SHORT COMMUNICATIONS

NOTES ON COSTA RICAN BIRDS

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The authors spent 29 June 1966 to 20 August 1967 in Costa Rica, primarily studying the ecology of Red-winged Blackbirds (*Agelaius phoeniceus*) and insects in the marshes of the seasonally dry lowlands of Guanacaste Province. During this period many parts of the country were visited in exploratory trips for other purposes. The Costa Rican avifauna is better known than that of any other tropical American country, thanks especially to the work of Slud (1964). This substantial fund of knowledge is of great value to ecologists, zoogeographers, and physiologists, and it is therefore important that changes in our knowledge be recorded in some detail. Those observations made by us that add to the knowledge of the distribution and abundance of the bird species are herein presented. Species not previously recorded from Costa Rica are indicated by asterisks.

Because we concentrated our field work in the dry-forested northwestern section of the country, we added more to existing knowledge of the avifauna of this area than elsewhere. Our studies necessitated regular visits to a number of marshes at the Estación Experimental Jiménez Nuñez, Hacienda Taboga, 12 km SW of Cañas, Guanacaste Province (called "Taboga" in subsequent discussions), and we observed marsh birds in numbers. The accumulation of knowledge of the distribution and habits of marsh birds in the New World Tropics has in general lagged substantially behind that of species found in dry land habitats. Only recently the work of Dickerman and Warner (1961) and Birkenholz and Jenni (1964) has shown that some of these species, formerly considered rare in Middle American marshes, are perhaps as common as many well known marsh-inhabiting birds of temperate regions.

Another locality where we carried out extended studies was Los Chiles, Alajuela Province, on the Río Frío. Our additions to the avifauna of that region were almost all birds of the Pacific slope, further documenting Slud's (1964) statements about the affinities of the two regions.

As forests throughout the world and especially in the tropics are rapidly being cut, accompanying changes in the biota are occurring. Such changes can be witnessed in the avifauna of Costa Rica, and a number of our new distribution records are of open-country birds in areas which were probably too well forested in the recent past to support populations of them.

In Guanacaste Province, where we made most of our observations, there is a long and severe dry season lasting from November to May, during which time most of the marshes dry up and trees on upland sites lose their leaves. In Costa Rica, this dry season is known as "summer," but in this paper we use the terms "winter" and "summer" to refer to winter and summer months of the North Temperate Zone.

Located in the lowland basin of the Río Tempisque, the Taboga region supports more mesic vegetation than the more elevated parts of Guanacaste Province. Originally the area must have been nearly covered with forest. In the river bottoms a tall, dense, largely evergreen forest was probably the dominant vegetation. The hillsides supported a primarily deciduous forest of lower stature. During the dry season the two forest types are very different, with the hillside forests being exposed to extremes of temperature, wind, and desiccation and the bottomland forests retaining much of their wet-season aspect. At present only scattered remnants of the original forest remain, most of them showing the effects of disturbance by man. The region has been deforested both by lumbering and by cultivation, and cane and rice fields are now a prominent feature of the area. Farmland and pastures occupied over half of the area within one mile of the Taboga station while we were there, and the ratio of these habitats to forest and second growth is constantly increasing. Annual burning and semiannual cutting maintain the pastureland and prevent the development of shrubby second growth except in a few abandoned areas. During our visits the only aquatic habitats present were a few small swamps, the Río Higuerón (a slow-flowing, muddy stream), and numerous large and small seasonal marshes, some of them entirely grown up with aquatic vegetation and others with large areas of open water, never much more than one meter deep. Like the forests, the marshes are decreasing in area with increased utilization of the land for cultivation, and one of our study marshes was in the process of being drained toward the close of our work there.

SPECIES ACCOUNTS

Cattle Egret. *Bubulcus ibis.* As elsewhere in its New World range, this species continues to increase in Costa Rica. It can now be found in the winter on the central plateau, as at the Laguna de Coris (4500 ft elevation), west of Cartago, Cartago Province, where it was common during the winter of 1966–67. At Taboga a few birds were present throughout the summer of 1966, although we saw no evidence of breeding there. These birds were augmented by hundreds of migrants in October, with a maximum of 800 estimated 16–19 November. The species decreased after mid-December but remained fairly common throughout the winter, the numbers again rising in May and early June before they dropped to the mid-summer level of 10 to 30 birds present.

Fasciated Tiger-Heron. *Tigrisoma fasciatum.* There are few published records of this species in Costa Rica. Our only encounter with the bird was on 17–23

September 1966 at Finca La Selva, near Puerto Viejo, Heredia Province, where an immature was seen regularly at a small marsh within the forest. It was considered to be *T. fasciatum* because of its feathered throat and short bill; the bill was between one and two inches shorter than that of an adult *Tigrisoma lineatum* with which it was seen.

Least Bittern. *Ixobrychus exilis.* Slud (1964) listed three records of this secretive heron from the country, and Arnold (1966) observed two at Taboga. We found it moderately common at that locality throughout the year, particularly during the rainy season. As many as three were seen in an area of one acre of cattail marsh on several occasions.

Pinnated Bittern. *Botaurus pinnatus.* Birkenholz and Jenni (1964) furnished the only previous record of this species from Costa Rica. We found it common in cattail marshes at Taboga throughout the rainy season, and a nest with three eggs was found on 23 July 1966. During the dry season a few individuals could be found along nearby drainage ditches.

Boat-billed Heron. *Cochlearius cochlearius.* Though it was expected to occur in southwest Costa Rica, there are no published records of this species from the Golfo Dulce region. We saw at least two of these birds at night at a forest stream and an open pond near Rincón de Osa, Puntarenas Province, in mid-November 1966 and mid-March 1967.

Glossy Ibis. *Plegadis falcinellus.* To the single previous record of this species from Costa Rica can be added our observations at Los Chiles, Alajuela Province, on the Río Frío: four on 29 August and one on 23 November 1966. All were seen well enough to preclude their having been White-faced Ibises, *P. chihi.* Interestingly, Slud's (1964) record of *falcinellus* concerned the same area. Possibly this ibis is a regular visitor to the marshy country of the Río Frío drainage.

Masked Duck. *Oxyura dominica.* This poorly known species was observed several times in two marshes at Taboga in July 1966 and June and July 1967; a maximum of seven birds was seen. The two marshes, no more than 4 ft deep, were dominated by *Typha-Alisma* and *Cyperus-Polygonum* respectively; the ducks remained in dense vegetation while swimming but flushed readily when approached.

King Vulture. *Sarcoramphus papa.* Although Slud (1964) remarked that this species was uncommon to rare in extensively forested regions, we saw it commonly at Rincón de Osa and slightly less so at Finca La Selva. By contrast we found it to be rare in Guanacaste, where it was reported to be common. In 14 months of regular visits to the Taboga area, we saw King Vultures on only four occasions though carcasses were regularly seen and Turkey Vultures (*Cathartes aura*) and Black Vultures (*Coragyps atratus*) were abundant.

Yellow-headed Vulture. *Cathartes burrovianus.* We observed a few individuals of this species at Los Chiles (12–14 October and 23–25 November 1966) and two birds at Taboga (28 June 1967). It has been found in the country previously only in April at two localities: Volcán Miravalles, Guanacaste Province, and the Río Frío. We scrutinized Turkey Vultures (*C. aura*) all over Costa Rica but failed to find the yellow-headed species on any other occasion.

White-tailed Kite. *Elanus leucurus.* This species, only definitely observed in Costa Rica for the first time in 1958 (Slud 1964), is apparently spreading rapidly. Wolf (1966), who reported on the first specimens taken in the country, thought that all records to that time represented migrants. The species definitely is breeding in Costa Rica now, as we observed a recently fledged immature at Taboga on 1 June 1967, and adults were seen there throughout the year. In addition, at least six were seen in the Quesada-La Marina area, Alajuela Province, on 5 July 1966, and birds were seen during the winter months at Los Chiles and San Ramón, Alajuela Province, and Coris and Ochomogo, Cartago Province.

Swallow-tailed Kite. *Elanoides forficatus.* One, probably a migrant, was seen by Paulson at Taboga in the period 18–21 April 1967. The species has not been recorded previously from the Guanacaste lowlands.

Hook-billed Kite. *Chondrohierax uncinatus.* Unlike Slud's (1964) experiences with this species, we most often found it hunting for snails in closed forest. We observed it regularly at Taboga and in a forest 8 mi. WNW of Esparta, Puntarenas Province. At the latter locality a male was observed incubating on 30 May and 5 and 12 June 1967; by 19 June, the eggs had hatched and downy young could be seen in the nest. The nest was located near the top of a large *guanacaste* tree (*Enterolobium cyclocarpum*) in a crotch formed by small branches far from the main trunk. The nest, composed of small sticks, was remarkably small compared to the size of the bird, and both the head and tail of the incubating male projected well beyond the rim. Since the downy young could easily be seen from the ground, the nest cup must have been very shallow. Our observation fits the only previously published description of the nest of this species (Fleetwood and Hamilton 1967), indicating that a rather small nest placed well out from the trunk may be characteristic. Placing the nest in this rather precarious position may result in a lower incidence of nest destruction by large arboreal predators.

Mississippi Kite. *Ictinia misisippienis.* To the few records of this species from Costa Rica can be added our observations of the following migratory flocks at Finca La Selva: 200 birds on 17 September 1966; 600 on 21 September; and hundreds on 10 April 1967. This is apparently the first record of large flocks of this species from south of its breeding range (Eisenmann 1963).

Plumbeous Kite. *Ictinia plumbea.* Not previously recorded from the northern Pacific lowlands, this hawk was seen by us at Taboga, 2–5 May 1967, and 8 mi. WNW of Esparta, 30 May 1967. These may have been migrants, as were probably small flocks passing over Los Chiles on 20 July 1966 catching dragonflies and large butterflies high in the air.

Snail Kite. *Rostrhamus sociabilis.* This species was common at Los Chiles on our visits there from July to November 1966. Slud (1964) did not encounter this species in his visits to the area in the dry season. Snails of the genus *Pomacea*, the primary food of this species, are common in the marshes bordering the Río Frío at Los Chiles. They are also common in the seasonal marshes at Taboga, but we saw *Rostrhamus* there only once, on 7 February 1967.

White-tailed Hawk. *Buteo albicaudatus.* At Los Chiles on 25 November 1966 we observed one adult of this species, not previously recorded from this area.

Red-tailed Hawk. *Buteo jamaicensis.* Orians observed an adult of this species, a highland resident and migrant in Costa Rica, perched in a tree near Taboga on 10 February 1967.

Zone-tailed Hawk. *Buteo albonotatus.* This species, not definitely known to breed in Costa Rica, was seen throughout the year at Taboga. No nests were found, but adults were seen carrying nesting material on 18 November, 10 December, and 17 May; the second instance involved a branch with green leaves. Immature birds were seen in April and May.

Swainson's Hawk. *Buteo swainsoni.* Slud (1964) listed no fall or winter records of this species for the Pacific slope of Costa Rica. We saw it for the first time at Taboga on 16–19 November 1966, when at least 16 birds followed a rice-harvesting machine. A few remained in the area throughout the winter, some of them, mostly immatures, roosting with vultures in large trees behind the experimental station. The first signs of spring migration occurred on 27 March 1967 when hundreds were observed flying north; only a few migrants were seen thereafter, the last on 4 May.

Bay-winged Hawk. *Parabuteo unicinctus.* Breeding data for hawks in Costa Rica are few, and none exists for this species. We saw a pair with two fledged young at Taboga on 6 July 1966.

Spotted Rail. *Pardirallus maculatus.* Slud (1964) listed a specimen of the Spotted Rail taken by Lankester near Cartago and two taken by Birkenholz and Jenni at Turrialba, Cartago Province. The latter authors (1964) reported the species to be common at the marsh at the Inter-American Institute of Agricultural Sciences near Turrialba. We found it common at Taboga in cattail marshes (and once in a *Polygonum* marsh) in July 1966 and from June to August 1967, when several could be flushed daily. The birds flew strongly when flushed, reminding us of the larger species of *Rallus* of the United States. Calls heard in the same marsh and tentatively ascribed to *Pardirallus* were reminiscent of those of *Rallus elegans* or *R. longirostris.*

Uniform Crake. *Amaurolimnas concolor.* This species, unrecorded from the Pacific slope of Costa Rica, was collected by Paulson at Rincón de Osa on 21 March 1967. The specimen, a mature female, foraged in leaf litter in dense forest at the edge of a stream. A bird briefly seen in a swampy area several miles away in November 1966 was probably the same species.

Sora. *Porzana carolina.* Our records of this species at Taboga in October 1966 and February 1967 (two individuals each time) are apparently the first for the Guanacaste region.

*Yellow-breasted Crake. *Porzana flaviventer.* This tiny and poorly known rail is widespread from southern México (Dickerman and Warner 1961) to Argentina (De Schauensee 1966) but had not been found in Costa Rica before our visit. It was seen regularly in grassy marshes at Taboga in July 1966 and from 18 April to July 1967. One bird was collected on 18 April, a female in fresh plumage with follicles not enlarged. It is now no. 212,497 in the collection of the Museum of Zoology of the University of Michigan. It weighed 22 g and had small insects and a 2-mm planorbid snail in its stomach. A bird was flushed from a nest with three eggs in late July 1966, but the nest was destroyed the following night by a predator before it could be collected.

*Black Rail. *Laterallus jamaicensis.* This species, even less known in tropical America than the preceding one, has been recorded only from Baja California, Guatemala, Honduras, and (probably) British Honduras between the United States and Peru (De Schauensee 1966). It was the least common of the four species of resident rails observed by us at Taboga, but at least three were seen 6–9 July 1966, another on 3 September, and another on 19 June 1967. All were seen clearly at close range, the last bird perching in a clump of grass just 3 ft from the observer. Very likely this species, like *Pardirallus maculatus* and *Porzana flaviventer,* has a continuous range throughout tropical America, its extreme secretiveness and the lack of general knowledge about marshes contributing to its apparent discontinuous distribution.

Solitary Sandpiper (*Tringa solitaria*), Lesser Yellowlegs (*Totanus flavipes*), and Greater Yellowlegs (*Totanus melanoleucus*). Listed by Slud (1964) as arriving in Costa Rica in September, these species were first seen by us at Taboga 23–26 August 1966.

Long-billed Dowitcher. *Limnodromus scolopaceus.* Eight were seen 16–19 November and three 9–11 December 1966 at flooded fields at Taboga. Call notes heard on both occasions allowed certain identification. Slud (1964) listed only two previous records from the country.

*Stilt Sandpiper. *Micropalama himantopus.* Although widely known in Middle America, this species remained unrecorded in Costa Rica until we observed it at flooded fields at Taboga: three on 25 August, seven on 3 September, five 28–30 September 1966 and one on 2 May 1967. Another was seen at a freshwater marsh at Puntarenas, Puntarenas Province, on 16 November 1966.

Black-necked Stilt. *Himantopus mexicanus.* Slud (1964) listed no summer records of the stilt from Costa Rica. We observed it in marshes and flooded areas at Taboga in July, September, and December 1966 and February, March, June, and July 1967. A pair remained at one marsh for some time in June and July, scolding intruders vigorously, but we could not find a nest.

*Herring Gull. *Larus argentatus.* A first-year immature of this gull, another of the water birds recorded from Central America but not Costa Rica, was observed by Paulson at Limón, Limón Province, 21 February 1967.

Laughing Gull. *Larus atricilla.* One adult was seen at Playas del Coco, Guanacaste Province, on 10 December 1966 with the following species.

Franklin's Gull. *Larus pipixcan.* Two adults of this species and 10 immature gulls which included both *atricilla* and *pipixcan* were seen at Playas del Coco, 10 December 1966. A very late migration of Franklin's Gulls, all adults with partially or fully black heads, was observed on 12 June 1967, when small groups of the birds were seen flying northwest along the Interamerican Highway northwest of Esparta, Puntarenas Province. An adult female in breeding plumage was taken 26 May 1942 along the west side of Lake Nicaragua by Ponsol (Howell 1964), indicating that late spring movements of this species through Central America may be more regular than heretofore supposed.

Black Tern. *Chlidonias niger.* A flock of about 400 birds was seen just offshore from Playas del Coco, 10 December 1966; Slud (1964) listed migrants only until early November and no winter records. We observed the species also on the Caribbean side, for which records were previously lacking: 10 at Los Chiles, 18–20 July, and four there, 29 July–1 August 1966.

Common Tern. *Sterna hirundo.* Known from only a single record from Costa Rica, this species may prove to be a regular visitor on the Pacific coast. We

observed about 30 at Playas del Coco on 10 December 1966 and five at Rincón de Osa on 16 March 1967.

*Elegant Tern. *Thalasseus elegans.* On the beach at Playas del Coco on 10 December 1966 15 to 20, all in winter plumage, were seen with Laughing and Franklin's Gulls and Common Terns. All rested in one area and allowed close approach and lengthy observation. The slender bill and relatively small size (mentally compared with Royal Terns, *T. maximus*, seen a week later on Isla San Andrés) left no doubt of the identification of this species, previously unrecorded from Costa Rica. As *T. elegans* was previously thought to winter entirely in South America (De Schauensee 1966), we are unsure whether our birds were northern outliers of the winter population or late migrants.

Mourning Dove. *Zenaidura macroura.* Two seen at Taboga, 6–9 July 1966, are anomalous as either breeding birds away from the central highlands or out-of-season migrants. Although we saw a few throughout the winter at Taboga, they were not as common as in the drier country to the north between Cañas and Liberia. Two seen at Rincón de Osa, 8–13 November 1966, represent the second record from the southern half of the country.

Inca Dove. *Scardafella inca.* As did Skutch (1966), we saw this species occasionally in the Alajuela and San José areas, into which it is spreading from the dry northwestern lowlands.

Common Ground-Dove. *Columbigallina passerina.* One seen by Paulson at Turrialba, 2 November 1966, was well east of the known range of this species in Costa Rica, and others at Los Chiles (six, 29–31 August; four, 23–25 November 1966) confirm Slud's (1964) supposition that the species occurs in the Río Frío region. All of these birds were in proximity to villages.

Plain-breasted Ground-Dove. *Columbigallina minuta.* This species centered in the valley of the Río Térraba in the Southwest, extends as well into Guanacaste in small numbers, where Slud (1964) observed it at the bases of Miravalles and Orosí volcanoes. We found it all year at Taboga. A male taken 5 May 1967 was in breeding condition (left testis 7 × 4 mm); another taken 15 July 1966 was not (left testis 3 × 2 mm). Probably only three or four pairs bred in the area at Taboga, where they were regularly seen on fence posts beside cultivated fields. Both *C. passerina* and *C. talpacoti* were much more common.

Scarlet Macaw. *Ara macao.* Formerly common in Guanacaste, this macaw was observed by us only once at Taboga, and the species was definitely not resident anywhere in the immediate area. Undoubtedly populations of this and other large, treetop-inhabiting birds of that region are decreasing rapidly as deforestation proceeds. However, in an equally open area of the Río Frío region, we found the species common on our visits from July to November 1966; a maximum of 30 was seen on one day. This species is absent from most of the Caribbean side of the country but penetrates the Río Frío region along with many other species of primarily Pacific slope distributions.

White-crowned Parrot. *Pionus senilis.* A flock of about 12 individuals of this species, a straggler on the central plateau, was seen by us in a coffee plantation along the toll highway between Alajuela and San José, San José Province, on 3 August 1967.

Black-billed Cuckoo. *Coccyzus erythrophthalmus.* An adult of this rare migrant was seen at Rincón de Osa in the period of 8–13 November 1966.

Yellow-billed Cuckoo. *Coccyzus americanus.* As spring records of this species are lacking from Costa Rica, we record an observation of an adult by Orians in a forest patch 8 mi. WNW of Esparta on 16 May 1967. It was feeding high in the canopy of a *guanacaste* tree in the company of Squirrel Cuckoos (*Piaya cayana*) and Mangrove Cuckoos.

Mangrove Cuckoo. *Coccyzus minor.* Single individuals of this species, rare on the central plateau, were seen just north of Heredia, Heredia Province, on 27 April and 21 May 1967.

Barn Owl. *Tyto alba.* The characteristic call of one was heard by Paulson as it flew over the cabin at Finca La Selva, near Puerto Viejo, at night in the period 7–15 April 1967. It has been recorded only a few times from the Caribbean lowlands.

Crested Owl. *Lophostrix cristata.* A pair was seen in a large stand of *Brosimum-Anacardium* forest near Taboga on 5 and 17 May 1967, the first record from the dry-forested northwestern part of the country.

Black-and-white Owl. *Ciccaba nigrolineata.* At least one individual of this rare owl was observed regularly by us at Taboga from July to October 1966 until a generator failure put out the bright lights which apparently attracted it to feed there.

Striped Owl. *Rhinoptynx clamator.* This species was rather common and regularly seen around Taboga. We observed it nightly hunting around the lights there together with the preceding species. One seen roosting in low forest at Los Chiles on 24 November 1966 by Paulson is the first record from the Caribbean side of Costa Rica.

Chuck-will's-widow. *Caprimulgus carolinensis.* One individual of this uncommon migrant foraged at the airport at Rincón de Osa in early November 1966, and another was flushed from the road nearby in mid-March 1967. On both occasions many Pauraques (*Nyctidromus albicollis*) were seen, along with at least three of a smaller unidentified caprimulgid. This species flew in prolonged flight from the ground to treetop level every evening and appeared entirely dark and rather short-tailed. It was neither Chuck-will's-widow nor Whip-poor-will. Repeated collecting attempts failed.

Whip-poor-will. *Caprimulgus vociferus.* One female was seen by Paulson from a distance of 6 ft in a dense *Mimosa* thicket at Taboga, 9–12 February 1967. The four previous records from Costa Rica also came from the Pacific slope.

Gray-rumped Swift. *Chaetura cinereiventris.* Slud (1964) listed this species as resident in the tropical belt of the country, occasionally to the lower subtropical belt. Of four *Chaetura* taken in the mountains, three were *vauxi* (6100–7700 ft) and the fourth a *cinereiventris*, the latter taken from a large flock of the same species 1 km S of El Empalme (San José—Cartago Province border) in the Cordillera de Talamanca at 7600 ft on 18 August 1966. This was the only definite flock of *cinereiventris* seen, and all other *Chaetura* seen at close range in the mountains were thought to be *vauxi*. All three species of *Chaetura* in the country are easily identified in the field when seen in good light, especially when below the observer.

Band-rumped Swift. *Chaetura spinicauda.* As with *cinereiventris*, this species was previously recorded only from the lowlands, but Paulson observed a large flock at 5000 ft elevation on the Interamerican Highway between San Isidro and Villa Mills, San José Province, on 7 May 1967. It was also common

at 4000 ft elevation south of San Vito, Puntarenas Province, 26–28 April 1967.

Hoffmann's Woodpecker. *Centurus hoffmannii.* Three birds seen by us on 30 August and two on 12–14 October 1966 at Los Chiles are the first records from the Río Frío region. A few *Centurus pucherani* were present in the area as well.

Yellow-bellied Sapsucker. *Sphyrapicus varius.* Apparently unrecorded previously from the Caribbean lowlands, one was observed by Paulson in a cacao grove at Portete, near Limón, on 21 February 1967.

Tawny-throated Leafscraper. *Sclerurus mexicanus.* This species was not previously recorded from the far southwestern part of the country, where Paulson observed one in dense forest 4 mi. S of San Vito at 4000 ft elevation on 26 April 1967.

Barred Antshrike. *Thamnophilus doliatus.* One male was seen by Orians at riparian forest-banana grove edge at Finca La Selva on 8 April 1967. Slud (1960) did not find this species at that locality, into which it has no doubt moved with increased replacement of forest by second growth on the north side of the Río Puerto Viejo, opposite the finca.

Plain Antvireo. *Dysithamnus mentalis.* This bird was seen in small numbers in forest at Rincón de Osa, 7–21 March 1967, although it was not found in the same places in November 1966. Its normal range includes the subtropical belt and it may be only a seasonal visitor to the Pacific lowlands.

Scaled Antpitta. *Grallaria guatimalensis.* This rarely seen species was observed by Orians in forest 3 mi. N of San José de la Montaña, Heredia Province, at 6800 ft on 15 November 1967.

Acadian Flycatcher. *Empidonax virescens.* This species, primarly known from the Caribbean side of Costa Rica in migration, was common in forest at Taboga on 17 May 1967; one specimen was collected.

Black-tailed Flycatcher. *Myiobius atricaudus.* This species has been recorded only rarely from Guanacaste Province (in the lower Tempisque River basin). A female in non-breeding condition was taken by Paulson from a streamside thicket at Taboga on 6 June 1967.

Barn Swallow. *Hirundo rustica.* Early fall migrants were seen at Taboga on 22 July 1966 and 10 July 1967, in both cases single birds.

Common Catbird. *Dumetella carolinensis.* One was seen by Paulson in riparian forest undergrowth at Taboga on 9 December 1966; this migrant species has not been recorded previously from the Guanacaste lowlands.

Cedar Waxwing. *Bombycilla cedrorum.* This species was seen commonly in small flocks high in forest trees south of San Vito at 4000–5000 ft elevation on 27 April 1967 by Paulson. It is an irregular visitor to Costa Rica.

"Brewster's Warbler." *Vermivora chrysoptera* × *pinus.* A male of this hybrid, recorded once previously from Costa Rica, was seen at Tapantí, Cartago Province, on 6 October 1966 by Orians.

Common Yellowthroat. *Geothlypis trichas.* This warbler, uncommon in Costa Rica and not before reported from the Guanacaste lowlands, was observed twice by us at a Taboga cattail marsh: a male, 27–30 March, and a female, 18–21 April 1967. The female was caught in a mist net, examined, and released.

Chestnut-headed Oropendola. *Zarhyncus wagleri.* This species, widespread in the humid lowlands of Costa Rica, has not been found previously in the dry-forested northwest. Orians observed several in a forest patch near Taboga on 7 February 1967, presumably wandering birds as they were not seen thereafter on several visits.

Giant Cowbird. *Scaphidura oryzivora.* Primarily a Caribbean slope species, this oropendola-parasite was seen in small numbers at *Zarhynchus* colonies 4 mi. S of San Vito on the Pacific slope on 26–28 April 1967 by Paulson.

Nicaraguan Grackle. *Cassidix nicaraguensis.* This species was common at Los Chiles from July to November 1966 and nested in trees over the extensive marsh there in July. They foraged with Great-tailed Grackles (*C. mexicanus*) in pastures. One recently-fledged young female was collected on 19 July 1966, apparently the first specimen record for Costa Rica. It is now University of Michigan Museum of Zoology no. 212,498. Nests with eggs were found on the same date.

Bullock's Oriole. *Icterus bullockii.* One female of this species spent the winter with a flock of Baltimore Orioles (*I. galbula*) at Paulson's home in San Rafael de Tres Rios, San José Province; another was seen at Taboga on 26–28 February 1967. Both were well seen and compared at length with females of the other species. The observer became familiar with the differences between these species in southern Florida, where both winter regularly. The Bullock's may be equally regular in Costa Rica, but female-plumaged birds may pass unnoticed among the many Baltimores. Apparently adult males only very rarely penetrate to the periphery of the range of the Bullock's, as none was ever seen among the total of more than a dozen birds observed and four collected by Paulson in southern Florida.

Tawny-capped Euphonia. *Euphonia anneae.* A male of this species, previously known from only the Caribbean slope of Costa Rica, was seen at the edge of forest 4 mi. S of San Vito on 28 April 1967 by Paulson.

Black-faced Grosbeak. *Caryothraustes poliogaster.* An unusual elevation record of this tropical and subtropical species was furnished by a pair seen repeatedly by Orians from 5 April–12 May 1967 in forest 1 km. S of El Empalme in the Cordillera de Talamanca at 7600 ft.

Painted Bunting. *Passerina ciris.* A late migration record for Costa Rica was furnished by a female seen at the edge of riparian forest at Taboga, 18–21 April 1967.

Dickcissel. *Spiza americana.* Slud (1964) indicated a great decrease of this species after the fall migration in Costa Rica, but our records show sizeable winter and spring populations as well. At Taboga, the first birds were seen 3 September 1966, already in large flocks. These flocks persisted until the end of September, but only a few were seen in October and November. On 10 December, 700–800 birds were observed flying north over the station, but no others were seen on our brief February 1967 visits. A very large spring migration was apparent on the next visit (27–30 March); the birds were present by the thousands then and from 18–21 April. By 2–5 May, the flocks had diminished, and only about 200 birds were present, all roosting in trees and cattails at an almost dry marsh. The last birds, a flock of about 15 at the same marsh, were observed on 16 May.

Variable Seedeater. *Sporophila aurita aurita.* A male of this race, normally confined to the Pacific lowlands, was seen by Paulson on a fence beside the road south of Puerto Viejo on 2 July 1967; black seed-eaters (*S. a. corvina*) and White-collared Seedeaters (*S. torqueola*) were common in the area.

Ruddy Seedeater. *Sporophila minuta.* This species, known from Middle America only on the Pacific slope, and from Costa Rica only in the upper Térraba valley, was observed by us at Los Chiles on 29 August 1966. The bird, a male, flew ahead of us in a marshy area and acted like a wandering individual.

Slaty Finch. *Spodiornis rusticus.* We observed this rare species in two localities on the south slope of Volcán Barba. A young male was collected from a flock of six, 5 mi. N of San Rafael, Heredia Province, at 6000 ft on 6 August 1966; a flock of 20 was seen north of San José de la Montaña at 6400 ft on 3 November 1966.

Peg-billed Finch. *Acanthidops bairdi.* This aberrant and rarely observed finch was seen twice on Volcán Poás, single birds on 27 March and 23 April 1967.

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ON THE NATURE OF "COTINGIN"

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The violet color of the contour feathers of certain members of the Cotingidae was once ascribed to the presence of a pigment called "cotingin" (Görnitz and Rensch 1924). The presence of violet pigments in birds is questionable, thus the origin and nature of such colors is of interest. The violet coloration in certain species (e.g., *Cotinga cotinga*) is considered to be produced structurally and is not a true pigment. On the other hand, pigments were isolated from other species of this family (e.g., *Xipholena pompadora*) as early as 1890. The carotenoid nature of these pigments was demonstrated by Görnitz and Rensch (loc. cit.). This observation is significant because violet carotenoids are not generally common in vertebrates and none seem to have been described from avian material. Aside from establishing the nature of the cotinga pigment as a zooerythrin (= a red carotenoid), Görnitz and Rensch did not attempt to characterize these pigments further.

Völker (1952:122–124) worked with a variety of Cotingidae and suggested that the pigment of *Xipholena punicea* and *X. lamellipennis* was similar to that of certain Ciconiiformes. That is, extracts of feather carotenoids had spectral characteristics which resemble the spectra of extracts from various Threskiornithidae and Phoenicopteridae. It is now known that the major feather carotenoid of the six flamingo species, the Roseate Spoonbill, and the Scarlet Ibis is canthaxanthin (4-4′-diketo-β-carotene), although other oxygen-containing carotenoids are present (for recent review see Fox et al. 1967). However, because of the similarity in the chromophoric groups of these pigments, they are not easily distinguished spectrally. Differentiation cannot be considered complete without further treatment and chromatographic separation.

A number of carotenoids have been identified in the brightly colored feathers of various species of the Cotingidae. These include zeaxanthin (3-3′-dihydroxy-β-carotene), astaxanthin (3-3′-dihydroxy-canthaxanthin), and perhaps canthaxanthin (Völker 1961). However, there are a number of species about whose pigments very little is known. Included in this category are most members of the genus *Xipholena* (Völker, loc. cit.).

Through the generosity of Dr. Pierce Brodkorb of the University of Florida I was able to obtain small amounts of body feathers from a cotinga, *Xipholena punicea,* and a manakin (Pipridae), *Pipra aureola.* Both specimens were taken in Surinam. The *Xipholena* feathers were intensely violet in color, although proximal parts of individual feathers were totally without pigmentation and appeared white. Feathers taken from the head of *Pipra* were red. The pigmented area of the barbs of these feathers was flattened and lacked barbules. This structural modification appears to be typical of small carotenoid-containing