

NOTES ON BIRDS OF THE PROVINCE OF BOCAS DEL TORO, PANAMA

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The province of Bocas del Toro occupies the northwestern part of the Caribbean slope of Panamá, adjacent to Costa Rica. Special avifaunal interest attaches to this area because here a number of wide-ranging Middle American species and strongly characterized subspecies reach their southern limit. In several instances these Central American forms meet, or almost meet, their South American geographical representatives, which have invaded the Isthmus of Panamá from the opposite direction. Deforestation on the coastal plain, by facilitating range extension of clearing and "edge" birds, is increasingly promoting contacts between closely allied forms formerly separated by heavy forest. The interrelations of these morphologically different Central and South American representatives present questions of taxonomy, speciation, and ecology that would repay concentrated field study.

The Caribbean coastal plain in Bocas del Toro is narrow, being deeply indented by a large irregular embayment, the Chiriquí Lagoon, the western section of which, Almirante Bay, is almost enclosed by wooded islands. The continental divide, only thirty miles away, forms the southern limit of the province, and between this Talamanca range and the coast are a series of lower ridges. Across the divide, to the south, is the better known Pacific slope province of Chiriquí, including the Volcán de Chiriquí, the 11,000-foot summit of which can often be seen from the Caribbean coast. Most of the level country in the Almirante Bay sector was cleared a half century or more ago for banana cultivation. The currently used plantations have service roads and banana railways, which extend northwestward across the international boundary into Costa Rica and provide easy access.

No ornithological activity has been reported from the province of Bocas del Toro for the past quarter of a century, although the Almirante Bay region can be reached from Panamá city or from Chiriquí by regularly scheduled airplanes. In 1931 Peters published a list of 316 species, summarizing what was then known of the avifauna of the province, based chiefly on a collection of over a thousand skins made by H. Wedel between 1926 and 1929. Peters' list also included data available to him from other collections, notably one made by Kennard in the mountains (Kennard and Peters, 1928), and another from the coastal plain by R. R. Benson, partly reported by Griscom (1928) and Chapman (1931). Since Peters' 1931 paper, little has been published regarding the avifauna of the area. Griscom (1933) recorded an additional ten species from Bocas del Toro, in the Havemeyer collection, taken in 1927 by A. P. Smith. Hellmayr and Conover (1942:306) mention a specimen of the Limpkin (*Aramus guarauna dolosus*), and Zimmer (1955) identified an immature Purple Martin (*Progne subis hesperia*), collected by Benson on October 27, 1927. It was in the Almirante area, as a research botanist, in 1928-1929, that Skutch's interest in tropical birds was aroused (1954:7), with such fruitful results for Middle American ornithology.

Most of the reported collections have come from the vicinity of the plantations in the western sector near Costa Rica. As is to be expected, the bird-life of this Caribbean area more closely resembles that of adjacent southeastern Costa Rica than that of the Canal Zone farther east or of the neighboring province of Chiriquí on the Pacific slope across the continental divide. Yet a number of forms said to be regular in adjacent Costa Rica are still to be reported from Bocas del Toro. Some of these unquestionably occur, for Carriker in his Costa Rican monograph (1910) lists a half-dozen such forms as collected by him on the Río Sicsola (now usually spelled "Sixaola"), a river marking the present boundary between Panamá and Costa Rica. Carriker has written me that most of his

specimens designated "Río Sicsola" were taken on what is now the Panamá (Bocas del Toro) side of the river, and that this was certainly true of some specimens of the hummingbird *Chalybura melanorrhoea* and of the antbirds *Dysithamnus striaticeps* and *Gymnocichla chiroleuca nudiceps*, which have not been definitely recorded from any Panamanian locality; the hummingbird has been doubtfully reported (Griscorn, 1933: 301). It is of interest that at Almirante, some twenty-five miles southeast of the Sixaola, this hummingbird and *Dysithamnus* are represented by closely allied South American forms (*Chalybura urochrysis isaurae* and *Dysithamnus puncticeps puncticeps*).

How much remains to be done before we have even an adequate inventory of the birds is indicated by the fact that on a five-day trip, visiting only a few of the most accessible localities, I observed thirteen species hitherto unreported from Bocas del Toro, one of which was wholly new to the Republic of Panamá—the White-collared Seedeater (*Sporophila torqueola moreletii*).

LOCALITIES VISITED

Through the courtesy of Mr. William Mais of the Chiriquí Land Company (Panamanian subsidiary of the United Fruit Company), I had the opportunity of visiting the plantations in the Almirante Bay area in 1956. On June 29 an airplane flight from Panamá City took me to the village of Bocas del Toro, situated on the tip of the Isla de Colón, one of the islands enclosing Almirante Bay. From there I went by launch across the island-studded bay to the mainland town of Almirante, administrative headquarters and port for the plantations of the area. Almirante is connected with the plantations by a network of railways. The district manager, Mr. Munch, and the assistant manager, Mr. Kidd, provided me with comfortable quarters at the company guest-houses at Almirante and Changuinola. Changuinola, where most of my sojourn was passed, is about eighteen miles northwest of Almirante by banana railway, only eight miles from Costa Rica, and about five miles from the Caribbean Sea. The guest-house was in a residential compound, on one side bordered by fruit trees (chiefly citrus), and on the other side overlooking a golf course with a fine vista of mountain ranges to the west and south. Changuinola is the present center of the banana growing area. While Changuinola is only a few feet above sea level, I found the climate pleasant, with the warm days tempered by cooling breezes from the mountains and the temperatures falling to 68°–70°F. at night. The annual rainfall of about 100 inches is well distributed, so that even the driest months (February and March) usually show at least four inches. During my five days stay, although there was a slight drizzle almost every afternoon, the heavy rain came only at night.

Most of the flat country about Changuinola was cleared for bananas by 1900, but before the end of the 1920's the "Panama disease" (*Fusarium cubense*) forced discontinuance of banana cultivation. Banana growing has now been resumed. The blight is kept under control by growing the bananas in large diked impoundments, which are artificially flooded periodically to deprive the soil fungus of oxygen. These impoundments, known locally as "lakes," are flooded in rotation and provide water birds with excellent habitats. The elevated dikes surrounding the impoundments facilitate observation, and their sloping sides, overgrown with aquatic vegetation and rank grass, are favored by rails and other marsh and grass birds. Mr. Peter Hogaboom, who guided me around, is a sportsman with previous experience in the United States and Honduras; he told me that migrant waterfowl were abundant on the "lakes" from November to April. Most common were American Coot (*Fulica americana*), Blue-winged Teal (*Anas discors*) and Lesser Scaup (*Aythya affinis*). Baldpate (*Mareca americana*) and Pintail (*Anas acuta*) often occurred in numbers, and he had also taken the Northern Shoveller

(*Spatula clypeata*). While there is no published record from Bocas del Toro for the last three species, specimens are known from even farther southeast in central Panamá.

On June 30 I briefly visited one of the flooded "lakes." Breeding grebes, gallinules and jacanas were plentiful, and two species of rail were repeatedly flushed. The same day we passed an hour in one of the remnants of original rain forest. July 1 and 2 were spent about the residential area of Changuinola and the neighboring roadsides and banana plantations. On July 3 Mr. Hogaboom took me by outboard motor down the San San River, two miles west of Changuinola, to its mouth on the Caribbean Sea. This is a beautiful tropical river, with slow, dark water overhung by swamp forest, and with beds of lavender water hyacinth growing profusely in the quiet shallows. The river becomes brackish and mangroves appear near its mouth, which at low tide is sometimes closed by a sand bar. On the afternoon of July 3 I returned by railway to Almirante, where I made a few observations in the residential area and the waterfront. On July 4 the launch took me to Bocas del Toro village. Pending the arrival of my airplane I spent a couple of hours in the open scrubby second growth immediately back of the town.

To facilitate orientation in the discussion, it is well to remember that the North American continent makes a sharp bend from west to east at the Isthmus of Panamá, so that western Panamá is the part connecting with North America, eastern Panamá connects with South America, the Atlantic Ocean (Caribbean Sea) is north of Panamá, and the Pacific Ocean is to the south, hence the old name "South Sea."

In the following list an asterisk marks species not previously reported from Bocas del Toro province. English names are from my "Species of Middle American Birds" (1955a).

Podiceps dominicus. Least Grebe. At least fifty noted on the flooded impoundment on June 30. One adult was followed by six young, and many larger immature birds were seen. Grebes are much more widely distributed in Panamá than was realized at the time of Griscom's check-list (1935). I have found this species breeding in June and July on the Volcán Lakes of Chiriquí, across the continental divide from Bocas del Toro, as well as on the Chagres River in the Canal Zone.

Podilymbus podiceps. Pied-billed Grebe. I made a quick count of ten on the flooded impoundment, some in breeding dress and others in juvenal plumage. Specimens from this area were attributed by Peters (1931) to the northern race *podiceps* and regarded as migrants. I have found this species with young in the same Panamanian localities as the Least Grebe during June and July. Van Tyne has assigned (1937) the breeding birds of the Canal Zone to the South American *P. p. antarcticus*. To determine the race to which the resident population of western Panamá belongs will require collecting in the nesting season.

Pelecanus occidentalis. Brown Pelican. A number noted in Almirante Bay and three at the mouth of the San San River.

Sula leucogaster. Brown Booby. Six (apparently the Atlantic form *leucogaster*) observed at close range in Almirante Bay, on June 29, a day during which there had been a severe storm.

Phalacrocorax olivaceus. Olivaceous Cormorant. Approximately thirty on the flooded impoundment.

Anhinga anhinga. Anhinga. One, perhaps two, on the flooded impoundment.

Fregata magnificens. Magnificent Frigate-bird. A number over Almirante Bay; some close to shore at Almirante, Bocas del Toro village, and the mouth of the San San. An English employee of the Chiriquí Land Company told me that on the previous day, July 2, while cleaning fish on the beach at the mouth of the San San River, he noticed a frigate-bird close by, swooping over the surf to pick up discarded floating pieces of fish. He then purposely threw a piece on the beach and was interested to see the bird swoop it up in flight, without making even a mark on the sand with its bill.

**Coragyps atratus*. Black Vulture. Very common in all localities visited. The absence of previous published records for Bocas del Toro doubtless reflects only the reluctance of collectors to prepare vulture specimens. At Almirante these vultures roosted at night in the coconut palms.

**Cathartes aura*. Turkey Vulture. Surprisingly uncommon. Only a few were noted at Changuinola and over the San San River, and one was seen at Bocas del Toro village.

**Heterospizias meridionalis*. Savanna Hawk. A juvenile studied on the dike of an impoundment near Changuinola on June 30. The bird, characteristically unwary, allowed approach to within about twenty feet before flying with slow beats of its long wings to another low perch a short distance off. This South American species is fairly common in the damp grasslands of the Pacific slope of Panamá. Although reported by Griscom (1935) only from western Panamá, it now regularly occurs in suitable localities east of Panamá city, favoring the green rice-fields. It has not been reported from the Caribbean slope of Panamá, which under natural conditions was forested; but its appearance in the extensively cleared areas of Bocas del Toro is not surprising. The presence of this hawk so near the Costa Rican border lends support to Zeledon's listing of this species from that country (1887:126), an occurrence rejected by later writers as unconfirmed (Hellmayr and Conover, 1949:83; Friedmann, 1950:209).

Buteo magnirostris. Roadside Hawk. Probably the Panamanian hawk most frequently noted in edge situations and fairly open country; observed at Changuinola, Almirante and Bocas del Toro. The bird at Changuinola was discovered while perched on a large banana plant by a pair of Clay-colored Robins (*Turdus grayi*), which noisily complained until a Great Kiskadee (*Pitangus sulphuratus*) drove the hawk away. The individual at Bocas del Toro was being chased by a Tropical Kingbird (*Tyrannus melancholicus*)—behavior I have seen repeatedly elsewhere in Panamá. Although this small raptor appears to feed chiefly on lizards, passerines seem to treat it as a menace. The English name here used, introduced by Sutton (1951:100), and since adopted by others, appears superior to any available in the literature. The species is, of course, not limited to roadsides (the Almirante bird was perched on a mangrove), but in tropical Middle America no other hawk is as frequently seen along the roadside, for it is a strikingly unsuspecting "edge" species.

Herpetotheres cachinnans. Laughing Falcon. One perched on a tree along the San San River.

**Porzana flaviventer*. Yellow-breasted Crake. Among the rails flushed from the grassy slopes of the dike bordering the flooded impoundment near Changuinola, on June 30, was this diminutive species. Two individuals afforded excellent views, showing buffy brown color, conspicuously white-streaked back, and dangling yellow legs. Before my trip I had examined specimens of this little-known species, because Dr. Alexander Wetmore had advised me of his discovery of this rail in Panamá in 1955 on the Chagres River, Canal Zone, and in 1956 near the Pacific coast in eastern Chiriquí. Although this species is widely distributed in South America and the Greater Antilles, the only Middle American locality definitely mentioned in the literature is Lake Olomega, El Salvador, from which van Rossem described the subspecies *woodi* (1934:243). Nicaragua was included in the range given in my Middle American list (1955a:27) on the basis of a specimen in the American Museum of Natural History, taken at San Francisco, San Juan River, May 22, 1917, marked "ovaries slightly enlarged." This little crake is probably widespread in fresh-water marshes.

Laterallus albigularis. White-throated Crake. On the same dike where the Yellow-breasted Crake was seen a number of these rails were flushed. Compared with *Porzana flaviventer*, they were larger and dark-backed, with mainly rufous head and neck, conspicuously black and white barred flanks, and dusky legs. This species does not require a wet marsh, for on July 1 two flushed from the grass of a dike bordering a dry impoundment in which banana plants were growing. One of these birds was a blackish juvenile that was flushed from a dry grassy spot where seedeaters (*Sporophila*) and Blue-black Grassquits (*Volatinia jacarina*) abounded.

Gallinula chloropus. Common Gallinule. At least ten, both adults and juveniles, were swimming in the flooded impoundment on June 30.

Porphyryla martinica. Purple Gallinule. Seen among the water hyacinths of the San San River and in a ditch bordering an impoundment. The Purple Gallinule has a wider distribution in Panamá than *Gallinula*, for it accepts habitats with little open water, provided there is a thick growth of aquatic vegetation. It often perches on top of marsh plants and shrubs and swims less than *Gallinula*.

Jacana spinosa. Middle American Jacana. The nominate race *J. s. spinosa* has "western Panamá" as its revised type locality (Ridgway, 1919:11). It abounds in shallow fresh-water areas about Changuinola and among the water hyacinths of the San San River. In my brief examination of one flooded impoundment I saw at least fifty, including many immatures. On June 30 in a small pool three partly-

grown young followed an adult. Only the male is known to incubate and care for the young (Miller, 1931:32-33; Dickey and van Rossem, 1938:167).

Most authors since Peters (1934:229) have treated all the American jacanas as one species. The situation in Panamá seems incompatible with this view, for the Middle American and South American forms there overlap, while maintaining their distinctive characters. The treatment of Wetmore (1939:191) and de Schauensee (1949:434) seems preferable in recognizing the South American *J. jacana* as specifically distinct from the Middle American *J. spinosa*. Each of these has its own array of subspecies. The *jacana* group ranges through South America and north through most of Panamá; the *spinosa* group ranges through the West Indies and Middle America and south into western Panamá on both coasts, overlapping *J. jacana hypomelaena*, at least on the Pacific slope. The morphologically distinguishing characters of the two complexes are in the soft parts, which are strikingly different in life, but look deceptively alike when dry, shrunken and brown in museum skins. The *jacana* group throughout its range has well-developed rictal wattles and a fleshy excrescence over the bill, which forms a two-lobed frontal shield; wattles, shield and base of the bill are red to purplish-red. The *spinosa* group lacks wattles, and the fleshy frontal shield is differently shaped, being three-lobed; the shield and entire bill are bright yellow to orange-yellow, sometimes with a pallid bluish band and a narrow red bar at the base. These distinctive features are shared by adults of both sexes and are independent of plumage color. In both species complexes the body plumage is chestnut to maroon, except in the Panamanian race *J. j. hypomelaena*, which is normally all black. This race, which extends also over northern Colombia, produces throughout its range occasional maroon-backed birds that cannot be distinguished from the adjacent South American race *melanopygia* (Hellmayr and Conover, 1948:6; Todd and Carriker, 1922:188-189; Ridgway, 1919:5). The fact that the Panamanian race is the only race of *J. jacana* that differs strikingly in plumage from the chestnut-backed *J. spinosa* suggests that its distinctive black color serves as a reproductive isolating mechanism in the only area where the two complexes overlap and where an isolating mechanism is needed. Long ago Griscom (1935:305) reported that *spinosa* and *hypomelaena* were to be found in 1924 in the same pool near Remedios, eastern Chiriquí, "without producing intermediates." In 1954 and 1956 Wetmore collected in the same area and the adjacent part of Veraguas province, immediately to the east. Over a zone of about fifty miles from Zapotillo, Veraguas, to Las Lajas, Chiriquí, Wetmore found both forms, without noting intermediates. In fact he has shown me a kodachrome of two freshly killed birds taken in the same pool in western Veraguas in 1954, one a typical *spinosa*, the other a typical black *hypomelaena*. Hellmayr (in Hellmayr and Conover, 1948:5) states that a series from central Veraguas in the British Museum, collected almost a century ago, "shows complete intergradation between *hypomelaena* and *spinosa*," some birds being *hypomelaena*, and others variously intermediate. Hellmayr also suggests that Griscom may have been wrong in saying that true *spinosa* occurred at Remedios. I have compared the three Griscom specimens in the American Museum taken at that locality with birds from Costa Rica and northward. All three in their trifold frontal shield, absence of wattles, and chestnut plumage are *spinosa*, although one has the underparts a darker maroon than Costa Rican specimens, possibly indicating some *hypomelaena* blood. It is not unlikely that occasional interbreeding may occur. But that would not establish conspecificity. The test in the case of overlapping forms is whether interbreeding is so free and genic disharmony so absent that the two forms tend to merge and to lose their distinctive characters as a result of the contact. Here the evidence indicates the contrary. *J. spinosa spinosa* and *J. jacana hypomelaena* maintain the same characters in Panamá that they respectively show in Costa Rica and Colombia. Even in the zone of overlap there is little evidence of interbreeding. Presumably some factor operates unfavorably to the production or the survival of hybrids. Hence natural selection should promote the development of effective reproductive isolating mechanisms and strengthen those already existing (Huxley, 1943:68, 359-360; Dobzhansky, 1951:207-211). Applying the criteria of modern biologists, the co-existence of two forms in the same area, without tendency to merge, justifies their treatment as species, even though occasional hybrids may occur (Huxley, 1943:165; Mayr, Linsley and Usinger, 1953:101-103). The nomenclature adopted in an incompletely studied situation is a matter of more than technical convenience. When the same binomial is used, with interbreeding characterized as intergradation between subspecies, the over-simplification discourages further investigation. On the other hand, "hybridization" between species suggests a dynamic and unresolved situation, stimulative of additional field work.

**Charadrius collaris*. Collared Plover. Two pairs were feeding on the sand-bar at the mouth of the San San River on July 3. They had pink or flesh-colored legs and called a rather weak *peet-peet*. Although this species has not been previously reported from Bocas del Toro, Carriker (1910) took it on the Sixaola River.

Caloptrophorus semipalmatus. Willet. One on sand bar at the mouth of the San San River on July 3. Like many other shorebirds, non-breeding Willets can be found on coastal mud-flats in Panamá throughout the year, particularly on the Pacific side (Eisenmann, 1951, 1955a).

**Larus pipixcan*. Franklin Gull. One hooded adult or sub-adult flying at close range over Almirante Bay on June 29; white wing bands across the primaries were easily noted. Non-breeders are regularly present in Panamá during the summer.

**Chlidonias niger*. Black Tern. At least fifty seen in Almirante Bay on July 4 (fewer on June 29), in small loose groups ranging up to twenty, from near Almirante to Bocas del Toro. None in breeding plumage. A common non-breeder in Panamá during the summer, most numerous on the Pacific coast, but also on the artificial fresh-water lakes of the Canal, as is true of the other larids here mentioned.

**Sterna hirundo*. Common Tern. Six in Almirante Bay on June 29. Another species commonly and regularly summering as a non-breeder in Panamá.

**Thalasseus maximus*. Royal Tern. One in Almirante Bay on July 4; orange bill and other characters observed. A regular summer non-breeder in Panamá.

Columba cayennensis. Pale-vented Pigeon. The common large pigeon about Changuinola, usually flying over in pairs or small groups, but sometimes perched; also on the San San River. At Almirante one was on the bare top of a tree growing over mangroves, calling *rúk-too-coooo*. This species favors semi-open second growth, avoiding heavy forest. Where not persecuted, it will even nest in suburban gardens, but being hunted constantly in Panamá, it has become quite wary in most localities.

Columba speciosa. Scaled Pigeon. In the remnants of rain forest near Changuinola I heard the characteristic *ptoo* of this usually solitary pigeon coming from the top of a tall dead tree.

Columbigallina talpacoti. Ruddy Ground Dove. Abundant everywhere about roads, gardens, and open places in Changuinola, Almirante, and Bocas del Toro.

Geotrygon montana. Ruddy Quail-Dove. In the undergrowth of the rain forest near Changuinola I heard the characteristic humming moan of this species.

Aratinga finschi. Crimson-fronted Parakeet. Noted regularly in the late afternoons at Changuinola, at least ten pairs coming in to roost in the coconut palms and certain heavily-foliaged tall trees near the residential area. They attracted attention by their noisy calls but were hard to see once they settled in the trees. At Almirante on July 3, between 5 and 6 p.m., at least a hundred pairs flew in to the coconut palms planted about the dwellings on the waterfront. From two to four pairs roosted in each palm tree, at the base of the fronds. On first arriving the birds called loudly, a harsh, guttural note, with a mellow undertone, *keerr-keerr*, sometimes more elaborately *kewkeekkeekkeekewkeerr*. By dusk they were quiet. At about 6:10 a.m., when it had become light again, they started to call, and pairs began to fly from one palm to another as if "visiting." About 6:30 a.m. they commenced to leave their roosts in flocks of about thirty to fifty birds, all flying roughly eastward toward wooded country.

Amazona farinosa. Mealy Parrot. A pair perched in a tree of the forest along the San San River on July 3.

Pionus menstruus. Blue-headed Parrot. Four parrots with the deep wing stroke of this genus and calling like this species were seen flying over the forest near Changuinola on June 30 and also across the San San River on July 3. Conceivably they might have been *Pionus senilis*, which has also been recorded from this region (and with which I am not familiar), but Peter Hogaboom said that although he had often observed Blue-headed Parrots in the area, he had never seen a White-crowned one (*P. senilis*).

Piaya cayana. Squirrel Cuckoo. One in a tree at the edge of the San San River on July 3.

Crotophaga sulcirostris. Groove-billed Ani. Abundant on lawns and roadsides and in gardens and other grassy places about Changuinola, Almirante, and Bocas del Toro village. Although a familiar bird in many parts of the Pacific slope of Panamá, nowhere have I found it so common or tame as on the Changuinola golf course. Here it seemed to occupy a niche that on the lawns of the Canal Zone is occupied by the Boat-tailed Grackle (*Cassidix mexicanus peruvianus*)—a species unrecorded in this

region or Caribbean Costa Rica (Carriker, 1910). I saw a Kiskadee (*Pitangus sulphuratus*) drive off one of these anis, which was sitting quietly on the golf course fence.

The distribution in Panamá of this species and its ally the Smooth-billed Ani (*Crotophaga ani*) shows the apparently conflicting effects of ecological and geographical factors. Both these anis are birds of grassy areas, and both occur in the open parts of the Pacific slope of Panamá. About the city of Panamá I have sometimes seen groups of the two species in the same field, although not actually associating. West of the Canal Zone the Groove-billed Ani is the species of this genus usually found in the drier scrubby areas that prevail in Coclé province and westward to Chiriquí province. In the more humid and richer pastures of the formerly forested parts of western Chiriquí, and up into the mountain clearings there, at least to 4200 feet, I have seen only the Smooth-billed Ani. This distribution suggests that in Panamá *C. ani* favors the damper areas and *C. sulcirostris* the drier grasslands. This preference seems to be confirmed by the situation in the Canal Zone, where only *C. ani* is known in the forest clearings of the humid Caribbean slope, including such small ones as occur on Barro Colorado Island. Yet in Bocas del Toro, one of the most humid areas of the Caribbean slope, not *C. ani* but only *C. sulcirostris* is known. The explanation appears to be geographical. Bocas del Toro was forested until the nineteenth century and probably lacked ani habitats. When extensive banana clearings were made, they were much nearer those of Costa Rica than those of central Panamá, so the new habitat was colonized from Costa Rica, where only the Groove-billed Ani occurred (Carriker, 1910). The Groove-billed is the ani of Middle America; the Smooth-billed is essentially a South American species. Curiously enough, the same type of banana clearing that made possible the invasion of the Groove-billed Ani into Caribbean Panamá from Costa Rica has recently facilitated the invasion of the Smooth-billed Ani into the Pacific slope of Costa Rica from Panamá. The first published record of *C. ani* from Costa Rica was from the Pacific banana district of Río Coto (formerly forested) near Chiriquí (Bent, 1940:25). Skutch has now reported the appearance of this ani farther northwest, in country where *C. sulcirostris* is still dominant. Whether the Smooth-billed Ani will now extend northward will be interesting to watch.

Distinguishing these two anis in the field is not difficult. However, the presence or absence of bill grooves is usually hard to determine. A more conspicuous bill character is the unbroken arc of the culmen in the Groove-billed Ani, while the Smooth-billed shows at the base of the culmen, in profile, a thin irregular projection that breaks the smooth arc. The Groove-billed is a smaller and sleeker bird. The best field character is the voice. In addition to various guttural clucks, the Groove-billed Ani gives a short rather dry *swilk* or *hwilk*, usually uttered in a series, *hwilk, hwilk, hwilk, hwilk*, and sometimes accelerated so as to suggest the *wicka-wicka-wicka-wicka* of a flicker (*Colaptes*), or it may sound like *suck-suck-suck-suck* or *sick-sick-sick-sick*. The corresponding call of the Smooth-billed Ani is a whining, long-drawn *ooeeek* or *oooo-eeek*, which may be repeated several times.

Streptoprocne zonaris. White-collared Swift. On July 2 first one, then two or three, of these large swifts began to appear over the golf course at Changuinola, their numbers slowly increasing until at least fifty were in the air at once, about 11 a.m. The swifts seemed to come from the mountains toward the west, but their circling flight, a glide alternating with rapid wing beats, made this somewhat uncertain. In the afternoon of July 3, more than half way to Almirante, in a much larger flock of small *Chaetura* swifts, perhaps ten of the White-collared Swifts were flying. *S. zonaris* is generally a highland species in Middle America, but the birds descend to nearby lowlands, perhaps only for feeding.

Chaetura cinereiventris. Gray-rumped Swifts. Flocks of small *Chaetura* swifts ranging from ten to a hundred birds were intermittently noted over all localities. A few flew sufficiently low to show the gray rump and anterior underparts that contrasted with the blackish back and lower ventral region, a contrast diagnostic of this species; this is the only *Chaetura* that has been collected in the Almirante Bay area.

Phaethornis superciliosus. Long-tailed Hermit. One in the forest near Changuinola.

Chlorostilbon canivetii assimilis. Fork-tailed Emerald. Two males seen feeding at flowers in door-yards at Bocas del Toro village on July 4. I give the trinomial because some authors do not regard *assimilis* as a race of *canivetii*, while Zimmer would treat all the Middle American, blue-tailed members of *Chlorostilbon* as races of the South American *C. mellisugus* (1950:5-12).

Amazilia tzacatl. Rufous-tailed Hummingbird. The most numerous hummingbird about Chan-

guinola, Almirante, and Bocas del Toro village. I must have seen over thirty, a large number, considering that they are solitary and that there was no local concentration. This is one of the commonest hummingbirds in cleared areas and gardens throughout the lowlands of Panamá, but nowhere else have I found it so numerous. At Bocas del Toro one was sitting on a twig calling continuously for minutes at a time a fast *tsip-tsip-tsip-tsip*, on and on, at the rate of 12 *tsips* per 5 seconds. Sometimes the call was accelerated so as to sound like a trilling rattle.

Chloroceryle americana. Green Kingfisher. One on the San San River and another in mangroves over salt water at Almirante.

Malacoptila panamensis. Whiskered Puffbird. Three together in the remnants of rain forest near Changuinola on June 30; one was a very rufous bird.

Dryocopus lineatus. Lineated Woodpecker. One in the rain forest giving a flicker-like call.

Centurus pucherani. Black-cheeked Woodpecker. Two at the edge of the rain forest near Changuinola.

Lepidocolaptes souleyetii. Streak-headed Woodcreeper. Two in trees at the border of the residential compound at Changuinola.

Synallaxis brachyura. Slaty Spinetail. A pair in the bushes among tall grass on a dike bordering a dry impoundment, across the road from the Changuinola golf course. When alarmed they gave a nasal *cheep* or *nyup* and disappeared in shrubbery.

Myrmotherula axillaris. White-flanked Antwren. The characteristic descending *pee-a*, *peh-a*, *pü-a* was repeatedly heard in the trees of the rain forest remnant near Changuinola on June 30.

Formicarius analis. Black-faced Anthrush. In the woods the familiar, clear, mournful whistle repeatedly came from the forest floor. The basic call consists of an easily imitated phrase, a long note followed by two shorter notes about a half tone lower than the first. This phrase is given at intervals of 15 to 20 seconds. Often the shorter note is repeated three or four times. Occasionally the phrase consists of the single higher note followed by a repetition of the shorter lower note as many as eight to ten times, and Major Francis O. Chapelle writes me that in the Canal Zone in April, doubtless near the start of the breeding season, he has counted the second note of the phrase reiterated sometimes as many as fifteen times.

Attila spadiceus. Bright-rumped Attila. While I did not see this arboreal cotinga in the forest remnant near Changuinola, I heard its unmistakable loud whistle, *whit, whit, weéda, weéda, weedoooo*. The attila, considering its size, is often hard to see, for it frequently perches in the foliage near the trunk.

Colonia colonus. Long-tailed Tyrant. One perched on a slender dead tree in partly cleared, burned-over second growth adjacent to the railroad, on the way to Almirante, on July 3.

Tyrannus melancholicus. Tropical Kingbird. Common in open areas throughout. In this area exceeded in number among the Tyrannidae only by *Pitangus*. Seen chasing *Buteo magnirostris* at Bocas del Toro.

Megarynchus pitangua. Boat-billed Flycatcher. One seen giving its almost kingfisher-like rattle at the edge of the forest adjacent to a marshy pool on June 30.

**Legatus leucophaius*. Piratic Flycatcher. One calling from a tree near the Bocas del Toro airstrip on June 29. The piratical behavior of *Legatus*, harassing certain birds that build closed nests until they abandon, and often discarding several such nests before settling on one for its own brood, has been well described (Chapman, 1929:111-121; Skutch, 1944:253) although not fully understood. Once its voice is known, a complaining *weé-yeé*, sometimes followed by *ptirirree*, the species is found to be well-distributed, although solitary, along wooded roadsides, in clearings, forest edge, and other open areas where large trees exist, up to at least 5200 feet. This covers the habitats of its favored Panamanian victims, which are not only the large colonial icterids, but especially the abundant flycatcher *Myiozetetes similis* and the becard *Pachyramphus cinnamomeus*, both of which build large globular nests. When calling, *Legatus* selects a post at or near the top of a tall, foliated tree, where it has an open view, but where, although the perch itself may be bare, the bird is hard to distinguish from the ground. One at Pedro Miguel, Canal Zone, used the very tip of the unfurled leaf spike of a lofty royal palm for its "song" perch.

Myiozetetes similis. Social Flycatcher. One of the commonest flycatchers of clearings, edge and even fairly dry open country, provided there be trees for nesting. An occupied nest, a roughly globular structure, conspicuous on a tree branch, was found on July 2 at Changuinola.

Myiozetetes granadensis. Gray-capped Flycatcher. This species appears to require more humid conditions than are needed by *M. similis*, but wherever in Panamá I have found *granadensis*, *similis* also has been present. In the citrus orchard within the residential compound at Changuinola there were at least two pairs. They called *chip*, *kew-kew* or *kip*, *kew-kew* and also *kip-kip* and *kew-kew*.

Pitangus sulphuratus. Great Kiskadee. The most conspicuous and widely distributed passerine about Changuinola, Almirante, and Bocas del Toro. It fed on the ground as well as in the air. A few could always be seen on the grass of the golf course, and I saw one catch a small lizard at the edge of a pool. They were noisy all day. The basic call seemed to be a loud, vibrant, slightly nasal, *keep-career*, or *geep-coweer*, sometimes *keep-careew*. One common call was a long-drawn, more nasal *geeeep*, or *keeeup*, or *keeeew*. At times it may alternate the two-syllable *keep-weeer* with a three-syllabled *keep-coweér*, or repeat one phrase several times before giving a variation. I found two occupied nests, large and globular, located with no attempt at concealment; one was on a telephone cross bar, the other on the open limb of a tree. Considering the species' wide neotropical range from southern Texas to Argentina and its abundance in cleared and cultivated areas throughout Central America and northern South America, its very limited distribution in the Republic of Panamá is surprising. Hitherto it has been recorded only from the Almirante Bay area (Griscom, 1935:348). In December of 1955, James E. Ambrose, Jr., a youth living in the Canal Zone, began writing me that he believed this species was present in the Canal Zone about the Caribbean terminal city of Colón. On June 19, 1956, Ambrose showed me two individuals, unquestionably *P. sulphuratus*, at New Cristóbal, a suburb of Colón. Ambrose reports the bird from a number of localities near the Caribbean coast in the Canal Zone, and even a little to the east at María Chiquita. That this is a recent range extension seems certain, for the many collectors who have visited or lived in the area could hardly have overlooked so conspicuous a species. So far as I know, this kiskadee has not yet been observed inland in Panamá, but that it will in time pass over to the Pacific side of the Canal Zone is to be expected. It remains to be ascertained by collecting whether the birds of the Canal Zone are the Central American race found in Bocas del Toro (*guatemalensis*) or the Caribbean Colombian form (*rufipennis*).

Myiarchus tuberculifer. Dusky-capped (Olivaceous) Flycatcher. A pair regularly seen in the orange orchard within the residential compound at Changuinola.

Cotopus cinereus brachytarsus. Tropical Pewee. Two were noted in the orange trees at Changuinola on July 2. The trinomial is given because some students have doubted whether the Middle American form is really conspecific with the Brazilian *C. cinereus*. In Panamá the Tropical Pewee, unlike its northern ally *C. virens*, is not a forest bird. It frequents clearings, the edge of second growth, road borders, orchards, and even small trees in savanna countries. While at times perching on high exposed branches, this pewee is more often seen rather low on small dead trees or dry bushes. The only call I have noted is a slightly burred or trilled *pee-ee*.

Todirostrum cinereum. Common Tody Flycatcher. This is a common species in orchards, gardens and clearings throughout Panamá. I noted it at Changuinola and at Almirante. In appearance and behavior it is somewhat suggestive of a gnatcatcher (*Polioptila*), as it nervously hops about shrubbery and low trees, with tail uptilted. In addition to fanning and closing the tail, and pumping it up and down, this species has a special trick of describing an arc from side to side by a slow movement of the uplified tail. While feeding, chiefly by gleaning, it gives a loud single *tsip*, repeated at irregular intervals of perhaps five or six seconds. At times a more rapid series of *tsips* is uttered. The song is a loud trill lasting usually about half a second and repeated with pauses of from three to four seconds; sometimes it is louder and higher, uttered at intervals of about a second. The trill suggests that of the Ferruginous Pygmy Owl (*Glaucidium brasilianum*), but is shorter, louder, and more musical.

Tyranniscus villosimus. Paltry Tyrannulet. Its characteristic and persistent *peeyick* or *chee-yip* heard at the edge of the forest on June 30; also seen in the tree border of the residential compound. This widely distributed little bird favors the lower trees at the edge of forest and woodland. It gleans in foliage, but sometimes it flies out to hover before a leaf, with extremely rapid wing beats, as it picks off small insect prey. I have also seen it eat the tiny berries of a tropical mistletoe.

Progne chalybea. Gray-breasted Martin. Numerous over Changuinola and Almirante.

**Phaeoprogne tapera*. Brown-chested Martin. Flying with the resident martins at Changuinola were several of this South American species; one was carefully studied on June 30. The migratory southern race *fusca* has proved to be an abundant, regular visitant in central Panamá during the

southern hemisphere winter (Eisenmann, 1955b). This is the farthest northwest that *Phaeoprogne* has been recorded, but I feel sure it will be found to migrate well into Central America. Its flight differs from *Progne*, being slower, with a peculiar fluttering character.

Hirundo rustica. Barn Swallow. One seen perched on June 30 and on July 1 at Changuinola, at localities about a mile apart; but the same individual perhaps was involved. Barn Swallows are such abundant migrants in Panamá that an occasional laggard is not surprising. On June 28, 1952, John L. Bull and I saw one at Fort San Lorenzo, Canal Zone. James Ambrose, Jr., writes that he observed two on July 23, 1956, at Coco Solo, Canal Zone; this seems a little early for fall migrants, which ordinarily begin to appear in the second week of August.

Iridoprocne albilinea. Mangrove Swallow. Perhaps thirty of these little low-flying swallows were noted over the flooded impoundment at Changuinola, a few were seen skimming over the San San River, and some were found near Almirante. Despite their name, in my experience they are most numerous about fresh water, although they do occur about mangroves, generally near the mouths of rivers.

Psilorhynchus (morio?) mexicanus. White-tipped Brown Jay. Several small groups were noted in the forest near Changuinola. Why the range of so aggressive a bird as the Brown Jay should end at Bocas del Toro is puzzling. It cannot be competition with other jays, for the only widely distributed jay in Panamá is the smaller *Cyanocorax affinis*, which is not a really numerous bird.

Thryothorus zeledoni. Cane-brake Wren. This species was heard singing in the tall cane-like grass at the edge of a dry impoundment at Changuinola on June 30 and July 1. I noted one song as a loud, ringing *chowereét, chowereét, chowereét*, repeated over and over, and another as *chicheéwee, chicheéwee, chicheéwee*. Hellmayr (1934:170) treats this local form, which is found from Caribbean Nicaragua to Bocas del Toro, as conspecific with the wide-ranging Plain Wren (*T. modestus*). The latter is found from México to central Panamá. The southern part of its range is restricted to the Pacific slope, except in Panamá where it has crossed to the Caribbean in the clearings of the Canal Zone. It is likely that before long *T. modestus elutus*, the Panamanian race, will extend northeast along the clearings of the Caribbean coast to overlap the range of *zeledoni*. The preferred habitat of these forms seems somewhat different; *elutus* is commonly found in garden shrubbery about houses, where I failed to find *zeledoni* at Changuinola. The songs I heard of *zeledoni* were different from any I have noted from *elutus*, but they showed some resemblance. Caution is indicated as to "lumping" sedentary tropical wrens, merely because they are closely allied "representatives." The Middle American *T. modestus* is represented in South America by the very similar *T. leucotis* group, yet in central Panamá there is a zone where subspecies of each are fully sympatric, although ecologically segregated, without any evidence of interbreeding.

Troglodytes musculus. Southern House Wren. I noted only one at Changuinola.

Turdus grayi. Clay-colored Robin. Common in cleared areas throughout. About the dwellings at Changuinola and Almirante, this robin was the first bird heard singing before dawn; it also sang intermittently through the day, particularly in the late afternoon. Its song closely resembles that of the American Robin, *T. migratorius*, although one of its calls is very different (Eisenmann, 1952:48). The Panamanian race (*casius*) seems not as confiding as *migratorius* and is less terrestrial, but where lawns are maintained, as at Changuinola, it feeds regularly on the ground.

Vireo flavoviridis. Yellow-green Vireo. Heard singing in the Changuinola residential compound on July 1. In Panamá it especially favors clearings, gardens, orchards, and low second growth. In forested areas it appears to be restricted to "edge." It seems to me convenient to regard it tentatively as a species distinct from the North American *V. olivaceus*, even though a derivative of the same stock, for this also is true of the West Indian *altiloquus* group, which no one lumps.

Hylophilus decuriatus. Gray-headed Greenlet. A small group was seen and heard in the forest near Changuinola. While favoring the foliage of the higher trees in the forest, this species drops down lower when feeding at forest borders. In addition to various chittering calls, the song strongly suggests a short two- or three-note phrase of the Yellow-green and Red-eyed vireos, but instead of then proceeding to another phrase, this greenlet repeats the same phrase over and over, usually, however, with pauses of two seconds or more between repetitions. I have noted the following variations in its whistled, monotonous song, *tsitseeewéé*, or *tsitseeetreeé* or *itsacheéé*; also there is a two-noted *tsiweéé* or *chwee-chweeé*; occasionally the phrase is a doubled *tsitseeewééé-tsitseeesweéé*.

Coereba flaveola. Bananaquit. A few were seen in trees growing near doorways at Almirante and at Bocas del Toro on July 3 and 4.

Geothlypis semiflava. Olive-crowned Yellowthroat. Many individuals of both sexes were flushed, in Changuinola, from the rank grass and shrubbery growing along the dikes bordering both flooded and dry impoundments.

Gymnostinops montezuma. Montezuma Oropendola. Small groups often flew over Changuinola or perched in the forest; also this species was noted on the outskirts of Bocas del Toro. This Middle American species seems to reach its regular southern limit in this area, although there are a few records from the Caribbean coast of the Canal Zone. Its call notes, which included a harsh *kzweck*, somewhat resemble those of the more widely distributed Chestnut-headed Oropendola (*Zarhynchus wagleri*). Despite differences in the extent of the facial feathering and shape of the frontal shield, their general behavior, the structure of their colonial nests, and their voices indicate that the oropendolas are split into too many small genera.

Amblycercus holosericeus. Yellow-billed Cacique. This thicket inhabitant was noted in a swampy part of the woods near Changuinola. It differs strikingly in nest and behavior from the other birds called "caciques" (Skutch, 1954:281).

**Tangavius aeneus*. Red-eyed Cowbird. Panamanian records of this Middle American species are very few. It was therefore interesting to find an adult male perched on a roadside telephone wire near the flooded impoundment on June 30. Peter Hogaboom, who identified the bird before I mentioned its name, said he had seen this species repeatedly about Changuinola. Carriker (1910:832) did not collect it in the adjacent low country of Costa Rica, so perhaps this species is a fairly recent invader.

Icterus prothemelas. Black-cowled Oriole. A male of this rather pallid icterid, which also reaches its southern limit in this area, was noted perched on a banana plant in a large plantation at Changuinola on June 30.

Icterus mesomelas. Yellow-tailed Oriole. This widely-distributed oriole was frequently seen in the trees about the residential area and particularly the bamboo thickets bordering roadside drainage ditches around Changuinola; also it was noted in trees bordering the San San River. In Panamá it is definitely not a forest bird (Griscom, 1935:372) but favors damp, fairly open localities, particularly near water, keeping rather low for an *Icterus*. On June 30 one was carrying a caterpillar into a bamboo thicket, probably to its young. It utters a variety of melodious, ringing whistles. One loud phrase, heard at Changuinola, consisting of from three to five notes, was repeated so often that until I saw the bird I supposed it to be some kind of wren. Less musical calls I have recorded as *chup-cheet*, also *chup-chup-cheet*, and *weéchaw weéchaw*. Skutch regards the Yellow-tailed Oriole as one of the outstanding Central American vocalists (1954:263).

Tangara larvata. Golden-masked Tanager. A pair was seen at the edge of a banana plantation at Changuinola, and another on a tree near the residential area. Skutch has given a good general account (1954:200) of the behavior of this beautiful tanager, as observed in Costa Rica and on Barro Colorado Island. The ordinary call I would syllabize as *tsit-tsit-tsit-tsit*. The song is a weak, dry, rapid trill of about one second's duration, too fast to distinguish syllables, but perhaps suggested by *tsirivirivirivirit*. It somewhat resembles the trill of a Chipping Sparrow (*Spizella passerina*), but it is shorter and weaker. This species shows great variety in its nesting sites in Panamá. While the small open cup is usually placed in the crotch of tree branches, one pair on Barro Colorado Island built in the concavity formed by the curving fruit of a growing bunch of bananas; and another, east of Panamá city, used an old woodpecker hole in a dead tree. On August 22, 1954, on Barro Colorado Island I saw a Golden-masked Tanager enter the deserted, pendent bag nest of an oropendola (*Zarhynchus wagleri*); that night a storm blew down the nest, which contained two fresh eggs of the tanager. An opening had been developed just above the widest part of the bag, so that the incubating tanager did not have to descend through the long neck.

Contrary to Hellmayr (1936:127), it seems to me preferable to follow Ridgway (1902:47-50) in treating the intergrading golden-headed races of *larvata* (from southern México to western Ecuador) as a species distinct from the blue-headed *nigro-cincta* (tropical South America east of the Andes), although the ranges do not overlap. Most recent authors have uncritically followed Hellmayr. Zimmer, although conceding that Hellmayr offered "a rather broad arrangement, since *larvata*, *fanny*, and *franciscæ* [the golden-headed forms] are closer together than the three are to *nigro-cincta*," felt that the four forms constituted at least a "superspecies," and concluded that "there is advantage in expressing this relationship which, in a system of trinomial nomenclature, can only be done by referring them

to a common specific unit" (1943:13). But not every relationship below the level of the genus needs to be expressed in the scientific name; relationships above that level also can not always be thus indicated. The binomial is intended to indicate substantial biological identity in the present rather than common ancestry in the past. To use the same binomial for all members of a superspecies destroys the distinctive function of the species name. "The species name signifies singularity and distinctiveness, the generic implies the existence of similar or related units" (Mayr, 1943:138). A general policy of lumping in one species groups of forms deemed "representative" may conceal striking differences of biological importance, and also it may obscure relationships within the groups. Granted that the test of reproductive isolation cannot be directly applied to geographically separated forms, inferences may be drawn by comparing the degree of morphological difference associated with reproductive isolation in other species of the same genus. The very plumage pattern shared by *T. larvata* and *T. nigro-cincta* characterizes the *T. cyannicollis* group of western Amazonia and the Andean slopes from Venezuela and Colombia to Bolivia. Subspecies of *T. cyannicollis* are sympatric with *T. larvata* in western Ecuador and with *T. nigro-cincta* east of the Andes (Zimmer, 1943:12-14). *T. nigro-cincta* resembles the *T. cyannicollis* group and differs from the *T. larvata* group in its entirely blue head and more conspicuous blue wing-edgings. While in *nigro-cincta* the head is a pale violaceous blue and in the *cyannicollis* group a more greenish turquoise blue, most races of *cyannicollis* have a violaceous tinge on the throat and some on the forehead as well. Moreover the golden head color of *larvata* seems to me closer to the turquoise of *cyannicollis* than to the violaceous of *nigro-cincta*. The *larvata* group and *nigro-cincta* are alike in having a white median area on the lower breast and abdomen. In the *cyannicollis* group the black of the breast-band and the blue of the sides and flanks have expanded to cover the ventral area; but even here *nigro-cincta* in its deeper blue flanks shows an approach to *T. cyannicollis cyanopygia* of Ecuador. If, despite its obvious derivation from the same stock, *T. cyannicollis* can maintain its reproductive isolation from both *T. larvata* and *T. nigro-cincta* where their ranges overlap, why should it be assumed that the latter would freely interbreed were their ranges to meet? Presumably there has been no genic interchange between them since the Andes were uplifted. Other sympatric species in the genus *Tangara* show differences less striking than those characterizing the birds here discussed. *Tangara lavinia* and *T. gyrola* share the same color pattern, the former being found only in Central America and west of the Andes, the latter chiefly, but not wholly, east of this range. The only "specific" character of the *lavinia* group is the rufous (as distinct from greenish) margins to the wing feathers. Yet from Costa Rica to western Ecuador the two close allies appear to be sympatric. Even more similar to each other are the *T. punctata* and *T. chrysophrys* (or *guttata*, if Cabanis' name be accorded priority, as Wetmore believes [*cf.* Hellmayr, 1936:100]), which overlap in parts of South America.

Thraupis episcopus. Blue-gray Tanager. A common bird about the residential area of Changuinola, Almirante, and Bocas del Toro; this is probably the most abundant and widely-distributed tanager in Panamá. It favors clearings, edge, and even open country if there are a few trees present. At Changuinola on July 2 at 5:15 p.m., in a period of heavy overcast, 16 Blue-gray Tanagers, 4 Palm Tanagers, 1 Scarlet-rumped Tanager, 1 Golden-masked Tanager, 1 Clay-colored Robin, and 1 Great Kiskadee were perched in one thinly foliated tree. They were quiet but dispersed when it began to rain.

Thraupis palmarum. Palm Tanager. More common than the Blue-gray Tanager at Changuinola and Almirante, but very similar in behavior and basic habitat. It seems to require better tree growth and is absent from the drier and more open areas, as well as the higher country. The activity of these birds about the Almirante coconut palms suggested nesting.

Ramphocelus passerinii. Scarlet-rumped Tanager. The commonest tanager about Changuinola; noted also near Almirante and Bocas del Toro. *R. p. passerinii* is another wide-ranging Middle American bird that reaches its southern limit in Bocas del Toro. It is a resident of shrubbery and low trees in cleared areas of rather humid country. Although I must have seen at least thirty adult male Scarlet-rumped Tanagers during my stay, I heard nothing that resembled a song. I heard a male frequently call *wheet-chee* from a small tree; females gave a harsh *chuck*, and males also uttered chucking notes. It seems strange that the local Pacific slope form, *costaricensis*, ranging only from southwestern Costa Rica to the adjacent Panamanian province of Chiriquí, should be, according to Skutch (1954:124), a most persistent and rather pleasant singer. Immediately to the east, reaching Panamá from northwestern South America, the similarly patterned Yellow-rumped Tanager (*R. icteronotus*) is found. A slight overlap of *icteronotus* and *passerinii* is reported in eastern Bocas del Toro (Peters, 1931:341). If this

situation is maintained, it would show how representative populations of obviously common ancestry, one developing in Middle America, the other in northwestern South America, may prove to be good species when their ranges actually meet. One behavior difference I have noted is that *passerinii* readily accepts the vicinity of houses for nesting whereas *icteronotus* remains a shy bird.

Tachyphonus rufus. White-lined Tanager. Several pairs were about the Changuinola residential compound. The birds usually keep low in roadside shrubbery and small trees and are ordinarily found in pairs; the rufous female makes an interesting contrast to the black male with its flashing white wing-linings.

Saltator maximus. Buff-throated Saltator. A shy bird, even though common among the thick growth of orange trees in the residential area and also in roadside shrubbery and bamboo thickets at Changuinola and Bocas del Toro. In the early morning of July 3, one was in the open perched on a tree singing a sweet, oft-repeated *cheeareét-chwéyou*. A frequent call note was a thin *seeeep*.

**Sporophila torqueola*. White-collared Seedeater. This species has never before been reported from Panamá, but the Central American race *morelleti* proved to be fairly common about Changuinola, particularly in the tall grass growing on the top and on the slopes of the impoundment dikes. First recognized on June 30, these seedeaters were noted daily thereafter along roadsides and about the edge of the golf course. I saw at least thirty, mostly white-collared adult males, but I also noted a number of females and immatures, including two juveniles and one mottled male with much buff below, which was singing as well as an adult. Presumably this species has extended its range rather recently, for it was not recorded by the collectors working at Bocas del Toro in the 1920's, and its presence in the area is not mentioned by Skutch in discussing its range (1954). Carriker (1910:887) did not find it even in the adjacent Caribbean lowlands of southeastern Costa Rica, although he regarded it as common in the highlands, on the Pacific slope, and on the northern Caribbean coast of that country. About Changuinola this bird associated with the larger and much commoner Black Seedeater, *S. (aurita?) corvina*. It was interesting to make comparison of its song with that of *corvina*, and of the nominate *aurita* (absent from this area), which I had been hearing daily prior to June 29 about Panamá city. The song is very different from either. It is slower, richer and sweeter, lacking the hurried, twittering effect of those birds. The fullest version I heard lasted about four seconds: *swee-swee-swee-swee-swee*, *teéoo-teéoo-teéoo*, *tew-tew-tew-tew* (these last notes very canary-like). Variations were *swee-swee-swee-teéoo*, and *swee*, *tew-tew-tew-tew*, *too-too-too-too-too*. Shorter forms were *swee-swee-swee*, *tew-tew-tew* and *twee*, *tew-tew*. Adult males strikingly resembled light-type males of *S. a. aurita*. Some even showed black on the throat; but they could be distinguished by white edges to the wing-coverts and secondaries which sometimes formed a wing-bar. Females were conspicuously different from *aurita* and *corvina* in their clear buff underparts and definite white or buffy wing-bars.

Sporophila (aurita?) corvina. Black Seedeater. The most abundant bird in grassy places at Changuinola, Almirante, and Bocas del Toro. Many hundreds were seen, for the birds are gregarious feeders. Males were heard singing freely. My notes describe the song as rapid and rather twittering, usually lasting between 3 and 4 seconds: *chirrechirrecheéwee*, *chirrechirrecheéwee*, *chirree-chirr-cheéwee*, *cheéwee*. Sometimes in place of the last phrase there is a closing *chirr*, or the song may end irregularly. I wrote the calls heard as *seeeyf*, *tseeeyf*, and *tsiwee*. Although the song is generally pleasant, some utterances were so thin and wiry as to seem unmusical.

The song resembled that of the Variable Seedeater (*S. a. aurita*) of the Canal Zone, but it seemed to me more hurried and less sweet. Accurate comparison would require mechanical recording of many samples, but some indication of the difference to my ear may be suggested by what I wrote as to the song of *S. a. aurita* on Barro Colorado (1952:58): "A sweet, rapid, twittering, somewhat canarylike *tsiwee tsiwee tsiwee*, *chee chee chee*, *twee-twee-twee-twee*, *chirr chirr chirr chirr*, with variations, the chirrs often omitted." In song, as in color, *S. a. aurita* appears intermediate between *morelleti* and *corvina*, although the song is nearer to the latter.

Hellmayr (1938:189), and most subsequent authors, treat *corvina* as a subspecies of the black and white *S. aurita*. This may well be correct, for *corvina* is certainly the representative, on the Caribbean slope of Central America, of the same stock that in northwestern South America produced *S. aurita*, which ranges northward over the Pacific slope of Panamá into Costa Rica and reaches the Caribbean coast in the Canal Zone area. In the comparative amount of black and white, the male of the nominate *aurita* is a variable bird throughout its range, particularly in and about the Canal Zone,

where some individuals show considerable approach to the all-black *corvina*. The Colombian race, *S. aurita ophthalmica*, consistently shows more white. The variability of Panamanian birds suggests the introgressive effects of possible interbreeding between *aurita* and *corvina*, although it was already apparent in specimens taken a century ago when these forms were probably not in contact. No one has reported both *corvina* and *aurita* from the same locality, but it is possible that nominate *aurita* is itself the product of some earlier contact between *corvina* and a population essentially like *ophthalmica*. But this is not necessarily the case, for there is a noticeable melanistic tendency in other species of the genus. Thus *S. torqueola moreletii* produces, particularly in Pacific Guatemala, some males that are so extensively black on the throat, chest and rump (so-called "*mutanda*") as to be almost indistinguishable from the usual Canal Zone *S. a. aurita* (Griscom, 1930:7; Hellmayr, 1938:188). These blackish individuals occur chiefly where both *corvina* and *aurita* are absent, so it is unlikely that they represent hybridization of *moreletii* with either of these darker forms. The prevalence of all-black color in *corvina* may have been developed by selection as an isolating mechanism to prevent mixing with the allied, but the widely sympatric *S. torqueola* group, which, although found now in the Caribbean habitats of *corvina*, probably originated on the more arid Pacific slope where *corvina* is absent. If black color is one of the mechanisms keeping *corvina* from interbreeding with *S. torqueola moreletii*, the question arises whether it will so serve as against the darker *S. aurita*, now that clearing of forest is bringing them in contact. *Corvina* is a remarkably uniform bird throughout its long range from southern México to western Panamá, but I did see one male at Changuinola that appeared to have a faint suggestion of white on the sides of the neck, perhaps indicating infiltration of *aurita* blood. Dr. Wetmore states (*in litt.*) that in 1952 he collected only *corvina* at the Boca del Rio Indio, Colón province, some twelve miles west of the Canal Zone. The approaching contact in Panamá between *corvina* and *aurita* invites field work to determine whether they react to each other as to the same species. The result would be prejudged by presently calling *corvina* a race of *aurita*. De Schauensee has recently proposed lumping the *aurita* group (including *corvina*) as races of *S. americana* of eastern South America (1952:169). Curiously enough *S. americana* resembles the distant smaller *S. torqueola moreletii* (rather than the *aurita* group) in having white wing edgings. Before accepting de Schauensee's proposal in a group where very similar birds may be good species, it would be well to know whether *S. americana* sings like *aurita* or like *moreletii*, or whether it sings differently from either.

Oryzoborus funereus. Thick-billed Seed-finch. Fairly common in roadside thickets and in the tall grass of the impoundment dikes at Changuinola. This species, although fond of grass seed, is more arboreal than the species of *Sporophila*, perching on the top of trees when singing. Its song is a very sweet warble that often lasts 8 to 12 seconds without a pause.

Volatinia jacarina. Blue-black Grassquit. Common in dry grassy areas at Changuinola, usually associated with *Sporophila corvina* and *S. torqueola*.

Arremonops conirostris. Green-backed Sparrow. A shy bird, but very common in bushy areas at the edge of the residential compound at Changuinola, about the dikes surrounding both flooded and dry impoundments, and in roadside thickets there and at Bocas del Toro. At 6 a.m. on July 3 I saw one in a tree calling, over and over, an unfamiliar *weet-cheh*. The local subspecies (*richmondii*) to my ear sang somewhat differently from that of the central Panamanian race, *lafresnayi*. The song of both consists of a similar accelerating series of notes, but the notes of *richmondii* seemed less full and ringing, and they usually began with a *cheeup*. I have never heard from *richmondii* the "bob-white" whistle so often given by *lafresnayi*, and Skutch (1954) does not mention it.

SUMMARY

In June and July, 1956, a visit was made to western Bocas del Toro, the Caribbean province of Panamá bordering on Costa Rica. Some thirteen species were observed which had not been previously recorded from the province, one being new to the Republic of Panamá. Notes are given on distribution, song and behavior in Panamá of many of the species observed. The Bocas del Toro area is especially interesting because a number of Central American species here reach their southern limits and are replaced farther to the southeast in Panamá by their South American representatives. Increasing clearing of forest is bringing the "edge" forms into contact, providing a natural laboratory for studies in speciation. The taxonomy of various species occurring at Bocas del Toro is

discussed, and the suggestion is made that two rather than one species of *Jacana* be recognized, that the *Tangara larvata* group be treated as a species distinct from *T. nigrocincta*, and that the relations of *Thryothorus modestus* with *zeledoni* and of *Sporophila aurita* with *corvina* require further study before their conspecificity is assumed.

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