

BIRDS OF THE TZITZIO REGION, MICHOACAN, MEXICO

By JOHN DAVIS

From August 4 to 10, 1939, Chester C. Lamb collected birds at a locality three miles north of Tzitzio, eastern Michoacán, México. From July 13 to 30, 1951, Mr. Lamb and his assistant, and my wife, Dr. Betty S. Davis, and I, made a second collection at this locality. We camped within a hundred yards of Mr. Lamb's 1939 campsite. The two collections total 310 specimens, all of which are now in the Moore Collection, Occidental College. Eighty-three species were recorded, of which seventy were collected. Eighteen miles by road east of Morelia, Michoacán, at a military outpost known as El Temescal, a road leaves the main highway to Mexico City and leads south to Huetamo, on the Michoacán-Guerrero boundary. The town of Tzitzio (Sitzio on some maps) is situated on this road, about ten miles by road south of the main highway to Mexico City. Our camp was located at the settlement of San Juan de los Llanos, on the Huetamo road, an estimated three miles airline north of Tzitzio. The altitude at San Juan was 6500 feet as registered on our altimeter. Many of the slopes and ridges in this area are covered with a second growth pine-oak forest, the pines being predominant. Much of this forest has been cleared away to make space for cultivated fields and grassy pastures. Isolated stands of pines and oaks scattered throughout the grassland indicate that the pine-oak forest was once continuous in this area. There has also been a heavy upward invasion of the leguminous thorn scrub vegetation of lower elevations. This scrub forms impenetrable thickets bordering roads and trails and breaking up the continuity of the grassland areas. Thickets of thorn scrub often occur in conjunction with small stands of oaks, leading to the formation of an association best referred to as oak-thorn scrub. The partial clearing of the original pine-oak forest, together with the invasion of thorn scrub from below, has led to an intermingling of vegetational associations in the vicinity of San Juan. The composition of the avifauna reflects this interdigitation of associations, and high and low altitude species of birds are found together in this region. Our collecting activities were carried out in the immediate vicinity of San Juan, and all the vegetational associations were investigated. Much time was spent on a steep, pine-oak forested ridge running east and west about 300 yards south of camp. The ridge was an estimated three hundred feet high and ended in a steep escarpment at the western end, below which lay the road to Huetamo.

In the following species accounts July records pertain to 1951 and August records to 1939.

Coragyps atratus. Black Vulture. These vultures were seen nearly every day. They were only slightly less common than Turkey Vultures.

Cathartes aura. Turkey Vulture. These were seen every day. On most occasions they appeared in greater numbers than the Black Vultures but on at least one occasion they were outnumbered by them.

Accipiter cooperii. Cooper Hawk. On July 28 one bird circled high over camp.

Accipiter striatus suttoni. Sharp-shinned Hawk. 1 ♂, 1 ♀, August 5, 10. Both specimens are immature. Their large size (wing, ♂, 181 mm., ♀, 212 mm.), brick red underparts, and virtually immaculate thighs place them in *suttoni*.

Buteo jamaicensis. Red-tailed Hawk. One individual was seen on July 13.

Buteo brachyurus. Short-tailed Hawk. 1 ♀, July 16. On July 14 a small, white-bellied *Buteo* flew rapidly over the tops of the pines on the ridge south of camp, giving a clear, two-syllabled whistle. On July 16 a small, dark *Buteo* flew to a pine near where the first bird had been seen and perched, giving the same whistled call as that previously noted. This individual, a melanistic juvenal Short-tailed Hawk, was collected. The crop and stomach contained the remains of a small bird. The hawk noted on July 14 was presumably an adult or juvenile of this species in the white-bellied phase.

Aquila chrysaetos. Golden Eagle. On July 28 my wife and I noted a huge hawk circling with an estimated 15 Black and 10 Turkey vultures. Closer inspection, using 9 power binoculars, revealed an immature eagle. The prominent white wing patches and white tail edged and bordered terminally with black were seen clearly. A short time later two adults came into view. The reddish gleam of their hindnecks and their huge hooked bills were readily visible. The three birds dwarfed even the Turkey Vultures. They were superb fliers, describing great circles in effortless fashion. Vultures of both species gave them a wide berth. The adults were silent but the immature uttered an occasional plaintive whistled call. As we were about to leave a second immature dove in with partly folded wings. The group of four then circled out of sight. Some time later, from a distance of about a mile, an immature was seen still circling with the vultures. The Golden Eagle has never before been recorded from Michoacán, although specimens have been taken near Irapuato, Guanajuato, some 80 miles north of Tzitzio.

Herpetotheres cacchianus. Laughing Falcon. This species was heard several times. On July 26 Mr. Lamb saw one fly into a tree near camp.

Philortyx fasciatus. Barred Quail. Large coveys of these quail were flushed on several occasions but they invariably settled in dense thorn scrub and none was collected.

Colinus virginianus. Bob-white. A pair was flushed twice from heavy oak-thorn scrub vegetation bordering a grassy field on July 13 and 25.

Scardafella inca. Inca Dove. 1 ♂, 1 ♀, July 23. Inca Doves were common in thorn scrub and were seen or heard many times.

Piaya cayana mexicana. Squirrel Cuckoo. 1 ♂, August 9. This was the sole individual encountered.

Geococcyx velox melanchima. Lesser Road-runner. 1?, July 22. This individual was collected from a roadside oak adjacent to heavy thorn scrub.

Bubo virginianus. Great Horned Owl. One bird was noted by Mr. Lamb on August 4.

Chordeiles minor. Nighthawk. On July 26 a Nighthawk was seen and others were heard calling at dusk. On July 29, again at dusk, a lone bird was heard calling from high altitude. Although poor light prevented observation, the bird dove and "boomed" twice.

Caprimulgus vociferus oaxacae. Whip-poor-will. 3 ♂, July 19, 23, August 6. Two individuals were flushed from the forest floor. The third was seen to fly into a pine tree at dusk.

Hylocharis leucotis leucotis. White-eared Hummingbird. 3 ♂, July 14, 20, August 6. These hummingbirds were uncommon at San Juan.

Amazilia beryllina viola. Berylline Hummingbird. 7 ♂, 2 ♀, July 13, 14, 22, August 6, 7, 9. These hummers were very common and were seen every day in the oak-thorn scrub.

Tilmatura dupontii dupontii. Dupont Hummingbird. 18 ♂, 3 ♀, July 15, 19, 28, 30, August 4, 6, 7, 8, 9. Dupont Hummingbirds occurred commonly in oak-thorn scrub and in heavy riparian vegetation.

Trogon elegans ambiguus. Coppery-tailed Trogon. 2 ♂, July 14, 27. This species was encountered only on the pine-covered ridge south of camp. They were fairly common but quite wary. On one occasion three males responded to imitated Pigmy Owl calls, and one was collected. Males were seen several times.

Momotus mexicanus mexicanus. Russet-crowned Motmot. 2 ♂, 1 ♀, July 16, 18. In addition to the three individuals collected a fourth was seen on July 20 in the pine-oak forest. One bird had the tail of a small snake protruding from its bill at the time of collection.

Colaptes cafer mexicanus. Red-shafted Flicker. 1 ♀, July 15. Flickers were common in the pine-oak forest.

Melanerpes formicivorus formicivorus. Acorn Woodpecker. 3 ♂, 2 ♀, July 23, 24, 27, August 8. These were common at the edges of clearings in the pine-oak forest.

Dendrocopos scalaris. Ladder-backed Woodpecker. 4 ♂, 4 ♀, 2?, July 15, 17, 18, 21, 22, 23, 24, 26, August 7. This species was common in the oak-thorn scrub. The series is intermediate between *centrophilus* and *azelus*. Although averaging more as in the former, small size (wings of 3 ♂, 95.6, 96.6, and 99.4 mm.), lack of black bars on the outer rectrices of some specimens, and less well-defined streaks on the sides of the breast indicate intermediacy toward *azelus*.

Dendrocopos arizonae X *D. stricklandi*. 2 ♂, 3 ♀, 2?, July 14, 16, 20, 21, August 5, 9. These woodpeckers were rather silent birds, and apparently were restricted to the pine-oak forest. They were best located by the light, intermittent tapping which they made while foraging. *Dendrocopos arizonae* and *D. stricklandi* have been considered two allopatric species. The easternmost record of

arizonae is three miles north of Tzitzio. The westernmost record of *stricklandi* is Puerto Lengua de Vaca, 9350 feet, México, about one mile east of the Michoacán-México boundary. These localities are about 50 airline miles apart. *Arizonae* has an unbarred dorsum and rump and heavily spotted and barred underparts. *Stricklandi* has the dorsum and rump heavily barred with white. The underparts are paler than those of *arizonae* with streaking on the throat and chest and barring on the sides and flanks. Examination of 64 specimens of *arizonae* in the Moore Collection from the states of Chihuahua, Durango, Sinaloa, Nayarit, and Jalisco reveals the presence of 10 variants toward *stricklandi*. These are from all states save Durango. Most of these variants show definite barring on the rump. On a few there are very faint indications of dorsal barring. Four specimens are available from west-central Michoacán (four miles east of Uruapan). Of these one is pure *arizonae*, one has a faintly barred rump, one a heavily barred rump, and one has the dorsum distinctly barred with white. The two specimens collected near Tzitzio in August are in fresh fall plumage. Both have heavily barred rumps and faint, but recognizable, dorsal barring. The five specimens collected in July provide further evidence of interbreeding between *arizonae* and *stricklandi*. In ventral aspect they are all typically *arizonae*. Two of the five are apparently pure *arizonae*. Moore Coll. 51170, female, ovary 6 mm., has only a few worn feathers scattered through the fresh dorsal plumage. The dorsum is faintly barred, the rump heavily barred. Moore Coll. 51171, sex unknown, has mainly fresh dorsal plumage with scattered worn feathers. Rump and dorsum are heavily barred with white. The most prominent dorsal bars are 3 to 3.5 mm. wide. The dorsal bars of *stricklandi* are 4 to 4.5 mm. wide. Moore Coll. 51172, female, ovary 3 mm., has worn dorsal plumage anteriorly, fresh posteriorly. Dorsum and rump are heavily barred with white. Dorsal bars are 2.7 to 3.7 mm. wide.

Dendrocoptes stricklandi occurs at high altitudes, mainly above 10,000 feet, in pine-fir forest, whereas *arizonae*, in central México, is found in the pine-oak forest of lower altitudes. Moore (1946: 105) noted that the series of *stricklandi* collected at Puerto Lengua de Vaca was found in a situation "where oaks occur occasionally among the firs and some of the individuals were actually collected as they foraged on oak trees." At least in this one locality there was an ecologic approach of *stricklandi* toward *arizonae*. Further collecting in ecologically intermediate situations in eastern Michoacán will probably turn up individuals more nearly intermediate between the two forms.

In my opinion *arizonae* and *stricklandi* are geographic representatives of a single polytypic species. From this point of view *Dendrocoptes arizonae arizonae* (Hargitt) 1886 and *D. a. fraterculus* (Ridgway) 1887 would become *Dendrocoptes stricklandi arizonae* and *D. s. fraterculus*, since *Picus* (*Leuconotopicus*) *stricklandi* Malherbe 1845 has priority over *Picus arizonae* Hargitt 1886.

Lepidocolaptes leucogaster leucogaster. White-striped Woodhewer. 1 ♂, 2 ♀, July 16, August 5, 10. This species was uncommon and apparently restricted to the pine-oak forest. Single individuals were also observed on July 20 and 27.

Attila spadiceus pacificus. Polymorphic Attila. 1 ♂, 1 ♀, July 13, 19. Attilas were uncommon and were seen only three times. The male was collected from a group of three giving loud, three-syllabled whistles from heavy riparian vegetation. When approached, the birds flew to *Baccharis*-manzanita vegetation at the edge of a boggy field where one was collected. The female is typical *pacificus* but the male is darker with a yellower, less ochraceous rump, and approaches *flammulatus* in coloration.

Platypsaris aglaiae albiventris. Rose-throated Becard. 1 ♀, August 9. This was the only individual encountered.

Tityra semifasciata griseiceps. Masked Tityra. 1 ♀, July 14. This individual, the only one seen, was collected on the ridge south of camp. The ovary measured 7 mm., and a brood patch was present. It is typical of the well-marked west-Mexican race.

Pyrocephalus rubinus mexicanus. Vermilion Flycatcher. 2 ♂, 3 ♀, July 14, 22, 25, August 8. Vermilion flycatchers were very common in oak-thorn scrub. Juveniles were seen nearly every day, but adults were uncommon. The single adult male was collected on July 25 as it pursued a female, both birds making several turns about a small tree in an open field.

Tyrannus vociferans. Cassin Kingbird. Noted only on July 13 and August 7.

Tyrannus crassirostris crassirostris. Thick-billed Kingbird. 1 ♂, July 25. On July 25 three individuals were noted in the upper branches of a large thorn tree, chattering and squalling loudly as they moved actively from branch to branch. The testis of the male collected measured 6 mm. Mr. Lamb noted Thick-billed Kingbirds on August 7.

Myiarchus tuberculifer querulus. Olivaceous Flycatcher. 4 ♂, 4 ♀, July 16, 18, 20, 24, 27, 28,

August 4. This species was common and widely distributed, occurring in both pine-oak forest and oak-thorn scrub. On July 16 four were seen, calling loudly as they travelled through the upper branches of the pines. An adult male and a female with a brood patch were collected.

Aechmolophus mexicanus. Crested Aechmolophus. 4 ♂, 1 ♀, July 21, 22, 23, 26. These crested flycatchers were fairly common in oak-thorn scrub. Three of the specimens are juveniles, one with the rectrices only partly grown. Small, nondescript flycatchers, possibly of this species, were seen several times but could not be collected. An adult male collected on July 22 was one of a pair. A testis of this individual measured 4 mm. No call notes were given by any individual. Collectors should look for this species between 5000 and 7000 feet wherever trees are present in conjunction with interrupted thorn scrub. It may be overlooked easily or confused with *Empidonax affinis*. The collecting of small, drab, rather long-tailed flycatchers in proper habitat at middle elevations will undoubtedly turn up many additional records of this species.

Contopus pertinax pertinax. Coues Flycatcher. 3 ♂, 1 ♀, July 16, 25, 26, August 8. This species was very common in the pine-oak forest.

Contopus richardsonii. Western Wood Pewee. 1 ♂, July 14. This specimen cannot be placed satisfactorily. It was taken within the geographic range of typical *richardsonii* as outlined at present but it is far too small for that race (wing, 79.9 mm.) and thus closer to *sordidulus*.

Empidonax difficilis occidentalis. Western Flycatcher. 1 ♂, 1 ♀, July 18, 25.

Empidonax fulvifrons rubicundus. Buff-breasted Flycatcher. 3 ♂, July 20, 21, August 10. This species was common in the pine-oak forest.

Mitrephanes phaeocercus. Tufted Flycatcher. 2 ♀, August 6, 10. These specimens are intermediate in coloration between typical *phaeocercus* and *tenuirostris*.

Elaenia viridicata. Greenish Elaenia. 7 ♂, 3 ♀, July 18, 23, 27, August 4, 9. These specimens are intermediate between *placens* and *jaliscensis*, but average more as in the latter. Although there is some variation within the series, most individuals more nearly resemble specimens of *jaliscensis* from Nayarit than specimens of *placens* from Oaxaca and Veracruz.

Camptostoma imberbe. Beardless Flycatcher. 1 ♂, July 24. The only individual encountered was collected as it flew from oak to oak at the edge of a steep gully. Van Rossem (1930:129-130) urged the resurrection of the subspecific name *ridgwayi* for the Beardless Flycatchers of Arizona and Sonora, stating that these populations were separable from typical *imberbe* on greater lengths of bill and wing. Griscom (1934:384-385) opposed this. Measurements of good series of this species from much of its range in México indicate that bill and wing lengths are subject to great individual variation, and series from northwestern and southeastern México overlap far too widely to allow of nomenclatural separation. As Griscom (*loc. cit.*) pointed out, a revision of the species over its entire range, south to Costa Rica, must be made before any subspecies are recognized within it.

Petrochelidon pyrrhonota. Cliff Swallow. 1 ♂, July 26. Swallows, presumably of this species, were noted on several occasions, but always too far away to permit unquestioned identification. On July 26 a juvenal male was collected from a flock of Cliff Swallows circling over the road near camp. This specimen probably pertains to the resident race *melanogaster*.

Tachycineta thalassina. Violet-green Swallow. Mr. Lamb saw this species on August 5.

Corvus corax. Raven. Individuals or pairs were seen several times.

Aphelocoma ultramarina ultramarina. Mexican Jay. 1 ♂, 2 ♀, July 14, August 10. This jay occurred only in the pine-oak forest. On July 14 a flock estimated at 12 individuals was seen travelling leisurely through the upper branches of the pines on the ridge south of camp, calling loudly. A juvenal male collected on July 14 has scattered blue feathers on the forehead, hindneck, scapulars, and malar region. The maxilla of this specimen is ivory basally, the mandible entirely ivory. The label of a female collected by Mr. Lamb on August 10 bears the notation "Full sized hard egg ready to lay."

Parus wollweberi wollweberi. Bridled Titmouse. 6 ♂, July 14, 21, August 6, 7, 8, 9. These titmice were common in the pine-oak forest. Large flocks were seen several times foraging high in the pines.

Psaltriparus minimus iulus. Bush-tit. 4 ♂, July 21, August 5, 8. Bush-tits occurred in the oak-thorn scrub. On one occasion a large flock was seen working through heavy thorn scrub. Three of the specimens are immature. They are grayer than immature male *melanotis* from Puebla and Hidalgo and agree with specimens of *iulus* of similar age and sex from Durango and Zacatecas. The adult is also typical *iulus*. Lea and Edwards (1950:265) recorded this race from the Pátzcuaro region of central Michoacán.

Sitta carolinensis. White-breasted Nuthatch. 1 ♂, August 10. Mr. Lamb noted this species on August 5 and 8, and collected the single specimen from a pine on August 10. It is an immature, with a wing too long (89.4 mm.) for *kinneari*, yet definitely shorter than the wings of 11 of 14 immature *umbrosa* (13 ♂, 1 ♀) from Chihuahua and Durango. In coloration it is slightly paler than some *umbrosa* and inseparable from others. Blake and Hanson (1942:538) found the same characteristics in their four specimens from Cerro de Tancitaro. Their statement seems well-founded, that the White-breasted Nuthatches of the Tancitaro region may constitute a population intermediate between *umbrosa* and *kinneari*, but not worthy of subspecific recognition, and the same statement may well apply to the nuthatches of eastern Michoacán.

Certhia familiaris. Brown Creeper. 1 ♂, 2 ♀, July 16, August 5, 10. Creepers were fairly common in the pine-oak forest. The male is too small for *alticola* (wing 61.8 mm.). The two females show some difference in this character (58.4, 61.4 mm.). The specimens pertain to *guerrerensis* on the basis of coloration, but the rather large wing of one female may indicate an approach to *alticola*.

Campylorhynchus gularis. Spotted Cactus Wren. 7 ♂, 5 ♀, July 13, 14, 17, 21, 23, 24, August 4, 7. This cactus wren was found in all associations. It was very common in thorn scrub and rather rare in the pine-oak forest. The series includes five juvenal males which are unspotted below.

Thryothorus felix felix. Happy Wren. 4 ♂, 2 ♀, July 17, 24, August 4, 8. These wrens were common in heavy brush and thorn scrub. Their loud song was heard frequently but individuals were rarely seen, seldom venturing forth from the heavy vegetation which sheltered them.

Thryomanes bewickii. Bewick Wren. 3 ♂, 1 ♀, July 13, 19, 27, 28. Bewick wrens were fairly common in oak-thorn scrub. The four specimens are juvenal, but the remiges and rectrices are fully grown. There is great variation in wing length among the three males (55.6, 58.9, 62.5 mm.). The dorsal coloration of three specimens is similar; that of the fourth is noticeably darker. The darkest specimen has the longest wing, and is referable to *percnus*. The other specimens are similar to *murinus*. The population from which the sample was collected is apparently intergrading between the two races, although averaging more as in *murinus*.

Catherpes mexicanus mexicanus. Canyon Wren. 4 ♂, July 15, 17, 19, 27. The Canyon Wren was fairly common and was often heard singing from the steep escarpment at the western end of the ridge south of camp.

Melanotis caerulescens effuticius. Blue Mockingbird. 3 ♂, July 18, August 8. Blue Mockingbirds were fairly common in heavy brush and thorn scrub. A juvenile collected on August 8 is well into the postjuvenal molt.

Turdus assimilis. White-throated Robin. 1 ♂, 1 ♀, July 14, 18. This species was rare at our locality. The male is adult, the female juvenal. The great amount of individual variation and apparent post-mortem color change in this species make it impossible to identify a single recently collected specimen by comparing it with a series of older skins. Wing length (123.8 mm.) is in the area of overlap between *assimilis* and *renominatus*. The Tzitzio region is within the geographic range of *renominatus*.

Turdus migratorius. Robin. 1 ♂, 2 ♀, July 20, 21, August 5. Robins were rare at San Juan. The July birds are juvenal male and female. They are considerably darker dorsally and ventrally than juvenal specimens of *propinquus* from northwestern México. The adult female, in worn plumage, resembles similarly worn *propinquus* in wing length and ventral coloration but has a shorter bill and darker dorsum than specimens of that race. It may represent an intergrade between *propinquus* and *permixtus*.

Catharus aurantiirostris clarus. Orange-billed Nightingale-Thrush. 7 ♂, 2 ♀, July 15, 16, 20, 21, 22, 23, August 5, 7. These birds were common in heavy, non-leguminous brush, both in the pine-oak forest and in small draws and along streams traversing the oak-thorn scrub. Their song was frequently heard but individuals were wary and showed themselves infrequently.

Myadestes obscurus occidentalis. Brown-backed Solitaire. 1 ♂, 3 ♀, July 18, 26, August 8. This species was uncommon, although its distinctive song was occasionally heard. A female collected on August 8 is in the terminal stages of the postjuvenal molt.

Sialia sialis fulva. Eastern Bluebird. 4 ♂, July 15, 16, 26, August 4. Bluebirds were common in both the pine-oak forest and in oak-thorn scrub. The two adults are pale ventrally and referable to *fulva*.

Poliophtila caerulea. Blue-gray Gnatcatcher. 2 ♂, 1 ♀, July 22, 28, August 7. Blue-gray Gnat-

catchers were fairly common in dense thorn scrub thickets. On July 22 a female was observed making repeated trips to feed a young Cowbird (*Molothrus ater*) perched at the edge of a thorn scrub tangle. Both birds were collected. The gnatcatcher had a brood patch. Unfortunately, both males collected are juvenal. The wing and tail measurements of all three specimens are too large for *deppei*, as judged by the measurements given by van Rossem (1934:402) for the breeding adult male type of that race (wing, ♂ ♂, 51.6, 51.3, ♀, 49.5; tail, ♂ ♂, 54.0, 54.1, ♀, 52.0), and the supposed wing-tail ratio of *deppei* is reversed in all three. Lea and Edwards (1950:267) noted that their specimen from the Pátzcuaro region was too large for *deppei*. Accurate subspecific determinations of central Mexican Blue-gray Gnatcatchers await a thorough revision of the species over its entire range.

Ptilogonys cinereus cinereus. Gray Silky Flycatcher. 4 ♂, 3 ♀, July 17, 22, 26, August 4, 9. This species was common wherever trees of any kind were present, calling loudly from the topmost branches. Mr. Lamb has noted the stomach contents of the two August specimens as "berries" and "madrone berries and mistletoe berries." This worn series appears similar to a series of typical *cinereus* from eastern México.

Vireo solitarius repetens. Solitary Vireo. 1 ♂, 1 ♀, 1?, July 16, 24, August 6. Solitary Vireos were fairly common and sporadic in occurrence. Specimens were taken in both pine-oak forest and oak-thorn scrub. The male and female, both adult, are typical of the Guerreran race.

Vireo gilvus. Warbling Vireo. 3 ♂, 1 ♀, July 16, 18, 19, 25. Warbling Vireos were common in oak-thorn scrub. In the absence of adequate comparative material these specimens are tentatively referred to *connectens*. The crown coloration is slightly darker and more purely brown than that of specimens taken farther west in Michoacán (Uruapan, Zacapu) and may indicate a slight approach toward *eleanorae* of Hidalgo. The specimen from the Tancitaro region described by Blake and Hanson (1942: 543) is probably referable to *connectens*.

Dendroica graciae graciae. Grace Warbler. 3 ♂, 1 ♀, 1?, July 16, 21, August 5, 10. These warblers were common and apparently restricted entirely to the pine-oak forest. On July 21 adults were seen feeding large young. The specimens show a slight approach toward *decora* in the posterior extent of yellow on the chest, but there is considerable variation in this character among individuals of typical *graciae* from northwestern México.

Setophaga picta picta. Painted Redstart. 4 ♂, July 14, 24, August 5, 9. Painted Redstarts were noted commonly in the pine-oak forest, and occasionally in the oaks of the oak-thorn scrub association.

Myioborus miniatus miniatus. Red-bellied Redstart. 1 ♂, 1 ♀, July 22, August 5. Both specimens are juvenal. The female, collected on July 22, has a few red feathers on the right side of the venter, but is otherwise in complete juvenal plumage. The male is about halfway through the postjuvenal molt. The pileum has several chestnut feathers, and the entire venter is red except for the postero-medial portion. The ventral coloration is noticeably paler and more pinkish than that of adults.

Basileuterus rufifrons dugesi. Rufous-capped Warbler. 7 ♂, 4 ♀, July 15, 16, 19, 22, 23, 24, August 7. This species was very common in heavy streamside brush along the small watercourses traversing the oak-thorn scrub association.

Molothrus ater. Cowbird. 1 ♂, July 22. Only one individual was encountered, a recently fledged male which was being fed by a female Blue-gray Gnatcatcher (which see). The specimen undoubtedly pertains to the resident race *obscurus*.

Icterus wagleri wagleri. Wagler Oriole. 1 ♂, 3 ♀, July 20, August 6. Wagler Orioles were uncommon and restricted to the oak-thorn scrub. An adult male and female and a bob-tailed juvenal female collected by Mr. Lamb on August 6 "from the upper branches of a cat claw tree" were apparently a family group.

Tanagra musica elegantissima. Blue-hooded Euphonia. 5 ♂, 1 ♀, July 25, 26, 28. Blue-hooded Euphonias were not seen during the first twelve days of collecting. On July 25 three specimens were taken, and the species was subsequently noted several times. Individuals were seen in the oak-thorn scrub association where they were noted feeding on mistletoe berries. Comparison of a large series of *elegantissima* with the type series of *rileyi* indicates the validity of the latter race, which reaches its southern limits in northern Sinaloa. The Tzitzio specimens are referable to *elegantissima*.

Piranga flava hepatica. Hepatic Tanager. 9 ♂, 7 ♀, July 14, 15, 17, 19, 20, 21, 22, 27, 28. This species was very common in the pine-oak forest. On July 19 a female fed a large juvenile in a pine tree at camp. Both individuals were collected.

Carpodacus mexicanus. House Finch. 1 ♂, 2 ♀, July 19, 26, 28. House Finches were common about

farmyards and roadside trees and brush. Although seen often, they were usually so close to dwellings that they could not be collected. Two of the three specimens are immature. The sole adult is a female. This specimen is easily separable from *centralis* by virtue of its far smaller bill and wing, paler, less pronounced ventral streaking, and buffier ventral ground color. It differs from *coccineus* in smaller bill and slightly buffier ventral ground color. It agrees in all characters of size and color with a good series of typical *mexicanus*, to which race it is referred.

Sporophila torqueola torqueola. Collared Seedeater. 3 ♂, July 18, 19, 20. Seedeaters were uncommon inhabitants of interrupted grassland.

Volatinia jacarina. Blue-black Grassquit. 1 ♂, July 19. Grassquits were seen infrequently in open, grassy fields broken by scattered trees and scrub thickets. On July 30 a male was observed executing the peculiar courtship display of this species, giving short, buzzing notes and following each note by a perfectly vertical upward leap of perhaps two feet and a direct descent to the spot whence it took off. The single specimen, an adult male in worn plumage, is inseparable from similar material of *diluta* and *atronitens*. Until the confused relationships within this species are worked out (see Hellmayr, 1938:254, n. 1), subspecific determinations of Mexican specimens are meaningless.

Spinus notatus grisei. Black-headed Siskin. 6 ♂, 1 ♀, July 15, 19, 21, 24, August 4, 7. This siskin was common, occurring mainly in the pine-oak forest, but it was noted several times in the oaks of the oak-thorn scrub.

Spinus psaltria psaltria. Arkansas Goldfinch. 2 ♂, 2 ♀, July 17, 20, 24. These goldfinches were common in oak-thorn scrub.

Loxia curvirostra stricklandi. Red Crossbill. 1 ♂, 3 ♀, July 20, August 5. A mixed flock of adults and immatures was seen high in the pines on the ridge south of camp on July 20. Two immature females were collected. A single adult male was seen on July 29. The specimens taken in August are adult.

Pipilo fuscus fuscus. Brown Towhee. 2 ♂, 6 ♀, July 13, 19, 20, 29, August 4, 10. Brown Towhees were common in roadside scrub and farmyards. Six of the seven adults collected were in breeding condition.

Melospiza kieneri rubricatum. Rusty-crowned Sparrow. 4 ♂, 2 ♀, July 18, 19, 22, 27. Ground sparrows were found only in two fields grown to long grass and interrupted by extensive tangles of thorn scrub and scattered trees. They were never seen commonly, although three were collected on July 22. The wary nature of these birds made them difficult to hunt. On one occasion an individual about ten feet up in a tree answered imitated Pigmy Owl calls with a four-syllabled series of clear notes, given rather slowly. The bird answered steadily for over half an hour without exposing itself. When approached more closely, it moved about and was taken. The alarm note of this species is a sharp *tsit*, given repeatedly. In a previous paper (Davis, 1951:100-101) it was suggested that *Pipilo fuscus* and *P. aberti* might have closer affinities with the genus *Melospiza* than with *P. ocai* or *P. erythrophthalmus*. None of the calls given by *Melospiza kieneri* throw any further light on this problem as they do not resemble any of the calls of any *Pipilo*.

Aimophila ruficauda acuminata. Russet-tailed Sparrow. 1 ♂, July 28. Individuals or pairs of this species were noted several times in roadside thorn scrub thickets.

Aimophila rufescens pallida. Rusty Sparrow. 8 ♂, 2 ♀, July 15, 19, 20, 21, 23, August 8, 9. This species was common, frequenting dense thorn scrub thickets and heavy brush. The subspecific determination of this series is difficult. Griscom (1934:418) named *A. r. subvespera* from Chilpancingo, Guerrero, stating that this race was separable from *pallida* of Jalisco by virtue of having black in the rufous crown stripes and a well-marked median gray crown stripe. Lea and Edwards (1950:270) referred their specimen from Tacámbaro, Michoacán, to *subvespera* because of the black in the rufous crown stripes. Although no specimens from Jalisco and Guerrero were available, the following features were noted on an extensive series of males only, nearly all taken in spring and summer. A single male from Sonora (*mcleodii*) has a pale rufous crown with no black feathers and no indication of a median crown stripe. A male from Cosalá, Sinaloa, has a darker crown with a few black feathers laterally. Of 12 males from west-central Chihuahua, eight have some black crown feathers laterally, and seven have definite indications of a median crown stripe. Of 15 individuals from southern Sinaloa (1) and Nayarit (14), here referred to *pallida*, five have indications of a median crown stripe. Fourteen have some black crown feathers laterally, and in four there are many black feathers in the crown.

Crown color varies in this series, but all individuals have darker crowns than the specimen of *mcleodii* from Sonora.

Of six specimens from western Michoacán (Uruapan) two have no lateral black, four have a small amount, five have a definite median stripe, and the sixth an indication of one. Of the six adult males taken near Tzitzio, four have definite stripes, one has an indication of same, one has none. Five have a very small amount of lateral black, one has none. Of six *rufescens* from Puebla and Veracruz, all have very dark crowns, pronounced median stripes, and heavy black feathering laterally. In addition these specimens of *rufescens* are much more rufous dorsally than *mcleodii*, *pallida*, and *subvespera*, and they are smaller than *pallida* and Griscom's measurements of *subvespera*. Specimens of *mcleodii* were not measured. There appears to be a branching cline involved. From Sonora to Oaxaca there is a cline of increase in darkness of pileum, lateral black crown feathering, and tendency toward a median crown stripe. This cline culminates in the populations of Guerrero and Oaxaca (*subvespera*). Branching from this north-south cline, probably at the level of Jalisco, is an east-west cline running through Michoacán, México, Morelos, Puebla, and Veracruz, the populations of the last two states (*rufescens*) showing the greatest expression of crown darkness, lateral black, and median striping of any of the populations here considered. *Subvespera* and *rufescens* are differentiated by virtue of the smaller size and more rufous dorsum of the latter. The specimens taken near Tzitzio are nearest *pallida* of Nayarit. Three of the eight adults of both sexes are noticeably rufous dorsally, thus varying toward *rufescens*, but all are too large for that race. Griscom (*loc. cit.*) called attention to the intermediacy of *pallida* between *mcleodii* and *subvespera*. Although I have not seen specimens of *pallida* from Jalisco, the similarity of the series from Tzitzio and Nayarit indicates that Jaliscan material would also be similar. If this is so, the clinal change from Sonora to Guerrero would appear to be gradual. I am reluctant to synonymize *subvespera* until adequate Jaliscan and Guerreran material has been examined. If the nature of the cline is gradual, as indicated, it would seem proper to recognize *mcleodii*, *pallida* (which has priority over *subvespera* even though named from an intermediate point on the cline), and the small, dark *rufescens* of eastern México. *A. r. antonensis* van Rossem is not considered here.

Aimophila ruficeps. Rufous-crowned Sparrow. 1 ♂, August 4. This sparrow was not seen in 1951. The single specimen, about half way through the postjuvinal molt, was taken from a low oak by Mr. Lamb. The fresh plumage of the dorsum is a rich, dark fuscous and the individual probably belongs to the race *fusca*.

Spizella passerina mexicana. Chipping Sparrow. 5 ♂, 2 ♀, July 13, 17, 20, 26, August 4. This species was very common in the pine-oak forest and were also noted frequently in the oaks of the oak-thorn scrub association.

The foregoing list gives some impression of the varied nature of the avifauna in the Tzitzio region. Blake and Hanson (1942) reported on a collection of birds made along a transect in the Tancítaro region of western Michoacán. This transect extended 37 miles and was limited to the south by the Río Tepalcatepec, 500 feet, and to the north by the summit of the Cerro de Tancítaro, 11,800 feet. Collecting was carried out in the months of June, July, and August. The authors list 16 species which were characteristic of the Arid Tropical Zone, lying between 500 and 3000 feet. Of these, four were collected three miles north of Tzitzio: *Piaya cayana mexicana*, *Momotus mexicanus mexicanus*, *Tyrannus crassirostris crassirostris*, and *Aimophila ruficauda acuminata*. In addition, *Coragyps atratus*, also limited to the Arid Tropical Zone in the Tancítaro region, was a common species three miles north of Tzitzio. Also collected near Tzitzio was *Myioborus miniatus miniatus*, which was an excellent indicator of the Humid Upper Tropical Zone on Cerro de Tancítaro. There has obviously been a much greater compression and interdigitation of associational vegetation types in the Tzitzio region. This area is apparently located at a point on the southern slope of the central Mexican plateau at which the pine-oak forest gives way rapidly to the thorn scrub vegetation of lower elevations. This rapid natural transition has been enhanced by human activities, since clearing of the original pine-oak forest has created the opportunity for an extensive upward invasion of thorn scrub. The effect on the avifauna has been marked. The original inhabitants

of the pine-oak forest are able to maintain themselves as breeding species in the extensive forest remnants, and they have been joined by a number of species which have followed their habitat as it spread to higher elevations.

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LITERATURE CITED

- Blake, E. R., and Hanson, H. C.
1942. Notes on a collection of birds from Michoacán, Mexico. Zool. Ser., Field Mus. Nat. Hist., 22:513-551.
- Davis, J.
1951. Distribution and variation of the brown towhees. Univ. Calif. Publ. Zoöl., 52:iv+1-120.
- Griscom, L.
1934. The ornithology of Guerrero, Mexico. Bull. Mus. Comp. Zoöl., 75:367-422.
- Hellmayr, C. E.
1938. Catalogue of birds of the Americas. Field Mus. Nat. Hist., Zool. Ser., 13, part 11:vi+1-662.
- Lea, R. B., and Edwards, E. P.
1950. Notes on birds of the Lake Pátzcuaro region, Michoacán, Mexico. Condor, 52:260-271.
- Moore, R. T.
1946. A new woodpecker from Mexico. Proc. Biol. Soc. Wash., 59:103-106.
- van Rossem, A. J.
1930. The Sonora races of *Camptostoma* and *Platypsaris*. Proc. Biol. Soc. Wash., 43:129-132.
1934. Critical notes on Middle American birds. Bull. Mus. Comp. Zoöl., 77:387-490.
- Moore Laboratory of Zoology, Occidental College, Los Angeles, California, May 6, 1952.*