* Chubb.

Yellow breast feathers of a small bird, possibly *Atlapetes pileatus virenticeps*, were found in the stomach of this falcon.

Ortalis vetula poliocephala Wagler

Cerro de Tancítaro: 1 female, August 17.

This specimen was a captive bird taken by the natives at San Juan, a village near Tancítaro.

Philortyx fasciatus Gould

Apatzingan: 2 males, 3 females, August 8–22.

Two coveys of 12 to 15 birds each were seen by the junior author in an old field of dense herbaceous cover and brush islands near Apatzingan. The testes of the males were still slightly enlarged in August and the oviduct of one female contained a hard-shelled egg.

Two stomachs were examined. Both contained a few small seeds and the remains of many leaf beetles (Chrysomelidae). One bird had also fed upon lepidopterous larvae.

Cyrtonyx montezumae montezumae Vigors

Tancítaro: 1 male, July 4.

Jacana spinosa spinosa Linnaeus

Apatzingan: 1 male, August 10.

Actitis macularia Linnaeus

Apatzingan: 1 male, August 20.

Columba fasciata fasciata Say

Tancítaro: 6 males, 2 females, July 21–August 4.

Band-tailed pigeons were fairly abundant in the tierra templada but were concentrated principally in the pine and oak forests between 4,500 and 6,000 feet altitude. Several small flocks, totaling approximately twenty-five individuals, frequented a grove of tall trees near a watercourse two miles south of the village.

These pigeons fed on acorns and to a considerable extent on wild grapes (*Vitis Berlandieri*). Thirty-four of the latter were found in the crop and gizzard of a single bird. Fully developed eggs were found in specimens collected by Fautin late in July.

Scardafella squamata inca Lesson

Apatzingan: 1 male, 1 female, August 9 and 23.

Cerro de Tancítaro: 3 males, 1 female, July 5–30.

Inca doves abounded in the Apatzingan area but were most numerous in the semi-arid thorn forest. On the plateau they were restricted principally to livestock corrals, where they fed on the seeds in cow manure.

Columbigallina passerina pallescens Baird

Apatzingan: 1 male, August 13.

This species was the least common of the three small doves found in the tierra caliente.

Columbigallina talpacoti eluta Bangs

Apatzingan: 3 males, July 31–August 14.

Leptotila verreauxi angelica Bangs and Penard

Apatzingan: 1 female, August 8.

Ara militaris mexicana Ridgway

Apatzingan: 1 male, 1 female, August 10.

Aratinga canicularis eburnirostrum Lesson

Apatzingan: 2 males, August 8.

This paroquet and macaws were more numerous than the other parrots of the lowland forests near Apatzingan.

All species fed principally upon wild figs during August when observations were made.

Rhynchopsitta pachyrhyncha Swainson

Cerro de Tancítaro: 3 males, July 4–22.

Thick-billed parrots occurred at random in the Cerro de Tancítaro area from the lowlands to the highest reaches of the mountain. They were moderately abundant in the tropical deciduous forest. Observations by both expeditions indicate that daily flights are made to the pine forests of the higher slopes for piñon nuts each morning and evening. The occurrence of thick-billed parrots in the Cerro de Tancítaro area constitutes, as far as we are aware, the first record for Michoacan and represents a considerable southwestern extension of range.

In addition to piñon nuts, the fruit of a local cherry tree (*Prunus Capuli*) was eaten, and one specimen contained seeds of an undetermined leguminous plant.

Amazona finschi finschi Sclater

Apatzingan: 2 females, August 9 and 13.

Finsch's parrots congregated in large flocks in the deciduous forest near Apatzingan but were not seen elsewhere.

Piaya cayana mexicana Swainson

Apatzingan: 3 females, 1 male, August 7–20.

Squirrel cuckoos were restricted to lowland forested areas, where their skulking habits permitted only occasional observation.

A stomach which was examined contained four small lepidopterous larvae, the chitinous remains of a beetle, and fleshy parts of a small fruit.

Crotophaga sulcirostris sulcirostris Swainson

Apatzingan: 1 male, August 9.

Geococcyx velox melanchima Moore

Acahuato: 1 female, August 17.

A specimen collected in the chaparral between Acahuato and Apatzingan, at an altitude of 2,000 feet, agrees in all salient characters with two birds from Tuxpan, Jalisco. The affinities of roadrunners from the highlands of Michoacan are not known with certainty, but they may be expected to show some degree of intergradation with *velox* of east-central Mexico.

Suitable plant associations rather than altitude apparently control the local distribution of this species. Members of the 1940 expedition saw an immature captive bird which had been taken on the northern side of the mountain in an area of open, mixed forest. In July of the following year Robert Traub observed a roadrunner at 8,000 feet altitude on Cerro de Tancítaro at the edge of a corn field and the upper limits of the cloud forest.

Tyto alba pratincola Bonaparte

Apatzingan: 1 male, August 5.

Otus trichopsis trichopsis Wagler

Tancítaro: 1 female, August 14.

A single specimen of spotted screech owl, representing an extreme rufous phase, was taken on the plateau at an altitude of approximately 6,500 feet. Specimens in comparable plumage are uncommon in collections and those available exhibit a marked diversity of

pattern. Two Jalisco birds examined (Amer. Mus. Nat. Hist. Nos. 105339, 105340) are more streaked above, lighter below and more barred generally than the Tancítaro specimen. The latter is more intensely rufous below with heavier black streaks totally lacking in crossbars. The measurements are wing 142, tail 67.

Spotted owls are nocturnal and largely insectivorous. The remains of four beetles (Scarabaeidae), a roach (Blattidae) and two indeterminate insect larvae constituted the stomach contents of the Tancítaro specimen.

Bubo virginianus mayensis Nelson

Tancítaro: 1 male, July 8.

Glaucidium minutissimum[1] **gnoma** Wagler

Cerro de Tancítaro: 2 males, 3 females, June 28–August 3.

Two specimens of the intermediate phase and three of the gray phase collected on Cerro de Tancítaro are in immature plumage. The grayish-brown pileum of each is more or less spotted with whitish on the forehead and contrasts sharply with the uniformly brown back. An interesting progression of plumage is discernible in this small series. Two specimens collected in June are almost devoid of forehead spotting but have their sides and breasts so heavily washed with rich, unmarked brown as to encroach upon the streaked under parts. July specimens exhibit increased spotting of the pileum coincident with a vague spotting on the sides of the breast. A single specimen collected August 3 approaches adult plumage in having the pileum and sides of the breast more strongly spotted than in those birds taken earlier and the pileum is less sharply defined from the unmarked back. All five specimens have either six or seven tail-bars.

Pygmy owls apparently occur only at the higher elevations on Cerro de Tancítaro, the present series being collected between 6,200 and 10,800 feet altitude.

Two stomachs were examined, one containing small portions of undetermined beetles and the other the remains of a small skink (*Eumeces*).

Ciccaba virgata squamulata Bonaparte

Apatzingan: 1 female, August 10.

[1] The apparent conspecificity of *gnoma* and *minutissimum* has been clarified by Griscom (1931), whose nomenclature we adopt.

Nyctibius griseus mexicanus Nelson

A specimen collected by natives near Tancítaro was examined by Joel Canby, mammalogist of the 1940 expedition, but unfortunately was not preserved.

Nyctidromus albicollis yucatanensis Nelson

Apatzingan: 1 female, 1 male, August 2 and 14.

Aëronautes saxatalis nigrior Dickey and van Rossem

Cerro de Tancítaro: 4 males, 2(?), July 29–August 13.

White-throated swifts from Cerro de Tancítaro are readily separable from specimens of the northern race on the basis of characters designated by Dickey and van Rossem in their description of the present form. No evidence of intergradation with *A. s. saxatalis* is apparent in our series although the two races are said to merge in central Mexico.

A flock of about thirty swifts inhabited the ruins of an old Spanish cathedral at the edge of Tancítaro and young birds were captured by natives late in June and during the early part of July. Small flocks of adult swifts were frequently observed in flight above the plateau and upward to the summit of the mountain. None were reported below 4,000 feet altitude.

Saucerottia beryllina viola Miller

Tancítaro: 4 males, 4 females, 1(?), June 25–July 30.

This was the most abundant humming bird on the plateau. The orange blossoms of an epiphyte (*Psittacanthus calyculatus*) were its primary source of food during the period of observation, and trees which bore this growth were almost invariably frequented by several individuals.

Cynanthus latirostris propinquus Moore

Apatzingan: 1 male, August 12.

The single specimen available from the Cerro de Tancítaro area indicates some degree of intergradation with *magicus* but must be referred to *propinquus* on the basis of its much bluer posterior under parts, darker and less golden green upper parts and absence of any conspicuous break in coloration between the throat and jugulum. Its relationship to *propinquus* apparently is similar to that of the three specimens from Lake Cuitzeo, Michoacan, discussed by Moore (1939a, pp. 57–58). Three males from Guaracha, a locality

between Zamora and Lake Chapala, which we have examined, are similarly intermediate.

Hylocharis leucotis leucotis Vieillot

Cerro de Tancítaro: 4 males, 3 females, June 23–July 30.

White-eared humming birds occurred on the plateau but, like the following species, were more abundant in the yellow pine–bunch grass association above 10,000 feet altitude, where the flowering lupine (*Lupinus persistens*) was a common source of food. At lower elevations both species resorted to the orange blossoms of an epiphyte (*Psittacanthus calyculatus*).

Cyanolaemus clemenciae clemenciae Lesson

Cerro de Tancítaro: 3 males, 4 females, June 29–July 24.

Lampornis amethystinus brevirostris Ridgway

Cerro de Tancítaro: 1 male, 1 female, July 11 and August 1.

Trogonurus mexicanus Swainson

Cerro de Tancítaro: 4 males, 1 female, July 2–19.

Mexican trogons were observed with about equal frequency in a dense pine forest at 6,500 feet altitude and in the damp, epiphyte-festooned cloud forest. They are distinctly birds of the forest crown, seldom being seen less than thirty or forty feet above the ground. During the early morning hours the males, particularly, often seek exposed perches well above the forest crown.

Trogons are largely insectivorous but one stomach which was examined contained the remnants of a small fruit in addition to a large lepidopterous larva and the elytra of a beetle.

Trogon citreolus Gould

Apatzingan: 3 males, 2 females, August 6–22.

Megaceryle torquata torquata Linnaeus

Apatzingan: 1 male, August 14.

Chloroceryle amazona Latham

Apatzingan: 1 female, August 12.

Chloroceryle americana septentrionalis Sharpe

Apatzingan: 2 males, 1 female, August 7–21.

Momotus mexicanus mexicanus Swainson

Apatzingan: 1 male, 2 females, August 7–18.

The three birds collected at Apatzingan are indistinguishable from Jalisco specimens which we have examined and may be matched equally well by a series from Guerrero and Oaxaca. Continued recognition of a supposedly larger and deeper-colored race (*saturatus*) of Michoacan, Guerrero, Oaxaca, and Chiapas is insupportable in the absence of constant and geographically correlated characters.

Colaptes cafer mexicanus Swainson

Cerro de Tancítaro: 1 male, 4 females, July 17–22.

This well-marked race of red-shafted flicker shows little preference in its altitudinal range. It avoids the lowlands but individuals were collected or seen from the plateau upward to 11,000 feet on Cerro de Tancítaro.

Ants constitute a considerable portion of this flicker's diet but miscellaneous larvae and the chitinous remains of beetles were also found in three of the four stomachs examined.

Centurus chrysogenys flavinuchus Ridgway

Apatzingan: 4 males, 1 female, August 8–13.

Balanosphyra formicivora formicivora Swainson

Cerro de Tancítaro: 3 males, 3 females, July 20–August 5.

Ant-eating woodpeckers were among the most conspicuous elements in the bird life of Cerro de Tancítaro. They were particularly abundant on the plateau, but also ranged upward in the pine forest to an elevation of about 9,000 feet. In the latter habitat their activities were generally confined to the upper portions of the large pines.

Grit was conspicuous in all five stomachs examined, twenty-two pieces being counted in a single specimen. On the plateau these woodpeckers were seen feeding on a large variety of choke-cherry (*Prunus Capuli*), but miscellaneous insects were also included in the stomach contents.

Phloeoceastes guatemalensis nelsoni Ridgway

Apatzingan: 2 males, August 1 and 16.

Dryobates villosus jardinii Malherbe

Cerro de Tancítaro: 5 males, 1 female, June 25–August 6.

Hairy woodpeckers occurred at random from the plateau upward to 11,300 feet on Cerro de Tancítaro, but were most numerous in areas of deciduous forest.

Insect larvae apparently constitute the principal food of this species, for a single pupa was the only exception found in the three stomachs examined.

Dryobates scalaris azelus Oberholser

Cerro de Tancítaro: 1 male, 2 females, August 5 and 6.

Dryobates arizonae fraterculus Ridgway

Tancítaro: 1 female, July 26.

Xiphorhynchus flavigaster mentalis Lawrence

Apatzingan: 1 male, August 14.

Lepidocolaptes leucogaster leucogaster Swainson

Tancítaro: 2 males, 3 females, 2(?), June 27–August 5.

White-striped woodhewers apparently were restricted to the plateau where they occurred with equal abundance in the unmixed stands of pine forest and in the pine–oak association near Tancítaro. The specialized feeding habits of this woodhewer limit its activities to the lower portions of tree trunks, which are seldom ascended above twenty-five feet.

Miscellaneous insects and chitinous parts of small beetles composed the bulk of the four stomach contents examined.

Attila spadiceus pacificus Hellmayr

Apatzingan: 1 female, August 15.

Tancítaro: 1 male, July 26.

Tyrannus vociferans vociferans Swainson

Tancítaro: 1 male, August 15.

The reduced measurements (wing 116, tail 80, culmen 16) and immature plumage of this specimen suggest that Cassin's kingbird breeds in Michoacan.

Tyrannus melancholicus occidentalis Hartert and Goodson

Apatzingan: 1 male, August 11.

Tyrannus crassirostris crassirostris Swainson

Apatzingan: 1 female, 1 male, August 13 and 15.

Myiodynastes luteiventris luteiventris Sclater

Apatzingan: 1 male, 1 female, August 10 and 15.

Pitangus sulphuratus derbianus Kaup

Apatzingan: 2 males, July 12 and August 18.

Myiarchus tuberculifer querulus Nelson

Apatzingan: 2 females, August 13 and 15.

Cerro de Tancítaro: 1 male, 2 females, June 27–July 23.

Birds from the Cerro de Tancítaro area are indistinguishable from four specimens of *querulus* collected at Tuxpan, Jalisco, and Iguala, Guerrero.

Querulous flycatchers have been recorded in the mountains as well as lowlands of Michoacan (Los Reyes, Ahuacana, Patzcuaro, Apatzingan, and Cerro de Tancítaro) and may be regarded as the resident race.

Myiochanes pertinax pertinax Cabanis and Heine

Acahuato: 1 male, August 20.

Apatzingan: 1 female, August 7.

Cerro de Tancítaro: 3 males, 1 female, July 28–August 5.

This pewee occasionally occurs in the lowlands but throughout its range it is primarily a bird of the mountains. It was usually associated with the open pine groves of the plateau.

Empidonax minimus Baird

Apatzingan: 1 female, August 12.

Empidonax difficilis occidentalis Nelson

Cerro de Tancítaro: 3 males, 2 females, 2(?), July 6–25.

Two unsexed specimens collected on the plateau and at 10,200 feet altitude July 20 and July 25 respectively are in immature plumage and probably came from nests in the vicinity. On the basis of data now available we agree with Moore (1940, p. 28) that the breeding birds of southern Mexico should be referred to this race.

Our field records for this flycatcher include elevations from 6,000 to 10,600 feet. There is no evidence that it discriminates between plant associations, for specimens were collected in such widely divergent habitats as the cloud forest and the pine–oak association.

Empidonax fulvifrons rubicundus Cabanis and Heine

Cerro de Tancítaro: 2 males, 1 female, June 27 and August 5.

Ruddy flycatchers were most frequently seen in open, grassy areas on the plateau where they perched on low shrubs and weed stems a foot or two above the ground.

One specimen had eaten a small orthopteron, two beetles, a weevil and a hymenopteron. A second stomach examined contained an unidentified dipteron and considerable chitinous débris.

Mitrephanes phaeocercus phaeocercus Sclater

Cerro de Tancítaro: 3 males, 2(?), June 26–August 5.

Michoacan and Morelos constitute an area of intergradation between *phaeocercus* and *tenuirostris* Brewster, but birds from the Cerro de Tancítaro area are unquestionably more closely related to the former.

Unlike the last species, this flycatcher usually selects exposed perches on the treetops from which to dart out on short flights for insects.

Hirundo rustica erythrogaster Boddaert

Cerro de Tancítaro: 2 males, July 19 and 24.

Although the available evidence is not conclusive, it is probable that additional observations will definitely establish the barn swallow as a breeding species in Michoacan. Both specimens listed above have the short tail and somewhat dull plumage of birds of the year, but admittedly were capable of strong flight.

Iridoprocne albilinea albilinea Lawrence

Cerro de Tancítaro: 1 female, June 27.

The occurrence of a single immature specimen of this typically coastal species far inland is most surprising. The Rio Tepalcatepec could have served as a natural route of migration from the lowlands.

Corvus corax sinuatus Wagler

Cerro de Tancítaro: 1 male, August 15.

Ravens were fairly abundant up to 6,000 feet but were most numerous below in arid areas of sparse vegetation.

A well-packed stomach which was examined contained Scarabaeidae (75 per cent), fifty-three seeds of a grape (*Vitis*) and a few kernels of corn.

Calocitta formosa formosa Swainson

Apatzingan: 1 male, 1(?), August 3 and 9.

Magpie-jays were observed only in the semi-desert scrub association near Apatzingan. A stomach which was examined contained 80 per cent vegetable matter in the form of small seeded fruits and 20 per cent miscellaneous insect bits.

Aphelocoma sordida sieberii Wagler

Cerro de Tancítaro: 4 males, 2 females, July 14–28.

The local distribution of Sieber's jay, unlike that of the following species, coincides with the distribution of pine forests to which it is restricted. A bold and raucous bird wherever found, this jay ranged from the plateau up to approximately 11,000 feet.

An unidentified nut was the predominant food in four of the stomachs examined. One bird had also eaten a nestling of uncertain identification. A fifth stomach contained only the remnants of miscellaneous insects.

Cyanocitta stelleri coronata Swainson

Cerro de Tancítaro: 2 males, 4 females, July 6–26.

Two races of the present species undoubtedly intergrade in Michoacan. Ridgway has called attention to specimens from Patzcuaro which indicate, in slightly reduced size and increased blueness of the crest, a definite trend towards *C. s. coronata*. Cerro de Tancítaro birds show a progression of this tendency and may be considered to occupy a position practically intermediate between that race and *C. s. azteca*. No clear picture can be gained from the measurements of our small series but a closer affinity with *C. s. coronata* is indicated by an evaluation of other characters. A striking feature of the Cerro de Tancítaro specimens, which we have not found in birds from other localities, is the considerable reduction of the white patch over the eye and absence of a white spot on the lower eyelid.

Blue-crested jays were restricted almost exclusively to the cloud forest, although one specimen was collected in the upper pine–oak association.

Parus sclateri sclateri Kleinschmidt

Cerro de Tancítaro: 5 males, 2 females, July 2–31.

Mexican chickadees were abundant in the pine forests at all altitudes above 3,000 feet. It is remarkable that this active species has not been reported in Michoacan before.

Psaltiparus minimus melanotis Hartlaub

Cerro de Tancítaro: 1 female, August 6.

A band of approximately twenty-five black-eared bush-tits ranged over an area of scattered bushes and small deciduous trees on the plateau.

Sitta carolinensis mexicana Nelson and Palmer

Cerro de Tancítaro: 2 males, 2 females, August 5 and 16.

Additional specimens of *carolinensis* are needed from Michoacan to determine accurately the status of Cerro de Tancítaro birds. In size, as well as geographically, the specimens listed above lie between *kinneari* and *umbrosa*, recently described by van Rossem. All measurements equal or exceed the maximum of the former but only partially satisfy the minimum requirements of the latter. Cerro de Tancítaro specimens are very slightly lighter above than *umbrosa* and in this respect resemble *mexicana*. It is probable that an adequate series of birds from this area will indicate the presence of an intermediate population linking the latter races, but not sufficiently differentiated for subspecific designation.

White-breasted nuthatches were restricted to the plateau where they were fairly abundant in the pine–oak forest. Nesting apparently ended early in July, for family groups were observed by the middle of the month.

Sitta pygmaea flavinucha van Rossem

Cerro de Tancítaro: 4 males, 4 females, July 17–21.

Unlike the last species, pygmy nuthatches were strictly limited to the pine forests of the upper slopes. One specimen was collected at 9,000 feet, but seven others were taken above 11,000 feet in the pine–bunch grass association.

Certhia familiaris guerrerensis van Rossem

Cerro de Tancítaro: 2 males, 3 females, July 19–August 5.

We have not had an opportunity to examine creepers from Jalisco but no significant difference can be found between our small series and four specimens from the Sierra Madre del Sur, Guerrero. Hellmayr includes Michoacan in the range of *alticola* but Cerro de Tancítaro specimens are readily separable on the basis of their smaller size (males: wing 60–63, tail 59–60, culmen 13–16) and much darker under parts.

Creepers occurred at all elevations, from the plateau to approximately 11,000 feet. They were fairly abundant in most zonal associations but none were found in the cloud forest.

Cinclus mexicanus mexicanus Swainson

Cerro de Tancítaro: 2 females, 1(?), July 3 and 7.

An examination of a large series of Mexican dippers collected over a period of years reveals a degree of plumage-fading not sufficiently emphasized heretofore. In very old skins the plain sepia of the head and neck becomes a dull brown wash which extends over and practically replaces the original clear slate color of the back. Consequently, no line of color demarcation between the neck and back remains. Some fading is to be expected under the best conditions of storage, but few birds deteriorate as rapidly in this respect as dippers. Among relatively fresh skins it is possible, on the basis of fading, to separate those collected at intervals of only two years. Therefore, consideration of probable new races of *mexicanus* should always be made on the basis of comparison with specimens of comparable age.

Dippers were restricted to the fast-flowing canyon streams of the cloud forest.

Heleodytes megalopterus megalopterus Lafresnaye

Cerro de Tancítaro: 4 males, 5 females, 1(?), June 28–July 26.

This cactus wren was seen only in the cloud forest. A band of nine individuals, probably constituting a single family, was frequently observed during the last week of July near a camp maintained at 8,500 feet. Their feeding activities extended from the forest floor to the mid-portions of the higher trees, but epiphytic plants were explored with particular energy. During the post-breeding season this wren becomes relatively furtive and silent but occasionally startles one with its characteristic rattling din.

Heleodytes gularis Sclater

Tancítaro: 3 males, August 7 and 16.

Some recent authors prefer to regard *gularis* and *jocosus* as conspecific on the basis of the relatively minor differences which are observable in the adults. This view is untenable, however, if one properly evaluates the genetic implications suggested by the strikingly dissimilar immature birds. These are no less important than adults in indicating relationships, and the origins of respective popu-

lations. In the light of modern genetics certain basic differences, including the presence of ventral spotting in *jocosus*, and its absence in immature specimens of *gularis*, indicate the introduction (or loss) of genetic characters so distinct as to belie the fortuitous resemblance of the adults. We do not hesitate to grant *gularis* specific rank.

Thryothorus pleurostictus nisorius Sclater

Apatzingan: 4 males, 1 female, August 10–23.

Thryomanes bewickii percnus Oberholser

Tancítaro: 1 male, 2 females, July 18–31.

The large size (male: wing 62, tail 61, culmen 15) and dark coloration of Tancítaro specimens readily distinguish them from *murinus* of south-central Mexico. Jalisco wrens have not been recorded from Michoacan before, but a straggler was collected at Puente Colorado, Puebla, on August 3, 1868, by Professor Sumichrast.

Troglodytes brunneicollis colimae van Rossem

Cerro de Tancítaro: 6 males, 4 females, June 30–July 28.

Our series of fresh breeding specimens agrees in all intrinsic characters with a December male from the type locality. This well-defined race apparently is a bird of the higher mountains. A single specimen was observed on the plateau but these wrens were most abundant in the pine–bunch grass association above 10,000 feet altitude.

Henicorhina leucophrys festiva Nelson

Cerro de Tancítaro: 1 male, July 31.

Wood wrens are among the best indicators of the Humid Upper Tropical Zone. They occurred only in the cloud forest on Cerro de Tancítaro and were excessively difficult to observe in the low shrubs and ground cover which constituted their principal habitat. The song of this species compares favorably in strength and clarity of tone with that of any other wren and frequently was the first or only indication of its presence.

Catherpes mexicanus mexicanus Swainson

Canyon wrens inhabited the ridges of volcanic rock and old stone fences on the plateau, but unfortunately none were collected by either expedition.

Toxostoma curvirostre curvirostre Swainson

Tancítaro: 3 males, 1 female, 2(?), June 24–August 3.

FIR FOREST
Altitude about 9,000 feet

CLOUD FOREST OF HUMID UPPER TROPICAL ZONE
Altitude about 7,500 feet

1

2

3

TEMPERATE ZONE OF CERRO DE TANCÍTARO

Fig. 1. Open pine, with high bunch grass; altitude 10,000 feet. Fig. 2. Fir-alder forest, upper limit of cloud forest. Fig. 3. Open pine forest, Tancítaro plateau; altitude about 4,500 feet.

The roadside thickets of agave, thorny bushes, and small trees on the plateau were the favorite habitat of the curve-billed thrasher.

Two stomachs which were examined contained several curculionid beetles, a cricket, undetermined larvae, and numerous fine seeds.

Melanotis caerulescens effuticus Bangs and Penard

Tancítaro: 1 male, 4 females, July 30–August 5.

Griscom refers specimens from Chilpancingo, Guerrero, to the present race but states (1934, p. 396) that they are slightly gradient toward *caerulescens* of eastern and south-central Mexico. Our birds show no divergence from typical *effuticus*, however, and are indistinguishable from a series of ten Jalisco and Nayarit specimens with which they have been compared.

The habitat of the blue mockingbird is similar to that of the curve-billed thrasher. It is a shy and elusive bird and apparently is restricted to the plateau, where trailside thickets and drainage ditches are particularly favored. Singing perches are usually selected in the upper parts of densely foliated trees so that detailed observation is impossible. This species is a versatile songster and has a repertoire somewhat reminiscent of the catbird.

A quantity of small berries, wild grapes, a lepidopterous larva, a small wasp, and a beetle were found in the three stomachs examined.

Turdus migratorius permixtus Griscom

Acahuato: 1 female, August 17.

Tancítaro: 3 males, 1 female, June 30–August 5.

Breeding specimens of *migratorius* from the Cerro de Tancítaro area agree in small size and dark coloration with the birds of Guerrero. The known range of *permixtus* is thus extended northwestward by more than two hundred miles.

Turdus rufo-palliatus rufo-palliatus Lafresnaye

Apatzingan: 1 female, 1 male, August 12 and 15.

Turdus assimilis renominatus Miller and Griscom

Apatzingan: 1 male, August 15.

Cerro de Tancítaro: 1 male, July 6.

Myadestes obscurus occidentalis Stejneger

Cerro de Tancítaro: 2 males, 3 females, July 15–August 16.

Pine-forested ridges and underbrush of the higher mountain slopes are the usual habitat of this remarkable songster. Solitaires were not observed above 8,000 feet but they were fairly numerous in suitable situations at lower elevations.

Catharus occidentalis fulvescens Nelson

Cerro de Tancítaro: 4 males, 2 females, July 2–27.

Members of this genus are among the wariest of tropical birds. The present species finds optimum conditions in the decaying vegetation, rank undergrowth, and other ground cover of the cloud forest and thus occupies a niche filled by the following species on the plateau.

Catharus aurantiirostris clarus Jouy

Tancítaro: 2 males, 3 females, June 27–August 5.

Sialia mexicana australis Nelson

Cerro de Tancítaro: 4 males, 3 females, July 20–August 16.

Nelson's bluebirds were most abundant in the pine–oak association on the plateau but three specimens were collected in the open pine forest above 11,000 feet altitude. A specimen taken on July 20 had left its nest not more than ten days before.

Polioptila plumbea bairdi Ridgway

Apatzingan: 2 males, August 18 and 24.

Regulus regulus clarus Dearborn

Cerro de Tancítaro: 1 female, June 29.

The single immature specimen collected in the cloud forest apparently constitutes the first specific record of a kinglet in Michoacan. In the absence of breeding adults from this area we assign this bird to *clarus* with reservations.

Ptilogonys cinereus pallescens Griscom

Cerro de Tancítaro: 3 males, 1 female, July 22–August 17.

Our small series, in molting and worn plumage, differs from specimens of *cinereus* collected in Vera Cruz and Mexico and may be regarded as intermediates. They appear to be nearer *pallescens* of Guerrero but an adequate series from Cerro de Tancítaro is needed to determine the actual relationship.

There seems to be no previous record of silky flycatchers in Michoacan. They occurred on the plateau in wandering bands of five or six individuals.

Vireolanius melitophrys melitophrys Du Bus

Cerro de Tancítaro: 1 female, June 30.

The occurrence of a shrike-vireo in Michoacan, almost two hundred miles distant from the nearest previous record, is most unexpected. Subspecific determination has been made arbitrarily in the absence of satisfactory comparative material.

Vireo huttoni mexicanus Ridgway

Tancítaro: 2 females, July 16 and 17.

Vireo bellii medius Oberholser

Apatzingan: 1 female, August 13.

Bell's vireo winters over the greater part of Mexico but there is no previous record of the occurrence of *medius*, an excellently differentiated race, south of Guanajuato.

Vireo solitarius repetens van Rossem

Tancítaro: 1 female, August 7.

The proportions (wing 82, tail 57) of our Michoacan specimen agree with those of Guerrero birds. It is further distinguished from a series of Arizona specimens (*plumbeus*) by its much greener flanks, back, and rump and hence may be regarded as a typical example of the long-winged, short-tailed race (*repetens*) reported heretofore only from Jalisco, Guerrero, and Oaxaca.

Vireo virescens flavoviridis Cassin

Apatzingan: 2 females, August 13 and 14.

Vireo gilvus subsp.

Tancítaro: 1 female, July 26.

The worn plumage and unsatisfactory condition of this specimen preclude accurate subspecific determination. Its measurements (wing 74, tail 52, culmen 11) conform with those of *brewsteri* and of the nominate race but the clear brown pileum and upper back are unlike any examples of the species which we have seen. Early migrants could reach Michoacan late in July but it is more likely that a large, brownish resident race exists there.

Diglossa baritula baritula Wagler

Tancítaro: 2 males, 1 female, June 23 and August 7.

Mniotilta varia Linnaeus

Tancítaro: 1 male, August 7.

Vermivora superciliosa palliata van Rossem

Cerro de Tancítaro: 4 males, 1(?), July 3–29.

The grayer (less greenish) flanks and generally paler coloration distinguish Cerro de Tancítaro specimens from a series of *mexicana* at our disposal. The extent of the yellow abdominal area, considered important by van Rossem, is so complicated by the "make" of individual skins that we find it useless as a diagnostic character.

All races of this species are birds of the highlands. On Cerro de Tancítaro it was most abundant in the open pine forest and pine–alder association above 8,000 feet altitude.

Compsothlypis pitiayumi pulchra Brewster

Apatzingan: 1 male, August 19.

Our single Michoacan specimen, in worn plumage, is somewhat darker (duller) above than typical examples from Sonora, but otherwise agrees with *pulchra* in all diagnostic characters. There is no previous record of this well-marked race south of Jalisco (Barranca Ibarra), so its status in Michoacan is uncertain.

Peucedramus olivaceus olivaceus Giraud

Cerro de Tancítaro: 5 males, 1 female, 2(?), July 17–August 7.

The variability of this species has been demonstrated by Miller and Griscom (1925, pp. 8–11) but their recognition of a supposedly small western race, *jaliscensis*, seems unjustified in the absence of a reasonably stable character. Specimens from Jalisco are said to differ from typical *olivaceus* only in size, being (male) wing 72–76, tail 51.1–53, culmen 10–10.6. However, the wings of ten males (*olivaceus*) from Cofre de Perote, Vera Cruz, measured by Hellmayr, varied from 74–78 mm. Theoretically, Michoacan lies well within the range of *jaliscensis*, but the measurements of our five males (wing 76–77, tail 51–54, culmen 10–11) undermine still further the concept of a distinct western race.

Olive warblers occurred in open pine forests from the plateau to the summit of Cerro de Tancítaro. They were most abundant at higher altitudes in the yellow pine–bunch grass association.

Dendroica occidentalis Townsend

Tancítaro: 1 male, 1 female, August 16.

Myioborus miniatus miniatus Swainson

Cerro de Tancítaro: 4 males, June 28–July 30.

All races of *miniatus* are excellent indicators of the Humid Upper Tropical Zone. The shrubs and undergrowth within pine forests of the plateau generally harbored this species and a few individuals were noted as high as 8,200 feet altitude, near the upper limits of the pine–alder–fir association.

Ergaticus ruber ruber Swainson

Cerro de Tancítaro: 4 males, 3 females, 1(?), July 6–25.

Red warblers are resident in the coniferous forests between 8,000 and 9,600 feet altitude.

Basileuterus belli clarus Ridgway

Cerro de Tancítaro: 1 male, 4 females, June 28–July 31.

No conclusive evidence that Cerro de Tancítaro birds differ intrinsically from typical *belli* can be found in the limited comparative material at our disposal. However, Wetmore's review of the species (1941, pp. 572–573) indicates the necessity of correlating individual color range with seasonal variation in evaluating racial distinctions, so we have accepted his determination of Michoacan birds.

This active warbler was restricted to the cloud forest, where it seldom ventured from the dense vegetation of the forest floor.

Cassiculus melanicterus Bonaparte

Apatzingan: 3 males, 1 female, August 11–18.

Mexican caciques were concentrated in the tropical deciduous forest and among the large trees in the irrigated country south of Apatzingan.

Cassidix mexicanus mexicanus Gmelin

Apatzingan: 1 female, August 13.

Tancítaro: 1 female, August 17.

A distinctly smaller form (*obscurus*) inhabits the coast district of western Mexico from Nayarit and Colima south to Guerrero. It has not been recorded in Michoacan specifically but undoubtedly supersedes the present race southwest of the Cerro de Tancítaro

area. The demarcation between the ranges of *obscurus* and *mexicanus* is not known in detail but certainly altitude is not an isolating factor. The former occurs on the coast and also at Chilpancingo, Guerrero, approximately 4,000 feet above sea level, and the latter has a vertical distribution no less extensive.

Icterus spurius Linnaeus

Apatzingan: 2 males, 1 female, August 12 and 23.

Icterus wagleri wagleri Sclater

Acahuato: 1 male, August 17.

Icterus pustulatus pustulatus Wagler

Apatzingan: 5 males, 4 females, August 9–21.

Scarlet-headed orioles from Apatzingan agree with an excellent series of Guerrero birds in Field Museum and give no indication of gradation toward *microstictus* as might be expected.

Tanagra musica elegantissima Bonaparte

Tancítaro: 1 male, June 23.

Piranga flava hepatica Swainson

Tancítaro: 4 males, July 22–August 6.

Piranga bidentata bidentata Swainson

Tancítaro: 2 males, 1 female, July 17–August 6.

Swainson's tanager is a subtropical form which, like the preceding species, was noted only in the open pine groves and pine–oak forests on the plateau.

Hedymeles melanocephalus maculatus Audubon

Tancítaro: 3 males, 2 females, June 24–August 6.

Passerina versicolor subsp.

Apatzingan: 2 males, August 12 and 13.

Our specimens from the semi-desert scrub area near Apatzingan agree in size (wing 64, tail 50–53) with *purpurascens* of Guerrero, Morelos, and Guatemala but are in such worn plumage that subspecific determination is impractical. There are no data on the breeding population, but Michoacan lies within the migration range of the nominate race, and adjoins that of *dickeyae* and *purpurascens*, so exceptional care should be exercised in identifying all specimens from that state.

Passerina leclancherii leclancherii Lafresnaye

Apatzingan: 2 males, August 10 and 24.

Hesperiphona abeillei abeillei Lesson

Cerro de Tancítaro: 1 male, July 8.

Abeille's grosbeak is a bird of the highlands, known heretofore only from the states of Mexico(?), Vera Cruz, Puebla, and Oaxaca. The Michoacan specimen is in immature plumage and represents an unexpected westward range extension of more than two hundred miles.

Carpodacus mexicanus coccineus Moore

Tancítaro: 7 males, 3 females, June 23–August 7.

The taxonomy and relationships of house finches in Mexico have been clarified in several recent papers by Moore, who regards Patzcuaro (Michoacan) specimens as intergrades between the present race and *centralis* of Guanajuato. It follows that Tancítaro birds are similarly intermediate. Five adult males from the plateau are indistinguishable in appearance from a series from Tuxpan, Jalisco, but approach *centralis* in size; wing 81–82, tail 61–63.

Volatinia jacarina diluta van Rossem

Apatzingan: 3 males, August 11 and 20.

The characters which are said to separate *diluta* from *atronitens* of eastern Mexico and Central America are evident only in females, young males, and adult males in winter plumage. We have not seen sufficient Mexican specimens in these critical plumages to form an independent opinion on the advisability of recognizing a western race, but regard it with suspicion. The relationship between the grassquits of Mexico, Central America, and northern South America is not yet clear; in fact, interesting data presented by Hellmayr (1938, pp. 254–255) indicates so great a degree of individual variation and instability among these birds as to cast doubt on their subspecific divisibility.

Spinus pinus macropterus Bonaparte

Cerro de Tancítaro: 1 male, 1 female, July 21 and 24.

Pine siskins were restricted to the higher reaches of Cerro de Tancítaro, being most numerous in open pine forest above 10,000 feet.

Spinus notatus griscomi van Rossem

Tancítaro: 1 male, June 27.

Loxia curvirostra stricklandi Ridgway

Tancítaro: 2 males, 3 females, 1(?), June 25–August 5.

Mexican crossbills were observed only on the plateau in the pine–oak forest (4,500–6,000 ft. alt.) and in the vicinity of the village. Several specimens were collected near the cathedral. The absence hitherto of this species from the known fauna of Michoacan is further indication of the limited field work done in that state.

Atlapetes pileatus pileatus Wagler

Cerro de Tancítaro: 5 males, 2 females, 1(?), June 23–July 28.

This finch was abundant on the plateau and ranged upward at least to 8,600 feet.

Atlapetes torquatus virenticeps Bonaparte

Cerro de Tancítaro: 1 male, 3 females, 1(?), July 1–30.

Arremonops rufivirgatus sumichrasti Sharpe

Apatzingan: 1 male, 1 female, August 20.

Pipilo ocai[1] **nigrescens** Salvin and Godman

Tancítaro: 5 males, 2 females, 2(?), June 22–August 6.

The presence in Michoacan of a breeding population of towhees combining characters of *Pipilo ocai* and of *P. macronyx* has caused confusion for many years. Michoacan birds were first recognized as a distinct entity in 1889 by Salvin and Godman, who described *Chamaeospiza nigrescens* on the basis of a pair of specimens collected at Patzcuaro. Ridgway (1901, p. 408) accepted the specificity of *nigrescens* but advanced the opinion that it might prove to be merely the result of hybridization between the *Pipilo torquatus* (=*ocai*) and *P. macronyx* groups. In support of this view, subsequently adopted by most authors, Hellmayr (1938, p. 454) states that "eight specimens (from Michoacan, Vera Cruz, and Puebla) form an almost unbroken chain between *macronyx* and *torquatus*, and clearly indicate hybridization."

The close relationship between these species is evident. Some degree of hybridization between them undoubtedly occurs, but analysis of their present distribution refutes the concept that individual Michoacan specimens are fortuitous hybrids. No race of *macronyx* or of *ocai* other than *nigrescens* occurs in that state, nor

[1] Priority of *ocai* over *torquatus* has been established by van Rossem (1940, pp. 173–174).

have birds of the *nigrescens* type been found elsewhere. The latter are composite in appearance, and exhibit considerable individual variation of certain characters, but there is not the slightest difficulty in separating Michoacan specimens from all others.

In order to determine the affinities of this interesting form the authors assembled all available specimens from Michoacan (thirty-three) for direct comparison with eighty specimens representing all known races of *macronyx* and *ocai*. Michoacan birds (*nigrescens*) resemble the latter in general pattern but may be distinguished by the vestigial nature of their white gular patch and by the absence of a superciliary line. Of the thirty-three Michoacan specimens examined, three show no trace of white on the throat and only one adult, collected at Patamban in January, 1903 (No. 185076, coll. of the Fish and Wildlife Service), lacks the typical chestnut crown-patch of the *ocai* group. Obscure black dorsal streaks and a slightly cinnamomeous tinge on the under parts (flanks and under tail coverts) of certain Michoacan specimens may be regarded as further indication of their link with the *macronyx* group but in no case are these characters well developed, nor do Michoacan birds have spotted tails.

The composite appearance of Michoacan birds is due to multiple gene factors possibly acquired at a time when the ranges of *ocai* and *macronyx* overlapped in this area. Whatever the origin of *nigrescens*, it constitutes an isolated breeding population in Michoacan (Cerro de Tancítaro, Nahuatzin, Patamban, and Patzcuaro), separable in 100 per cent of the specimens examined, and hence must be regarded as subspecifically distinct. The distribution and composite appearance of *nigrescens* indicate a relationship between *P. ocai* and *P. macronyx* so close as to suggest that they are races of the same species. Complete revision of these forms is beyond the scope of the present report.

Pipilo fuscus fuscus Swainson

Tancítaro: 3 males, 4 females, 2(?), June 23–August 3.

Our series from Cerro de Tancítaro, which lies in an area generally conceded to be occupied by the nominate race, agrees in size and color with seven adult specimens collected in May at Tuxpan, Jalisco, only eleven miles south of Zapotlan, type locality of the recently described race *tenebrosus*. We have not seen Zapotlan specimens but it is evident that Mexican races of this species require careful revision before additional forms are described.

Brown towhees are among the most abundant birds on the plateau, being especially numerous in the village of Tancítaro and in the roadside thickets of the surrounding country. They probably have two broods during the season, as parents feeding full-grown young were frequently observed and on July 20 natives brought in a nest containing three half-grown fledglings.

Plagiospiza superciliosa superciliosa Swainson

Cerro de Tancítaro: 3 males, 4 females, 1(?), July 17–22.

Striped sparrows and pygmy nuthatches are the only birds which seem to be limited to the highest slopes of the mountain. All our specimens of the former were collected in the pine–bunch grass association above 10,200 feet.

Two stomachs which were examined contained leguminous seeds (probably *Lupinus*) and miscellaneous plant and insect débris.

Aimophila humeralis humeralis Cabanis

Apatzingan: 1 female, August 9.

This specimen agrees perfectly with a series from Iguala, Guerrero, and shows no tendency to intergrade with *asticta* of Colima.

Aimophila ruficauda acuminata Salvin and Godman

Apatzingan: 2 males, 1 female, August 11–19.

Junco phaeonotus australis van Rossem

Cerro de Tancítaro: 3 males, 2 females, 1(?), July 15–August 1.

These specimens are intergrades between *colimae* of Jalisco and *australis* of Guerrero but apparently are more closely related to the latter. They differ from a series of summer adults from Nuevo Leon (typical *phaeonotus*) in having somewhat browner flanks, darker upper parts and decidedly more extensive red on the tertials and lower back. Measurements of three males agree with those of *australis:* wing 76–78, tail 68–69.

Mexican juncos were found at all elevations from the plateau to near the summit of Cerro de Tancítaro wherever there were open fields or areas with herbaceous cover.

Spizella passerina mexicana Nelson

Tancítaro: 1 male, June 23.

REFERENCES

FRIEDMANN, HERBERT

1933. Critical Notes on American Vultures. Proc. Biol. Soc. Wash., **46**, pp. 187–190.

1934. The Hawks of the Genus *Chondrohierax*. Journ. Wash. Acad. Sci., **24**, pp. 310–318.

GRISCOM, LUDLOW

1931. Notes on Rare and Little Known Neotropical Pygmy Owls. Proc. New Engl. Zool. Cl., **12**, pp. 37–43.

1932. The Distribution of Bird-life in Guatemala. Bull. Amer. Mus. Nat. Hist., **64**, pp. 1–425.

1934. Ornithology of Guerrero, Mexico. Bull. Mus. Comp. Zool., **75**, pp. 367–422.

1937. A Collection of Birds from Omilteme, Guerrero. Auk, **54**, pp. 192–199.

HELLMAYR, C. E.

1938. Catalogue of Birds of the Americas. Field Mus. Nat. Hist., Zool. Ser., **13**, pt. 11, pp. 1–662.

MILLER, W. DEW. and GRISCOM, LUDLOW

1925. Notes on Central American Birds, with Descriptions of New Forms. Amer. Mus. Nov., **183**, pp. 1–14.

MOORE, R. T.

1934. A Review of the Races of *Geococcyx velox*. Trans. San Diego Soc. Nat. Hist., **7**, pp. 455–466.

1939. A Review of the House Finches of the Subgenus *Burrica*. Condor, **41**, pp. 177–205.

1939a. A New Race of *Cynanthus latirostris* from Guanajuato. Proc. Biol. Soc. Wash., **52**, pp. 57–60.

1940. New Races of *Empidonax* from Middle America. Proc. Biol. Soc. Wash., **53**, pp. 23–29.

—— and PETERS, J. L.

1939. The Genus *Otus* of Mexico and Central America. Auk, **56**, pp. 38–56.

RIDGWAY, ROBERT

1901. Birds of North and Middle America. Bull. U. S. Nat. Mus., **50**, pp. 1–715.

VAN ROSSEM, A. J.

1934. Critical Notes on Middle American Birds. Bull. Mus. Comp. Zool., **77**, pp. 387–490.

1938. Descriptions of Twenty-one New Races of Fringillidae and Icteridae from Mexico and Guatemala. Bull. Brit. Orn. Cl., **58**, pp. 124–138.

1938a. Notes on Some Mexican and Central American Wrens of the Genera *Heleodytes*, *Troglodytes*, and *Nannorchilus;* and Four New Races. Bull. Brit. Orn. Cl., **59**, pp. 10–15.

1939. Four New Races of Sittidae and Certhiidae from Mexico. Proc. Biol. Soc. Wash., **52**, pp. 3–6.

1940. Du Bus' Type of the Collared Towhee, *Pipilo torquatus*. Wilson Bull., **52**, pp. 173–174.

WETMORE, ALEXANDER

1941. Notes on Birds of the Guatemalan Highlands. Proc. U. S. Nat. Mus., **89**, pp. 523–581.

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