

RELATIONSHIPS OF THE AVIFAUNA OF SAN ESTÉBAN ISLAND, SONORA

RICHARD C. BANKS

Bureau of Sport Fisheries and Wildlife
U.S. National Museum
Washington, D.C. 20560

San Estéban Island, Sonora, México, lies in the Gulf of California approximately midway between the mainland of México and the peninsula of Baja California, at a latitude of 28° 40' N. It forms the center link of a chain of islands across the Gulf, being slightly nearer Tiburón Island on the Sonoran shore than to South San Lorenzo Island on the Baja California side. Tiburón is a large island, very near shore, with a large avifauna and several endemic forms (van Rossem 1932), whereas South San Lorenzo is small with a meager avifauna. The birds of Tiburón are all closely related to those of Sonora, and the species on San Lorenzo are all identical with those of Baja California. Although the avifauna of San Estéban Island is small, it includes seven species which vary geographically and of which, therefore, one can attempt to determine relationships.

The first impression that one obtains, from looking at maps or from visiting the area, is of the proximity of San Estéban to Tiburón, which suggests that the affinities of the biota of the former should be with Sonoran forms. A. J. van Rossem, who is responsible for virtually all the published information about the birds of San Estéban Island, originally held that viewpoint and assigned specimens from that island to subspecies found on Tiburón and the Sonoran coast. For example, van Rossem (1930b) stated that his "Tiburón Island District" of Sonora "includes also San Estéban Island."

In later writings, however, van Rossem re-investigated the subspecific status of the geographically variable San Estéban birds and came to quite different conclusions. In 1942 he assigned specimens of three species to races found in Baja California rather than to Sonoran forms, and he emphasized his changed viewpoint on a number of subsequent occasions, stating, for example, "San Estéban Island, although politically a part of Sonora, is Baja Californian in its avifaunal relationships..." (van Rossem 1945a:243). The clearest expression of this concept is set forth in a discussion

of the avifaunal areas of Sonora, where he states (van Rossem 1945b:24): "The San Lucan, a term coined by Dice for the southern three-fourths of Baja California, is used with extreme reservation. If employed here it does not imply acceptance of the proposal to recognize Baja California as a separate 'Biotic Province' but to emphasize the character of the avifauna of San Estéban Island. This island which lies almost exactly in mid-Gulf is a political accident so far as the present report is concerned for only one bird, a thrasher, belongs to the Sonoran mainland avifauna. So far as is known at this time all the other indicative resident races (except for an *Amphispiza*) are those of Baja California or more particularly of the San Ignacio District (of Grinnell, 1928)." The San Ignacio District as outlined by Grinnell (1928:8) covered about the central two-thirds of the peninsula and was characterized as "poorly developed as regards endemic differentiates."

The subspecific assignments of the birds of San Estéban made by van Rossem (1945b) were accepted by the committees that prepared the most recent A.O.U. and Mexican check-lists. My own work in Baja California and on the islands in the Gulf of California (Banks 1963; see also Lindsay 1962, 1966) has led me to question some of the reported subspecific determinations and thus to reopen the question of the relationships and affinities of the San Estéban avifauna. In the course of the reassessment reported here I have examined all available material from that island, including most of that seen by van Rossem and several recently taken specimens. In each of the seven species accounts which follows, I present briefly the history of the nomenclature of the San Estéban population prior to setting forth my own concept of its relationship.

DENDROCOPOS SCALARIS

When he first reported the Ladder-backed Woodpecker on San Estéban Island, van Rossem (1931) listed his single specimen under the name *D. s. cactophilus*. Later (van Rossem

1942) he assigned that specimen and one additional one to the race *D. s. lucasanus* of southern Baja California, noting that the race on the peninsula opposite the island was not *lucasanus* but *eremicus*. Birds of this species from nearby Tiburón Island were referred to *cactophilus* while those from the mainland opposite San Estéban (Kino Bay) were placed first in *cactophilus* but later in *sinaloensis* (van Rossem 1932, 1945). Recent check-lists (A.O.U. 1957; Miller et al. 1957) followed van Rossem's treatment of the insular populations but placed the northern limits of *lucasanus* at about 29° on the peninsula, following Grinnell (1928), to the north of San Estéban. More recently, Banks (1963) reported a specimen of *D. s. sinaloensis* from Tiburón Island. Thus, by current treatment the San Estéban population is flanked by *lucasanus* on the peninsula and *sinaloensis* on the mainland, with the southern limits of both *cactophilus* and *eremicus* not far away.

There are but three specimens from San Estéban available for comparison, including the two mentioned by van Rossem and one taken in 1966. All are males; two were taken in April and one in January. The two April birds, both of which were breeding, are quite worn. Only the most recent specimen has a complete upper mandible.

None of these specimens is like the small *sinaloensis*, but I cannot with certainty assign them to any subspecies. Each individual seems to be variously intermediate, resembling one race in some characters and another race in other ways. The relatively fresh plumaged January bird is most like *cactophilus* dorsally, but is more similar to *lucasanus* in the reduction of markings on the posterior underparts. Both April birds are similar to *lucasanus* dorsally, but one is close to *eremicus* and one to *cactophilus* ventrally. Thus there seems to be influence from both the mainland and the peninsula. Certainly this species cannot be said to demonstrate particularly close affinities between the San Estéban and southern Baja California avifaunas.

MYIARCHUS CINERASCENS

The earliest specimens of Ash-throated Flycatchers from San Estéban Island (Townsend 1923) were reported under the name *M. c. cinerascens*. Van Rossem originally (1931) referred his material from there to the race *cinerascens*, although he considered them to be intergrades with the mainland form, *inquietus*. The fact that van Rossem did not separate the species *nuttingi*, of which the race

TABLE 1. Mean measurements (mm) of *Myiarchus cinerascens*.

	All <i>cinerascens</i>	Mexican <i>cinerascens</i>	San Estéban	<i>pertinax</i>
Wing length, ♂	99.9	98.9	98.5	96.4
Wing length, ♀	94.2	93.3	92.2	90.9
Tail length, ♂	91.4	90.9	91.6	89.8
Tail length, ♀	86.0	85.6	85.2	84.2
Bill length, ♂	14.57	14.49	14.55	14.83
Bill length, ♀	14.05	14.10	14.30	14.37

Data, except for San Estéban, from Lanyon (1961 and pers. comm.). Wing length is of flattened wing.

inquietus is now considered a part, from the species *cinerascens* adds uncertainty to any interpretation of his early concept of the relationships of the San Estéban population. Later, when commenting on the Baja California affinities of the San Estéban avifauna, van Rossem (1942) referred the same specimens to *M. c. pertinax* of the southern part of the peninsula. He maintained that position (van Rossem 1945b) when he recognized the distinction of *nuttingi* and *cinerascens*. This final assignment of the San Estéban birds to *pertinax* was followed by the A.O.U. (1957) and by Miller et al. (1957). Lanyon (1961) did not specifically mention the San Estéban birds; although his range map shows a symbol for *pertinax* on San Estéban Island, at the latitude of intergradation of *pertinax* and *cinerascens*, he discussed *pertinax* (p. 443) only with reference to the peninsula of Baja California south of latitude 29°.

I have been able to examine all material previously reported from the island (Townsend 1923; van Rossem 1945b) as well as specimens taken in 1966, a total of eight males and five females. All specimens were taken 13–27 April. Although migrants of *cinerascens* are not unexpected at this latitude at this time, I consider the material examined to be members of the resident population. Males taken on 27 April 1966 had testes 13 × 5, 10 × 5, and 11 × 8 mm; others taken on 17 and 18 April 1930 are labeled as being in "breeding condition."

M. c. pertinax is a weakly defined race that averages smaller in wing and tail length but slightly larger in bill length than *M. c. cinerascens*. Lanyon (1961:428) detected no significant divergence in plumage coloration between the two races. Ridgway (1907:628) mentioned that the yellow of the underparts of *pertinax* averaged slightly deeper, but noted that this character was not entirely constant. The difference seems more useful in fresh plumaged fall birds than in samples of the breeding populations, and I could not use

this or any color character in trying to place the birds from San Estéban Island.

Measurements of my sample from San Estéban are presented in table 1, with the data given by Lanyon (1961) for the two races for comparison. Both van Rossem (1945b) and Lanyon (op. cit.) noted that Mexican populations of *M. c. cinerascens* average somewhat smaller than more northerly samples. Dr. Lanyon kindly provided me with the pertinent data for a Mexican series of 46 male and 20 female birds, which are included in table 1.

Except for the tail length of males, the means of the small sample from San Estéban Island fall between the means of *pertinax* and *cinerascens*. With the single exception of bill length of the few females available, means for the San Estéban Island population are closer to those of *cinerascens* than of *pertinax*, and in general are most like the Mexican *cinerascens*. Thus, although the island population is somewhat intermediate, it should most properly be referred to *M. c. cinerascens*. This species gives no indication that the avifauna of San Estéban is closely related to that of southern Baja California.

The southern race *pertinax* is resident through most of the peninsula, north to latitude 28° with a zone of intergradation north to at least 29° (Grinnell 1928; Lanyon 1961). San Estéban Island is well within the zone where some tendency toward *pertinax* would be expected in populations which might be considered basically *cinerascens*.

AURIPARUS FLAVICEPS

When van Rossem (1930a) described the race *A. f. fraterculus* of central and southern Sonora, he included in it the Verdins of Tiburón and San Estéban Islands, even though they averaged slightly paler than mainland birds. At that time van Rossem remarked on the resemblance of the adults of *fraterculus* to the birds of the race in southern Baja California, for which he used the then current name *lamprocephalus*, but he considered it to be possibly a matter of convergence of characters as a result of the occupation of areas of similar climatic conditions. He noted that the young of *fraterculus* were "very different" from those of the subspecies of the Cape region of Baja California, and stated that "the evidence of the juveniles places *fraterculus* in the *ornatus-flaviceps* series . . . of relatively distant relationship to *lamprocephalus*." It should be recalled that the name *flaviceps* as used at that time referred to the birds of southern California and Arizona.

Soon after the above statements appeared, Huey (1930) described *A. f. ignatius* from the central part of the peninsula of Baja California, restricting *lamprocephalus* to the Cape region proper, as van Rossem (1930a) had suggested should be the case. Before long, however, Grinnell (1931) reported new information about the type specimen of the species which led him to apply the subspecific name *flaviceps* to the birds of Baja California (including both *lamprocephalus* and *ignatius*) and to rename the population of southern California and Arizona as *A. f. acaciarum*.

Again in 1931, van Rossem referred the San Estéban Island Verdins to the Sonoran race *fraterculus*, and only slightly later (1932:138) he repeated this position, stating, "In the light of more freshly plumaged material taken . . . on both Tiburón and San Estéban Islands I am still of the opinion that this name is the best one to employ. Birds from the two islands are slightly but definitely grayer even than Kino Bay intergrades between *fraterculus* and *Auriparus flaviceps acaciarum* Grinnell. . . ." It is evident from the last sentence quoted that van Rossem considered the San Estéban birds to be most like those of Tiburón Island, and closely related to the birds of central and southern Sonora.

Later, however, van Rossem (1942) referred his San Estéban specimens to *A. f. flaviceps* for the first time, stating about the insular population "the Verdin is seemingly identical with that of the nearest part of the peninsula and the intermediate San Lorenzo Island. It may be here noted that . . . there is a readily distinguishable race of the Verdin in central Lower California and that *lamprocephalus* is confined to the Cape region proper." From this it is clear that he used the name *flaviceps* to refer to the birds of central Baja California (Huey's *ignatius*) and not in reference to the birds of the Cape region. In a later study, van Rossem (1945b) mentioned the San Estéban Verdins under the subspecific name *flaviceps* once again, but it is not clear to which portion of the Baja California population he considered the name to apply.

Under the present generally accepted arrangement (Miller et al. 1957; A.O.U. 1957) of races of the Verdin, the name *flaviceps* applies to birds of Baja California south of about 30°, and the name *fraterculus* is attached to birds in Sonora south of 30°. The San Estéban population, flanked by these two races, is called *flaviceps* in both these check-lists but the Tiburón birds are included in *fraterculus*. Recall that van Rossem (1930a, 1931) considered

these two insular populations to be identical and that at various times he used both names for the San Estéban birds.

I had available a total of nine specimens from San Estéban Island, three males and six females, all adult birds. This sample included all the birds available to van Rossem and two more recently taken skins. Two of the males were taken in January; all others were April birds.

Comparison of the San Estéban material with small seasonally comparable series of specimens from both Sonora and the Cape region of Baja California showed that the greatest similarity is with *fraterculus* of Sonora. The Baja California birds are brighter yellow on the throat and head, slightly grayer on the back, and have a richer, darker chestnut patch at the bend of the wing than the Sonoran birds. In all these characters, the San Estéban birds agree with those from Sonora, but they are, as van Rossem (1930a) mentioned, slightly paler dorsally.

Thus, I feel that van Rossem's original assignment of the San Estéban population of Verdins to the race *A. f. fraterculus* was correct, and that he erred in later calling it *flaviceps*. The Verdins thus show a relationship to the Sonoran rather than to the Baja Californian avifauna.

TOXOSTOMA CURVIROSTRE

When he described a race of Curve-billed Thrasher, *T. c. insularum*, as endemic to San Estéban and Tiburón islands, van Rossem (1930b) had but one bird from the former island, which he made the type, and two first-year birds from Tiburón. He later (van Rossem 1932, 1945b) reported five additional specimens from Tiburón, but no further material was taken on San Estéban. Van Rossem (1945b:195) stated that "It is now possibly extinct on San Estéban, for suitable associations are of limited area and investigations subsequent to 1930 have failed to find it." I did not find this species on the island during my visits in 1962 or 1966. One wonders if this species is or was really a part of the avifauna of San Estéban, or if the single individual known from there may have been a waif from the larger nearby island.

This is the only one of the geographically variable species in the San Estéban avifauna that van Rossem (1942, 1945b:24) considered to be definitely of Sonoran affinities. This is certainly so, as the species does not occur in Baja California.

POLIOPTILA CAERULEA

Van Rossem and Hachisuka (1937) referred to two specimens of Blue-gray Gnatcatcher taken on San Estéban Island in January as being "unmistakably" of their newly described Sonoran form *P. c. gracilis*. Later van Rossem (1945b) recanted, and assigned these specimens to *obscura*, the race of the Cape region of Baja California. He assumed that these birds were representative of the breeding population on the island, although no specimens had been taken during the breeding season. Miller et al. (1957) incorporated the report of wintering birds in their account of *P. c. gracilis*, but did not mention a breeding population on San Estéban; it appears that van Rossem's 1945 reassessment was overlooked.

The two January specimens, one male and one female, are still the only material available for examination. I have compared these birds with samples of both *obscura* and *amoenissima* (no *gracilis* were available) at the U.S. National Museum, and find that they fit best with the latter. The measurements of these birds are within the range of variation of both races (Grinnell 1926), but in color they compare closely with examples of *amoenissima* from the western United States.

It is not definitely established that there is a breeding population of this species on San Estéban Island. I did not see this gnatcatcher there in late March 1962 or in mid-April 1966, and no breeding material is available. The Blue-gray Gnatcatcher is absent as a breeding bird in the nearby coastal areas of both Baja California (Grinnell 1928) and Sonora (van Rossem 1945b). At any rate, the specimens available, which are probably wintering individuals, show no indication of a relationship between the avifaunas of San Estéban Island and southern Baja California.

CARPODACUS MEXICANUS

On the basis of sight records, Townsend (1923) referred to the House Finch on San Estéban as *C. m. frontalis*. Van Rossem (1931) listed three April specimens under the same name. Later, van Rossem (1945b) referred to winter specimens of the race *frontalis*, but he called the resident form *ruberrimus*, the subspecies of southern Baja California. He noted that the single resident male specimen available was paler than birds from Cape San Lucas, Baja California, but that five females were quite typical of the southern peninsular race. The A.O.U. Check-list (1957) includes San Estéban Island in the range of *ruberrimus*, but this

form is expanded to include populations of southern Sonora which van Rossem considered a distinct race, *sonoriensis*. Miller et al. (1957) also included *sonoriensis* in *ruberrimus*, but assigned the latter to San Estéban Island "somewhat doubtfully on [the] basis of one specimen."

I had available for examination two males and three females from San Estéban Island, including at least the one male and two of the females mentioned by van Rossem (1945b). All were taken 17–18 April 1930, and all but one (female) are labeled as breeding birds. All are quite worn.

Neither of the males shows the intensity or the extent of red that is typical of *ruberrimus*, or the darkening of other parts of the plumage. None of the females is dark as are the females of typical *ruberrimus*, nor are the birds very like members of the race *sonoriensis*, which I am inclined to keep separate from *ruberrimus*. All specimens from San Estéban are within the range of variation of, and similar to typical individuals of, the widespread race *frontalis*.

Carpodacus m. frontalis is the form of House Finch which occurs at the latitude of San Estéban Island on both the peninsula and the mainland (Miller et al. 1957), although it is near its southern limits in both areas (Grinnell 1928; van Rossem 1945b). Thus the presence of *C. m. frontalis* on San Estéban Island does not reveal whether the affinities of the avifauna of the island are with Sonora or Baja California; certainly it does not indicate a relationship to the avifauna of the Cape region of Baja California.

AMPHISPIZA BILINEATA

In the original description of the Black-throated Sparrow, *A. b. cana*, of San Estéban Island, van Rossem (1930c:223) characterized it as "palest and grayest of the races; most closely resembles *Amphispiza bilineata deserticola* but . . . coloration paler . . ." In a discussion of *A. b. bangsi* in the same paper, he called that race darker than *deserticola* and "decidedly darker than *cana*." Somewhat later (van Rossem 1945a) he noted that "five worn examples from the vicinity of San Ignacio eastward to the Gulf (lat. 27°) are seemingly like equally worn *deserticola* in color . . ." Still, he repeated the idea that the San Estéban avifauna showed relationships to southern Baja California, and noted that "in grayness of coloration *cana* stands out conspicuously from *deserticola* of the peninsula and still more so from *pacifica* of Tiburón Island and the southern Sonora mainland." Nonetheless, he again

characterized *bangsi*, the only race on the mainland of Baja California south of San Ignacio, as darker than *deserticola*, and *cana* as paler. In describing the birds from Carmen Island (*A. b. carmeni*, merged with *bangsi* by Miller et al. 1957, but kept separate by Banks 1963) van Rossem (1945a:244) stated that "in series they average slightly grayer and paler than *bangsi*. At one time I was inclined to place them as nearest to *cana* . . ." This is the only direct comparison that I have found of *cana* with birds from farther south in Baja California.

I have examined a series from San Estéban Island consisting of seven birds taken 11–12 January and 14 birds taken between 22 March and 26 April. These specimens were compared with series of *deserticola*, *bangsi*, *pacifica*, and *grisea* taken at comparable seasons (no April *pacifica* were available). The paleness and grayish coloration of *cana* is quite distinct, and these features set that population apart quite sharply from all others. In being gray, *cana* is similar only to *grisea*, but the latter is very much darker. Of the brown races, *pacifica* is the palest although in coloration it is not greatly different from *bangsi*, from which it is best distinguished by its much greater size. The San Estéban race, *cana*, is so distinct from the other races that I cannot hazard an opinion on its nearest relative. It bears no greater resemblance to birds of Baja California than of elsewhere.

CONCLUSIONS AND SUMMARY

Seven species of geographically variable birds have been reported as part of the resident avifauna of San Estéban Island in the Gulf of California, Sonora. Two of these, the Curve-billed Thrasher and the Blue-gray Gnatcatcher, may not actually have breeding populations there, at least at the present time. Of the seven, only two, the Verdin and the doubtfully resident thrasher, can be used in a determination of the relationships of the avifauna, and both show affinities to that of Sonora. The Ash-throated Flycatcher and the House Finch are represented by the same form on San Estéban and in both Sonora and Baja California at the latitude of the island. Neither the Ladder-backed Woodpecker nor the endemic Black-throated Sparrow shows greater similarity to the Baja California or Sonoran avifauna. The slight balance of evidence indicates that the avifauna of San Estéban Island is best considered with that of Sonora.

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