

BIRDS OF CERRALVO ISLAND, BAJA CALIFORNIA

By RICHARD C. BANKS

Cerralvo Island, like most of the islands in the Gulf of California, has been neglected by the many ornithologists who have worked in México. It seems that many biologists share the opinions of Bancroft (1932:180–181), who described Cerralvo Island in these words: "This, the first of our Gulf islands, was something of a shock to those of us who never before had been in the Vermilion Sea A volcanic uplift, abrupt and tawny and hot, the ugly mass lies a few miles offshore, uninhabited, unwatered, and unused We were well content that the representation elsewhere of its flora and fauna relieved us of obligation to struggle with this wedge of ash and lava."

The southernmost of the islands in the Gulf of California, Cerralvo (sometimes spelled Ceralvo or Ceralbo) lies at 24° 15' N latitude and 109° 53' W longitude. Approximately five miles from the nearest point on the Peninsula of Baja California, it is roughly 18 miles long and four miles in greatest width. A high ridge extends northwest to southeast the entire length of the island, reaching elevations of over 2500 feet. The island is rugged and deeply dissected. Along the shore steep cliffs rising from the water alternate with rocky or gravelly beaches at the mouths of the larger arroyos. Only at the southwestern point of the island is there a large sandy beach. The vegetation of the island is like that of the lowlands of the Cape region of Baja California in species composition and in general aspect. Although presently uninhabited, there are a few temporary fishing camps along the west shore of the island.

ACKNOWLEDGMENTS

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PREVIOUS WORK

Although neglected, Cerralvo Island has not been ignored completely. Previous collecting activity in vertebrate biology on the island has been reviewed by Banks (1962*b*), but that concerned with birds can be briefly summarized here. Only five investigations are involved: (1) E. W. Nelson and E. A. Goldman spent parts of three days on the island, February 10 to 13, 1906. Nelson (1921) recorded the presence of six species of birds but made no mention of specimens taken. They did secure, however, ten specimens representing five other species. (2) Eggs of the Elegant Tern (*Thalasseus elegans*) were collected on Cerralvo for J. E. Thayer in 1910 (Thayer, 1911). (3) The "Albatross" expedition spent three hours on Cerralvo Island on April 19, 1911. Three specimens were taken and one other species was recorded (Townsend, 1923). (4) The Cali-

ifornia Academy of Sciences expedition of 1921 stopped at Cerralvo on June 6. Four bird species were recorded; three sets of eggs and one skin were secured. (5) Donald R. Dickey visited the island on May 22 and 23, 1928; two records from his notes were published by van Rossem (1943), but the remainder of his observations, concerning 19 other species, are reported here for the first time.

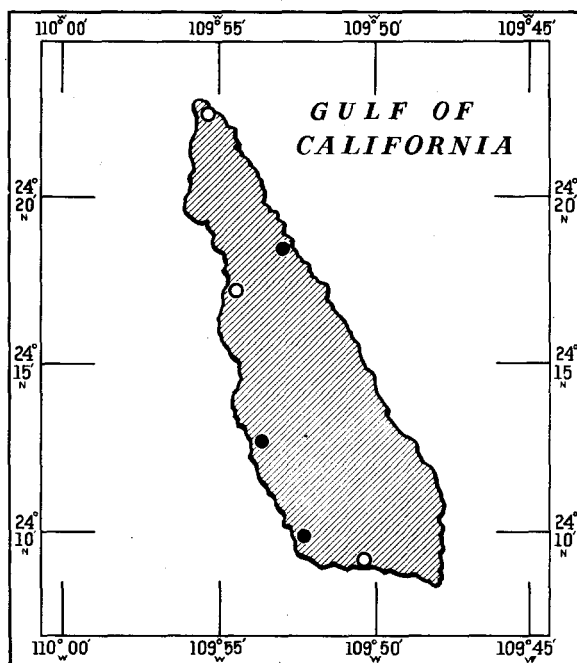


Fig. 1. Map of Cerralvo Island. Dots show locations of camp sites; circles show locations of briefer visits.

There is some duplication in the species observed by these investigators. However, at the beginning of the present study the known avifauna of Cerralvo Island consisted of 27 species, of which only 14 had been reported in the literature. Eggs or specimens of 12 species were available, although six of these had not been reported.

THE PRESENT STUDY

My studies on Cerralvo Island have been concerned primarily with the composition of the avifauna, with determining the status, relative abundance and distribution of the species on the island, and with obtaining such information on their biology as was possible. Since the degree of endemism of mammalian and reptilian forms on the island is known to be high, particular attention was paid to determining the systematic relationships of the populations on the island. Some of the results of these investigations have been published (Banks, 1962a, 1963), but the present paper constitutes the major report.

From October 25 to 30, 1960, Robert G. Crippen and I camped near the mouth of an arroyo on the east side of Cerralvo Island, approximately one-third of the way south from the north end of the island (fig. 1). This arroyo broadened and divided toward the interior and gave access to steep but climbable slopes covered with cardón (*Pachy-*

cereus pringlei), several other species of cactus, and shrubs or trees of *Bursera*, *Pachycormus*, and *Ficus*. The latter was more abundant at higher elevations (fig. 2). A number of species of annual plants were in flower. Near the head of one branch of the arroyo there was a small spring and several tiny pools of water. The ground cover was nowhere dense, but there were areas which were quite well vegetated.

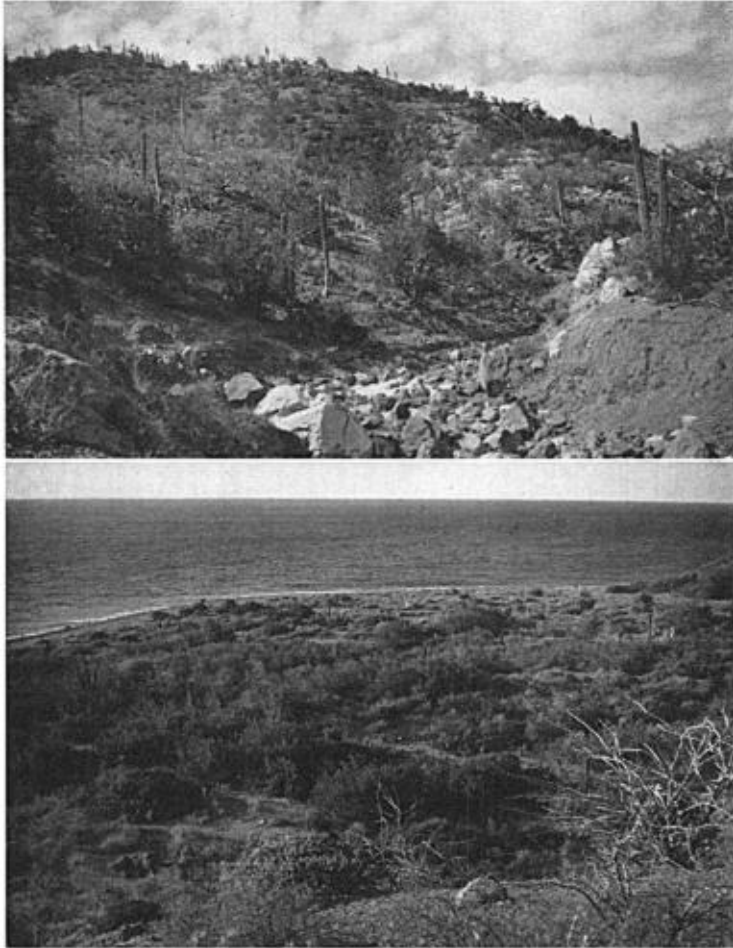


Fig. 2 (above). Arroyo on east side of Cerralvo Island.

Fig. 3 (below). Well vegetated flood-plain at mouth of arroyo near Ruffo's Ranch.

On October 23, 1961, Michael E. Soulé and I made camp near the site of the former Ruffo's Ranch, where we remained until November 9. This old ranch, represented now only by the remains of a stone-walled corral and a dry well, lies on the densely vegetated plain at the mouth of a broad, winding arroyo (fig. 3). The brush along the south edge of the arroyo, dense and thorny with a liberal allotment of cactus, was nearly impenetrable. The steep wall and ridges bounding the arroyo were heavily vegetated for the entire length of both major branches, except at the extreme heads. Two small puddles of water were found near a large granite outcrop, but no running water was found. Moist earth was found in several places.

Through the courtesy of a party of skindivers, I had the opportunity to visit several other areas of the island during the week of November 13 to 18, 1961. A steep, narrow arroyo at the north end of the island contained two large patches of tall reeds. There was a steady drip of water from a granite outcrop, a few small pools of stagnant water, and several patches of moist soil. The surrounding slopes and ridges, however, were the most barren seen on the island and supported only a sparse growth of cardón (fig. 4). The extreme southern end of the island is comparatively flat and the vegetation is thick and low. Here the cardón is less abundant but sour pitahaya (*Machaerocereus gummosus*) is more common.

With a party from the San Diego Natural History Museum, I visited an arroyo north of Ruffo's Ranch on the west side of the island on April 15, 1962. This arroyo is known locally as Arroyo Aguaje because of the permanent springs close to the shore. The water is potable but has an extremely sweet taste. The canyon is steep near the mouth, but above the springs it broadens into a flat, sandy wash.

Wesley M. Farmer and I camped from May 20 to June 3, 1962, near the southwestern point of the island, an area visited briefly on earlier trips. This part of the island, most amenable to landing, has been the site of nearly all previous investigations (Banks, 1962*b*). A large, flat, sandy area here (fig. 5) seems out of character with the rest of the island. Sparsely vegetated sand dunes are found only here. A large salt flat, apparently subject to periodic flooding, supports *Salicornia* and other halophilic plants. Brush to the north of this flat and in the mouths of several small arroyos is extremely dense. Even the largest arroyo is steep and narrow. Slopes and ridges are covered by nearly impenetrable brush.

Temperature data as obtained on a shaded maximum-minimum thermometer are summarized in table 1. Differences between succeeding high and low temperatures ranged from 12 to 36 degrees, the greatest spread occurring in late May. The highest temperature recorded, in the sun, was 115° F.

TABLE 1
TEMPERATURE DATA FOR CERRALVO ISLAND (°F.)

	Minimum		Maximum	
	Range	Mean	Range	Mean
Oct.-Nov., 1961	65-74	69.7	80-98	88.1
May-June, 1962	60-74	66.8	84-105	95.5

SPECIES ACCOUNTS

Loomelania melania. Black Petrel. These birds were seen over open water between the peninsula and Cerralvo Island on April 15, 1962, and between Cerralvo and Espíritu Santo islands, but closer to the latter, on April 17. Again on May 20 they were recorded between Cerralvo and the peninsula. The Black Petrel is not known to breed in the southern half of the Gulf of California (Grinnell, 1928), but these records of occurrence in the season during which breeding takes place farther north (Mailliard, 1923:445) are suggestive of a southern colony. Until further evidence is forthcoming, however, this species cannot be considered as part of the Cerralvo Island avifauna.

Pelecanus occidentalis californicus. Brown Pelican. These birds were seen in large numbers daily. At Ruffo's Ranch in October and November, 1961, groups totaling over 50 birds flew north nearly every morning and returned to the south each evening. On November 14 approximately 50 were seen in the shallow water at the south end of the island. Nelson and Goldman obtained two male specimens (USNM 203363-4) on February 13, 1906. A complete skeleton was picked up on the beach on November 14, 1961.

Sula leucogaster brewsteri. Brown Booby. A lone individual was seen just offshore from Ruffo's Ranch on October 30 and November 1, 1961. A female specimen was taken on February 12, 1906, by Nelson and Goldman (USNM 203338).

Phalacrocorax auritus. Double-crested Cormorant. Dickey's field notes for May 22, 1928, include the words: "Also saw two or three Farallon Cormorants." Although Grinnell (1928) records this species as being more abundant in the Gulf of California than the Brandt Cormorant, no birds definitely referred to this species were seen by me.

Phalacrocorax penicillatus. Brandt Cormorant. Cormorants were seen frequently along the west side of the island, in October and November and in May. Two skulls were picked up from the beach on May 25 and 26, 1962.

Fregata magnificens. Magnificent Frigatebird. Frigatebirds were seen nearly every day, soaring over both land and water. They were more frequently observed in the fall than in spring.

Ardea herodias. Great Blue Heron. Single individuals were flushed from the shore of the island on May 27 and 31, 1962. Mailliard (1923) reported that eggs were in an advanced state of incubation on June 6, 1921, and a set of three eggs of this date is in the California Academy of Sciences. Dickey (MS) reports nest building on May 22, 1928.

Leucophoyx thula. Snow Egret. One bird was seen flying south along the east shore of the island on October 28, 1960.

Cathartes aura. Turkey Vulture. This species was seen daily but in larger numbers in fall than in spring. In October and November circling groups of 10 to 20 birds were commonly noted, but in May vultures were seen singly or in small groups. Early on the morning of November 17, 1961, 61 Turkey Vultures were counted in cardóns at the southwestern point of the island; they began flying at about 8 o'clock.

The nature of the food supply for the large winter population of vultures is not clear. Refuse from temporary fishing camps on the island is probably the major item in the diet of these birds, but this food source is by no means constant. Goats, the only large mammals on the island, are apparently few in number. I never observed vultures feeding.

A completely tailless individual seen on November 1, 1961, seemed to have no difficulty in soaring or maneuvering.

Coragyps atratus. Black Vulture. Dickey (MS) lists "Black Vultures" as among the birds seen on Cerralvo on May 22, 1928. This record was later published by van Rossem (1943) and constitutes the only report of the species from Baja California. Dickey's notes for May 19, 1928, contain a reference to vultures with the word "Black" crossed out and "Turkey" inserted. This lapsus a few days previous to the entry for Cerralvo Island, in addition to the fact that there is no mention in his notes of the very abundant Turkey Vulture, is convincing evidence that this record of the Black Vulture is an error. Baja California, therefore, should not be included in statements of the range of this species.

Accipiter striatus. Sharp-shinned Hawk. A single bird of this species was seen on November 5, 1961.

Accipiter cooperii. Cooper Hawk. Individuals were seen on October 27 and 28 and November 1, 1961. On the latter date the hawk unsuccessfully pursued a small passerine bird.

Buteo jamaicensis. Red-tailed Hawk. This hawk was seen or heard almost daily. A dark-phase bird was observed on October 28 and 29, 1960, on the east side of the island. As many as five were seen together on several occasions; usually in such situations there was considerable fighting. Red-tailed Hawks were subject to harassment from both Ravens (*Corvus corax*) and Sparrow Hawks (*Falco sparverius*).

Aquila chrysaëtos. Golden Eagle. On October 26, 1961, an immature Golden Eagle soared over our camp. Almost immediately after its appearance a Red-tailed Hawk began to dive at it. Both birds gained altitude as the hawk continued the attack. The eagle ignored the hawk and soared out of sight over the island to the east. Grinnell (1928) had no records of the Golden Eagle south of 30° N latitude.

Pandion haliaetus. Osprey. Nelson (1921) included the Osprey in his list of birds seen on Cerralvo Island. They were seen regularly at each of my camps. In May a pair was seen carrying fish inland, presumably to a nest. A nest with young is recorded in Dickey's field notes of May 22, 1928.

Falco peregrinus. Peregrine Falcon. Dickey's field notes include the Duck Hawk among the list of birds seen. This is the only record for the island, and the status of this species there is uncertain.

Falco sparverius peninsularis. Sparrow Hawk. This species was among the six listed for the island by Nelson (*op. cit.*). It was present in small numbers in October and November, but I did not see it in the spring. Dickey (MS), however, listed it in May. A male weighing 84.2 gm. was taken on October 29, 1960; its stomach contained insect parts.

Porzana carolina. Sora. A partly cleaned skeleton was found on October 28, 1960, in an arroyo approximately 100 yards from the shore. The skull was clean, but the body was nearly intact and most of the feathers were still present.

Haematopus palliatus frazari. American Oystercatcher. Two pairs were present on the southwestern part of the island in May and June, 1962. The beach areas which they occupied, approximately a mile apart, were separated by steep cliffs. Nelson and Goldman took five specimens (USNM 203330-34) in February, 1906, which were never reported, although they presumably formed the basis for Ridgway's (1919) inclusion of Cerralvo Island in the range of the species. The unusual behavior of a bird taken by Dickey was recorded by van Rossem (1943).

Charadrius wilsonia. Wilson Plover. One was seen on the rocky southern end of the island on November 14, 1961.

Numenius americanus. Long-billed Curlew. A nearly complete skeleton was found at the edge of the salt flat on the southwestern side of the island on May 28, 1962. A few feathers, extremely worn and faded, still adhered to it.

Heteroscelus incanum. Wandering Tattler. An unreported male specimen (USNM 197825) taken by Nelson and Goldman on February 12, 1906, is the only record for the island.

Actitis macularia. Spotted Sandpiper. In the fall of 1961 these sandpipers were frequently seen on the rocky beaches. The single female specimen obtained on November 1, 1961, was fat (35.0 gm.) and was molting body feathers.

Catoptrophorus semipalmatus. Willet. Single birds were observed along the shore near Ruffo's Ranch in late October and early November, 1961.

Phalaropus fulicarius. Red Phalarope. Four phalaropes were seen near the island as we approached on October 23, 1961. Grinnell (1928) reported only two occurrences of this species in the Gulf of California.

Larus occidentalis. Western Gull. Individuals were seen frequently but irregularly; there was no large concentration of gulls at any time.

Larus heermanni. Heermann Gull. A number of adults and immatures was observed at the southwestern point of the island on November 17, 1961. The species was noted on only one other occasion. Townsend (1923) first reported this gull from Cerralvo Island.

Thalasseus elegans. Elegant Tern. Thayer (1911) reported on a series of eggs of the Elegant Tern which were taken on Cerralvo Island by Eduardo Menriquez. This series, of 23 sets, is in the Thayer collection at the Museum of Comparative Zoology. Although the collection dates are reported by Thayer (*op. cit.*) as April 9 and 15, 1910, the eggs are labeled April 9 and 10 of that year.

Terns which I saw offshore in November, 1961, were not definitely identified and may have been Royal Terns (*T. maximus*). Elegant Terns were not found on the island in June of 1921 (Mailliard, 1923). There were no terns present at the sandy southwestern point of the island on April 15, 1962. This is presumably the location of the colony visited by Manriquez. Feral house cats which regularly patrol the shores of the island may have contributed to the eradication of this colony; they would certainly prevent its re-establishment.

Zenaida asiatica mearnsi. White-winged Dove. One of the most common birds on the island, the White-winged Dove was seen in large numbers daily. A male taken on October 26, 1960, weighed 172 gm. and had testes 2 mm. in length. A female taken the same date weighed 158 gm. Her crop contained approximately 60 seeds weighing 6.5 gm.; they have been identified as seeds of *Bursera microphylla* and *B. cerasifolia* by Dr. Reid Moran. Dickey's notes indicate that he also took a specimen.

Six nests with two eggs each were found on May 22, 1962; at least one of these nests contained young birds on May 29, when a female nestling was collected. Another nest, also with two eggs, was found on May 28.

These specimens are referred to the race *Z. a. mearnsi* because I cannot distinguish the characters of *Z. a. clara* named by van Rossem (1947) from the Cape region of Baja California.

Columbina passerina pallescens. Ground Dove. These small doves were seen commonly in the fall months, but only three individuals were seen in May at the southwestern point of the island. Two of the latter seemed to be paired, but no nesting activity was noted. This species is less abundant than the White-winged Dove.

Males taken on October 27, 1960, October 25, 1961, and November 8, 1961, weighed 40.9, 34.2, and 42.2 gm., respectively; the latter bird had testes 3 mm. in length. A female taken on October 25, 1961, weighed 36.3 gm., and one dated May 24, 1962, had ova 3 mm. in diameter.

I follow Johnston (1961) in the use of the generic name *Columbina*.

Bubo virginianus. Great Horned Owl. Two of these owls were heard and seen at Ruffo's Ranch from October 23 to 29, 1961. Their calls became less frequent as the moon became less full. A nearly complete skeleton was found on the floor of an arroyo on the east side of the island on October 25, 1960.

Speotyto cunicularia hypugaea. Burrowing Owl. A female taken by Nelson and Goldman on February 12, 1906, is the only record for the island (USNM 197772).

Phalaenoptilus nuttallii dickeyi. Poor-will. A few Poor-wills were heard or flushed in October and November, 1961. They were quite common in May and June of 1962, when they began to call each evening about ½ hour after sundown. On June 1 we watched a Poor-will fly from the shore out over the Gulf, toward the mainland. It flew an estimated ½ mile before it returned to the island. Female specimens were obtained on October 27, 1961, and May 29, 1962; the former weighed 27.0 gm.

Calypte costae. Costa Hummingbird. This species is widely distributed on the island. Often the birds seen had yellow pollen on their throats and foreheads. Males taken on October 27 and 29, 1960, weighed 3.8 and 2.7 gm., respectively; the difference in weight was largely, if not entirely, a result of subcutaneous fat deposits in the heavier bird. A female weighing 2.4 gm. was taken on November 7, 1961, and another female was obtained on May 27, 1962.

Hylocharis xantusii. Xantus Hummingbird. Apparently slightly less abundant than the former species, the Xantus Hummingbird prefers the higher portions of the island. A female, on October 27, 1961, uttered a loud, rapid series of chips, which she repeated several times. Males secured on October 29, 1960 (3.4 gm.), and October 24, 1961 (3.8 gm.), had testes of 2 and 2.5 mm., respectively. A female weighing 3.4 gm. was taken on October 27, 1961.

Megaceryle alcyon. Belted Kingfisher. A single bird was seen at the south end of the island on November 14, 1961.

Centurus uropygialis brewsteri. Gila Woodpecker. This large woodpecker is abundant on Cerralvo Island and is quite conspicuous. Dickey (MS) recorded its presence in May, 1928, but it is surprising that the species was not reported by other observers. The birds are seldom seen singly but rather are usually in groups of two to six. They frequent fig trees and pitahaya cactus as well as the large cardón. Three birds were seen leaving holes in cardóns, presumably nesting cavities, on May 30 and June 1, 1962.

A total of five males and five females was collected. Four males averaged 66.7 gm., and four females averaged 56.75 gm. Males were recorded with 1 mm. testes in October but with 8 mm. testes in May. Several birds were infested with nematodes.

Dendrocopos scalaris soulei. Ladder-backed Woodpecker. Although occasionally seen high on cardóns, these woodpeckers were most commonly observed feeding in dense vegetation only a few feet from the ground. However, five nests located between May 25 and 30, 1962, were all near the tops of cardóns, 10 to 15 feet above the ground. At each nest the adults were carrying food to the noisy young.

A female taken on October 26, 1960, was molting on the body and crown, but other specimens taken in late October had completed the molt. Eleven females and three males were taken as specimens. Six of the females had an average weight of 29.45 gm., whereas two males averaged 33.3 gm. Testis measurements were 3 mm. in November and 7 mm. in May.

This subspecies was recently described as endemic to the island (Banks, 1963).

Myiarchus cinerascens pertinax. Ash-throated Flycatcher. Townsend (1923) first reported this species from Cerralvo Island, where it is fairly abundant. The male specimen taken by Townsend,

on April 19, 1911, is now in the United States National Museum (no. 305859). Ash-throated Flycatchers were observed eating the fleshy fruits of *Bursera* on October 28 and 29, 1960; the stomach of one bird so observed contained two large seeds but very little insect material. On June 2, 1962, one of a nesting pair repeatedly carried berries from a *Bursera* tree to the young birds. A perfectly cleaned skull, not associated with any other remains, was found in an arroyo on June 1, 1962.

Because of a lack of fresh material, Lanyon (1961) was unable to report on weight or the color of the mouth lining of this race of the Ash-throated Flycatcher. The mouth lining is "flesh-colored" as he reported for the more northern form. Weights of four males taken in October and November, including one from the peninsula, ranged from 28.9 to 30.6 gm. and averaged 29.75 gm. Two females weighed 25.3 and 36.5 gm. These weights are greater than those recorded by Lanyon (*op. cit.*:432) for *M. c. cinerascens*.

Three males and seven females were collected on Cerralvo, besides the skull mentioned above. Females on May 21 and 23 had brood patches.

Empidonax difficilis difficilis. Western Flycatcher. This species was recorded twice in late October of 1961. An immature male taken on October 27 weighed 9.8 gm. and was molting on the head and body.

Contopus sordidulus peninsulae. Western Wood Pewee. The single pewee seen on November 8, 1961, is assumed to have been a wanderer from the peninsula. It was a very fat male bird (12.6 gm.) with a fully ossified skull. The stomach contained several beetles.

Tachycineta thalassina. Violet-green Swallow. Two swallows were seen near our camp on October 30, 1961. On May 30 and 31, 1962, one bird was flying over the ridge north of the arroyo near camp.

Corvus corax. Common Raven. Although probably not present in great numbers, ravens are very conspicuous on the island. They were included in Nelson's (1921) list of the six most common land birds. Early in the morning of October 25, 1961, a group of 25 ravens flew south past camp; usually not more than two were seen together, however. On several occasions ravens were seen chasing or attacking Red-tailed Hawks.

Auriparus flaviceps flaviceps. Verdin. The Verdin is one of the most common birds on the island. It was first reported by Townsend (1923) on the basis of a male specimen (USNM 305963) taken on April 19, 1911. Verdins were often associated with Blue-gray Gnatcatchers and Black-throated Sparrows, forming small groups which appeared to move and forage together. Verdins were also seen foraging on or around the flowers of the giant cardón.

Brewster (1902) gave the breeding season as April to November in the Cape region of Baja California. A bird was seen entering a nest on October 26, 1961, but I have no evidence of breeding in October or November. Male birds taken in these fall months had testes only 1 mm. in length whereas testes measured 4 or 5 mm. in April and May. Mailliard (1923) reported a set of eggs taken on Cerralvo Island on June 8, 1921. Seven nests found between May 22 and June 2, 1962, contained from one to three young birds in various stages of development. One member of a pair observed on June 2 was carrying material for a nest lining. All active nests found were about three feet above the ground in pencil cholla cactus.

Thirteen specimens were taken on the island. Weights of nine of these, not segregated by sex, ranged from 6.1 to 7.5 gm. and averaged 7.14 gm.

Troglodytes aedon. House Wren. Several of these birds were seen, and others heard, in late October and November, 1961. They were extremely shy.

Catherpes mexicanus conspersus. Canyon Wren. A Canyon Wren was seen and heard near a spring in a canyon on the northwestern part of the island on April 15, 1962. A female secured the following day near Ruffo's Ranch by Mr. Chris Parrish is now in the San Diego Natural History Museum.

Sialpinctes obsoletus obsoletus. Rock Wren. Nelson (1921) included the Rock Wren in his list of birds observed on the island. It is a fairly common resident; more were observed on the east side of the island than in other areas. A male weighing 15.1 gm. was taken on October 26, 1960, and a female weighing 12.8 gm. was secured on October 31, 1961.

Mimus polyglottos leucopterus. Mockingbird. Mockingbirds were much less abundant in the southwestern part of the island in the spring than in other parts in the fall months. What appeared to be courtship behavior was observed in early November, 1961, when territoriality was quite evident.

The stomach of a bird taken on November 7, 1961, contained seeds of *Bourreria sonora*, a plant on which the species had previously been noted feeding. Four specimens were obtained.

Toxostoma cinereum cinereum. Gray Thrasher. This bird was not observed on the east side of the island in 1960. It was present in small numbers around Ruffo's Ranch in the fall of 1961 and at the southwestern part of the island in the spring of 1962. Remains of large ground beetles were found in the stomachs of two males taken on October 31 and November 8, 1961. These birds weighed 63.7 and 59.3 gm., respectively. Testes of the latter measured 2 mm.

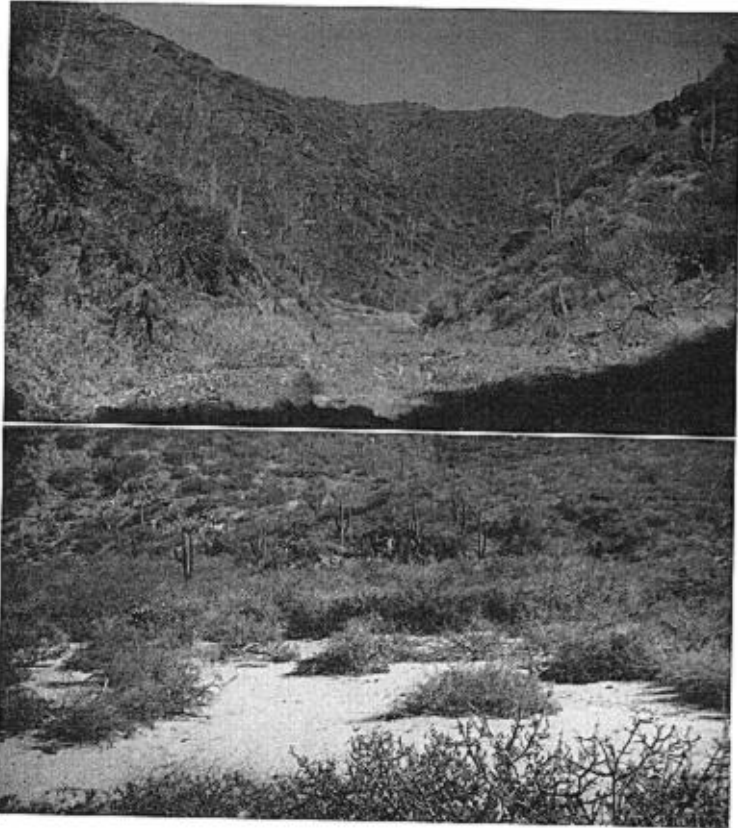


Fig. 4 (above). Sparse vegetation on north end of Cerralvo Island.

Fig. 5 (below). Sand flat at southwestern point of the island.

Poliophtila caerulea obscura. Blue-gray Gnatcatcher. This is an abundant bird on the island, perhaps even more common than the Verdin, with which it is often associated. A nest in a *Jatropha* contained two young birds which left on June 2. Other juveniles had been seen with their parents on the preceding days. A juvenal male was taken on May 23, 1962. Four of the six specimens secured averaged 5.3 gm. in weight.

Bombycilla cedrorum. Cedar Waxwing. This species was observed only on November 6 and 7, 1961, at Ruffo's Ranch.

Lanius ludovicianus nelsoni. Loggerhead Shrike. Shrikes were seen occasionally in the fall months but are not common on the island. I did not see the species in the spring on the southwestern side of the island, but Dickey (MS) recorded them in that area in May, 1928. A male taken on October 27, 1960, had testes 1 mm. long.

Vermivora celata orestera. Orange-crowned Warbler. This species was occasionally seen in November of 1961. An adult female taken on November 1 weighed 8.0 gm.

Dendroica petechia. Yellow Warbler. This species was seen only once; the immature female taken on November 8, 1961, was fat and weighed 10.2 gm. It has tentatively been referred to the race *D. p. morcomi*.

Dendroica auduboni auduboni. Audubon Warbler. This was the most commonly seen warbler in the fall of 1961. Several were seen on the ground, feeding on low annual weeds. Two specimens were obtained—an immature female weighing 9.9 gm. on October 27, 1961, and an adult male, November 5, 1961, weighing 10.0 gm.

Icterus cucullatus trochiloides. Hooded Oriole. No Hooded Orioles were seen on the east side of the island in 1960, but several were noted in the fall of 1961 in the vicinity of Ruffo's Ranch. A female appeared to be carrying food on April 15, 1962, but a male taken on that date had testes only 3 mm. in length. An immature male specimen weighed 23.2 gm. on October 26, 1961; an adult female, taken on November 6, weighed 26.7 gm.

Icterus parisorum. Scott Oriole. A single male Scott Oriole was seen near Ruffo's Ranch on October 28, 1961. Two pairs were observed in May, 1962. The female of one pair twice entered a hole near the top of a decayed cardón on May 24; nest material showed through the exposed ribs of the cactus. A male with testes 10 mm. long was taken on May 22, 1962.

Euphagus cyanocephalus. Brewer Blackbird. A blackbird flew past camp at 6:45 a.m. on October 25, 1961, and a few minutes later it was caught in a mouse trap baited with walnut. It was the only bird of this species seen on the island. An immature male, it weighed 51.5 gm. and had testes 1 mm. in length.

Molothrus ater artemisiae. Brown-headed Cowbird. The dried remains of a cowbird were found on the salt flat near camp on June 1, 1962. The fully feathered head and wings were saved, making possible the determination of sex (male) and subspecies. This race has only once previously been reported from the southern part of Baja California (Grinnell, 1928).

Richmondia cardinalis clintoni. Cardinal. The Cardinal has been observed on all parts of the island which have been visited, and it is one of the most abundant birds. Cardinals were observed feeding on the flowers of the cardón in May and June. Farmer saw a male at a nest under construction on May 30, 1962.

A total of 10 males and five females were secured as specimens. The average weight of seven males from October and November is 39.5 gm.; for four females taken in the same months the average weight is 33.7 gm. Males in the fall months had testes 2 or 3 mm. long, whereas in birds taken in the spring the gonads measured 7 to 9 mm.

This form is endemic to Cerralvo Island (Banks, 1963).

Passerina amoena. Lazuli Bunting. A single individual was seen near a spring high in the arroyo above Ruffo's Ranch on October 29, 1961. It was an immature male with no fat, weighing 14.5 gm.

Carpodacus mexicanus. House Finch. Although Nelson (1921) listed the House Finch as one of the most common birds on Cerralvo Island, it was seen only occasionally during my visits there. Groups of three to five were noted several times in the fall of 1961 and the spring of 1962, and single birds were observed from time to time.

Chlorura chlorura. Green-tailed Towhee. This bird was abundant on the island in the fall months. An adult male taken on October 28, 1960, weighed 30.3 gm. and had no fat.

Chondestes grammacus strigatus. Lark Sparrow. A few Lark Sparrows were seen in the fall of 1961, usually in association with Black-throated Sparrows. Immature males secured on October 26 and November 3 weighed 23.8 and 24.4 gm.; an adult male on the latter date weighed 26.8 gm.

Amphispiza bilineata belvederei. Black-throated Sparrow. This is one of the most common species on the island, as reported by Nelson (1921). Although most foraging was observed among annual plants in the washes, one bird was seen feeding at a cardón flower.

Van Rossem (1945) pointed out that Black-throated Sparrows in different parts of Baja California have different breeding seasons. His evidence suggested autumnal, or post-rainy season, breeding in the Cape region, although the birds on nearby Espíritu Santo Island seemed to breed in the spring and summer. In view of this, it seems appropriate to record in some detail the available information on the breeding of this species on Cerralvo Island.

No adult birds in breeding condition were taken in the fall months, when the population was composed largely of immature birds. Most specimens taken between October 24 and November 6,

1961, showed signs of either postjuvinal or postnuptial molt. An adult male taken on October 24, 1961, had testes only 1 mm. in length. A male taken on April 15, 1962, had testes 4 mm. long, but three females of the same date showed no indication of breeding. A male taken on May 21 had testes 8 mm. in length and a cloacal protuberance; a nest found that day held three eggs which hatched on May 25 or 26. Five of six males collected between May 21 and June 2 had testes 7 or 8 mm. long. A female on May 24 had an egg in her oviduct; another showed no evidence of breeding on June 2, although she was mated. In the California Academy of Sciences there is a set of eggs taken on Cerralvo on June 6, 1921 (see Mailliard, 1923).

Part of van Rossem's evidence of fall breeding in the Cape region was the presence in collections of birds in juvenal plumage taken in the winter months. One bird so feathered was taken on Cerralvo on October 26, 1960. Others in juvenal plumage or still in early stages of the postjuvinal molt were seen until early November, 1961. Immature birds in various plumage combinations were in flocks of 20 to 30 birds at that time of year, whereas adults were seen only singly or in pairs. The large flocks had not yet broken up by April 15, 1962.

This evidence suggests a breeding season for this species on Cerralvo Island beginning in mid-May and extending perhaps into late September or even early October. If the season is as long in other parts of Baja California, breeding evidence drawn from specimens obtained on short collecting trips may be misleading. The whole question of the breeding season of this species in Baja California needs a much more thorough analysis.

Seventeen males and seven females were taken as specimens. A specimen from 1921 is in the California Academy of Sciences. Weights of nine males taken in the fall averaged 12.8 gm.; two fall females averaged 12.5 gm.

This form of the Black-throated Sparrow is endemic to Cerralvo Island (Banks, 1963).

Spizella pallida. Clay-colored Sparrow. Common in November, 1961, this species was often noted mixed with flocks of Black-throated Sparrows. A very fat immature female on November 2 weighed 10.5 gm.; an immature male taken on November 6 weighed 10.0 gm.

Spizella breweri breweri. Brewer Sparrow. An immature female weighing 9.5 gm., taken on October 25, 1961, was the only one recorded on the island.

Zonotrichia leucophrys gambelii. White-crowned Sparrow. Both adult and immature White-crowns were seen frequently in the fall. A male taken on October 27, 1961, weighed 19.6 gm.; females taken on October 28 and November 4 weighed 19.1 and 18.8 gm., respectively. All specimens were in immature plumage.

Melospiza lincolni alticola. Lincoln Sparrow. A single bird was obtained near a spring on the east side of the island on October 29, 1960. It was an immature male and weighed 16.4 gm.

Calcarius lapponicus lapponicus. Lapland Longspur. A longspur found dead in an arroyo on the south end of the island on November 14, 1961, represents the only record (Banks, 1962a).

ANALYSIS OF THE AVIFAUNA

Excluding the Black Petrel and Red Phalarope, 67 species recorded from Cerralvo Island may be placed in four categories according to their status, as follows: resident and breeding birds, 31 (46 per cent); winter visitant or migrant, 24 (36 per cent); wandering or wide-ranging species, 10 (15 per cent); and stragglers, 2 (3 per cent).

A few of the birds classified as residents or breeders on the island are included because of their occurrence there during the proper season and because of their sedentary habits. All are known to nest on the nearby peninsula. The Sparrow Hawk and Loggerhead Shrike were not observed in the spring, but because their predatory habit implies a rather low population level, they may have been overlooked. The Burrowing Owl is included here although it may no longer occur on the island.

The list of winter visitors and migrants would probably be increased with additional work on the island. It is unlikely that any of these species will ever occur in any other status.

Most of the wandering and wide-ranging species are water or shore birds. Some of these nest in the Cape region but probably not on the island. The Elegant Tern is

included here despite the previous nesting records because it is not believed to nest on Cerralvo at the present time.

The two birds considered to be stragglers are the Golden Eagle and Lapland Longspur.

As far as can be determined from the relationships of the birds that breed on Cerralvo, the avifauna of that island is entirely Baja Californian with no influence from the mainland of México across the Gulf of California to the east.

THE ABSENCE OF SPECIES

Comments concerning the absence of birds from an area must be made with the realization that they may some day be proven wrong. However, the lack of observations on Cerralvo Island of certain species which are common in similar or identical habitat on the peninsula of Baja California only a few miles away deserves some mention, even though the depauperate nature of insular faunas is well known.

The Cactus Wren (*Campylorhynchus bruneicapillus*) is a common bird in the southern part of Baja California (Grinnell, 1928). I have observed it at all areas visited around La Paz and at Bahía de los Muertos, a peninsular locality not far from Cerralvo. The vegetation in these areas is similar to that on the island, but it is more continuous because the land is less dissected. Nonetheless, there are large areas of apparently suitable habitat on Cerralvo, especially on the south end. It is difficult to believe that such a noisy and distinctive species could have been overlooked.

The substance of the preceding paragraph could be repeated for the Scrub Jay (*Aphelocoma coerulescens*), Brown Towhee (*Pipilo fuscus*), California Quail (*Lophortyx californicus*), Gilded Flicker (*Colaptes chrysoides*), Black-tailed Gnatcatcher (*Polioptila melanura*), and Pyrrhuloxia (*Pyrrhuloxia sinuata*), although these species seem somewhat less abundant on the peninsula than is the Cactus Wren. All seven species are relatively sedentary, but it is doubtful that any of them, with the possible exception of the quail, would be unable to fly the short distance from the mainland to the island.

The subspecies of the California Quail in the Cape region, *L. c. achrusterus*, is not greatly different from its more northern relatives and in many characters is at the end of a southward cline (Banks, MS). This suggests that the subspecies did not develop in isolation during the separation of the Cape from the rest of the peninsula but rather that it represents an adjustment to the slightly different environmental conditions encountered by a species extending its range. The rejoining of the Cape region to the peninsula has apparently taken place since the separation of Cerralvo Island and the Cape (Durham and Allison, 1960). Thus the quail, not noted as a long distance flyer, may have been unable to reach the island by either land or air.

The Scrub Jay of the Cape region shows its greatest affinities to the populations of the California coastal areas and may similarly be a relatively recent arrival in the Cape region (Davis, 1959:82). Its absence on Cerralvo Island is probably not associated with an incapacity for extended flight, however.

Competition from the Gila Woodpecker, Blue-gray Gnatcatcher, and Cardinal might be invoked as a factor in the absence of the Gilded Flicker, Black-tailed Gnatcatcher, and Pyrrhuloxia, respectively. The members of each of these species pairs have been seen in close proximity without conflict on the mainland, however. Unless competition for nest sites, food resources, and/or territories increases as land area decreases, it is probably not a factor in the absence of these forms from Cerralvo.

It should be mentioned here that, with the exception of the Black-tailed Gnatcatcher, these seven species are apparently absent from all the Gulf islands associated

with Baja California. No good explanation of this absence can be provided at this time, however.

SUMMARY

An intensive survey of the avifauna of Cerralvo Island revealed the presence of 69 species on the island or in nearby waters. Of these, 31 are considered to be breeding species. Three of these are represented by endemic races. The Elegant Tern and Burrowing Owl, previously reported from the island, may no longer occur there. An earlier record for the Black Vulture is shown to be in error.

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