

## BIRDS OF THE BARRANCA DE COBRE REGION OF SOUTHWESTERN CHIHUAHUA, MEXICO

By KENNETH E. STAGER

In the period from May 7 to May 30, 1950, an ornithological expedition from the Los Angeles County Museum, sponsored and led by Mr. William J. Sheffler, conducted field work in southwestern Chihuahua, México. Mr. Sheffler has long held a very active interest in the ornithology of northwestern México, and this particular expedition is but one of many field programs sponsored by him in the western states of México. The Los Angeles County Museum is very grateful for being allowed to join Mr. Sheffler in this particular investigation.

The purpose of the field work on this occasion was to further the knowledge of the distribution and movement of bird life through the great barranca, or canyon region, of the Sierra Madre Occidental. This large mountain chain rises gently on its east flank but drops off rapidly on the west. The region of the Sonora-Chihuahua-Sinaloa boundary is a highly eroded area made up of a network of large canyons or barrancas. Each of these attains a depth of several thousand feet. The three principal barrancas of this network are the Barranca de Chinapas, Barranca de Batopilas, and the Barranca de Cobre. All three canyons are river formed and their streams drain westward as tributaries of the Río Fuerte which empties into the Gulf of California in extreme northwestern Sinaloa.

The Barranca de Cobre, which was the selected terminus of the expedition, is the largest of the three canyons. We approached the barranca from the southwest, having changed from motor vehicles to pack train at Rancho Guirocoba in the southeastern corner of the State of Sonora. The initial route of the pack train was through northern Sinaloa in order to bypass the mountain mass immediately to the northeast of Rancho Guirocoba. At a point where the Barranca de Chinapas makes its confluence with the Río Fuerte, the pack train turned northeastward and crossed into the State of Chihuahua on May 7, 1950, at the small border village of Tierras Coloradas, 4000 feet. From this point we continued generally northeastward toward the Barranca de Cobre, arriving on the west rim of the canyon (8200 feet) on May 13, 1950.

This route led through various collecting localities in Chihuahua, which are listed in order of visiting as follows: Naranjo, Metate, El Muerto, Cusáraga, Arroyo Hondo, Refugio, Baqueré, Cerocahui, El Cajón and finally Cumbre, on the canyon rim.

The vegetative pattern of the country traversed begins with oak-covered ridges and canyons at Tierras Coloradas and gradually changes to light and then heavy mixings of pine and oak at the higher elevations. Arid tropical vegetation was encountered at one point along the transect where the trail drops down to Naranjo, 2650 feet, in the deep Arroyo Guachero. The forest cover of the west rim of the Barranca de Cobre consists chiefly of Chihuahua pine (*Pinus chihuahuana*) and Lumholtz pine (*Pinus lumholtzii*) with some fir and oak. The most interesting area of faunal and floral associations is the great canyon itself, for here on the steep slopes that descend to great depths is found a sharply delineated stratification of plant life with a characteristic avifauna for each association.

In past references to the Barranca de Cobre various observers have been inclined to exaggerate its depth. Our instruments indicated an elevation of 8200 feet at the base camp at Cumbre on the west rim, and 2900 feet at the river edge in the canyon bottom. Thus the canyon is over a mile in depth and is comparable in size to the Grand Canyon of Arizona. No instrument survey was attempted to determine the width of the Barranca from rim to rim. The general opinion is that it reaches a width of twenty miles

at some points and narrows to five miles at others. The Barranca de Cobre is shorter than the Grand Canyon, having a length of slightly over a hundred miles compared to a length of over two hundred miles for the Grand Canyon.

From the west rim at 8200 feet to the 6000 foot level, the slopes of the canyon are covered with a fairly heavy pine forest. At 6000 feet the pines give way rapidly to large oaks which in turn thin out and become smaller in size as the lower elevations are reached. At 4300 feet the first traces of the thorny and deciduous arid tropical plants are observed and at 4000 feet the first giant pitahaya cactus (*Lemaireocereus montanus*) are encountered. From this point down into the very bottom of the canyon, the slopes are covered with plants typical of the arid tropical association.

Although changes corresponding to those noted for the vegetation were evident in the avian population and certain species were found to be restricted to definite altitudinal zones, a few forms were found to move quite freely from one plant association to another. Some examples of the stratification of bird life on the slopes of the barranca are as follows:

Pine-oak 8200-6000 feet	Oak 6000-4300 feet	Arid tropical 4300-2900 feet
<i>Columba fasciata</i>	<i>Amazona finschi</i> †	<i>Heterocnus mexicanus</i>
<i>Rhynchopsitta pachyrhyncha</i>	<i>Otus tricopsis</i>	<i>Coragyps atratus</i>
<i>Otus flammeolus</i>	<i>Lampornis clemenciae</i> *	<i>Buteogallus anthracinus</i>
<i>Glaucidium gnoma</i>	<i>Colaptes cafer</i> *	<i>Caracara cheriway</i>
<i>Trogon mexicanus</i>	<i>Balanosphyra formicivora</i> *	<i>Scardafella inca</i>
<i>Cyanocitta stelleri</i>	<i>Dendrocopos arizonae</i>	<i>Leptoptila verreauxi</i>
<i>Parus sclateri</i>	<i>Aphelocoma ultramarina</i> *	<i>Ara militaris</i>
<i>Turdus migratorius</i>	<i>Myadestes obscurus</i>	<i>Piaya cayana</i>
<i>Sialia sialis</i>	<i>Icterus wagleri</i>	<i>Amazilia beryllina</i>
<i>Setophaga picta</i>	<i>Pipilo fuscus</i>	<i>Momotus mexicanus</i>
<i>Loxia curvirostra</i>		<i>Centurus uropygialis</i>
<i>Junco phaeonotus</i>		<i>Calocitta colliei</i>
		<i>Thryothorus sinaloa</i>
		<i>Polioptila nigriceps</i>
		<i>Basileuterus rufifrons</i>
		<i>Richmondia cardinalis</i>

† Ranges downward into arid tropical.

\* Ranges upward into pine-oak.

The occurrence of arid tropical plant growth along the bottom of the Barranca de Cobre, in Chihuahua, provides an interesting ecological condition wherein an arid tropical avifauna is able to extend itself far northward into the heart of the Sierra Madre Occidental. This long tropical corridor is northward on both sides by plant associations of pine and fir with their corresponding avifaunas.

The avian use of this deep corridor has been indicated by Moore (Condor, 40, 1938: 23-28) when he suggests that the Barranca de Cobre may provide a means whereby a species such as the Black-capped Vireo (*Vireo atricapillus*) is able to cross the Sierra Madre Occidental in its southward migration to wintering grounds on the arid tropical plains of the Sinaloa coast. By using the deep canyon troughs as migratory flyways, Moore believes that the species resident in the south-central United States can travel to and from Sinaloa without having to climb over the Sierra Madre proper. Black-capped Vireos are common on the coastal plains of Sinaloa in winter and the canyon-flyway theory may be the explanation of this phenomenon. In so far as is known, however, *Vireo atricapillus* has yet to be observed or collected in the Barranca de Cobre. We were especially watchful for migrants in the canyon bottom, but found only western forms such as *Piranga ludoviciana*, *Chlorura chlorura* and *Hylocichla ustulata*. It is entirely pos-

sible, however, that our observations in the canyon bottom between May 17 and May 20, 1950, were too late to detect the migration of the Black-capped Vireo.

The rugged terrain of southwestern Chihuahua has been visited by few ornithologists and it is felt that the work of those preceding our activities are worthy of note. McLeod (van Rossem, *Bull. Mus. Comp. Zool.*, 77, 1934:424-490), although primarily engaged in mining activities, collected worthwhile bird material from time to time through the years 1883 to 1885, inclusive. His itinerary in southwestern Chihuahua included the localities of Moris, Pinos Altos, Jesus Maria, Carmen, La Trompa, and Durazno. Frazar



Fig. 1. Barranca de Cobre from west rim near Cumbre, looking north.

followed McLeod and worked in the Pinos Altos area from June 2 to July 15, 1888, and at Bravo from July 18 to August 11 of the same year.

The first record of fieldwork in the immediate area of the Barranca de Cobre proper is that of Moore (*loc. cit.*) during the spring of 1934. Knobloch (*Anales Inst. Biol.*, 21(1), 1950:155-157) did a limited amount of collecting in the upper reaches of the Barranca de Cobre in May of 1940.

The following account of species lists only material collected or observed within the boundaries of Chihuahua. Subspecific determinations are given only when supported by specimens.

*Heterocnus mexicanus*. Tiger Bittern. A solitary bird of this species was observed by Sheffler as it flushed from along the bank of the Urique River, 2900 feet, below our camp at the bottom of the Barranca. This observation apparently constitutes the first record of the species for Chihuahua, as Frazar, McLeod, and Knobloch failed to record it.

*Anas discors*. Blue-winged Teal. On May 29 a pair of teal took flight ahead of the pack train in the deep Arroyo Guachero, two miles east of Naranjo, near the Chihuahua-Sinaloa border. The same



Fig. 2. Pine forests (*Pinus chihuahuana* and *Pinus lumholtzii*) near El Cajón, Chihuahua.

pair was again encountered and collected as they flushed several hundred yards downstream. Examination of the testes and ovaries showed both birds to be in breeding condition and the female would probably have laid within a few days.

*Coragyps atratus*. Black Vulture. A fairly common species along the bottom and lower slopes of the Barranca. Several individuals were noted on the Urique River at 2900 feet elevation.

*Cathartes aura*. Turkey Vulture. Turkey Vultures were common in the bottom of the Barranca where they fed on bird carcasses from our skinning tables. One individual was observed at 8200 feet elevation in the vicinity of our camp on the west rim.

*Accipiter cooperii*. Cooper Hawk. A breeding male was collected at El Muerto, 5600 feet, on May 9 in the heavy pine-oak forest. The bird responded to "squeaking" at a point along the trail where it had been observed the previous evening. Neither the female nor the nest could be located, although the breeding condition of the male indicated both must be close at hand. A circling bird of this species was observed at a lower elevation, 4500 feet, on the trail below El Muerto on May 8, 1950. Frazar collected two specimens of this species at Bravo in August of 1888 (van Rossem, *op. cit.*)

*Buteogallus anthracinus anthracinus*. Black Hawk. Black Hawks appeared to be a rather abundant species in southwestern Chihuahua and were observed and collected at several elevations and in varying associations. An adult male was taken among the alders in the bottom of Arroyo Hondo, 5300 feet, on May 10, 1950. The bird was one of a nesting pair and an inspection of the nest revealed one egg. The crop contents of this specimen included a large centipede, an adult neuropteran insect, one lizard, and two small fish. A single bird of this species was active about camp at the rim of the Barranca at 8200 feet on May 15 and another pair was observed along the Urique River in the bottom of the Barranca, 2900 feet, on May 18. One member of this latter pair was collected by Sheffler on this date and proved to be in breeding condition.

*Urubitornis solitaria*. Solitary Eagle. A sharp watch was kept for trace of this large, rare hawk which had heretofore been recorded only from southeastern Sonora. A single bird was observed by Sheffler on May 12 near El Refugio, 5900 feet, in pine-oak association. A second bird of this species was sighted by Sheffler on May 16 as it circled a tall pinnacle on the west slope of the Barranca at approximately 4000 feet elevation. Neither bird was collected.

*Caracara cheriway*. Caracara. Caracaras were observed in the arid tropical belt of the Barranca bottom between May 17 and May 20. What appeared to be a mated pair of birds was generally in sight about our camp in the Barranca bottom.

*Cyrtonyx montezumae mearnsi*. Montezuma (Mearns) Quail. This species is apparently quite common in the mountains of southwestern Chihuahua, as it was encountered at several points along the trail above 5000 feet elevation. A flock of quail was observed on May 10 in the deep, white-fir-choked canyon which leads down into Arroyo Hondo. A female collected from this flock by one of the Mexican pack men proved to be too badly mutilated to save as a skin. Assignment to race is based on the distribution as given in the check-list of Mexican birds (Friedmann, Griscom, and Moore, Pac. Coast Avif. No. 29, 1950:202).

*Meleagris gallopavo*. Turkey. Although no specimens were obtained, turkeys appeared to be quite plentiful in the high pine-oak country west of the Barranca. The pack train was moving too rapidly to allow collection of this species, but numbers of feathers, tracks and droppings of these large birds were common along the trail. The first evidence of the presence of turkeys was encountered above Metate at 5000 feet on May 9 and the Tarahumare Indians in the area reported turkeys as abundant at Arroyo Hondo, El Refugio, Guayachi (near type locality of *onusta*), and Techumichi, which is about a two-day ride southwest of the village of Churo.

*Columba fasciata fasciata*. Band-tailed Pigeon. Pigeons were common at Cumbre, 8200 feet, the location of our base camp on the west rim of the Barranca. There were many nesting pairs in the area and a bird collected on May 14 contained a hard-shelled egg.

*Scardafella inca*. Inca Dove. Several individuals of this species were observed along the main stream course of the Urique River and in the lateral canyons emptying into the Barranca proper.

*Leptotila verreauxi angelica*. White-fronted Dove. A common species in the arid tropical thickets of the Barranca bottom. A breeding male was taken by Sheffler on May 18 and a female in the same condition was obtained by Stager on May 19.

*Ara militaris*. Military Macaw. Macaws were first encountered in Chihuahua by our field party at Arroyo Hondo, where two pair flew continually back and forth across the deep canyon, making the narrow gorge ring with their raucous cries. The species was again observed in the Barranca de Cobre below the 6000 foot level. From our camp in the bottom of the canyon it was possible to observe two or three pairs flying in and out of the cliffs at about 4000 feet where they apparently were nesting.

*Aratinga holochlora*. Green Paroquet. A flock of paroquets was observed at Naranjo, 3100 feet, on May 7 and May 29. The flock, consisting of approximately 100 birds, was observed in evening flight to a roost in the Arroyo Guachero, east of Naranjo. The birds passed our camp so swiftly on both occasions that it was impossible to obtain specimens.

*Rhynchopsitta pachyryncha*. Thick-billed Parrot. Thick-bills were encountered only at Cumbre, 8200 feet, on the west rim of the Barranca. Shortly after our arrival at Cumbre on May 13 a flock of approximately 35 birds passed over our camp and began feeding on the terminal buds of a stand of Chihuahua and Lumholtz pines on the nearby hillside. Several specimens were collected and of those obtained, the males outnumbered the females two to one. The remainder of the flock continued to feed in the area of Cumbre and were still present at the time of our departure on May 21.

*Amazona finschi woodi*. Red-fronted Parrot. Parrots of this species were first encountered at El Muerto, 5600 feet, on May 9, 1950, when several individuals flew into the pines surrounding our trail camp. An adult male in prebreeding condition was collected by Stager. From El Muerto north-eastward the species appeared to be fairly common and a second specimen was taken at Cusáraga, 6300 feet, on May 10 by Sheffler. At the end of the first day's descent into the Barranca on May 16 camp was made in a stand of oaks at the 4700 foot level on the west wall. This particular group of oaks was evidently a parrot roost of long standing; just before dark several hundred Red-fronts came streaming in from their feeding grounds and began settling into the trees for the night. An adult male was collected from this flock. Red-fronts were not uncommon in the arid tropical growth at the bottom of the Barranca at 2900 feet elevation.

*Piaya cayana*. Squirrel Cuckoo. A single individual of this species was observed and shot in one of the lateral arroyos of the Barranca's bottom, but it was lost as a result of its falling into a deep crevice between giant boulders. The only other recorded occurrence of this species in Chihuahua are the two specimens taken by McLeod at La Trompa in 1885.

*Otus flammeolus*. Flammulated Owl. An adult male and female were collected by Sheffler on May 12 at a trail camp located at Baqueré, 7000 feet, 15 miles west of Churo. The pair of birds was noticed flying from branch to branch in the large Chihuahua pine above our skinning table. The birds made no sound and a search of the pines and oaks surrounding our camp the following morning failed to disclose a nesting site. At Cumbre on the Barranca rim, on May 15, Sheffler located a nesting female sitting on eggs in an abandoned woodpecker hole. The nest hole was in a dead pine snag about twenty feet off the ground. As Sheffler beat on the base of the snag, the nesting bird thrust its head from the hole. The bird proved to be a female and the nest contained three heavily incubated eggs. A search of several other woodpecker holes in the immediate vicinity of the nest failed to disclose the male bird. This species has not previously been recorded from Chihuahua.

*Otus trichopsis asperus*. Spotted Screech Owl. Judging from the number of specimens collected, the Spotted Screech Owl is apparently a fairly abundant species in the oak association and the pine-oak belt of southwestern Chihuahua. Sheffler secured an adult male at Cusáraga, 6300 feet, on May 10 and I collected a male in a stand of oaks on the west slope of the Barranca at 4700 feet on May 16. The latter bird was calling and was collected by "eye-shining." Three additional males were collected near Cerocahui on May 24 in the middle of the day; each was discovered sitting in the mouth of its roosting hole in medium-sized oak trees.

*Bubo virginianus pallescens*. Horned Owl. These owls were frequently heard in the mountainous area of southwestern Chihuahua. At Arroyo Hondo on May 11 a pair was heard calling long after daylight. I succeeded in decoying them down the mountainside and was able to collect the male. The bird was a postbreeding adult of very small size, but within the size range of *pallescens*. Sheffler later secured a large postbreeding female at Cusáraga, 6300 feet, on May 27.

*Glaucidium gnoma pinicola*. Pygmy Owl. On May 21 as the pack train neared the west rim of the Barranca on the return trip, one of the men observed a small owl sitting in a large oak tree above the trail at 7200 feet elevation. The bird was collected and proved to be an adult female. The specimen agrees in size and color with examples of the race *pinicola*.

*Asio stygius lambi*. Stygian Owl. This owl is apparently a rare species in the northern portion of its range and it was therefore of real interest to encounter it in Chihuahua. A mated pair was collected by Sheffler at El Muerto, 5600 feet, on May 8 in a forest of oak and Chihuahua pine. The first bird was taken as it flushed from its roost in a tall pine when it was alarmed by gunshots. A search of the immediate area revealed a large nest twenty feet up in a pine. The second bird left this nest as a man began to climb the tree. This individual, the female, was collected and examination of the gonads of both specimens indicated breeding condition; the female probably would have laid in ten days or less. The nest structure was an old one made of sticks and may have originally belonged to some species of hawk. This species had previously been recorded only as far north as Sinaloa and Durango.

*Caprimulgus vociferus arizonae*. Whip-poor-will. Whip-poor-wills of this species were common throughout the high country of Chihuahua, as individuals were heard calling in the vicinity of almost every trail camp. Several specimens were secured, including one individual exhibiting a good deal of melanism which was taken at Baqueré, 7000 feet. All specimens taken showed evidence of breeding, and eggs were obtained by Sheffler at El Cajón, 6500 feet, and Cusáraga, 6300 feet. Both sets, taken on May 23 and May 27, respectively, were heavily incubated and deposited in shallow depressions on the ground. The species was very easily "eye-shined" and all specimens were taken in this manner.

*Hylocharis leucotis borealis*. White-eared Hummingbird. This was apparently a common species in the Sierra Madre. On May 28 Sheffler collected an adult female at Cusáraga, 6300 feet.

*Amazilia beryllina viola*. Violaceous Hummingbird. Violaceous hummingbirds were encountered in the bottom of the Barranca, 2900 feet, where Sheffler took an adult female on May 17.

*Lampornis clemenciae bessophilus*. Blue-throated Hummingbird. Blue-throats were found to be exceedingly abundant at Cusáraga, 6300 feet, where they frequented the willow-bordered stream in the bottom of the small valley. A number of specimens was collected at this location by Sheffler on the return trip on May 25. All were breeding except for one immature male. I took an adult male May 17 in a stand of oaks on the west slope of the Barranca at 4700 feet.

*Eugenes fulgens fulgens*. Rivoli Hummingbird. These large hummers were fairly common at Cusáraga, 6300 feet. One adult male was taken at this locality by Sheffler on May 27.

*Trogon mexicanus clarus*. Mexican Trogon. Trogons of this species are fairly common in the mountains of southwestern Chihuahua at least at elevations up to 8200 feet. One was observed among the pines at Cumbre on May 13. An adult breeding male was taken on May 22, three miles west of



Fig. 3. Conifer-covered hillsides at east end of valley of Cusáraga, Chihuahua.

Churo in the pine-oak association. Trogons were heard calling at the bottom of the Barranca, 2900 feet, but none was taken there. These latter birds may have been *Trogon elegans*, which is the dominant species in the arid tropical zone of northern Sinaloa and southeastern Sonora.

*Momotus mexicanus*. Mexican Motmot. Motmots probably belonging to the race *vanrossemi* were heard calling at the bottom of the Barranca, 2900 feet, on May 18.

*Megaceryle alcyon*. Belted Kingfisher. One was encountered along the stream at the bottom of Arroyo Hondo, 5300 feet, on May 10 and a second bird was observed flying rapidly upstream at the bottom of the Barranca, 2900 feet, on May 18.

*Colaptes cafer collaris*. Red-shafted Flicker. Flickers were found to be fairly abundant in suitable localities throughout the mountain region of southwestern Chihuahua. Breeding birds were collected near Churo, 7000 feet, on May 23 and at Cusáraga, 6300 feet, on May 25.

*Balanosphyra formicivora formicivora*. Acorn Woodpecker. Woodpeckers of this species were common at elevations above 5500 feet. Large numbers were observed at El Muerto, 5600 feet, where I took an adult male on May 9. This species was also found abundantly at Cumbre at 8200 feet on the west rim of the Barranca.

*Centurus uropygialis*. Gila Woodpecker. A single specimen of this species was taken at the bottom of the Barranca on May 18, but circumstances made it impossible to save the bird as a specimen. As a result the species can only be tentatively assigned to the race *fuscescens*.

*Dendrocopos arizonae fraterculus*. Arizona Woodpecker. These woodpeckers were observed and collected at a number of localities above the 5000-foot level. They were most frequently encountered in an oak association, but they were also common in mixed pine and oak. Specimens were taken at El Muerto, 5600 feet, Cumbre, 8200 feet, and El Refugio, 6500 feet. The birds were preparing to nest and Sheffler estimated that an adult female collected would have laid within two days.

*Lepidocolaptes leucogaster umbrosus*. White-striped Woodhewer. Woodhewers were encountered only at Cusáraga, 6300 feet, on May 27. On this date a breeding pair of birds was taken in heavy pine-oak association. McLeod took three specimens of this species at Carmen in 1884 and 1885.

*Sayornis nigricans*. Black Phoebe. A solitary phoebe was observed feeding from a rocky perch in the middle of the Urique River opposite our camp at the bottom of the Barranca.

*Tyrannus tyrannus*. Eastern Kingbird. Sheffler observed a pair of these birds building a nest on May 12, six miles east of Cerocahui. The nest was fifteen feet above ground in a tree of a hedgerow.

*Myiodynastes luteiventris swarthi*. Sulphur-bellied Flycatcher. The only flycatcher of this species encountered in Chihuahua was a breeding male taken by Sheffler at Cusáraga, 6300 feet, on May 28. Several individuals had been observed at lower elevations in northern Sinaloa, but the species tended to become fewer in numbers as the Chihuahua border was approached.

*Myiarchus nuttingi inquietus*. Nutting Flycatcher. A breeding male was taken by Sheffler at the bottom of the Barranca on May 18. Other individuals were seen in the same locality.

*Myiarchus tuberculifer olivascens*. Olivaceous Flycatcher. A breeding female was taken by Stager on the west rim of the Barranca at 8200 feet on May 21. The bird was in the process of constructing a nest in a hollow snag six feet above the ground. The nest had not been completed and contained no eggs. Knobloch (1950, *op. cit.*) records the species at Mojarchic.

*Contopus pertinax pallidiventris*. Coues Flycatcher. This species was found breeding at El Cajón, six miles east of Cerocahui, on May 23, where an adult female was taken.

*Empidonax difficilis immodulatus*. Western Flycatcher. A small flycatcher of this species was found nesting on a rocky shelf of a small shelter cave at 7350 feet, a few miles west of Churo on May 13. The nest was of moss and was lined with rootlets and hair. The nesting site was so close to the mule trail that it was possible to ride up to it without dismounting. The first egg was present on May 13 and the bird, nest and set of three eggs were collected by Sheffler on May 22.

*Mitrephanes phaeocercus tenuirostris*. Tufted Flycatcher. These flycatchers were quite common in the pine-filled ravines along the west rim of the Barranca at 8200 feet and also at Cusáraga, 6300 feet. Specimens were taken at this latter locality on May 28, and many large young were noted out of the nest but still being fed by parent birds. A breeding male was taken by Sheffler near Churo, 7300 feet, on May 22.

*Tachycineta thalassina*. Violet-green Swallow. Swallows of this species were observed over the Urique River at the bottom of the Barranca between May 17 and May 19.

*Corvus corax*. Raven. Ravens were observed fairly frequently on the slopes of the Barranca as well as in the high pine-oak country lying to the west of the canyon. A nesting bird was located at Cusáraga, 6300 feet, on May 25. The nest structure was situated in the top of a tall pine. No attempt was made to reach the nest, but the bird was often observed going silently to and from the nest.

*Calocitta colliei*. Magpie-Jay. A single pair frequented the area about our camp at the bottom of the Barranca. Presumably the birds had a nest in the arid tropical growth on the opposite side of the Urique River from our camp, as their flights back and forth across the river were always silent with none of the raucous calls so characteristic of non-breeding birds of this species. McLeod obtained one specimen at Carmen on August 8, 1884.

*Aphelocoma ultramarina wollweberi*. Mexican Jay. From our observations, this large, soft-voiced jay appeared to be confined to a rather definite vegetative and altitudinal zone. All stations where the species was observed or collected were between 4700 feet and 6500 feet. Plant associations ranged from pure stands of oak to mixed pine-oak areas. The jays were abundant at El Muerto, 5600 feet, on May 8 and at Cusáraga, 6300 feet, May 10 and 25. They were absent from the west rim of the Barranca at 8200 feet, being replaced there by *Cyanocitta*, but they were again found common on the west slope of the canyon from 6200 feet on down into the oaks at 4700 feet. A nest with three heavily incubated eggs was found on the west slope of the Barranca a little above 6000 feet on May 21. A second nest was found on May 22 between Churo and Cusáraga at 6500 feet. It was placed well out on a lower limb of a Chihuahua pine twenty feet from the ground and it contained two fresh eggs. This nest was made of sticks, was lined with rootlets, and was adorned with lichens.

*Cyanocitta stelleri diademata*. Steller Jay. These jays were found abundantly from 6300 feet upward in heavy pine-oak and pine-fir forests. Several specimens were collected at Cumbre on the west rim of the canyon and at Cusáraga. All specimens taken showed definite indications of breeding, but no actual nesting sites were located at either of the two principal localities.

*Parus sclateri eidos*. Mexican Chickadee. Chickadees were not common and, although a diligent search was made for them, only two specimens were obtained in the Barranca area. An adult male was taken in the pine forest of the Barranca rim on May 21 and Sheffler obtained a female near Churo, 7200 feet, on May 22.

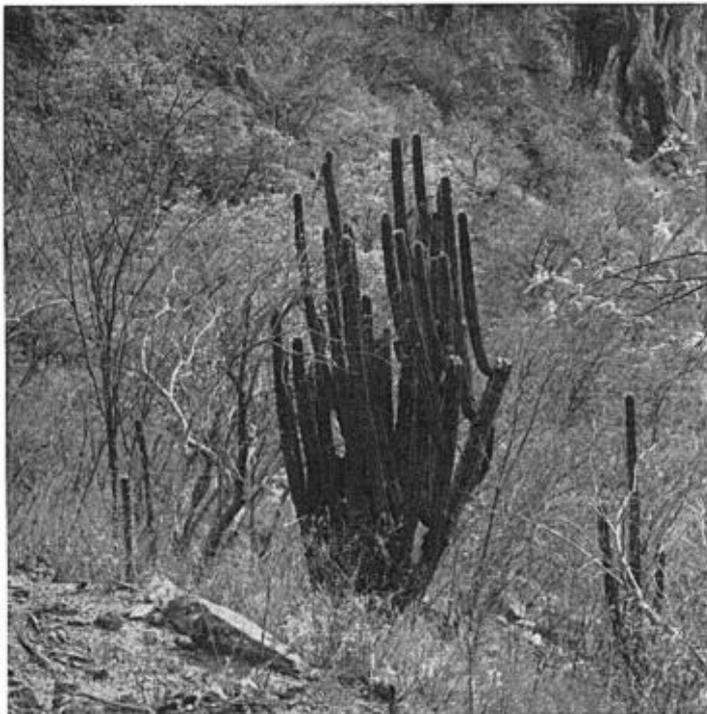


Fig. 4. Arid tropical growth on lower slopes of Barranca de Cobre. Pitahaya cactus in foreground.

*Parus wollweberi*. Bridled Titmouse. Titmice were found abundantly throughout the oak and pine-oak associations west of the Barranca. The species was abundant at Metate, El Refugio, Techumichi, Cusáraga, and west of Churo.

*Psaltriparus melanotis lloydi*. Black-eared Bush-tit. Although it is probably a common species throughout similar habitat of the region, the Black-eared Bush-tit was taken only at Cusáraga where Sheffler secured a breeding female on May 27.

*Sitta carolinensis umbrosa*. White-breasted Nuthatch. Nuthatches were found commonly at El Muerto, 5600 feet, where they were busy feeding among the pines and oaks.

*Certhia familiaris albescens*. Creeper. Creepers were noted commonly in the pine-oak association from El Muerto to Cusáraga.

*Campylorhynchus gularis*. Spotted Cactus Wren. This cactus wren was observed between El Muerto and Cusáraga (pine-oak association) and a breeding male was taken by Sheffler at the latter locality on May 10. A new nest was found beside the trail below the village of Metate on May 8. All stations where we encountered this species in Chihuahua are at greater elevations than those represented in the range given by van Rossem (Occas. Pap. Mus. Zool. Louisiana State Univ. No. 21, 1945:379) in his report on the birds of Sonora.

*Thryothorus sinaloa cinereus*. Sinaloa Wren. Two nesting pairs of this arid tropical species were taken at the bottom of the Barranca de Cobre. The first nest was located on May 18 and contained four eggs of approximately 8 days' incubation. The purse-shaped nest was made of grass and was

draped over a limb. The tunnel entrance was heavily lined with wool. A second nest containing a set of four fresh eggs was discovered by Sheffler on May 19. A third nest, located by Sheffler on May 29 near Naranjo, contained two wren eggs and a single egg of the Red-eyed Cowbird.

*Catherpes mexicanus mexicanus*. Canyon Wren. One of the most frequently heard bird notes in the bottom of the Barranca was that of the Canyon Wren. The species is extremely abundant all along the canyon floor and several specimens were taken. A nest containing six fresh eggs was found by Sheffler on May 17. The nest was constructed of small twigs, grass and spider webs, with a lining of wool and fine hair.

*Melanotis caerulescens effuticius*. Blue Mockingbird. A breeding pair was discovered in a lateral canyon of the Barranca bottom on May 17 and the female was taken. These were the only representatives of this species observed in the arid tropical growth of the canyon. At Cusáraga, 6300 feet, in heavy pine-oak association, at least two pairs were heard singing in the dense growth of the stream bed which enters the valley from the south. A breeding male was taken at this locality on May 27.

*Turdus migratorius propinquus*. Robin. This species was common throughout the mountainous area of southwestern Chihuahua and was observed and heard singing at many points along the trail. On May 22 Sheffler took an incubating female with a set of three eggs near Churo at an elevation of 6500 feet. The nest was 15 feet above the ground in a small pine. Unlike most robins' nests, it contained no mud cup; instead it consisted of an outer layer of heavy grass and twigs, a middle layer of moss, and a lining of fine grass. At El Cajón, 6500 feet, a second nest was located 15 feet up in a small oak and contained three eggs considerably incubated. On the same day another nest was found near Cerocahui, 6100 feet, which contained three fresh eggs. It was in a small cedar 8 feet above ground.

*Myadestes obscurus cinereus*. Ashy Solitaire. The melodious notes of this solitaire were heard more frequently than the bird was actually observed. A breeding male was taken by Sheffler at Arroyo Colorado, 4000 feet, near the Sinaloa-Chihuahua line on May 8. The bird was taken in a dense thicket on an oak-covered hillside. I collected a singing male among the rocky cliffs on the gorge at El Cajón, 6500 feet, on May 23, and a third male was taken by Sheffler at Cusáraga on May 27.

*Hylocichla ustulata ustulata*. Swainson Thrush. Nonbreeding thrushes were abundant along the Urique River course in the bottom of the Barranca and several specimens were taken on May 17 and 18. They also were abundant along the alder-shaded stream in the bottom of Arroyo Hondo at 5300 feet.

*Sialia sialis fulva*. Common Bluebird. A common species among the pines and oaks at El Muerto, 5600 feet, on May 9 where a male bird was taken. It also was common about our rim camp at Cumbre.

*Poliophtila nigriceps restricta*. Black-crowned Gnatcatcher. A breeding male which agrees with examples of this race was taken at the Barranca bottom on May 18, 1950. Gnatcatchers were abundant in the arid tropical growth of the canyon floor and Sheffler found a nest containing four heavily incubated eggs on May 19. In this instance the nest consisted of very small twigs and plant down held together with spider webs. It was lined with down and fibres of the "kapok" tree (*Ceiba acuminata*).

*Vireo solitarius pinicolus*. Solitary Vireo. A common species among the pines and oaks at El Muerto, 5600 feet, where an adult male was taken on May 9.

*Vireo gilvus brewsteri*. Warbling Vireo. An abundant species at Cusáraga, 6300 feet, on May 26, where Sheffler took a breeding female. Warbling Vireos were observed and heard singing at several other trail localities near Cusáraga.

*Vireo huttoni stephensi*. Hutton Vireo. The only individual of this species collected was a breeding male taken by Sheffler at Techomichi on May 11.

*Vermivora superciliosa palliata*. Chestnut-chested Warbler. Warblers were common among the pines at Cumbre on the Barranca rim on May 15 and amid the arid tropical growth of the Barranca bottom on May 19. The testes of a bird taken on May 15 was somewhat enlarged, but the species appeared not to be nesting on these dates.

*Peucedramus taeniatus arizonae*. Olive Warbler. Sheffler took a breeding pair at Cumbre on May 21. A number of other individuals of this species were observed in the high country in the pine-oak association between Cusáraga and El Muerto.

*Dendroica aestiva morcomi*. Yellow Warbler. A migrating female warbler apparently assignable to this race was taken by Sheffler at the bottom of the Barranca on May 19. A number of Yellow Warblers was observed moving up canyon at the lower elevations on this date.

*Dendroica graciae graciae*. Grace Warbler. Warblers of this species were fairly plentiful at several localities between Cumbre and El Muerto, where Sheffler collected a breeding female on May 19.

*Cardellina rubrifrons*. Red-faced Warbler. Common at several trail localities between Arroyo Hondo and Cumbre. At the latter locality the species was represented by several breeding pairs in the deep, shaded, lateral canyons leading down into the Barranca.

*Setophaga picta picta*. Painted Redstart. Common at suitable elevations throughout southwestern Chihuahua. Birds with eggs were found near Arroyo Hondo on May 10 and at Cumbre on May 16.

*Myioborus miniatus miniatus*. Slate-throated Redstart. This redstart, which is rare in northern México, was only encountered at Cusáraga at 6300 feet where it was a very abundant species. The heavy tree growth which fills the ravine on the south side of the valley at Cusáraga harbored many pairs of breeding birds. Several specimens were collected and, after considerable search, two nests were

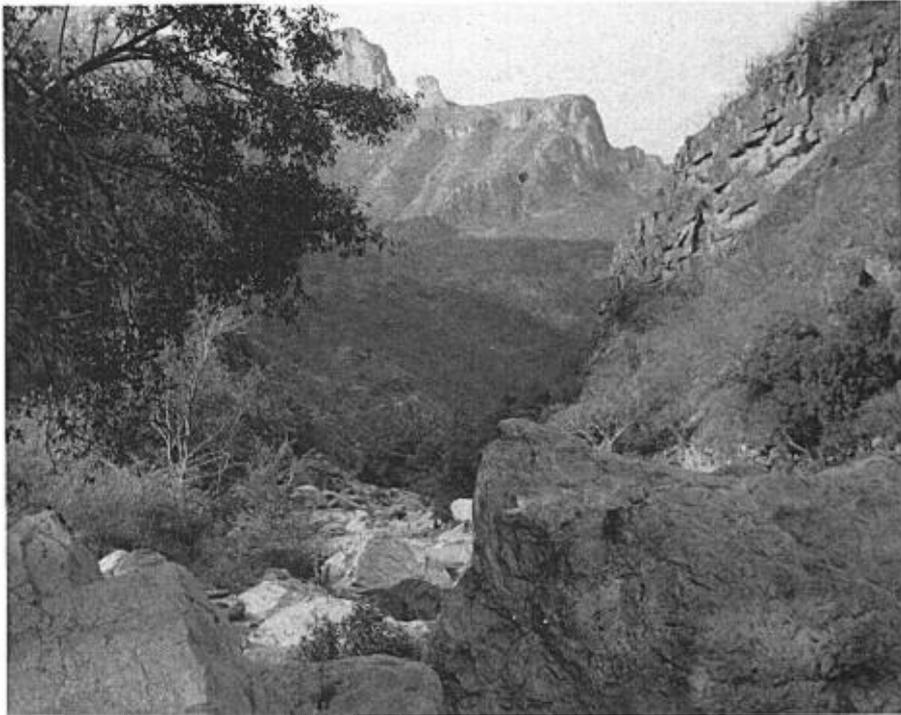


Fig. 5. Urique River course at bottom of Barranca de Cobre; Arid Tropical Zone.

located. The first nest, found on May 26, was placed in heavy grass growing on the bank of the stream approximately five feet above the water. It contained four eggs and was constructed of grass, adorned with gray leaves and one feather. The lining was of fine plant down. Pine needles had been carefully bent and draped over the nest so as to provide a side entrance. The second nest, also containing four eggs, was situated among the branches and broad leaves of a dense shrub in the bottom of the stream bed, completely hidden from view. Its presence was only detected by flushing the bird from the nest.

*Basileuterus rufifrons caudatus*. Rufous-capped Warbler. A solitary bird of this species was taken by me at the Barranca bottom on May 17, 1950. It was found foraging among the deciduous shrubs of the canyon bottom along the east bank of the river. The species was not encountered again.

*Passer domesticus*. House Sparrow. The ever-present House Sparrow was added to the avifauna of southwestern Chihuahua upon the discovery of several pairs of birds at Churo, 7900 feet, on May 13, 1950. The birds were noisily engaged in housekeeping in the tower of the old Jesuit church on the east fringe of the village.

*Tangavitus aneus milleri*. Red-eyed Cowbird. Cowbirds were observed at only one locality in Chihuahua and that was at Naranjo, 2600 feet, on May 7 and May 29. It was close to this locality that Sheffler also found the nest of *Thryothorus* that was parasitized by this cowbird.

*Icterus wagleri castaneopectus*. Wagler Oriole. Although a very common species in the Arid Tropical Zone of Sonora to the westward, the Wagler Oriole was encountered only once in southwestern Chihuahua. On May 16 Sheffler collected an adult female among the oaks half way down the west slope of the Barranca at the 4700 foot level. The species was not detected among the arid tropical growth of the canyon bottom.

*Piranga flava hepatica*. Hepatic Tanager. Tanagers of this species were common among the pines and oaks at El Muerto, 5600 feet, on May 9 when two adult birds, male and female, were collected.

*Piranga ludoviciana*. Western Tanager. A number of migrating Western Tanagers was noted in the arid tropical growth of the Barranca bottom between May 17 and May 19. The birds all appeared to be moving northward and no individuals remained in the immediate area of our river camp for long.

*Richmondia cardinalis affinis*. Cardinal. Cardinals were noted in the arid tropical growth of the Barranca bottom and an adult male assignable to this race was taken on May 17. On May 18 Sheffler took a nest and set of three heavily incubated eggs in the same area.

*Phœnicurus melanocephalus melanocephalus*. Black-headed Grosbeak. Encountered at Cusáraga only, where Sheffler succeeded in collecting a breeding male on May 26. Comparison of this individual with series of *melanocephalus* and *maculatus* indicates that it is referable to the former race.

*Passerina versicolor dickcyeae*. Varied Bunting. Buntings assignable to this race were noted as fairly abundant in the Barranca bottom between May 17 and May 20. An adult male was taken at this station on May 19.

*Carpodacus mexicanus*. House Finch. House Finches were fairly common about the camp area in the bottom of the Barranca between May 17 and 19. Sheffler found birds with fresh eggs at El Cajón (east of Cerocahui) on May 12 and close to Cerocahui, 6100 feet, on May 23.

*Loxia curvirostra stricklandi*. Red Crossbill. A small flock of crossbills was active among the pines about our rim camp at Cumbre at 8200 feet. Sheffler succeeded in collecting a juvenal male and an adult female on May 21.

*Chlorura chlorura*. Green-tailed Towhee. A solitary migrant towhee was taken on the hillside above the Barranca bottom on May 18, 1950. No other individuals of this species were observed.

*Pipilo erythrophthalmus griseipygius*. Red-eyed Towhee. Towhees were found commonly at Cusáraga on May 10 and again between May 25 and 27. All specimens taken were breeding birds, but no nests were found. Sheffler found a nest and three fresh eggs east of El Cajón, 6500 feet, on May 22. The nest was situated in a small shrub two feet off the ground and was constructed of coarse grass with a lining of fine grasses. A second nest containing two fresh eggs was found at Cerocahui on May 23, and it too was placed in a small bush two feet above the ground.

*Pipilo fuscus perpallidus*. Brown Towhee. These towhees were observed frequently in suitable localities at elevations between 5500 and 7000 feet. The stone fences enclosing the small ranches of the Tarahumare Indians were a favorite shelter for these birds. On May 22 near Churo, 6500 feet, Sheffler found a nest and three fresh eggs. The nest was in a small bush and was constructed of weed stalks. The lining was of fine grass and included some hair.

*Atlapetes pileatus dilutus*. Rufous-capped Atlapetes. This shy sparrow was encountered only at Cusáraga at 6300 feet, where I took an adult breeding male on May 10. All individuals observed were in heavy cover which choked the mouth of the wooded canyon leading into the valley from the south. A few individuals were seen again at the same location between May 25 and 27.

*Aimophila ruficeps simulans*. Rufous-crowned Sparrow. These sparrows were common throughout the higher elevations and in much the same type of habitat as that selected by *Pipilo fuscus*. I collected breeding birds at Guasagota, 6250 feet, on May 10 and at El Cajón, 6350 feet, on May 23.

*Junco phaeonotus palliatus*. Mexican Junco. Juncos were found only at Cumbre at 8200 feet on the west rim of the Barranca. In this area they were common, and specimens collected on May 15 showed evidence of nesting.

*Spizella passerina atramaeus*. Chipping Sparrow. A solitary incubating female and four fresh eggs of this species were taken by Sheffler six miles east of Cerocahui on May 12. The nest was placed among the branches of a small pine. This specimen is assignable to the race *atramaeus* after comparison with a series from nearby localities in the Robert T. Moore Collection.

*Los Angeles County Museum, Los Angeles, California, April 21, 1953.*