

THE AVIFAUNA OF THE SIERRA DEL CARMEN OF COAHUILA, MEXICO

By ALDEN H. MILLER

In the desert of northern Coahuila, México, lies a rugged mountain system collectively known as the Sierra del Carmen. The high northern part of this sierra is about 30 miles in extent along a north-northwest axis and it supports conifer and pine-oak vegetation that is well isolated from other such ecologic formations of significant areal extent. The Sierra consists principally of an elevated limestone plateau, deeply dissected, and with steep escarpments, especially to the west. The top of the plateau in most places is about 8000 feet altitude. The northern end of the Sierra is less than 50 miles southeast of the higher parts of the Chisos Mountains in the Big Bend National Park of Texas. The two mountain areas are part of the same system of uplifts, although of course they are separated by the Rio Grande Valley and are composed of different types of rock.

The upper levels of the Sierra del Carmen have seldom been penetrated by naturalists and no extensive investigation of the bird life of the area has previously been undertaken. The birds of the lower Chisos Mountains have been well studied (Van Tyne and Sutton, 1937) and considerable data are available on the birds of the mountains of extreme southern Coahuila at the northern end of the Sierra Madre Oriental (Burleigh and Lowery, 1942). In the summer of 1936 Ernest G. Marsh, Jr., botanist, was commissioned by the United States National Park Service to make a biological survey of the Sierra del Carmen. Incidental to his general objectives, observations on birds were made and forty-four specimens were deposited in the United States National Museum. Through the courtesy of Herbert Friedmann and Victor H. Cahalane, permission has been granted to report specimens taken by Marsh and to draw on his notes related to them. All Marsh's specific localities, unless otherwise mentioned, lie along the northwest edge of the Sierra within a five-mile radius of the high northern point known as El Centinela. A few of Marsh's records were reported shortly after his trip (Marsh and Stevenson, 1938).

The Sierra del Carmen was visited by A. Starker Leopold, Ward C. Russell and myself in April of 1953 through support by the Associates in Tropical Biogeography of the University of California. Our purpose was to study game populations as part of a broad investigation of this subject in México by Leopold and to determine the extent and relationships of the avifauna of the area. Penetration of the upper levels of the Sierra was possible through the extreme helpfulness of Ramón D. Bosquez whose lumbering interests embrace a large part of the mountains. Many courtesies were extended our party, and it is a pleasure to record the aid received also from Ramón D. Bosquez, Jr., Alejandro López, Eduardo López, and Arturo Flores. The Dirección General Forestal y de Caza kindly granted permission to conduct scientific work in México, and C. H. Muller gave helpful advice with respect to the flora.

The Sierra was reached by road running west from Villa Acuña and crossing the Serranías de Burros. We passed through Noria and thence southwest to Piedra Blanca (see Amer. Geog. Soc. Map N.H-13) at the east base of the principal highlands. From here we worked up into the mountains on a road developed for timber cutting. We have found no maps that adequately record the details of these mountains, the elevations, or indeed their general outlines; in fact such maps as exist show very poor agreement. Our first camp, from April 1 to 20, was at 7000 feet elevation, an estimated 8 miles southwest of Piedra Blanca, near the head of Carboneras Canyon and the main divide of the mountain system. Carboneras Canyon drains northeast and is joined from the west by

another northeast-flowing tributary, Corte Madera Canyon, at about the 6000-foot level to form Botellas Canyon. This in turn joins at about 5000 feet Boquillas Canyon, coming from the west, and the latter opens out onto the desert piedmont at 4700 feet. The junction of Botellas and Boquillas canyons is the site of the old Carmen Mountain Hunting Club, which was our base of operations from April 20 to 28 and was estimated to be 5 miles west of Piedra Blanca. From the higher camp frequent trips were made to the tops of the plateau and especially to the head of Corte Madera Canyon. Leopold went to the high point in this vicinity, Loomis Peak, and recorded its elevation as 8800 feet. From the lower camp we worked down into the desert areas as low as 4600 feet.



Fig. 1. Crest of Sierra del Carmen viewed from desert border at 4800 feet in Boquillas Canyon.

PLANT BELTS

For purposes of analyzing bird distribution, major vegetation belts may be outlined, largely in relation to altitude, and as manifested in the vicinities of our camps:

1. Desert Scrub. About the base of the mountains this formation prevails in which species of *Acacia*, *Larrea*, *Prosopis*, *Opuntia*, *Yucca*, and *Fouquieria* are dominant or common. Desert scrub extends over the piedmont area and up the washes to the mouths of the canyons (fig. 1). In Boquillas Canyon it terminates rather abruptly in the canyon bottom at 4800 feet but some elements of it range higher on heavily insolated ridges.

2. Oak or Encinal. From 4800 feet to 6000 feet live and deciduous oaks prevail (fig. 2) forming the "montane low forest" of Muller (1947). Piñons and junipers occur in this belt on the steeper, warmer slopes, but they nowhere form an extent of woodland significant as a separate kind of habitat for birds. In canyon bottoms, walnuts, elms, madrones, and basswood are present with the oaks.

3. Pine-oak. From 6000 feet to the top of the range this belt occurs. A ponderosa-type pine (*Pinus arizonica*) and a white pine (*Pinus ayacahuite*) are intermixed with oaks (fig. 3). The conifers increase in numbers upward, but even at 8000 feet oaks are still prominent on the plateaus and south exposures. Some junipers and piñons grow on cliff faces or on poor soil in the lower part of this belt. At 7000 feet the oaks often form a dense shinnery. We found, on the eastern slopes at least, no development of chaparral

over large enough areas to support a chaparral avifauna, although patches of low growth (*Ceanothus* and *Garrya*) that might be so classed occurred, locally or marginally to the woods, and afforded important habitat for a few species.

4. Conifer. In some of the high valleys and slopes from 7500 to 8800 feet, shading, local climate and soil conditions permit development of Douglas fir (*Pseudotsuga taxifolia*) and pines to the exclusion of oaks (fig. 4). In some parts of upper Corte Madera Canyon, Douglas fir occurs in nearly pure stands (fig. 5). Aspens and true firs (*Abies*) are present also as rare elements in the conifer forest. In canyons in the pine-oak and conifer belts, madrones, basswood, *Prunus*, and hawthorne are common.



Fig. 2. Encinal in Boquillas Canyon at 5000 feet.

INSULAR CHARACTERISTICS

The pine-oak and conifer belts of the Sierra del Carmen are large enough to afford adequate habitat for coniferous forest birds. This habitat is absent or is not sufficiently extensive to support a typical conifer-dependent avifauna in any nearby areas such as the Chisos Mountains (Van Tyne and Sutton, 1937). In fact no comparable habitat is present to the north for 230 miles until the Guadalupe Mountains of the Texas-New Mexico border are reached, although the Davis Mountains 150 miles north support an impoverished and limited conifer association (Popper, 1951). Similarly it is over 200 miles to the nearest adequate conifer belts to the west in the Sierra Madre Occidental of Chihuahua. There are no high mountains with high-zone conifers to the east. And to the south and southeast the Sierra Madre Oriental is 200 miles distant with its humid montane forests. The intervening broken ranges in this direction are unknown ornithologically. As viewed from a distance most of them do not seem to support significant areas of pine-oak habitat. However, the Sierra de Madera lying approximately 100 miles south is reported by Muller (1947:55, fig. 1) to have a good development of conifers. Even though this range may have a conifer-dependent avifauna, the isolation of the Sierra del Carmen is still very substantial. It is appropriate, therefore, to suggest the

similarity of its isolation to that of a true island such as Guadalupe off the coast of Baja California. Dispersal of conifer-belt birds to and from the Sierra del Carmen, although not as difficult as to well separated islands, is nevertheless a formidable matter to accomplish across the great deserts of Texas, Chihuahua, and Coahuila.

The birds of the upper levels of the Sierra del Carmen reflect insularity in two important ways. (1) The avifauna is unbalanced in that it lacks many conifer-zone species found in the Sierra Madre Occidental, Sierra Madre Oriental, and southern Rocky Mountains. (2) As a consequence of unbalance, species that are present show ecologic extension and unusual numerical relations. Notably lacking are breeding populations of Hairy Woodpeckers, Steller Jays, chickadees, Brown Creepers, bluebirds, Solitary Vireos, and Audubon Warblers. It is always difficult to prove absence, but even if we missed occasional pairs of these types of birds, it seems highly unlikely that continual hunting for them over a period of a month by three of us would have failed to reveal



Fig. 3. Pine-oak belt at 7000 feet in Carboneras Canyon.

substantial breeding populations if they existed. And such species as these, if they were present at all, should be established in good numbers, most of them as residents, or if not as spring arrivals by the period of our visit there. Other absentees, less confidently looked for, were the Arizona Woodpecker, Olivaceous and Coues flycatchers, Bridled Titmouse, and Grace and Red-faced warblers of the Sierra Madre Occidental. Also absent were the more definitely southern montane elements such as trogons, parrots, Striped Sparrow, Black-headed Siskin, and Brown-backed Solitaire, although unlike the earlier mentioned absentees these would be less likely to find appropriate habitat in the Sierra del Carmen. It should be noted, however, that the Sierra may be reached in late April or early May by certain migrant species of southern distribution, not thus far specified, as among the flycatchers and warblers, that would have been missed as a consequence of termination of our work at the end of April.

The absence of the first, most notable group listed poses a problem of the history of the high-level habitats of the Sierra. In the course of variable extension of pluvial and boreal climatic regions in the Pleistocene it must be supposed that the Sierra was periodically closer than now to other conifer areas or was actually connected with them. Why have the permanently resident birds of such habitats disappeared? Possibly the area of habitat has diminished at times to such a degree as to allow certain species to die out whereupon subsequently expanded tracts of conifers have not been occupied by reinvasion across the deserts. It is scarcely conceivable that the habitat is not presently adequate for them. In other words we can hardly regard such an island as strongly isolated for long periods of time. It is not like an oceanic island that was never connected to the mainland but rather like well set off coastal islands, such as the channel group off southern California, which have impoverished and unbalanced avifaunas (see Miller, 1951), perhaps for similar reasons.



Fig. 4. White pine and Douglas fir at 7500 feet in Corte Madera Canyon.

ECOLOGIC EXTENSIONS

When species are absent, related types may partly take their place in insular faunas as they are released from competition. There is extension or expansion of the ecologic spheres of the species present. Four fairly clear instances of this are seen in the Sierra del Carmen.

1. The pine and oak dependent woodpeckers of the genus *Dendrocopos*, namely *villosus* and *arizonae*, occur only casually, or in the latter instance not at all. A hybrid of *villosus* and *scalaris* indicates sporadic or limited occurrence of *villosus* (see Miller, 1955). In the absence of effective populations of the higher-zone members of *Dendrocopos*, *D. scalaris* of the desert scrub spreads upward into the pine-oak belt to unusual degree, to the 6800-foot level. Burleigh and Lowery (1940:109) specifically record it up to 6000 feet in the Guadalupe Mountains of western Texas and a similar situation

prevails seemingly in the Chisos Mountains, but in neither place is there an invasion of pine-oak habitat as contrasted with oak and mixed desert vegetation. In the Sierra del Carmen, *scalaris* is scarce, to be sure, in the middle of the pine-oak belt at 6800 feet and it has not invaded the more predominantly coniferous stands higher up in full ecologic replacement of *villosus*. It has taken over completely the habitat normal for *arizonae* in the oak and lower pine-oak belts.

2. Jays of two types were absent, namely *Cyanocitta stelleri* normally present in good developments of conifers, and *Aphelocoma coerulescens* normal in scrub growth such as afforded by areas of junipers and piñon. Compensating for these absences is *Aphelocoma ultramarina* that is extraordinarily abundant (p. 167) and which ranges from the lowest strings of oaks in canyons at 4700 feet up through the oaks and conifers



Fig. 5. Slope dominated by Douglas fir in Corte Madera Canyon; the skyline is approximately at 8000 feet elevation.

to the top of the range. In ecologic spread and numbers this species completely takes over the habitats normally divided among the three jays in such regions as southern Arizona. Indeed *Aphelocoma ultramarina* is so prevalent that one wonders if the other species could readily meet its competition in their own preoccupied niches should they disperse to the Sierra in small numbers.

3. The absence of chickadees in the conifers and of *Parus wollweberi* in the oaks is balanced by the remarkable zonal and ecologic range of *Parus atricristatus*. This titmouse extends from the desert levels, where at least in nearby areas it occupies mesquite, up through oak and pine-oak to 7500 feet. At the higher levels it has not fully taken over the chickadee habitat in that it stays out of the pure stands of conifers but in many areas of mixed oak and pine that the chickadees *Parus sclateri* and *Parus gambeli* would use, *atricristatus* is present.

4. The breeding warblers of the pine-oak and conifer belts consist of two species in the Sierra del Carmen, *Peucedramus taeniatus* and *Setophaga picta*. Along with these one would expect to find in the Sierra Madre Occidental *Dendroica graciae*, *Dendroica*

auduboni, and *Cardellina rubrifrons*, each, to be sure, operating in a slightly different sphere on the average and foraging in a slightly different way. Compensation for the absentees seems reflected in the unusually large numbers of *Peucedramus* and *Setophaga*, the contrast in numbers with what might be expected from prior experience in the Sierra Madre being particularly great in the former. Certainly *Peucedramus* seems to take over for *Dendroica graciae* and *Dendroica auduboni*. No counts were made to document this situation but the impression of unusual abundance was repeatedly gained in the field.

FAUNAL RELATIONS

The relations of an insular fauna are indicated by the proportion of types in it that appear to be derived from adjacent source faunas. Such derivation may reflect initial contribution to the island fauna, subsequent contributory gene flow, and similarity of the environment of source area and island. The following groups of forms reflect by their presence in the upper plant belts of the Sierra del Carmen affinities of that area with faunas and habitats in particular directions.

West	Lampornis clemenciae clemenciae
Cyrtonyx montezumae mearnsi	Colaptes cafer nanus
Caprimulgus vociferus arizonae	Aphelocoma ultramarina couchii
*Dendrocopos scalaris cactophilus	Piranga flava dextra
Psaltriparus melanotis lloydi	
Troglodytes brunneicollis cahooni	North-northwest
*Thryomanes bewickii eremophilus	Accipiter cooperii
Junco phaeonotus palliatus	Glaucidium gnoma californicum
	Phalaenoptilus nuttallii nuttallii
South and West	*Sayornis nigricans semiatra
*Otus asio suttoni	Empidonax difficilis hellmayri
Peucedramus taeniatus arizonae	* e Parus atricristatus dyseleptus
Eugenes fulgens fulgens	Sitta carolinensis nelsoni
Balanosphyra formicivora formicivora	Sitta pygmaea melanotis
Setophaga picta picta	e Vireo huttoni carolinae
	e Pipilo maculatus gaigei
South-southeast	* e Pipilo fuscus texanus
*Cathartes aura aura	e Aimophila ruficeps tenuirostris
*Meleagris gallopavo intermedia	
* Ranges through lowlands.	
e Forms essentially peculiar or endemic to the west Texas area immediately to the north.	

These listings show that 7 and possibly 12 forms relate to the west and could be influenced by dispersal from the Sierra Madre Occidental. On the other hand 6 and possibly 11 of the forms can be related to the Sierra Madre Oriental to the south, although 2 of the 6 are lowland forms extending to the uplands in the Sierra del Carmen from the east as well and probably should not be used to show special affinity with the Sierra Madre Oriental to the southeast. In view of the position of the Sierra del Carmen at the east edge of the plateau of northern México, more or less in line with the Sierra Madre Oriental, the fauna seems unexpectedly weighted in the direction of the Sierra Madre Occidental. This is probably a reflection of ecologic similarity, as the isolation for the strictly montane species across deserts to the west is even greater than to the south and southeast.

The lists also show an affinity to the north of considerable proportion, an affinity further strengthened by absentees from the south that might be expected (see p. 157). The 12 forms with northern affinity include 5 that are essentially endemic to the west Texas province, including the Carmen area, and thus center only locally to the north. We have found no races differentiated solely in the Sierra del Carmen. Balanced against the 12 northern forms are 9 (4 of the south-southeast group; 5 in the south and west

group) of southern affinity. Possibly some of the western group could be regarded as of southwestern origin. Thus the northern and southern elements are not far out of balance.

In summary, then, the avifauna shows, in consideration of spatial separation from source areas and general geographic location, a higher element of western derivation than would be expected and no conspicuously large southern element. The southern forms with few exceptions extend on north into the Chisos Mountains in any event. The avifauna of the Sierra Madre Oriental as a whole does not reach the Sierra del Carmen and there is in the upper parts of these mountains no distinctively eastern element as there is in the flora (basswood, elm and others). The dominant vegetation and the environment for birds is much like that to the north and west, favoring maintenance of transfers to this insular area from these directions. Despite evident isolation, either this has not been rigorous enough or the environmental peculiarities have not been forceful enough to result in differentiation of high-zone endemics in this one mountain range.

SPECIES LIST

Anas discors. Blue-winged Teal. Marsh took a male of the year at a tank in the western hills area on September 10.

Anas carolinensis. Green-winged Teal. On September 4 a male of the year was taken at the tank in the western hills; there was a large flock of ducks present here at the time according to Marsh.

Anas acuta. Pintail. A specimen was taken on September 10 at the same tank where the teal occurred.

Cathartes aura aura. Turkey Vulture. On April 17 a vulture was caught in a steel trap baited with a Mexican Jay. Significant is the fact that it was a female about ready to lay its first egg; the ovum, in the ovary, measured 25 mm. in diameter, and the bird was fat, weighing 1500 gm. Another bird circled repeatedly over the trapped female. Thus the specimen must represent the breeding population of the area. Its wing length is 485 mm. and the tail is 242 mm. There is of course overlap in size among the races of Turkey Vultures and the area here concerned may involve intergradation. However, the measurements of this one breeding individual fall clearly in the range of the race *aura* (see Friedmann, 1950:35, 45) and not in that of *teter*. Until more statistics are available on breeding birds of northern Coahuila, they must be considered *C. a. aura*, a race known heretofore in northeastern México only from southern Coahuila (Las Delicias; Amadon and Phillips, 1947:577) and the lower Rio Grande Valley.

Accipiter cooperii. Cooper Hawk. At 7500 feet in pine and Douglas fir timber a pair of these hawks was cackling and was responsive to Horned Owl imitations. Evidently there was a nest location somewhere nearby in the conifers, as the birds responded at this point on April 8, 10, and 14. At 5000 feet in the oak belt an adult female with yellow ova up to 4 mm. in diameter was taken on April 26; weight 513 gm. These clear evidences of breeding constitute the first report of summer residence of the species in Coahuila.

Accipiter striatus velox. Sharp-shinned Hawk. An adult male was taken on April 18, at 7000 feet; weight 98 gm. Its testes showed no enlargement and it may therefore have been a migrant. In any event its ventral coloration in no way suggests the race *suttoni* which breeds in the mountains of southern Nuevo León (see Storer, 1952). Marsh and Stevenson (1938:286) report a family of young on August 2 in Vivoras Canyon. The young male that Marsh took on that date in the pine and Douglas fir forest has well barred flank feathers and thus also is *velox*.

Buteo jamaicensis fuertesi. Red-tailed Hawk. An adult male was taken on April 14 at 7000 feet; testis 17 mm., weight 950 gm. The bird had a small rattlesnake in its throat. Red-tails also were seen occasionally at the base of the mountains. The specimen in hand is a well marked example of the race *fuertesi* which was named from Brewster County, Texas.

Circus cyaneus. Marsh Hawk. Seen in northward migratory flight across the desert east of the Sierra del Carmen on March 31 and on April 11 along the west face of Loomis Peak at 8800 feet.

Pandion haliaetus. Osprey. Seen on April 9 flying through the saddle at the head of Corte Madera Canyon, apparently in migration. The Osprey has not been listed heretofore for Coahuila.

Falco sparverius. Sparrow Hawk. Noted occasionally in the lower canyon areas at 5000 feet in the period from April 20 to 28.

Callipepla squamata pallida. Scaled Quail. These quail were sparsely distributed in the desert border at the base of the mountains in open mesquite, catclaw, and yucca at 4700 feet. The two males taken had testes 10 and 11 mm. long on April 24 and 26 and were giving the single *cow* call characteristic of unmated cocks. There was no water source in the area in the dry year of 1953. One of the birds had greens and mahonia berries in the crop. Quail breast feathers were noted in the lining of a nest of a Cactus Wren in this area. The specimens show no approach to the race *castanogastris* of eastern Coahuila nor to *C. s. squamata* of southern Coahuila. Weights were 186 and 172 gm., respectively.

Cyrtonyx montezumae mearnsi. Montezuma Quail. An area of open pine-oak and grass centering on a temporarily dry ciénega in the head of Corte Madera Canyon at 7500 feet was the principal location for these quail in the parts of the mountains we traversed. In all at least five different pairs were flushed here between April 7 and 17. Winter coveys evidently were entirely dispersed and the ova in three females taken ranged up to 3 mm. in diameter on April 14 and 17, indicating the approach of nesting. There was abundant sign of quail digging in the turf in the ciénega area and crops contained bulbs of a sedge, fleshy roots, acorns, and dipterous pupae. On April 27 at 4700 feet in a dry wash at the base of the mountains a group of two males and a female, travelling together, was encountered; all were sexually active. There was a scrubby stand of oak near the wash, the lowest oaks in an otherwise desert area of mesquite and catclaw. The female of this trio also had ova up to 3 mm. in diameter. Marsh also found this species as far down as the mesquite belt, and he took a male on September 7 at Jardín del Sur. It was an adult just beginning the annual molt.

The series of specimens taken shows a wide variation in color but as a group it conforms satisfactorily with other material of the race *mearnsi*. Friedmann, Griscom and Moore (1950:79) indicate that both *C. m. mearnsi* and *C. m. montezumae* occur in northern Coahuila. The reported occurrence of the latter is possibly an error or was based on individual dark variants such as occur in the series now at hand. Weights of our specimens were: ♂ ♂, 170, 171, 173, 186, 201, 205 gm.; ♀ ♀, 172, 175, 180, 184 gm.

Meleagris gallopavo intermedia. Turkey. The population of turkeys in the mountains was sparse and apparently did not range above 7500 feet into the highest pine-oak and Douglas fir areas. Such high levels are occupied by turkeys of the races *merriami* and *mexicana* in the mountains to the west. The race *intermedia*, to which the specimens of the Sierra del Carmen clearly belong, is a lowland form of the Atlantic plain and only peripherally here works up from the Sabinas drainage into the middle part of the pine-oak belt. Turkey tracks were noted at 7500 feet in Corte Madera Canyon. Otherwise turkeys were detected only in the vicinity of our camp in Carboneras Canyon where they were within easy cruising radius of a few pools of water in the canyon bottom. A roost was situated in large pines on the end of a spur ridge 300 feet above this water. On April 2 a gobbler from this roost was attracted by imitated hen calls at 6:30 a.m. and came in to my location, running with a hen. The latter was taken and proved to be nearly ready to lay; no eggs had been deposited but the largest ovum was 20 mm. in diameter. The gobbler from this roost, and occasionally one other, were heard at dawn up to April 5, when all gobbling ceased. On April 7 as many as five separate turkeys were seen by members of our party in the oak borders in the vicinity of the water holes. On April 12 Leopold saw a gobbler come into the roosting grove at 7:10 p.m. Ten minutes later another bird flew in nearby and was taken. It was a hen, not fat as the first one was, and not yet laying, although the largest ovum was 10 mm. in diameter. The crop contents consisted of clover, *Desmodium*, grasses, and forbs. Weights of the two hens were 9½ and 8 pounds, respectively.

Totanus flavipes. Lesser Yellow-legs. Marsh took a fall migrant at the tank in the western hills on September 4. This species seems not to have been recorded before in Coahuila.

Actitis macularia. Spotted Sandpiper. An immature in fall migration was taken on September 4 at the tank in the western hills.

Erolia melanotos. Pectoral Sandpiper. A specimen taken on September 4 at the tank in the western hills is apparently the first record of the species in Coahuila.

Columba fasciata fasciata. Band-tailed Pigeon. This species was unaccountably rare in 1953. Single individuals were seen flying over an oak-covered slope on April 13 and 16, and two were flushed

from the ground here on April 9. Marsh found pigeons to be common in August at the north end of the mountains. A specimen was taken on August 7 in Vivoras Canyon.

Zenaidura macroura marginella. Mourning Dove. This dove occurred commonly in the desert border and lower canyons at the base of the mountains, but it occasionally ranged up to 6000 feet in openings in the pine-oak belt. Two females were taken at the mill at this elevation in Carboneras Canyon on April 16. One had enlarged ova up to 13 mm. in diameter; the other was not thus approaching breeding; weights were 119 and 96 gm., respectively.

Zenaida asiatica asiatica. White-winged Dove. A single male was taken on April 23 at the mouth of Boquillas Canyon at about 4900 feet. It was singing and the testes measured 12 mm.; weight 158 gm., fat. No others were seen here in the next five days and it is not certain that there is an established breeding population at this point.

The specimen has a wing length of 161 mm. which is in the segment of overlap between values for the races *Z. a. mearnsi* and *Z. a. asiatica*. However, its coloration is distinctly dark, as in the latter, and I am inclined to think that color is a fairly satisfactory basis for separation of northern populations of these races even though it may not serve in southern México (Pitelka, 1948:121-122). The Carmen mountain bird, whether a straggler or representative of a normal breeding population, therefore seems related to *Z. a. asiatica* of the lower Rio Grande Valley to the east.

Coccyzus erythrophthalmus. Black-billed Cuckoo. A migrant was taken in the maples and basswood near a water hole in the bottom of Boquillas Canyon at 5200 feet, on April 22. This apparently is the first record of the species in Coahuila.

Geococcyx californianus. Road-runner. On April 22, following a light rain, several of these birds were calling from the hills at the canyon mouth at 4800 feet. The notes were not the cooing sequence of the male but a series of *cow* notes known to be given by females. One of these calling birds was stalked and taken and proved to be a female with the largest ovum 4 mm.; weight 250 gm. A female taken on April 20 had an ovum of 15 mm. and weighed 274 gm.

Tyto alba. Barn Owl. Heard at 5000 feet in the oak belt on the night of April 25.

Otus flammeolus flammeolus. Flammulated Owl. This species proved to be common in the pines and oaks at 7000 feet in Carboneras Canyon. Seven were taken here, chiefly by stimulating aggressive response with imitated calls. All but one of the birds was in breeding condition. On April 3, after two had already been taken in the area, four males could be heard calling at once. On April 1 and 12, males were taken at our camp grounds; on the last date a higher pitched call of a female also was heard here. On April 17 a male was again heard at the camp, possibly a replacement on the same territory where the others had been stationed. Birds were found in oaks and white and ponderosa pines from 3 feet up to 50 feet above ground. At 5000 feet in Boquillas Canyon the species was heard in a scattering of pines among oaks above camp on April 22 and 23. The stomach contents of these owls consisted largely of moths and beetles. A stomachful of moths would be collected in the dusk period before full darkness fell.

Heretofore this species has not been reported from northeastern México, although it has been taken in the Chisos Mountains of Texas (Van Tyne and Sutton, 1937:36-37). The series from the Carmen Mountains average a little darker above, redder, and more heavily striped below than do series from the United States; a male from the Río Gavilán in Chihuahua is similar. However, less than half of these northern Mexican birds are separable from the material north of the border. It is important to stress the extreme individual variability to be seen even in a small series of this species.

Data on gonads, weights, and dates, respectively, are: ♂♂, 6 mm., 53.7 gm. (April 1); 6, 53.9 (2); 6, 57.0 (3); small, 48.2 (11); 5, 49.7 (12); 6, 53.1 (14). ♀, largest ovum 2 mm., 63.0 gm. (April 8).

Otus asio suttoni. Screech Owl. These owls were common in groves of oaks both at 7000 feet and 5000 feet. At the higher camp their territories often overlapped with those of Flammulated Owls in the pine-oak formation. Their calls were both the accelerated trill common to western races and a slow even cadence of three to six notes somewhat suggestive of *Otus trichopsis*; a single individual would at times switch from one to the other. At our higher camp, the birds taken in early April were about to breed and those at 5000 feet in late April had already laid. Food noted consisted of moths and June bugs. A bird taken by Marsh at Jardin del Sur on August 28 is an adult in annual molt.

Data on reproduction, weights, and dates, respectively, are: ♂♂, testis 8 mm., 131 gm., heavy fat (April 2); 8, 110 (3); 6, 99 (3); 10, 92 (21); 8, 98 (24). ♀♀, largest ovum 3 mm., 135 gm. (April 4); 3 empty follicles and brood patch, 154 (23); empty follicles and brood patch, 150 (23).

In a revision of the desert Screech Owls (Miller and Miller, 1951:169) it was indicated that the influence of *suttoni* extends north to west Texas, although birds of that area are best referred to the race *cineraceus*. The present series from the Sierra del Carmen matches well in all respects the *suttoni* from Chihuahua previously reported and a recently taken example of that race from 12 miles north-east of Durango, Durango, México. This race has not heretofore been recorded from Coahuila. The race *cineraceus* was reported from the Sierra del Carmen by Marsh and Stevenson (1938:286), but Marsh's bird is found to agree with our series of *suttoni*. With measurements of 11 *suttoni* now at hand, it is even more clear than formerly that *suttoni* is not an especially large form. Both with respect to wing length and weight it corresponds closely with *cineraceus*. Wing lengths are: ♂ ♂, 146 mm., 150, 153, 155, 155, 159; ♀ ♀, 155 mm., 157, 162, 163, 173 (for *cineraceus*, compare Miller and Miller, fig. 1, table).

Bubo virginianus pallescens. Horned Owl. Heard occasionally, chiefly at the lower camp, where a pair was stationed in the steep rocky canyon wall. A male taken here on April 22 weighed 875 gm.; testis 10 mm.

Glaucidium gnoma californicum. Pigmy Owl. We encountered at least five different individuals, chiefly in the pine-oak at 7000 feet, but one at least in oaks and piñons at 5000 feet in Boquillas Canyon. Usually the birds were heard in the morning from dawn until 10 a.m., but once on April 24 one called in bright moonlight after all daylight was gone. The Pigmy Owls were mobbed by several species, among them Acorn Woodpeckers, Broad-tailed Hummingbirds, and Painted Redstarts. One owl had a *Sceloporus* in its stomach.

These resident Pigmy Owls called with rapid cadence, sometimes giving the whistles in couplets, as do the owls of the race *G. g. gnoma* of Chihuahua, and unlike the more northern and western races. However, the characters of the three specimens taken are clearly those of the large *californicum* (includes *pinicola*, now regarded as a synonym) and not *G. g. gnoma*. The best distinguishing characters of *G. g. gnoma* and *californicum* are tail length and, less satisfactorily, wing length (see van Rossem, 1936:132); I cannot substantiate color distinction between *gnoma* and *pinicola*. The occurrence in the Carmen area represents the first record of the species in Coahuila. Data on specimens taken are: April 3, testis 6 mm., wing 93.5, tail 65.0, 55.6 gm.; April 12, testis 7 mm., wing 90.7, tail 64.7, 57.5 gm.; April 13, testis 8 mm., wing 93.9, tail 63.6, 56.3 gm.

Micrathene whitneyi. Elf Owl. This species was heard at very close range in oaks at 5000 feet in Boquillas Canyon on April 24, but no specimen was obtained. The Elf Owl has not heretofore been listed for Coahuila, although it is present in the Chisos Mountains of Texas.

Phalaenoptilus nuttallii nuttallii. Poor-will. Common along the rocky canyon walls at 5000 feet but not noted higher up. A female taken on April 25 was induced to call shortly before Poor-wills voluntarily started activity by giving an imitation. This was at a station where a bird had been heard on previous evenings. This bird was about to start laying, the largest, yellow ovum being 3 mm.; weight 49.6 gm.

Caprimulgus vociferus arizonae. Whip-poor-will. This species was extremely noisy about our camp at 7000 feet. The birds apparently ranged considerable distances, but the shaded oak and pine-filled canyon bottom back of camp always had a calling bird stationed in it. Calling was especially noticeable at dusk and dawn but in moonlit periods it would occur in the middle of the night. Dawn calling was correlated with temperature. On mornings when sunrise readings of 3 and 4° C. were recorded, little or no calling was heard, but when temperatures were 8 to 10° C., Whip-poor-wills called regularly. Birds were heard at a distance in several parts of upper Carboneras Canyon and at one place in thick oaks in Boquillas Canyon at 5000 feet. At this elevation they were apparently at the lower limit of their range.

The pair at the upper camp on April 4 called in responsive fashion, the male giving the guttural whip-poor-will call and the female a single *quip*, in nearly perfect unison with his terminal note. On this evening the female was taken; it was a bird with ova up to 2 mm. in diameter; weight, 54.7 gm. The male was taken on April 5 in the evening; testis 9 mm., weight 50.1 gm. Before sunrise another calling bird had taken over this area. On April 9 this bird was shot but not retrieved. Again, by morning another individual with a recognizably different voice was calling in the area.

The specimens agree in color, long bristles, and wing length (♂ 162 mm.) with examples of *C. v. arizonae* from Arizona and Chihuahua. This race has not been recorded before in Coahuila.

Aëronautes saxatalis saxatalis. White-throated Swift. Seen frequently especially about cliffs but

also at other times low over wooded slopes, from 4800 feet up to the crests of the mountains. Two females were taken, on April 9 and 21, neither of which was laying. Nevertheless some of the population probably would have bred in the area; copulation was observed on April 23. The two specimens, with wing lengths of 145 and 140 mm., are best referred to *A. s. saxatilis*, although the first approaches the dimensions of *sclateri*.

Lampornis clemenciae clemenciae. Blue-throated Hummingbird. Canyon bottoms were clearly the habitat of this species, whether at 7500 feet among the rocky slopes, oaks, and white pines of Corte Madera Canyon or at 5000 feet in the madrone, maples, elms, and basswoods of Boquillas Canyon. On April 8 and 16 males were taken at the border of a talus slope where they were feeding at flowering *Ribes* bushes among the rocks. In Boquillas Canyon, they were several times heard calling in flight but were noted especially about an agave with heavy, thick set flower clusters on an eight-foot stalk. This grew at the upper edge of the rock wall of the canyon, level with the crowns of the madrone trees growing in the bottom. Here on April 28, at least three different males and one female visited in the course of one-half hour. The testes of the birds taken did not indicate that nesting was underway; they were $2\frac{1}{2}$ to 3 mm. in length.

On the basis of the more metallic, less gray rump compared with *bessophilus* of Arizona and Chihuahua (Van Tyne, 1953), these specimens are referable to *L. c. clemenciae*, the race recorded from the Chisos Mountains but not apparently heretofore from Coahuila (see Friedmann, Griscom, and Moore, 1950:175). Weights of specimens were: ♂♂, 8.2 gm., 8.1, 7.7; ♀, 6.9.

Eugenes fulgens fulgens. Rivoli Hummingbird. This hummer was detected only once, on Loomis Peak, 8800 feet, on April 11, where a male was taken; testis 2 mm., weight 7.9 gm. This bird is indistinguishable from specimens of the species taken in Arizona. I cannot at present satisfactorily separate *E. f. aureoviridis* van Rossem (1939:7) from *E. f. fulgens*, and apparently Peters (1945:91) and Friedmann, Griscom, and Moore (1950:177) had similar difficulties. The species has not heretofore been recorded in Coahuila.

Archilochus alexandri. Black-chinned Hummingbird. Common in the desert area at the base of the mountains, where in the canyon mouths, in open mesquite and catclaw, males were displaying. Specimens, with testes measuring 2 mm. were taken here on April 23 and 27. Marsh also took this hummer on July 25, near Piedra Blanca (Conejo).

Selasphorus platycercus platycercus. Broad-tailed Hummingbird. The males of this species were heard frequently in flight, chiefly along canyons, from 5000 to 7500 feet. Displaying, territorial males were established only in canyons. We observed them chiefly in Corte Madera Canyon along the base of a rock slide, the currant bushes there supplying food to both this species and the Blue-throated Hummingbird. About four males had stations on bare oak or white pine limbs above the slide in a section 300 yards in length. As birds were collected, other males appeared on the same perches to take their places, sometimes even within a few minutes. A small series of water holes was located here in the creek bottom. One female, not yet laying, was taken here and another female which could not be saved as a specimen was taken in flat, open pine-oak woods 400 yards from any canyon, at 8000 feet, on April 15. This last female was gathering cobwebs and had at least one yellow ovum in the ovary; no males were seen in the vicinity.

Data on gonads, weights and dates, respectively, are: ♂♂; 3 mm., 2.8 gm. (April 4); 2, 3.2 (9); 1, 3.1 (9); —, 3.4 (9); 2, 3.4 (10); 2, 3.2 (10); 2, 3.6 (12). ♀♀, largest ovum $\frac{1}{2}$ mm., 3.7 gm. (April 16); —, 3.7 (17); 1, 3.7 (19).

Megaceryle alcyon. Belted Kingfisher. On April 1 a Belted Kingfisher was present at the small mill pond in Carboneras Canyon at 6000 feet.

Chloroceryle americana hachisuki. Little Green Kingfisher. Marsh took a specimen on July 24 at Tanque de los Melones on La Bavia Ranch east of Fresno Mesa, which is in the southern part of the Sierra del Carmen. The bird is typical of the northwest race of the species originally described as *C. a. leucosticta*. It is noted that two of three specimens from Brownsville, Texas, in the collection of the Museum of Vertebrate Zoology are no different and it seems therefore somewhat doubtful to extend the range of *C. a. septentrionalis* north on the Gulf coast to the mouth of the Río Grande.

Colaptes cafer nanus. Red-shafted Flicker. Common throughout the pine-oak and oak belts from 7500 feet in Corte Madera Canyon down to the lowest oaks and dead cottonwoods in Boquillas Canyon at 4900 feet. Spring calling was heard throughout the month of April and on the 7th at 7000 feet in Carboneras Canyon one was excavating a nest cavity in a dead snag in the creek bottom.

Flickers responded readily to Horned Owl imitations, coming in excitedly but cautiously to the sound source.

In color and wing length the birds taken accord with the characters claimed for this race, although in our fairly large sample some birds are larger than any reported by Griscom (1934) and Van Tyne and Sutton (1937:46); yet they are with one exception shorter winged than the normal range of *C. c. collaris* which is 160 mm. or greater for males. Wings of the Carmen birds are: ♂♂ 146, 149, 150, 152, 155, 158, 161; ♀♀ 147, 151, 155, 156, 159. The largest birds in this series were no less advanced toward breeding than others of the population. None had laid or was incubating but most birds were courting and apparently were preparing nests. A specimen from the Sierra de Jardin taken on August 7 is in the middle of a complete molt.

Data on gonads, weights, and dates, respectively, from specimens, all taken from or near the 7000-foot level are: ♂♂, 11 mm., 122 gm. (April 3); 11, 123 (5); 10, 118 (6); 8, 113 (11); 10, 124 (15); 4, 105 (16); 11, 121 (17). ♀♀, largest ovum 2 mm., 110 gm. (April 6); 1, 114 (8); 2, 126 (16); 2, 108 (16); 3, 119 (18).

Balanosphyra formicivora formicivora. Acorn Woodpecker. An abundant and conspicuous species throughout the oak and pine-oak belts, from 5000 to 8000 feet. Females taken on April 15 and 18 were nearly ready to begin laying. Males showed a wide range of gonad development. Marsh took a bird in juvenal plumage at Jardin del Sur on August 21.

Data on gonads, weights and dates, respectively, are: ♂♂, 7 mm., 67.1 gm. (April 1); 11, 75 (3); 7, 67.2 (4); 4, 70.1 (5); 3, 56 (6); 5, 63.3 (9); 7, 63.2 (14); 10, 64.0 (16); 8, 72.3 (20). ♀♀, largest ovum 1½ mm., 63.5 gm. (April 4); 4, 62.5 (15); 2, 65 (16); 4, 65.5 (18).

Sphyrapicus varius. Yellow-bellied Sapsucker. Two well defined races of this sapsucker, *S. v. varius* and *S. v. nuchalis*, were winter visitants or migrants in the mountains. The race *nuchalis* was indeed common. The species was found only at the upper levels in the pine-oak formation and usually in relatively dense clumps of trees in the canyon bottoms. None showed significant gonad enlargement, the greatest measurement being a testis of 2 mm. on April 9.

Specimens are as follows: *S. v. varius*, ♀, April 3, 42.7 gm., little fat; ♂, April 16, 38.4 gm., thin. *S. v. nuchalis*, o?, April 1, 47.5 gm., little fat; ♀, April 3, 53.2 gm., fat; ♀, April 5, 40.2 gm. no fat; ♂, April 7, 47 gm., fat; ♂, April 9, 46.5 gm.; ♀, April 10, 48.4 gm., little fat; ♀, April 11, 46.7 gm.

Dendrocopos villosus x *Dendrocopos scalaris*. Hybrid woodpecker. For a detailed description of this hybrid and its possible significance, see Miller (1955). The bird was taken in open live and deciduous oaks at 7000 feet on April 12. No Hairy Woodpeckers (*D. villosus*) could be found in the mountains, although they were searched for constantly.

Dendrocopos scalaris cactophilus. Ladder-backed Woodpecker. This woodpecker was found chiefly in the oaks and was common in the lower oak belt at 5000 feet. It ranged upward in the stands of pines and oaks of more heavily isolated parts of Carboneras Canyon to about 6800 feet, but it was scarce at this upper limit. The birds at the higher elevations had apparently not started incubation by April 11 but at 5000 feet the season was more advanced in some individuals at least. On April 22 a female was flushed from a nest cavity in Boquillas Canyon in which small young were calling. The cavity was in a 6-inch live oak in the canyon floor and was 5 feet above ground. A bird in juvenal plumage was taken on August 11 in the western hills area.

Our nine specimens are, as a group, dark backed and of large size normal for the race *cactophilus*. One female is light enough above for *symplectus* but its wing is 102 mm., which is long for that race. There is, therefore, a suggestion of intergradation, which is not unexpected since *symplectus* occurs in the lowlands in northeastern Coahuila and *cactophilus* in the Chisos Mountains north and west of the Sierra del Carmen.

Data on gonads, weights, and dates, respectively, are: ♂♂, 8 mm., 34.7 gm. (April 10); 7, 38 (20); 7, 37.5 (20); 8, 26.0 (20); 4, 33 (26). ♀♀, largest ovum 1 mm., 32.7 gm. (April 21); 3, 34.4 (21); brood patch, 30.9 (22).

Myiarchus cinerascens cinerascens. Ash-throated Flycatcher. Found only in the oak belt at 5000 feet, where it was common. A female taken here on April 21 was laying. Data on specimens are: ♂♂, April 21, testis 11 mm., weight 29.5 gm.; April 22, 13 mm., 29.3 gm.; April 23, 11 mm., 28.3 gm. ♀♀, April 21, laying, 34 gm.; April 21, largest ovum 2 mm., 24.5 gm.

Sayornis nigricans semiatra. Black Phoebe. Confined, as would be expected, to the vicinity of water sources in the larger canyons. One was seen near the mill pond at 6000 feet in Carboneras Canyon on April 1 and a pair was taken on April 28 at 5000 feet in lower Botellas Canyon; ♂, testis 6 mm., 17.8 gm.; ♀, ovum 1 mm., 15.3 gm. The two specimens have narrow dark shaft streaks on the under tail coverts, a feature shown little or not at all in *semiatra* of California. Otherwise the specimens agree with *semiatra* in color. The marking of the under tail coverts may indicate a beginning of a gradient in increased darkening of these feathers toward *S. n. nigricans* in southern Coahuila. Specimens from northern Chihuahua (Río Gavilán) are similar.

Sayornis saya saya. Say Phoebe. A female with an active brood patch was taken in the open lower part of Boquillas Canyon at 5000 feet on April 22; weight 21.0 gm. Marsh took a juvenile on September 2 at El Rincón.

Empidonax hammondi. Hammond Flycatcher. A common migrant from April 4 to 24, chiefly in stands of low oaks in the pine-oak belt but also occasionally in the desert scrub at the base of the mountains. No specimen taken had testes larger than 2 mm. in length. Males taken on April 4, 12, 13, 19, and 24 weighed 10.5, 10.0, 10.8, 11.6, and 12.3 (fat) gm., respectively.

Empidonax wrightii. Wright Flycatcher. This species was a common migrant from April 19 on and occurred chiefly in the lower oak belt and in the desert scrub. Only one was taken at 7000 feet. Males had testes no larger than 2 mm. and those taken on April 19, 22, 23, 24, and 25 weighed 12.5, 12.1, 13.0, 12.1 and 12.3 gm., respectively; indeterminate sex, April 23, 13.0 gm. None was conspicuously fat and it is perhaps significant that the weights ran consistently greater than in *hammondi* except when the latter was distinctly fat.

Empidonax difficilis hellmayri. Western Flycatcher. This species began to arrive on breeding territories in the canyons at 7000 feet on April 6. From April 12 to 17 it moved in in full force, occupying canyon bottoms grown to basswood, maple, Douglas fir, and oaks, from 6800 to 7500 feet. These flycatchers were then repeating a rhythmic *tee-sit* song performance, different although evidently homologous with certain notes of *E. d. difficilis* of the Pacific coast. Unlike the migrant species of the genus, these birds had testes well developed, although not all were yet at maximum size; none had any more than a trace of subcutaneous fat. No Western Flycatchers were detected in the lower canyons at 5000 feet.

The race *hellmayri* is topotypical in the Chisos Mountains (Brodkorb, 1949) and the series from the Sierra del Carmen apparently is similar to the original material of this race. One is impressed with the large size of this race and the bright green, rather than olive green, dorsum of most individuals, compared with *E. d. difficilis*. Also the breast and sides are greener and less yellow, but the belly is more yellow. *Hellmayri* has not been reported heretofore as a breeding bird in Coahuila. Data on gonads, weights, wing lengths, and dates, respectively, are: ♂ ♂, 3.5 mm., 14.5 gm., 72.6 mm. (April 6); 5, 14.0, 73.0 (12); 5, 12.4, 70.3 (15); 4, 12.2, 71.2 (16); 3, 13.2, 70.8 (16); 5, 12.8, 71.0 (17). ♀, ovum ½ mm., 11.0, 67.8 (17). The male taken on April 12 had an incompletely ossified skull, a persistent sign of immaturity from the previous spring when presumably it was hatched.

Pyrocephalus rubinus flammeus. Vermilion Flycatcher. The specimen reported by Marsh and Stevenson (1938:287) taken on July 24 at Santo Domingo, east of Fresno Mesa, has been reexamined. Its affinity with the northwest race of the species seems correct in terms of the characters outlined by van Rossem (1934:353).

Nuttallornis borealis. Olive-sided Flycatcher. Migrants of this species were passing through the desert at the base of the mountains in the last week of April. One was taken on April 24; testis 3 mm., weight 36.2 gm.

Tachycineta thalassina lepida. Violet-green Swallow. Definitely identified from April 12 on, both at the 7000- and 5000-foot levels. On April 24 in lower Boquillas Canyon a male was taken; the testes were enlarged (7 mm.) to such an extent as to suggest it would breed locally. The bird must be regarded as an intergrade of *lepida* and *T. t. thalassina* as there is considerable admixture of green with the purple of the rump. The wing length, 115.1, is not particularly great; it is usually over 117 mm. in *T. t. thalassina*.

Aphelocoma ultramarina couchii. Mexican Jay. This was the most abundant species of bird in the mountains. It ranged from the lowest patches of oaks in the canyon bottoms at 4700 feet up to 8800 feet at the highest point of the range. Although the greatest concentrations were in the

stands of oaks and pine-oak, the species was seen regularly in Douglas fir and white pine in upper Corte Madera Canyon and also in piñon scrub on steep slopes at the 5000-6000-foot levels. These latter habitats might be expected to be occupied by *Cyanocitta stelleri* and *Aphelocoma coerulescens*, respectively, both of which apparently are absent in this mountain range.

Mexican Jays, as is typical of the species, were at all times organized in social groups. We saw no isolated pairs. Individual groups operated in their own areas and by our counts consisted of four to eight individuals. Under the stimulus of a Horned Owl call as many as four different groups could be brought into one clump of trees, thus aggregating up to 30 individuals. On such an occasion on April 3, four groups came in from as many different directions and during the excitement appeared temporarily to lose their identity. On April 12 one members of a group was seen gathering sticks on the ground; two others were on the ground with it and a fourth was in the trees overhead. On the same day, elsewhere, courtship feeding was noted. We obtained no evidence that laying had occurred at the higher levels up to April 20; possibly birds at 5000 feet were more advanced. An adult undergoing a complete wing molt (primaries 8-10 still old) was taken on August 2 in Vivoras Canyon.

Data on gonads, weights, and dates, respectively, are: ♂ ♂, 7 mm., 107 (April 1); 10, 115 (1); 10, 108 (2); 12, 121 (3); 9, 105 (5); 12, 110 (13); 12, 106 (16); 10, 116 (21; at 5000 feet). ♀ ♀, largest ovum ½ mm., 102 gm. (April 1); 1, 107 (6); ¾, 108 (7); ½, 97 (8); 1, 101 (13); 1, 94 (13); 2, 100 (14); small, 94 (17).

Corvus corax sinuatus. Holarctic Raven. Ravens occasionally were seen in the pine-oak and cliff areas of the range. A female taken on April 9 at the head of Corte Madera Canyon, 7500 feet, had an ovum 3 mm. in diameter and would probably therefore have started laying soon. This bird has dimensions normal for the race *sinuatus*; wing length 420 mm., bill depth 24.7 mm., weight 875 gm.

Parus atricristatus dysleptus. Black-crested Titmouse. This titmouse, the only representative of the genus *Parus* in the Sierra del Carmen, ranges from the desert at the base of the mountains at 4800 feet up at least to 7500 feet. We did not see them in mesquite habitat but elsewhere in the Rio Grande Valley this species of titmouse occupies mesquite. In the Sierra del Carmen it was an abundant bird of the oaks and pine-oak. It seldom entered Douglas fir and white pine in Corte Madera Canyon where its presence seemed to center in the oaks that were interspersed. It was also seen frequently in alligator juniper. At 7000 feet, pairs, with the males singing, were spaced through the live and deciduous oaks at 200 to 300 yards. Courtship feeding was noted on April 12. Laying and incubation had not started by mid-April. Males taken throughout April had testes measuring 5 to 7 mm.; four females taken up to April 7 had small ova. Marsh took a bird in juvenal plumage on August 9 in the Vivoras Canyon area and another individual approaching the end of the postjuvenal molt on September 1 at El Rincón.

These titmice belong to the recently described race *dysleptus* (Van Tyne, 1954:201) of the Chisos Mountains. Weights, in order of date, were as follows: ♂ ♂, 16.1, 17.3, 17.2, 16.5, 17.3, 17.2, 17.2, 16.0, 17.5 and 17.0 gm. ♀ ♀, 16.1, 15.3, 15.2, 15.8.

Auriparus flaviceps ornatus. Verdin. This desert species followed the catclaw scrub up the washes to about 4800 feet, the limit of such habitat. Specimens were as follows: April 23, testis 5 mm., weight 8.0 gm.; April 24, ova small, 7.4 gm.; April 27, testis 4 mm., 6.8 gm.

Psaltriparus melanotis lloydi. Black-eared Bush-tit. Throughout April bush-tits were seen in pairs. In one instance on April 13 a third bird may have been associated with a pair. On April 18, three males and a female were moving as a flock; otherwise no flocks were seen. Many pairs were checked at close range and invariably the male was black-eared and the female not; several pairs were collected to verify this situation. The fact that the members of the pair are distinguishable in this way permitted us to see differences in behavior. The males are definitely more aggressive and excitable when a pair is approached or is squeaked up. The male calls more loudly when the mate is shot than when the female is left after a male is taken. Males carry nest material as in *Psaltriparus minimus*, and many nests, often situated in junipers, were under construction. On April 18, a pair at 8000 feet was observed in copulation. The birds were 15 feet up in a small bare oak. The male held the head and bill tilted high as he mounted; the nape of the female was not touched at any time. Faint notes of a type not heard by me before in bush-tits were given as copulation took place. The male reported by Marsh and Stevenson (1938:287) was still largely in worn plumage on September 5.

Bush-tits ranged from the upper borders of the mesquite area at 4800 feet, where locally they

occurred with Verdins, up through the oak, juniper, and pine-oak habitats to the tops of the mesas at 8000 feet. They usually avoided shaded canyons and dense clumps of conifers, but in foraging they occasionally ranged into Douglas fir and white pine.

Van Rossem and Hachisuka in describing the form *Psaltriparus minimus dimorphicus* (1938:8), which is regarded as a synonym of *P. m. lloydi*, were apparently unfamiliar with the normal sex and age variations in head pattern of *P. melanotis* and ascribed this variation to interbreeding of *P. melanotis* and *P. minimus*, a geographically improbable event in southern Sonora whence *dimorphicus* was named. The type material of *dimorphicus* on which their discussion was based has been reviewed by me and has been found to yield no sure evidence of interbreeding; this material resembles *P. melanotis lloydi* in all respects, the females showing the more subtle pattern differences in contrast to *P. minimus* that Van Tyne and Sutton (1937:64-66) point out. In view of this and the apparent sympatry of *P. melanotis* and *P. minimus* in west Texas, these bush-tits are treated as separate species pending further field study. In the Sierra del Carmen there is no trace of the *minimus* type, and it is to be noted that *P. melanotis* is not confined to the higher altitudes as it apparently is in the Chisos Mountains.

Data on specimens are: ♂♂, iris dark in all; testes 4 to 5 mm.; weights in order of date: 5.8, 5.0, 5.5, 5.3, 5.5, 5.4, 5.7, 5.8, 5.2, and 5.2 gm. ♀♀, iris whitish in all; April 4, largest ovum $\frac{3}{4}$ mm., 5.0 gm.; April 3, ova minute, 5.2 gm.; April 10, 5.1 gm.; April 15, ovum 2 mm., 6.0 gm.; April 17, 2 mm., 5.9 gm.

Sitta carolinensis nelsoni. White-breasted Nuthatch. Common in the oaks and open conifers from 6500 to 8000 feet; none was recorded in the oak belt at 5000 feet. Nesting was apparently underway, as a female taken on April 3 had an ovum $2\frac{1}{2}$ mm. in diameter; weight 18.5 gm. Testes of males ranged from 4 to 6 mm. in length. Weights of males, in order of date, were: 16.9, 15.9, 16.2, 16.9, 16.0, 16.5, 17.4, 16.5, and 16.0 gms.

The series taken shows no significant differences in dimensions of bill or wing from *nelsoni* of Arizona and New Mexico; it is shorter winged than *umbrosa* of Chihuahua. Nor is coloration consistently different from *nelsoni*, although the tendency in the series is toward slightly darker coloration in the direction of *S. c. mexicana* to the southward. The material from the Sierra may be presumed to be equivalent to the population of the Chisos Mountains from which *S. c. oberholseri* Brandt was named, and it fits Aldrich's characterization of that form (1944:599). However, it shows insufficient differentiation to support the distinction of *oberholseri* from *nelsoni*. The populations of the Chisos Mountains and the Sierra del Carmen seem best regarded as a stage in the cline of which *nelsoni* and *mexicana* are end points, although falling closer to *nelsoni*.

Sitta pygmaea melanotis. Pygmy nuthatch. This nuthatch was not seen below 7000 feet where it was scarce, but at 7500 to 8000 feet in pine-oak on the mesa tops and in the heads of canyons where conifers were more dominant than at 7000 feet it became common, pairs being encountered at intervals of 200 yards. No flocks or parties of three were seen. At times the birds would move into oaks to feed, but usually they foraged in needle tufts of ponderosa and white pines and on the smaller limbs. We took no females that had laid or were about to lay. One collected on April 6 had six ova of nearly uniform enlargement up to $1\frac{1}{2}$ mm. diameter; others taken up to April 15 did not show even this level of development. Pairs were probably engaged in nest construction, and the males often were heard "singing." The testes varied from 3 to 6 mm. in the period from April 2 to 15 without correlation as to date. Weights of 13 males had a narrow range of variation, from 10.0 to 10.8, and averaged 10.3; 9 females ranged from 9.2 to 11.0 and averaged 10.2. Robert A. Norris has identified the material as to race. Pygmy Nuthatches have not been recorded heretofore from Coahuila and they are absent in the Chisos Mountains.

Certhia familiaris montana. Brown Creeper. We could find no evidence of a breeding population of creepers in the Sierra del Carmen although the higher conifers would seem to constitute favorable habitat for nesting. Twice what are assumed to be winter visitant or migrant individuals were detected and taken in Corte Madera Canyon above 7000 feet. One could not be sexed and the other, a female, was sexually inactive and somewhat fat. These birds taken on April 18 and 15, respectively, are referable to the race *montana*; they match worn plumages of birds from Montana and Idaho.

Campylorhynchus brunneicapillus couesi. Cactus Wren. A few pairs were present in open swales and mesas at the base of the mountains. Nests were placed in bare thorny scrub and in larger ar-

borescent yuccas. A pair taken on April 25 was building, the male at least carrying material, apparently to a breeding nest. The female had yellow ova up to 3 mm. in diameter that indicated she would have laid in about a week; she had no brood patch. A third bird was heard in the vicinity of this pair that was feeding and gathering the nest material about 300 yards from its nest site. On April 27, two miles away, a second pair was found with a nest placed 5 feet up in the crown of a 6-foot yucca. The nest contained two partly grown young, about a week old; no addled eggs could be found. The female only had a brood patch, which was past the edematous stage. Data on specimens are: April 25, ♂ testis 7 mm., weight 38.7 gm., ♀, ovum 3 mm., 37.8 gm.; April 27, ♂, testis 5 mm., 39.7 gm.; ♀, ovum 1 mm., 33.8 gm.

Thryomanes bewickii eremophilus. Bewick Wren. Common in the piedmont area on yucca-dotted slopes and along the lower canyon walls in growths of piñon, yucca, and cactus. A few occurred up to 7000 feet where they were found only on sunny canyon slopes or in dry junipers and oaks. Males were singing steadily. A female taken on April 24 was laying. The testes of males measured 5 to 7 mm. Weights were: ♂ ♂, 10.7, 10.0, 11.4, 10.0, 10.0, 10.7, 11.5 gm.; ♀ ♀, 12.7 (ovum 5 mm.), 10.1 gm.

Troglodytes brunneicollis cahooni. Brown-throated Wren. These wrens were common, although inconspicuous, in canyon bottom log and brush tangles in the pine-oak belt from 6700 feet upward. Singing was not noticed until April 15 and apparently it correlated with attainment of full gonadal development of some of the males at about that time. In contrast with *Troglodytes aëdon* the birds stayed close to the ground when singing and were more secretive. The song was not as harsh and the *teer* call-note was less guttural. In general their behavior approached that of *Troglodytes troglodytes*, although their close affinities to *aëdon* are obvious.

The series taken is not separable in color or size from *T. b. cahooni* of the Sierra Madre Occidental of Chihuahua and Sinaloa. Most, however, have gray dorsal areas equivalent to *T. a. parkmanii* and were it not for consistently brown throats and breasts might be confused with that form. The birds of the Sierra del Carmen suggest in no way *compositus* of the Sierra Madre Oriental. The species has not been reported before from northern Coahuila, but Burleigh and Lowery (1942:198) record a *cahooni*-like specimen from Diamante Pass in southern Coahuila. Data on gonads, weights, and dates, respectively, are: ♂ ♂, 2 mm., 11.1 gm. (April 5), 2½, 11.1 (8); 3, 10.0 (15); 3, 10.0 (15); 5, 10.8 (15); 8, 10.8 (15); 7, 10.1 (17). ♀ ♀, none with ova more than 1 mm.; 11.8 gm. (April 5); 10.3 (7); 9.9 (8); 9.7 (8); 10.0 (15); 10.2 (15); 10.1 (16); 10.3 (17).

Salpinctes obsoletus obsoletus. Rock Wren. Seen only in the rocky piedmont and on lower bare canyon faces. Data on specimens are: ♂, April 21, testis 6 mm., 17 gm.; ♀, April 22, ovum 1 mm., 15 gm. Marsh took a bird in fresh fall plumage on September 6 at El Jardín.

Catherpes mexicanus albifrons. Canyon Wren. Found in shaded rocky canyons and on larger cliff slopes at the base of the mountains from 4700 to 5300 feet. A pair had a nest on a 15-foot boulder in a narrow section of the canyon bottom at 5000 feet opposite a large cliff. It was situated in a 6-inch pothole, protected from rain, on a vertical face 10 feet from the ground. The female was incubating on April 22. Males were singing frequently and were aggressively responsive to imitations of the song.

The four specimens taken display the large size of this race in contradistinction to *C. m. conspersus* and are much paler than *C. m. mexicanus*, although as usual in this species there is much individual variation in color (Miller, 1948). Data on specimens are: ♂ ♂, April 21, testis 3½ mm., wing 64.3 mm., weight 13.4 gm.; April 22, 4 mm., 65.7 mm., 11.5 gm.; April 23, 4 mm., 65.2 mm., 13.5 gm. ♀, 58.7 mm, brood patch, 130 gm.

Mimus polyglottos leucopterus. Mockingbird. This species was sparsely distributed in the mesquite and catclaw at the base of the mountains. Two males were taken: April 22, testis 8 mm., weight 47 gm.; April 26, 8 mm., 43 gm.

Toxostoma curvirostre celsum. Curve-billed Thrasher. A scarce resident of the desert scrub at the mouth of Boquillas Canyon. One was taken here on April 22; testis 13 mm., 88 gm. Its large size and spotted and dusky posterior underparts distinguish it from *T. c. oberholseri* of eastern Coahuila. The race *celsum* seems not to have been recorded previously from Coahuila, although it occurs in Chihuahua and the Big Bend area of Texas.

Toxostoma dorsale dorsale. Crissal Thrasher. Found only in the mesquite, desert willow, and walnut scrub along the wash of Boquillas Canyon at about 4700 feet. Four specimens representing

as many pairs were taken in a section one mile in length on April 27. The female had a brood patch; the males had testes of 6 and 7 mm. maximum length. The specimens conform in color with *T. d. dorsale* of New Mexico. This race has not heretofore been recorded from Coahuila, although it is present in the Chisos Mountain area of Texas. Weights are: ♂♂, 64, 62.7, 65.0 gm.; ♀, 60.7 gm.

Hylocichla guttata. Hermit Thrush. Migrant or winter visitant thrushes were seen both in the Douglas fir and pine-oak belts and in the lower levels in the oaks at the foot of the range. Two races are involved in our material: *H. g. auduboni*, ♂♂, April 15, 7500 feet, testis 2 mm., wing 117 mm., weight 29.2 gm.; April 18, 7000 feet, testis small, wing 121 mm., 30.9 gm. *H. g. guttata*, ♂♂, April 12, 7000 feet, testis small, wing 92 mm., 22.5 gm.; April 19, 7000 feet, testis small, wing 92 mm., 22.6 gm. (fat); April 22, 5000 feet, testis 2 mm., wing 94 mm., 28.2 gm. (moderate fat); April 26, 5000 feet, testis small, wing 93 mm., 27.8 gm. (very fat). An additional unsexed bird probably belongs with this race. The dimensions and color of the specimens of *H. g. guttata* are equivalent to those of the somewhat large population of this race breeding in southern interior British Columbia (McCabe and McCabe, 1932).

Myadestes townsendi townsendi. Townsend Solitaire. Detected in clumps of large pines in two different locations at 7000 and 7500 feet on April 4, 6, and 8. At no time was singing heard and it is probable but not certain that the birds were merely winter visitants. The habitat would be favorable for breeding in as much as similar conifers and rock cliffs are frequented by the species in summer in the Sierra Madre Occidental of Chihuahua. The specimen taken on April 8 was a female with minute ova and no fat; weight 31.9 gm. The species has not before been recorded in Coahuila.

Polioptila caerulea amoenissima. Blue-gray Gnatcatcher. This gnatcatcher was apparently established on summer territories in the oaks and walnuts of the wash of Boquillas Canyon at the foot of the mountains. Males were singing and patrolling here on April 23 and 27. Some individuals that were seen in desert scrub may have been migrants. Only one was noted at higher elevations, on April 10 on a dry oak-covered bench at 7000 feet; no song was heard and it may have been a migrant. Specimens taken were: ♂, April 23, testis 5 mm., weight 6.3 gm.; ♀, April 24, ova small, 6.0 gm.

Regulus satrapa satrapa. Golden-crowned Kinglet. In a side canyon at the head of Corte Madera Canyon, at 7500 feet, a small wintering flock of this kinglet was found on April 8. The kinglets frequented a dense stand of Douglas firs in which the trunks and ground beneath were covered with moss that was dry at this season. A female was taken in which the ova were minute; weight 5.9 gm., little fat. This is the first record of the species in Coahuila.

Regulus calendula. Ruby-crowned Kinglet. These kinglets were common in the conifers and oaks of the upper levels of the mountains, at 6500 to 7000 feet, as winter visitants or migrants. At times in particular areas they were abundant, as though a wave of migrants was passing through; this was noted especially on April 3, 5, and 10. At the base of the mountains they were also seen, specifically as late as April 23. Two races are represented in the specimens taken: *R. c. calendula*, ♂?, April 1; ♂, April 17, testis small, weight 6.3 gm. *R. c. cineraceus*, ♀, April 19, weight 6.4 gm., fat. The race *cineraceus* does not seem to have been reported previously from Coahuila.

Bombycilla cedrorum. Cedar Waxwing. Twice flocks of this winter visitant were encountered. On April 5 a flock of 12 was noted in oaks in Carboneras Canyon at 6600 feet, and on April 21 a group was noted in oaks at 5000 feet. Data on specimens are: ♂♂, April 5, testis 2 mm., weight 32.2 gm.; April 21, 2 mm., 31.5 gm. ♀♀, April 5, ova minute, 31.0 gm.; April 21, ova minute, 36 gm.; April 21, ova minute, 34 gm.

Phainopepla nitens. Phainopepla. Noted on April 20 and 28 in large clumps of mesquite near Piedra Blanca, at about 4500 feet, in the foothills of the range.

Lanius ludovicianus mexicanus. Loggerhead Shrike. Detected only once in catclaw scrub in the lower part of Boquillas wash at about 4600 feet elevation. The male that was taken was not in full breeding condition on April 27, but it was apparently resident; testis 4 mm., weight 49 gm. This individual, a first-year bird, surprisingly is very much like *mexicanus* in dark dorsal coloration and extensive mask; the underparts are paler than normal in that race and the bill hook is small as in *excubitorides*. The bird may best be considered an intergrade of *mexicanus* and *excubitorides*, somewhat closer to the former. Even so it is surprising that the influence of *mexicanus* is seen so far north.

Vireo atricapillus. Black-capped Vireo. This small vireo was stationed on territories in the low catclaw-dominated scrub in the lower washes of Boquillas Canyon and its side valleys, at 4600 to

4800 feet. The cover of the habitat may be open to the extent that a person can easily walk through it, or it may be closed almost like chaparral. The birds stayed almost entirely within four feet of the ground and exposed themselves rarely on the tops of the bushes. The song was a long series of wheezy and whining notes intermixed with notes remindful of both Gray and Hutton vireos. One bird sang continually for a half-hour period. A call note was essentially identical with the chatter of a Ruby-crowned Kinglet. Twice females were seen with males and it seemed evident that breeding would soon begin. This species has not heretofore been specifically reported as summer resident in México, but it nests in the Chisos Mountains of Texas.

Specimens taken were: ♂, April 23, testis 3 mm., iris light brown, 8.4 gm., no fat; ♀, April 23, ovum $\frac{1}{2}$ mm., iris light brown, 8.4 gm., no fat; ♂, April 24, testis 3 mm., 9.2 gm.; ♂, April 26, testis 5 mm., 8.3 gm.; ♀, April 27, ovum 1 mm., 8.0 gm.

Vireo huttoni carolinae. Hutton Vireo. This was a common bird from 6500 feet to 8000 feet. Three males singing at once could often be heard from a single listening post. They occurred in rather open piñons on south-facing slopes at 7000 feet, but chiefly in live and deciduous oaks as also in tracts of pines almost devoid of oaks. The birds were in pairs and apparently preparing to nest but only one female was taken that was nearly ready to lay; this was on April 12. All males had testes 4 to 5 mm. in length.

The dorsal coloration of our series supports well Brandt's claim (1938:269) of separation of the Chisos Mountain population from *V. h. stephensi* and *V. h. mexicanus*. There is no overlapping in characters between *stephensi* of Arizona and the birds of the Sierra del Carmen, and *mexicanus* is much greener above and below and averages larger. The wing lengths of the males of the Carmen Mountains are about as reported for the Chisos Mountains. It is therefore considered appropriate to recognize the race *carolinae* as described by Brandt. Data on wing lengths, weights, and dates, are: 65.5 mm., 11.4 gm. (April 2); 64.8, 11.4 (2); 67.5, 12.0 (2); 65.1, 11.3 (6); 65.3, 11.4 (6); 63.0, 11.1 (12); 66.7, 11.5 (15); 64.0, 11.5 (15); 66.0, 11.7 (17); 64.9, 11.7 (18). ♀♀, 63.8 mm., 11.0 gm. (April 2); 66.7, 11.5 (2); 65.1, 12.6 (12; laying); 67.9, 12.0 (13); 63.5, 11.6 (14).

Vireo solitarius. Solitary Vireo. Apparently there was no summer resident population of this vireo in the mountains or at least none had arrived up to April 20. One was heard singing on April 10 in a shaded growth of pine and oak in a canyon at 7500 feet. But it was not in evidence later and was presumed to have been a migrant, since this species often sings in the course of spring migration.

Mniotilta varia. Black and White Warbler. Marsh took a fall migrant on September 1 in Chuperosa Canyon.

Vermivora virginiae. Virginia Warbler. On April 22 a male was taken on a canyon side in scattered scrubby oak growth with grass and cactus beneath. This was at 5200 feet in Boquillas Canyon. The bird was not singing but circled about the area chipping vigorously in alarm after a shot was fired. It is by no means certain that this warbler was stationed here for the summer, although the habitat appeared suitable. The testis was not yet fully developed (2½ mm. long), but there were only slight deposits of fat on the bird; weight 7.3 gm. This species has not been reported heretofore from Coahuila.

Parula americana pusilla. Parula Warbler. A migrant was taken in an oak grove at 7000 feet on April 16; testis 4 mm., weight 7.3 gm. This is apparently the first record of this species in Coahuila.

Peucedramus taeniatus arizonae. Olive Warbler. This was a common warbler in the pine timber above 6800 feet. It was most numerous from 7500 feet to the summit of Loomis Peak at 8800 feet. Tall ponderosa and white pines, as also Douglas firs, were the normal habitat. Most of the time the birds were 40 feet or more above ground, singing and foraging. The song of this species has two very different patterns between which any one individual may switch freely. First-year, yellowish males were singing and breeding as were adults.

No differences could be detected between the series taken and material from Chihuahua and Arizona. This species has not been recorded before from northern Coahuila. Data on gonads, weights, and dates, respectively, are: ♂♂, 5 mm., 10.2 gm. (April 2); 5, 11.5 (4); 4, 10.1 (4); 4, 10.1 (4; yellow plumage); 3, 11.1 (8); 7, 11.3 (10); 6, 11.6 (11; at 8800 feet); 4, 11.1 (11; at 8800 feet); 5, 11.5 (12; yellow plumage); 6, 11.2 (14; yellow plumage); 7, 12.1 (14); 5, 10.7 (15; yellow plumage). ♀♀, all ova 1 mm. or less; 10.5 gm. (April 4); 10.9 (10); 11.4 (13); 10.1 (15).

Dendroica auduboni auduboni. Audubon Warbler. This species was recorded as a migrant from April 7 to 26, but the greatest numbers were seen between April 11 and 18 at the 7000-foot level. None of the specimens taken indicated approach to breeding and little singing was heard. Apparently there was no nesting population settling in the mountains, although the habitat in the upper conifer belt appeared ideal for it. Marsh's manuscript report on the species likewise affords no satisfactory evidence of summer residence. One individual that we took is an extensively black male approaching the characters of the race *nigrifrons* of Chihuahua but it is no darker than occasional examples of *D. a. auduboni* that are summer resident in the Rocky Mountains of the United States. These latter I regard as part of a cline of blackness and size in which *D. a. auduboni* of the northwest and *D. a. nigrifrons* of México are extremes; it is not practical to define an intermediate level on this cline under the name *memorabilis* as has been proposed.

On April 18 a call note of one of these warblers was heard which had the distinctive quality of the species *Dendroica coronata*. The bird was taken and proved to be a hybrid in which the characters of the adult males of *D. auduboni* and *D. coronata* are both evident. The considerable differences in head pattern assort as follows in this individual: The throat is about half yellow and half white, the two types of feathers intermixed; a loral white mark and postocular white are present as in *coronata* but they are not connected as in that species; the black cheek area is well defined as in *coronata*; the white of the tail occurs on only rectrices 4, 5, and 6 as is normal in *coronata*, but this is not an absolute distinction separating it from *auduboni*. Although hybrids are not rare between *auduboni* and *coronata*, the degree to which the forms interbreed and overlap geographically on their nesting grounds has never been fully worked out. Until this is done and in view of the several differences in pattern and call note, it would seem best to retain them as separate species.

Data on specimens are: ♂♂, April 7, testis 2 mm., weight 13.8 gm. (fat); April 11, 3 mm., 14.3 gm. (moderately fat); April 10, 2 mm.; April 17, 1½ mm., 11.8 gm. (no fat); April 18, hybrid, 1½ mm., 13.8 gm. (fat); April 26, 5000 feet, 3 mm., 12.0 gm. (fat). ♀, April 17, ova small, 11.3 gm. (little fat); April 19, 1 mm., 13.5 gm. (fat).

Dendroica nigrescens. Black-throated Gray Warbler. A spring migrant was seen and heard singing on April 12 at 7000 feet in oaks and a male was taken at the same elevation on April 16; testis 3 mm., weight 8.5 gm. This species has not been reported heretofore from Coahuila.

Dendroica townsendi. Townsend Warbler. A fall migrant was taken on September 2 at Jardín del Sur in Chuperosa Canyon.

Wilsonia pusilla pileolata. Pileolated Warbler. Spring migrants were taken from April 9 to April 27; they were moving through the desert areas at 4800 feet in large numbers in the last week of April, but a few appeared earlier in thickets in canyon bottoms at 7000 feet, especially near water sources. All specimens are normal for this race. Data on specimens are: ♂♂, testes all 1 mm.; 7.2 gm. (April 9; little fat); 7.0 (9; no fat); 8.0 (18); 7.0 (18; no fat); 8.1 (19; fat). ♀, 7.7 gm. (April 27).

Setophaga picta picta. Painted Redstart. These very conspicuous warblers were common from 6000 to 7500 feet in canyon bottom growth, in oaks, and in mixed pines and oaks. They became scarce higher up and dropped out at 7500 feet where conifers tended to dominate the vegetation. Singing was heard regularly and one female taken on April 7 would soon have laid. The male reported by Marsh and Stevenson (1938:287) from Vivoras Spring was undergoing a complete annual molt on August 11. Data on gonads, weights, and dates, respectively, are: ♂♂, 6 mm., 10.4 gm., (April 1); 7, 9.6 (4); 7, 10.7 (7); 8, 10.1 (11); 7, 10.0 (16); 5, 10.0 (17). ♀♀, largest ovum 1 mm., 9.5 (April 6); 3, 10.0 (7); 1, 9.2 (11).

Xanthocephalus xanthocephalus. Yellow-headed Blackbird. At Noria in the flats immediately east of the Sierra del Carmen a Yellow-head was seen among Brewer Blackbirds on April 28. Marsh took a male in worn breeding plumage on July 24 at Tanque de los Melones on La Bavia Ranch east of Fresno Mesa.

Icterus parisorum. Scott Oriole. This oriole was common in the canyons at the base of the range. It occurred in oak woodland but was especially centered in the piñons, yuccas, and agaves of the canyon walls. Also it ranged into the low hills of the desert areas where there were agaves and unbranched yuccas, 2 to 5 feet tall. The song of this species was one of the most prominent features of our camp in Boquillas Canyon. As many as three pairs could be heard at once from our base.

Both males and females sang, and this was while the latter were approaching egg-laying. A female taken on April 21 was in dull plumage without black throat and was singing at full volume in a fashion identical with the male with which she was associated.

A careful comparison of the series from the Sierra del Carmen with examples of the species from California reveals no significant differences in dimensions or coloration. Data on gonads, weights, and dates, respectively, are: ♂♂, 10 mm., 33.8 gm. (April 21); 8, 35.8 (21); 11, 39 (21); 9, 36 (22); 8, 38.5 (23); 11, 37.2 (24); 7, 36.5 (26); 8, 34 (26). ♀♀, ovum 2 mm., 34.9 gm. (April 21); 3, 34.3 (21).

Euphagus cyanocephalus. Brewer Blackbird. A few migrant Brewer Blackbirds stopped in the tops of oaks at the corral at the Carmen Mountain Club in Boquillas Canyon on April 27. Three were taken: ♂, testis 5 mm., weight 77 gm. (fat); ♀, 51 gm.; ♀, 66.5 gm.

Piranga rubra. Summer Tanager. On the evening of April 28 in a canyon in the Serranías de Burros, about 40 miles east of the Sierra del Carmen, one was present in small trees in a wash.

Piranga flava dextra. Hepatic Tanager. This tanager arrived in the pine-oak belt at 7000 feet on April 12, when a male was seen and a female was taken. No singing was heard until April 18. Possibly not all birds destined to nest in the area were present by April 20 as the species was still scarce at that time. The specimens accord well with the east-Mexican race (see Sutton and Phillips, 1942) of which *P. f. oreophasma*, named from the Chisos Mountains, is regarded as a synonym. Data on specimens are: ♀, April 12, largest ovum 1 mm., weight 35.4 gm., little fat; ♂, April 18, testis 6 mm., 39.3 gm.; ♀, April 20, ovum 1 mm., 37.1 gm., little fat.

Piranga ludoviciana. Western Tanager. Marsh took what is apparently a migrant at Jardín del Sur on September 7; it is an immature largely in fresh postjuvinal plumage.

Richmondia cardinalis. Cardinal. Present and singing in the larger masses of mesquite and other thorny scrub in gulleys at the base of the mountains in the Boquillas drainage at 4800 feet. Males were taken here on April 25 and 26: testis 10 mm., weight 39.7 gm.; 7 mm., 39.1 gm.

Pheucticus melanocephalus melanocephalus. Black-headed Grosbeak. This species first appeared on April 13 in the narrow canyon back of our camp at 7000 feet, in shaded oaks and pines. Song and numbers increased in the next five days and by April 18 three males were spaced along one-quarter mile of this canyon, patrolling territories. No females were detected. Males also were present in the encinal of the bottom of Boquillas Canyon at 5000 feet in the last week of April. The four males taken are rather large-billed and have fully developed black head areas; they therefore conform adequately with the rather poorly differentiated race *P. m. melanocephalus*. Data on specimens are: April 18, testis 9 mm., weight 46 gm.; 9, 43.5; 9, 48.5; April 22, 10 mm., 41.2 gm. An immature male, largely in postjuvinal plumage, was taken by Marsh at Jardín del Sur on September 7.

Guiraca caerulea interfusa. Blue Grosbeak. A male in worn breeding plumage was taken by Marsh on August 3 at Vivoras Spring.

Passerina versicolor versicolor. Varied Bunting. The habitat of this species consisted of catclaw-covered bottom lands at the base of the mountains at 4700 feet in which there were taller trees, such as walnuts, that could be used as song posts. Singing was apparently not at full peak, although by April 27 some individuals were singing steadily. Four males taken were as follows: April 23, testis 4 mm., weight 13.0 gm., no fat; April 26, 5 mm., 12.6 gm., fat; April 26, 5 mm., 13.8 gm.; April 27, 3½ mm., 13.6 gm., little fat.

Passerina ciris pallidior. Painted Bunting. Reported by Marsh and Stevenson (1938:287) from the foothills of the Sierra where they evidently are summer residents. Specimens were taken at Piedra Blanca on July 25 and at Jardín del Sur on September 1.

Carpodacus mexicanus potosinus. House Finch. There was a sparse population of this species in the yucca and cactus growth of the foothills adjoining Boquillas Canyon at 4800 feet. Small young just out of the nest were found on April 25 and a laying female was taken on April 26. The six specimens taken match *potosinus* of Nuevo León and Zacatecas in broad ventral streaking, dark dorsum, and dark red of the males. They seem to show no intergradation toward *frontalis* such as Moore (1939:182, 195) indicates occurs in western Texas north and west of the Big Bend area. Data on specimens are: ♂♂, April 24, testis 8 mm., weight 19.5 gm.; April 25, 4 mm., 18.2 gm.; April 26, 5 mm., 19.6 gm. ♀♀, April 26, largest ovum 4 mm., 21.8 gm.; April 26, 2 mm., old brood patch, 20.2 gm.; April 27, 1 mm., 19.6 gm.

Spinus pinus pinus. Pine Siskin. Winter visitant or vagrant flocks were seen in Carboneras Canyon at 6800 feet. On April 5 a flock of at least 50 was feeding on willow catkins and buds near a water hole. Three were present here on April 7. One was taken on April 21 at 5000 feet. The wings of six males are: 71.5, 72.5, 72.7, 73.0, 73.2, and 74.2 mm. These are similar to the dimensions of *S. p. macropterus* of northern Baja California but not as great as the average (75 mm.) of true *macropterus*. Unlike the Baja California birds, those from the Sierra del Carmen are dark and, usually, broadly striped. In this respect as in size they conform adequately with samples of *S. p. pinus* of Montana. The gonads of all birds taken were quiescent. Weights were: ♂ ♂, 11.8, 12.0, 12.1, 12.2, 12.4, and 12.7; ♀ ♀, 12.0 and 12.5.

Spinus psaltria psaltria. Lesser Goldfinch. Surprisingly we did not encounter this species. Marsh took a specimen on August 22 in Chuperosa Canyon. It is a female and hence may only be presumed to belong to the nominate race which is well known in surrounding areas.

Chlorura chlorura. Green-tailed Towhee. Several migrants were seen each day in the last week of April as they moved through desert vegetation at the mouth of Boquillas Canyon. Specimens taken were: ♀, April 24, small ova, 33.0 gm., heavy fat; ♂, April 26, testis 3 mm., 30.0 gm., fat.

Pipilo maculatus gaigei. Spotted Towhee. Between 6800 and 7500 feet these towhees were sparsely distributed in areas of scattered low ceanothus and hawthorne, chiefly in canyon bottoms, but also on slopes where ceanothus was intermingled with downed timber and young pines. Between April 4 and 18 singing was sporadic, although occasionally vigorous, and not all males were in maximum breeding condition; still they seemed to be stationed on breeding areas. Females were unaccountably scarce. Marsh took an adult in worn breeding plumage in Vivoras Canyon on August 25.

The series is referred to *gaigei* named from the Chisos Mountain area. The males are ashy gray on the lower back and rump rather than olive gray as in the Mexican races to the south. *Gaigei*, if here represented in typical form, is less certainly distinguishable from *montanus*. Even though age types have been carefully segregated and compared, little or no difference in amount of white dorsally and in depth of chestnut can be discerned between *montanus* and the birds of the Sierra del Carmen. The latter are perhaps separable, however, on the basis of the grayer rump and upper tail coverts (see Sibley, 1950). Data on gonads, weights, and dates, respectively, are: ♂ ♂, 3 mm., 40.0 gm. (April 4); 8, 44.3 (5); 4, 41.2 (5); 4, 40.5 (10); 3, 38.4 (10); 5, 38.2 (12); 6, 37.3 (16); 8, 40.8 (18); 4, 40.5 (18). ♀, ovum 1 mm., 35.5 gm. (April 8).

Pipilo fuscus texanus. Brown Towhee. This towhee did not range up into openings in the woodlands of the mountains but occurred in the canyon mouths and open, rocky canyon walls up to 5200 feet. A dissected mesa at the mouth of Boquillas Canyon with scattered mesquite, catclaw, and barberry shrubs was particularly favored. The *tis-up* call note of the eastern races of this species was often given, as well as the usual pair reinforcement note. Only occasionally was singing heard. One singing male that was taken was apparently solitary; the song was broken into parts as in some Spotted Towhee songs, suggested by the syllables *chip-chip trrrr*. Females had not laid by late April although males were in full breeding condition. The short tail of this race was noticeable in the field in contrast to the races of coastal California, especially.

All specimens taken were from the mouth of Boquillas Canyon unless otherwise indicated. Data are as follows:

Date in April	Wing length	Tail length	Testis or ovum in mm.	Weight in grams
♂ 23	96.3	98.2	11	45.0
♂ 23	95.0	96.9	14	44.6
♂ 24	96.7	96.9	10	46.0
♂ 25	94.3	92.5	12	45.7
♂ 26	95.0	95.0	12	44.9
♂ 27	92.0	91.6	10	46 -
♂ 27	93.8	99.8	11	47 -
♀ 15*	98.1	97.1	minute	45 -
♀ 15*	91.4	1/2	45 -
♀ 23	92.8	89.3	1	40.0
♀ 24	92.1	97.0	2	44.3
♀ 25	89.3	91.9	1	44.4

* Taken 15 mi. S Piedra Blanca.

The series from the Sierra del Carmen in color of sides and back agrees satisfactorily with *texanus* and not with the darker *potosinus* to the south, an opinion concurred in by Dr. John Davis, reviser of this group (1951). There is in it, however, some sign of intergradation toward *potosinus*. The measurements given in the table fall somewhat between those of *texanus* of west Texas and *texanus* of the Edwards Plateau. The race *texanus* has not been recorded heretofore in México. Davis allocated a single juvenile taken by Marsh on August 28 from Jardín del Sur to *P. f. potosinus* but he now regards this specimen as inadequate for critical determination, the present series more satisfactorily representing the racial character of the population of northwestern Coahuila.

Poecetes gramineus confinis. Vesper Sparrow. Winter visitants were found on two occasions in the grass of the dry ciénega at the head of Corte Madera Canyon at 7500 feet. Specimens were taken here on April 9 and 14, as follows: ♀, ova minute, 19.5 gm.; ♂, testis 2 mm., 24.7 gm., moderately fat.

Chondestes grammacus strigatus. Lark Sparrow. A male was singing, apparently on a breeding territory, on April 27 in an open, rather barren desert flat adjoining the lower part of Boquillas wash at 4600 feet. No other individuals of the species were seen. The testis of the bird taken was 7 mm. long; weight 26.1 gm. Marsh took a young of the year, still largely in juvenal plumage, on September 6 in the western hills.

Aimophila ruficeps tenuirostris. Rufous-crowned Sparrow. This species ranged up to 7000 feet on open south-facing slopes within the oak belt. Rock, yucca, cactus, and tussock grass afforded cover both at this elevation and in the lower canyon slopes and escarpments of the foothills. At 5000 feet the species was common. Males were singing here regularly, usually from posts 2 to 8 feet above the ground. On one occasion a male singing on a canyon wall took flight, singing on the wing in an irregular arc 50 yards in extent. Females had not yet laid so far as we could discover.

The eight specimens taken agree in color with an example of *tenuirostris* from Carlsbad Caverns, New Mexico. They are dark gray and less red than *eremoeca* and are much less reddish than *scotti*. The bill characteristics of *tenuirostris* are less certain. The bill tends to be a little less thick than in *eremoeca*; it does not seem to be smaller or shorter (see Miller, 1941). Our series shows no approach to *boucardi* of southern México, although Marsh and Stevenson earlier reported (1935:257) a specimen as this race. This bird is in postjuvenile molt and is difficult to evaluate racially. Such fresh plumage as it does possess accords satisfactorily with fresh fall plumage of *tenuirostris*, to which it may now be referred. This specimen was taken on August 22 in Chuperosa Canyon. The race *tenuirostris* has not been reported previously from México. Data on gonads, weights, and dates, respectively, are: ♂ ♂, testes all 8-10 mm.; 20.5 (April 5); 19.0 (11); 17.0 (22); 19.3 (22); 20.3 (23). ♀ ♀, ova minute, mate of ♂ of same date, 17.8 gm. (April 5); ovum 1 mm., 18.8 (21).

Amphispiza bilineata opuntia. Black-throated Sparrow. This sparrow was moderately common in the open desert scrub at the base of the mountains below 4800 feet. Females taken on April 22 and 26 had brood patches and had recently laid.

The series of 10 specimens resembles most the race *opuntia* of western Texas (Miller, 1954) but shows some intergradation toward *grisea* of southern Coahuila and toward *A. b. bilineata* of eastern Coahuila. The dorsal coloration of 6 of the 10 is the normal light gray of *opuntia* as represented by birds from Brewster and Hudspeth counties, Texas, but three and possibly four are darker gray dorsally as in *grisea* of southern Coahuila. The white spot on the lateral tail feather is 9 mm. long or less in seven of the ten and is between 9 and 12 mm. in the other three. This is a not unusual situation in the races other than *A. b. bilineata*, in which latter the tail spot is almost always 12 mm. long or greater. Wing length of males of *grisea* and *opuntia* ranges from 65 to 69 mm., rarely 64, whereas in *A. b. bilineata* the range is usually 60 to 64 mm. The six males from the Sierra del Carmen measure: 62.4, 63.7, 64.2, 65.0, 66.0, 66.3 and thus as a group are intermediate in this regard between *opuntia* and *A. b. bilineata*. These evidences of intermediacy are to be expected in view of the location of the Sierra del Carmen area between the ranges of three well defined races. The total of characters, however, relates the birds most definitely with *opuntia*, a form not heretofore listed for México. Marsh and Stevenson (1938:287) report a specimen from this area as *grisea* on the basis of Oberholser's determination. It is in extremely worn, dirty summer plumage and contributes nothing reliable to racial determination. It was an adult taken on September 1 at Jardín del Sur and is just beginning the annual molt. Data on gonads, weights, and dates, respectively, are: ♂ ♂, testes all 7-8 mm.; 13.5 gm. (April 22); 14.3 (24); 13.0 (24); 14.0 (24); 12.0 (26); 12.6 (27). ♀ ♀, ovum

2 mm., 13.6 gm. (April 22); 1, brood patch, 12.6 (22); 2, 14.7 (26); empty follicles, brood patch, 15.2 (26).

Junco phaeonotus palliatus. Mexican Junco. Juncos were scarce at 7000 feet in the arid pine-oak belt but became more numerous in the conifers of the upper Corte Madera drainage at 7500 feet, and they ranged to 8800 feet on Loomis Peak. In Corte Madera Canyon as many as six pairs might be seen within a half mile of valley bottom in open white pine and Douglas fir cover. Many of the males were not yet in full breeding condition in early April and no females taken were laying. Song was noted on April 8 but it was never conspicuous up to April 20. The birds were usually detected by their weak alarm note which is softer and less blunt than in northern species of the genus. Also the songs were typical of *phaeonotus*, never consisting of a simple trill but of a multiple trill usually of two or three segments of different pitch and rhythm. In addition, locomotion on the ground usually was by means of walking, not hopping, a further characteristic of this species. The bird recorded by Marsh and Stevenson (1938:287) was taken on August 14 in Vivoras Canyon. It is an adult just beginning the annual molt.

Measurements of the series taken conform well with those of *palliatus* of Arizona and the coloration is like that of birds of Chihuahua (see Miller, 1941:213-214). Data on gonads, weights, and dates, respectively, are: ♂ ♂, 3 mm., 19.5 gm. (April 2); 5, 19.2 (6); 3, 20.2 (7);, 20.0 (8); 2, 20.6 (8); 2, 20.2 (8); 4, 18.2 (8); 3, (10); 4, 20.2 (14); 6, 18.6 (15); 6, 19.5 (17). ♀ ♀, all with small ova; 18.3 gm. (April 3); 17.7 (4); 17.8 (7); 17.5 (7); 20.6 (15).

Spizella passerina arizonae. Chipping Sparrow. At the base of the mountains in the washes and in desert scrub migrants were noted in small flocks from April 21 to 27. No Chipping Sparrows could be found higher in the mountains where, in the pine-oak belt, conditions suitable for breeding existed. Specimens taken were: ♂, April 21, testis 1 mm., weight 12.5 gm.; ♂, April 21, 1 mm., 11.9 gm.; ♀, April 22, ova minute, 13.4 gm.

Spizella atrogularis. Black-chinned Sparrow. On April 23 on a steep brushy hill slope at the mouth of Boquillas Canyon a male was singing regularly and patrolling a section 150 yards across. On April 26 no bird could be found here and the one noted earlier is presumed, therefore, to have been a transient even though it was in full song.

Zonotrichia leucophrys gambeli. White-crowned Sparrow. On April 27 at 4600 feet in Boquillas wash a small group of migrants or winter visitants was present in the catclaw brush. One sang briefly. A male taken was in the middle of an extensive prenuptial molt; testis 1½ mm., weight 27.8 gm., no fat.

Melospiza lincolnii gracilis. Lincoln Sparrow. A winter visitant or migrant was taken on April 7 in the thick vegetation bordering a water hole in Carboneras Canyon at 6700 feet. Although the bird could not be sexed, its very short wing (56.8 mm.) and broadly striped, moderately yellow dorsum leave no alternative but to place it in the race *gracilis*. This form is not to be expected this far east and south and it has not been recorded previously from eastern México.

LITERATURE CITED

- Aldrich, J. W.
1944. Notes on the races of the white-breasted nuthatch. *Auk*, 61:592-604.
- Amadon, D., and Phillips, A. R.
1947. Notes on Mexican birds. *Auk*, 64:576-581.
- Brandt, H. W.
1938. Two new birds from the Chisos Mountains, Texas. *Auk*, 55:269-270.
- Brodkorb, P.
1949. Variation in the North American forms of western flycatcher. *Condor*, 51:35-39.
- Burleigh, T. D., and Lowery, G. H., Jr.
1940. Birds of the Guadalupe Mountain region of western Texas. *Occas. Pap. Mus. Zool. Louisiana State Univ.* No. 8:85-151.
1942. Notes on the birds of southern Coahuila. *Occas. Pap. Mus. Zool. Louisiana State Univ.* No. 12:185-212.
- Davis, J.
1951. Distribution and variation of the brown towhees. *Univ. Calif. Publ. Zool.*, 52:1-120.

- Friedmann, H.
 1950. The birds of North and Middle America. U. S. Nat. Mus. Bull. 50, pt. 11, xiv + 793.
- Friedmann, H., Griscom, L., and Moore, R. T.
 1950. Distributional check-list of the birds of Mexico. Part I. Pac. Coast Avif. No. 29, 202 pp.
- Griscom, L.
 1934. The ornithology of Guerrero, Mexico. Bull. Mus. Comp. Zool., 75:367-425.
- Marsh, E. G., Jr., and Stevenson, J. O.
 1938. Bird records from northern Coahuila. Auk, 55:286-287.
- McCabe, T. T., and McCabe, E. B.
 1932. Preliminary studies of western hermit thrushes. Condor, 34:26-40.
- Miller, A. H.
 1941. Rufous-crowned sparrow of southeastern New Mexico. Auk, 58:102.
 1941. Speciation in the avian genus *Junco*. Univ. Calif. Publ. Zool., 44:173-434.
 1948. Further observations on variation in canyon wrens. Condor, 50:83-85.
 1951. A comparison of the avifaunas of Santa Cruz and Santa Rosa islands, California. Condor, 53:117-123.
 1954. Nomenclature of the black-throated sparrows of Chihuahua and western Texas. Condor, 56:364-365.
 1955. A hybrid woodpecker and its significance in speciation in the genus *Dendrocopos*. Evolution (in press).
- Miller, A. H., and Miller, L.
 1951. Geographic variation of the screech owls of the deserts of western North America. Condor, 53:161-177.
- Muller, C. H.
 1947. Vegetation and climate of Coahuila, Mexico. Madroño, 9, 1947:33-57.
- Moore, R. T.
 1939. A review of the house finches of the subgenus *Burrica*. Condor, 41:177-205.
- Peters, J. L.
 1945. Check-list of birds of the world. Vol. 5 (Cambridge, Harvard Univ. Press), xii + 306 pp.
- Pitelka, F. A.
 1948. Notes on the distribution and taxonomy of Mexican game birds. Condor, 50:113-123.
- Popper, D. M.
 1951. Notes on the birds of Mount Locke, Texas. Condor, 53:51-54.
- Sibley, C. G.
 1950. Species formation in the red-eyed towhees of Mexico. Univ. Calif. Publ. Zool., 50:109-194.
- Storer, R. W.
 1952. Variation in the resident sharp-shinned hawks of Mexico. Condor, 54:283-289.
- Sutton, G. M., and Phillips, A. R.
 1942. The northern races of *Piranga flava*. Condor, 44:277-279.
- Van Rossem, A. J.
 1934. Notes on some types of North American birds. Trans. San Diego Soc. Nat. Hist., 7:347-362.
 1936. Notes on birds in relation to the faunal areas of south-central Arizona. Trans. San Diego Soc. Nat. Hist., 8:121-148.
 1939. A race of the Rivoli hummingbird from Arizona and northwestern Mexico. Proc. Biol. Soc. Wash., 52:7-8.
- Van Rossem, A. J., and Hachisuka, M.
 1938. A dimorphic subspecies of bush-tit from northwestern Mexico. Trans. San Diego Soc. Nat. Hist., 9:7-8.
- Van Tyne, J.
 1953. Geographical variation in the blue-throated hummingbird (*Lampornis clemenciae*). Auk, 70:207-209.
 1954. The black-crested titmouse of trans-Pecos Texas. Auk, 71:201-202.
- Van Tyne, J., and Sutton, G. M.
 1937. The birds of Brewster County, Texas. Misc. Publ. Mus. Zool. Univ. Mich. No. 37, 119 pp. *Museum of Vertebrate Zoology, Berkeley, California, December 3, 1954.*