

sparrows in a 40-acre field of ragweed and hairy indigo 5 miles northwest of Trenton in Gilchrist County. In two 40-foot nets stretched across a small unplowed portion of the field we caught 25 Grasshopper Sparrows (*Ammodramus saviannarum*). This unusually large concentration probably represented less than 50 per cent of the individuals present in the field because many more were seen to bounce out of the net.

In a nearby hedgerow on the same date we caught two immature White-crowned Sparrows (*Zonotrichia leucophrys*), an uncommon bird in Florida, plus three more (two immatures and an adult) on 18 January. One of the latter immatures, a male, was identified as *Z. l. gambelii* by Pierce Brodkorb and Richard Banks, and the specimen is now in the United States National Museum. Previous specimens of this subspecies in Florida include birds taken at the WCTV television tower north of Tallahassee. A female killed there on 27 October 1962 was prepared by H. L. Stoddard, Sr. and identified by R. A. Norris. Another bird Stoddard prepared that struck the tower 10 November 1963 is labelled *gambelii* (?) on the original tag.

The most startling discovery of the season was that of a Sage Thrasher (*Oreoscoptes montanus*) in the same ragweed field on 11 January. When the bird first flushed along with numerous sparrows of several species, it was quite wary but was eventually taken. It was a female, weighed 53.6 g, and was excessively fat. Its gizzard contained the remains of many small black beetles. This specimen, now in the United States National Museum, represents the first record for Florida and is only the second specimen taken east of the Mississippi River (see Imhof, Alabama birds, Univ. Alabama Press, 1962).—DAVID W. JOHNSTON, *Department of Zoology, University of Florida, Gainesville, Florida 32601*.

Notes on birds of Isla San Andrés.—Because most of the small peripheral islands of the Caribbean are infrequently visited by ornithologists, we consider it worthwhile to record our observations on Isla San Andrés, which each of us visited independently in a year's period. We wish to thank James Bond for commenting on the manuscript, Albert Schwartz for making pertinent literature references available to us, and the Organization for Tropical Studies for making Leck's trip to the island possible.

San Andrés is a small (7 by 1½ miles), low (maximum elevation 340 feet), sand and limestone island located about 120 miles east of the Nicaraguan coast and 60 miles south of its sister island, Providencia. It has been visited by ornithologists (or collectors for ornithologists) six times previously: by Henderson in the winter of 1886–87 (Cory, 1887), by Abbott on 1 May 1887 (Bond and Meyer de Schauensee, 1944), by the Pinchot Expedition on 27 April 1929 (Fisher and Wetmore, 1931), by the Armour Expedition in May 1933 (Bond and Meyer de Schauensee, 1944), by the Vanderbilt Expedition on 27–29 March 1941 (Bond and Meyer de Schauensee, 1944), and by Bond from 28 April to 4 May 1948 (Bond, 1950). Of the present writers, Paulson visited the island from 14–18 December 1966, Orians from 12–15 April 1967, and Leck from 22–30 July 1967. We observed 55 species in December, 42 in April, and 27 in July. Our combined lists totaled 72 species, including 38 species (all migrants) not heretofore recorded from the island. Six species reported previously but not by us bring the list of species known to occur on San Andrés to 78.

During the December visit the rainy season was at its peak. The short daily rains flooded many depressions and formed shallow marshes. One large pond south of San Luis on the eastern shore was especially attractive to water birds. By April most of the water birds had disappeared, and clear skies and dry weather prevailed. In July the sky was mostly clear, with short but intense showers on a few days. Prevailing winds were from the east and moderately strong during all visits.

TABLE 1
NON-RESIDENT BIRDS OBSERVED ON ISLA SAN ANDRÉS IN 1966-67

Species	Dec.	Apr.	July
**Pied-billed Grebe (<i>Podilymbus podiceps</i>)	1		
Magnificent Frigatebird (<i>Fregata magnificens</i>)	7	6	7
Green Heron (<i>Butorides virescens</i>)	2		2
Little Blue Heron (<i>Florida caerulea</i>)	2	6	
**Cattle Egret (<i>Bubulcus ibis</i>)	16	5	7
*Common Egret (<i>Casmerodius albus</i>)	4		
**Snowy Egret (<i>Leucophoyx thula</i>)	2		
Louisiana Heron (<i>Hydranassa tricolor</i>)	10	4	1
**Yellow-crowned Night Heron (<i>Nyctanassa violacea</i>)	3		
**Glossy Ibis (<i>Plegadis</i> sp.) (immature)	1		
**Blue-winged Teal (<i>Anas discors</i>)	6		
**Ring-necked Duck (<i>Aythya collaris</i>)	4		
**Lesser Scaup (<i>A. affinis</i>)	3		
Pigeon Hawk (<i>Falco columbarius</i>)		1	
Sparrow Hawk (<i>F. sparverius</i>)		1	
**Sora (<i>Porzana carolina</i>)	1		
**Purple Gallinule (<i>Porphyryla martinica</i>)	3	1	
**Common Gallinule (<i>Gallinula chloropus</i>)	5		
*American Coot (<i>Fulica americana</i>)	100	12	
*Semipalmated Plover (<i>Charadrius semipalmatus</i>)		1	2
**Killdeer (<i>C. vociferus</i>)	6		
*Black-bellied Plover (<i>Squatarola squatarola</i>)			2
**Ruddy Turnstone (<i>Arenaria interpres</i>)	10	35	9
*Whimbrel (<i>Numenius phaeopus</i>)	1	1	
Spotted Sandpiper (<i>Actitis macularia</i>)	2	3	1
**Willet (<i>Catoptrophorus semipalmatus</i>)			2
Lesser Yellowlegs (<i>Totanus flavipes</i>)		1	1
*Least Sandpiper (<i>Erolia minutilla</i>)	3		3
*Semipalmated Sandpiper (<i>Ereunetes pusillus</i>)		3	7
**Western Sandpaper (<i>E. mauri</i>)			3
**Sanderling (<i>Crocethia alba</i>)	4	4	3
Laughing Gull (<i>Larus atricilla</i>)		1	
Tern (<i>Sterna</i> sp.)	1		
Royal Tern (<i>Thalasseus maximus</i>)	10	6	2
**Common Nighthawk (<i>Chordeiles minor</i>)		1	
Belted Kingfisher (<i>Megaceryle alcyon</i>)	5	2	
Yellow-bellied Sapsucker (<i>Sphyrapicus varius</i>)	5		
Eastern Wood Pewee (<i>Contopus virens</i>)		1	
*Bank Swallow (<i>Riparia riparia</i>)		4	
Barn Swallow (<i>Hirundo rustica</i>)	20	many	
**Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)		5	
Catbird (<i>Dumetella carolinensis</i>)	2		
Black-and-white Warbler (<i>Mniotilta varia</i>)	4	2	
**Prothonotary Warbler (<i>Protonotaria citrea</i>)	1		
**Worm-eating Warbler (<i>Helmitheros vermivorus</i>)	3		
**Tennessee Warbler (<i>Vermivora peregrina</i>)	1	5	
*Parula Warbler (<i>Parula americana</i>)	4		
**Magnolia Warbler (<i>Dendroica magnolia</i>)	5	1	
*Cape May Warbler (<i>D. tigrina</i>)	2	1	
*Myrtle Warbler (<i>D. coronata</i>)	6		
**Chestnut-sided Warbler (<i>D. pensylvanica</i>)		2	
Bay-breasted Warbler (<i>D. castanea</i>)	1		
*Palm Warbler (<i>D. palmarum</i>)	1		
*Ovenbird (<i>Seiurus aurocapillus</i>)	15		
Northern Waterthrush (<i>S. noveboracensis</i>)	10		

** , first record for San Andrés—Providencia area.

* , first record for San Andrés.

TABLE 1 (Continued)

Species	Dec.	Apr.	July
Common Yellowthroat (<i>Geothlypis trichas</i>)	6		
**Rose-breasted Grosbeak (<i>Pheucticus ludovicianus</i>)		2	
**Indigo Bunting (<i>Passerina cyanea</i>)		4	
Dickcissel (<i>Spiza americana</i>)		1	

During the last ornithological visit to the island in 1948, Bond (1950) reported 14 species of breeding land birds. Populations of animals on small and isolated islands are known to fluctuate in time, but our data do not indicate any major changes in abundance of the resident species in recent years. We recorded 13 of the 14 species (the rare Mangrove Cuckoo, *Coccyzus minor*, was not found) in numbers similar to those Bond (1950) reported.

The migrants we recorded are shown in Table 1. All water birds seen are listed, as we have no proof as yet that any of these species breeds on San Andrés, although probably some of them do. The discrepancy in numbers of migrants between December and April may be attributed partially to Paulson's working several mangrove areas that abounded in both aquatic and terrestrial migrants, while Orians worked only in the more upland habitats (low coppice, coconut palm groves) that support lower populations of migrants. The time of his visit, as well, was rather late in the spring for large numbers of migrants at that latitude.

San Andrés qualifies as a "near island" by the criteria of MacArthur and Wilson (1963), i.e. it is less than 500 miles from the potential source of immigrants, and it falls very near their "saturation curve" for near islands in the Southwest Pacific. Its breeding avifauna is as rich as that of South Bimini, an island slightly smaller than San Andrés but ecologically as diverse and much nearer source areas (75 miles from Andros Island, 55 miles from Florida) than is San Andrés. The San Andrés avifauna has remained virtually unchanged for the last 20 years, but Bimini has apparently lost two to three species and gained two species of breeding birds in that same period (Vaurie, 1953; Paulson, 1966). No more than 12 breeding species have been recorded there at one time. Thus the breeding avifauna of South Bimini has undergone more change (immigrations and extinctions) in the last 20 years than has that of San Andrés, which supports MacArthur and Wilson's (1963) prediction that immigration and extinction rates will be higher on islands nearer source areas.

Although San Andrés is much closer to the Central American mainland than it is to most of the other Caribbean Islands, its indigenous avifauna is almost completely Caribbean. Only the Green-breasted Mango (*Anthracoceros prevostii*) and Tropical Mockingbird (*Mimus gilvus*) are unquestionably of mainland origin (the White-winged Dove (*Zenaida asiatica*) is probably so), and even these three species do not occur on the Atlantic slope of Central America at the latitude of San Andrés. This may be the result of the prevailing northeast winds, which greatly reduce the number of mainland species blown out to sea; the failure of mainland species of the very wet regions of the Atlantic slope of Central America to survive on the relatively dry island when they do arrive; or propensities of the island species that lead to their greater tendencies to disperse.

Despite the large number of species of migrants that pass through or winter on San Andrés, its avifauna is about the same size as those of similar sized East Indian islands that have few or no such visitors. Moreover none of its residents is derived

from a migrant species, suggesting that this group of birds is an extremely poor source of colonizing material for tropical islands. This conclusion is also supported by the scarcity of resident races of North American species on all the West Indian islands except for those that breed on the nearest mainland, i.e. Florida, or are obviously derived from Middle America. The exceptions to this are the Ruddy Duck (*Oxyura jamaicensis*), Sharp-shinned Hawk (*Accipiter striatus*), Broad-winged Hawk (*Buteo platypterus*), Short-eared Owl (*Asio flammeus*), and White-winged Crossbill (*Loxia leucoptera*).

Of these species the Ruddy Duck and Sharp-shinned Hawk breed south in the highlands to Guatemala and southern Mexico respectively. The Short-eared Owl breeds south only to California in the West but reappears as a resident in most of temperate and subtropical South America. Any of these three species could have colonized the West Indies from some other direction than north. The Broad-winged Hawk is widespread in the West Indies and has differentiated into at least four recognizable populations, which suggests origin in the West Indies and later immigration to the mainland where only a single subspecies is known.

The White-winged Crossbill remains the only case in which a species clearly of northern origin has colonized a West Indian island well south of its breeding range. Rather than being true migrants, species of *Loxia* are sporadic emigrants that may breed at times in areas beyond their normal ranges and then pull back in ensuing years. Thus they may be better adapted to colonize areas outside of their normal range than are regular annual migrants whose physiological mechanisms virtually ensure early departure from the island and who may not be responsive to short tropical photoperiods. As one would suspect that the extent of migration through island regions might have a strong influence upon the immigration rate to the island, and therefore upon the equilibrium number, it is of interest that this is not the case. Rather, the effective species pool for immigration to tropical islands is virtually restricted to resident tropical species of adjacent islands and continental areas.

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