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Ornithogeography of the Southern Bahamas.

Donald W. Buden

Louisiana State University and Agricultural & Mechanical College

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ORNITHOGEOGRAPHY
OF THE
SOUTHERN BAHAMAS

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in
The Department of Zoology and Physiology

by
Donald W. Buden
B.S., University of Miami, 1965
M.S. Louisiana State University, 1971
May, 1979
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ABSTRACT

Locality records are given for 179 species of birds reported from the southern Bahamas. Twenty-eight of these are indigenous land birds in the familial sequence Columbidae through Emberizidae; none is endemic to this region.

Morphological variation is discussed and taxonomic status of problematical subspecies are reassessed. Many Bahaman populations show clinal variation in size and coloration. Although character gradients do not change in the same way for all of these species, there is a general tendency for individuals in the southern Bahamas to have shorter wings, longer bills, and paler coloration than do those from more northern latitudes.

Distributions of birds in the Bahamas appear to be largely affected by habitat availability, but other factors such as island size, proximity to potential sources of colonists, dispersal abilities, competition, and the vagaries of colonization and extinction also are in evidence.

The avifauna of the northern Bahamas appears to have been derived largely from Florida and the Greater Antilles; Cuba appears to have provided the greatest number of species. The specific geographic origins of the southern Bahama avifauna are more difficult to assess because most of the species are fairly widespread and weakly differentiated, and thus could have been derived from any one or more of several potential sources. Evidence from morphology and distribution patterns suggest that Cuba has been a particularly important source here as well, but that Hispaniola cannot readily be discounted as a potential source especially for some
of the more widely distributed species. Minor contributions from Florida, Puerto Rico, and Central America also are evident in the southern Bahama avifauna.
INTRODUCTION

The discovery of the New World by Europeans was for many years dated from the arrival of Christopher Columbus in the Bahamas in 1492; thus it is somewhat ironic that the avifauna of the southern part of this archipelago (Figure 1) is one of the least known of any in the West Indies. The unprepossessing physiography of these low-lying, sparsely vegetated islands, along with difficulties of access, probably contributed to a general lack of interest in their fauna by naturalists. Impoverished fauna notwithstanding, the southern Bahamas are intriguing zoogeographically because of their proximity to many potential sources of colonization, including continental North America, the northern Bahamas, and the Greater Antilles (particularly Cuba and Hispaniola, which are nearly equidistant from the southernmost part of the Bahaman archipelago). In this study, I have assembled available information on distributions of birds in the southern Bahamas and have discussed the probable origins, colonization routes, and patterns of distribution that pertain to this avifauna.

Until recently, commercial enterprise, largely tourism, which long has been associated with the northern Bahamas, has left the southern islands relatively untouched. However, over the past several years even some of these remote islands have had a considerable portion of land bulldozed for construction sites and the already scanty terrestrial habitats fragmented by roads. These drastic changes in physiography still are fairly uncommon and localized, but even slight changes in delicately balanced small island ecosystems can have disastrous results on the fauna.
Iverson (1978) reported how quickly and drastically the population of *Cyclura carinata*, a species of iguana endemic to the southern Bahamas, was decimated on Pine Cay (on the Caicos Bank) following alteration of the ecology of the island. The introduction of dogs and cats and an increase in human activity there, both concomitantly with the construction of a resort in the early 1970's, are given as reasons for the near extirpation of this population. According to Iverson (1978) an estimated 5500 adult *C. carinata* were present on Pine Cay (3.64 km²) in the summer of 1974, but evidence for the presence of only five individuals was found during one week in June 1976; none was actually seen.

Over the past decade the Bahamas National Trust, a nonprofit organization supported in part by government funds and in part by private donations, has been involved in a vigorous conservation program to set aside critical habitats as wildlife reserves. This organization is to be commended not only for immediate measures taken to preserve the natural resources of the Bahamas, but also for its public awareness and education programs, pointing out both the economic and aesthetic benefits of conservation to the people of the Bahamas.

Hopefully this study will be of particular interest and of use to those concerned with maintaining the natural resources of the Bahamas, even though it was not done expressly for that purpose but rather to provide information on a fauna that has been long neglected.

**Materials and Methods**

My field work for this study was done intermittently over a period of 8 years (1970-1978); an itinerary is included in the section on ornithological explorations. All specimens that I collected have been
deposited in the Louisiana State University Museum of Zoology (LSUMZ); sources of comparative material are listed in the acknowledgments.

Measurements.--All measurements are in millimeters; nearly all were taken by me—the few exceptions are noted in the text. Measurements taken on fresh specimens have been treated separately from those taken on preserved specimens (mostly dried study skins). Occasionally measurements from one to several fluid-preserved specimens were included, but only if they were well within the range of variation of those obtained from the study skins. Unless otherwise indicated, the most commonly used measurements were taken in the following manner: **wing length**, the arc from the "wrist" to the tip of the longest primary; **tail length**, from the base of the central rectrices to the tip of the longest rectrix; **bill length**, the chord of the exposed culmen; **bill width**, the breadth of the maxilla at the level of the nares for most species, but taken between the lores and the posterior border of the nares in grassquits and bullfinches; **bill depth**, the vertical distance between the external surfaces of the maxilla and mandible, at the level of the nares for most species, but from the proximal end of the exposed culmen in grassquits and bullfinches. Wings were measured flattened against a ruler, bill measurements were taken with dial calipers, and tail length was taken either with a millimeter ruler or with dial calipers, but in the same way for all intraspecies samples.

Group Names Defined.--Most of the interisland comparisons in the analysis of the avifauna pertain to **land birds**—those species that typically nest and forage in scrub and woodland habitats. This group includes all the indigenous species in the sequence of families.
Columbidae through Emberizidae in the species accounts section, although owls (Tytonidae and Strigidae) at times are treated separately (along with hawks and allies) as raptors. The Osprey, a raptor that feeds almost exclusively on marine fishes, is excluded from comparisons that combine raptors with land birds. All species not included among raptors or land birds categorically are treated as water birds.

**GEOGRAPHY AND GEOLOGY**

The Bahama Islands and their banks (Figures 1-4) occupy a region of the southwestern Atlantic between North latitudes 19° 30' and 27° 30', and between West longitudes 68° 30' and 81° 31'. The archipelago includes the Turks and Caicos Islands, a British Crown Colony at the southern end of the chain; the Bahamas (sensu stricto), also formerly a British Colony, became an independent nation in 1973.

The Bahama Islands are distributed over an area about 950 km long; the archipelago averages about 300 km in width (600 km maximum). Although the total area of the banks is about 124,716 km$^2$ only 11,406 km$^2$ are exposed land—the total land area is comparable to that of Jamaica (10,962 km$^2$) or the state of Connecticut (12,973 km$^2$). Schuchert (1968) stated that the Bahamas are comprised of 29 inhabited islands, 661 cays, and 2387 rocks.

The Florida Straits (through which the Gulf Stream passes) separate the northwestern end of the Bahama chain from the Florida peninsula—this passage is about 75 km wide and 550 to 900 m deep. At the southeasterm end of the archipelago, the Turks and Caicos Islands lie about 125 km off the northern coast of Hispaniola; Great Inagua is about 110 km northwest of Hispaniola and approximately the same distance east of Cuba.
The maximum depths of the straits separating these southernmost islands from the Greater Antilles range from 3111 to 4026 m. The Silver, Mouchoir, and Navidad banks extend a distance of about 250 km southeastward of the Turks and Caicos Islands—presently there are no islands on these shallow banks but a few rocks and rocky heads are awash.

The shortest distance between the Bahama Banks and any other land mass is across the 15 km wide, 550 to 2745 m deep, Old Bahama Channel. This passage separates the Great Bank from the narrow bank off the northern coast of Cuba. At present there are no islands along the Bahama side of this channel but during Pleistocene glaciation, when sea level was much lower, dispersal of organisms from Cuba to the exposed bank probably took place across this channel with relative ease. Also, the presently submerged banks southeast of the Turks Islands probably served as "stepping stones" in dispersal of organisms from Hispaniola and, to a lesser extent, Puerto Rico to the southern Bahamas.

Most of the islands of the northern Bahamas are on the Little and Great Bahama Banks; however, the small cays of the western, outlying Cay Sal Bank also are included in this group, as are San Salvador (=Watlings Island) and Rum Cay, which lie on small, separate banks in the east-central part of the archipelago. Water seldom lies more than 6 to 9 m deep over any of these banks.

In contrast, islands and groups of islands in the southern Bahamas (Figures 2-4) are separated from each other by deep water passages. The Crooked Island Passage (42 km wide between Long Island, on the Great Bank, and Crooked Island) is the geographic boundary between the northern (=northwestern) and southern (=southeastern) Bahamas (Doran, 1958); depths
in this passage reach 2700 m. Other deep water channels in this region include the Mayaguana Passage (between Mayaguana and the Crooked-Acklins Bank—1800 to 4860 m), the Caicos Passage (between the Caicos Bank and Mayaguana—2592 to 4095 m), the Turks Island Passage (between the Turks and Caicos Banks—1800 to 2000 m), and the Silver Passage (between the Mouchoir and Silver banks—3600 m). The deepest known part of the Atlantic (Brownson Deep, 8392 m) is about 50 km southeast of the Navidad Bank and 75 km northeast of Hispaniola.

There is no evidence to indicate that the Bahamas ever were connected to any other land mass. The Little Bahama Bank and Great Bahama Bank each probably comprised a single large island during sea level minima, but the islands of the southern Bahamas undoubtedly have been isolated from each other throughout the Pleistocene and probably never have been interconnected.

The Bahamas are low-lying islands with elevations seldom exceeding 5 to 10 m; a few ridges and hills reach heights of 30 to 60 m, and the highest elevation is 67 m on Mt. Alvernia, Cat Island (Lind, 1969). The higher topography consists of consolidated dunes of Pleistocene sands, and the lower topography is of marine origin and of Pleistocene Age (Newell, 1955).

Newell and Rigby (1957) stated that if the relative sea level were to rise 10 feet, more than 50 percent of the present land surface would be inundated. They also stated that "at the highest levels of the sea practically all the islands were inundated".

Milliman and Emery (1968) and King (1975) indicated that the maximum lowering of sea level (to about 130 m below present level) took place at the end of the last glacial episode (about 15,000 years ago). Submerged
sinkholes (= "Blueholes" or "Ocean Holes"), which presently are 60 to 90 m under water, are evidence that seas were at least that much lower in the Bahamas (Newell and Rigby, 1957; Waltham, 1974).

PALAEONTOLOGY

Sea level changes followed by either expansion or reduction and fragmentation of the available terrestrial habitats likely have been principal factors in determining the composition of the Bahama bird fauna. Although little avian palaeontological work has been done in the Bahamas there is ample evidence to show that the Pleistocene avifauna, at least in the northern Bahamas, was quite different from the modern avifauna. Brodkorb (1959) examined a Pleistocene deposit on New Providence that he assigned to the Wisconsin glacial stage—a time when sea level was about 10 fathoms lower than present and most of the Great Bahama Bank was exposed land. Of the 15 species of birds identified in this sample six still are present in the Bahamas, one is present only in the Antilles, and eight are extinct. Five of the extinct species are raptors (1 accipitrid, 1 falconid, 1 tytonid, and 2 strigids). The large number of raptors in this assemblage suggests an abundance of prey items (probably small mammals) which were part of the vertebrate community on this extensive land mass. Most of the mammalian skeletons in this deposit are of a relatively large rodent (Geocapromys) now found in the Bahamas only on East Plana Cay.

A bone deposit of uncertain age from Great Exuma, which also is on the Great Bahama Bank, was examined by Wetmore (1937). Eight of the 13 species discussed in this account are still present in the Bahamas, as regular visitors if not as residents, two are present in the Antilles,
and three (all raptors) are extinct. The remains of the rodent *Geocapromys*
also are abundant in this deposit. Conklin (1970) reported on avian bones
found in a Post-Columbian site on Abaco, on the Little Bahama Bank; all
the species are represented in the present-day Bahaman avifauna.

Less information is available on fossil birds from the southern
Bahamas; therefore comparisons of the fossil avifaunas of the northern
and southern parts of the archipelago are not possible at this time.
Wetmore (1938) reported on skeletal remains of birds from a Pre-Columbian
cave deposit on Crooked Island. The bones were found in association with
tortoiseshell fishhooks and crude pottery, along with other artifacts,
and probably are of relatively recent age; none of the eleven species
reported in the account is extinct, although several no longer occur in
the Bahamas. I know of no other reports on fossil or subfossil remains
of birds from the southern Bahamas.

Because of the absence of any large, shallow banks the lowering of
sea level probably has had a less dramatic effect on avifaunal composition
of the southern Bahamas than it has on the islands farther north; the
relatively small and widely separated islands of the southern Bahamas
probably never had a fauna as diverse as that on the Great Bank.

**CLIMATE AND VEGETATION**

The Bahamas frequently are treated as tropical islands (Udvardy,
1969), even though nearly half the archipelago lies within subtropical
latitudes. The Tropic of Cancer (23° 30' N) transects Great Exuma and
the northern part of long Island, and it is nearly congruent with the
geographic and geologic boundary between the northern and southern islands
(i.e., the Crooked Island Passage).
Differences in mean annual temperature are not great within the archipelago, but the northern Bahamas receive nearly twice as much rainfall as do the southern islands (Table 1). Data for temperature and precipitation in Table 1 are from Reed (1926) for New Providence and Grand Turk, from the United States Department of Commerce, Environmental Science Services Administration (1966) for Mayaguana, and from United States Weather Bureau annual summaries for climatological data on the West Indies and the Caribbean for the years 1949-1952 and 1960-1967 for all other islands. On both New Providence, in the northern Bahamas, and on Grand Turk, in the southern part of the chain, August is the hottest month and January is the coldest; most of the precipitation falls during the months May through October.

Prevailing winds in the Bahamas are easterly during most of the year, generally more south-southeasterly in summer and north-northeasterly in winter. In the vicinity of New Providence the average wind velocity ranges from a low of about 5 knots in July to a high of about 8 in December, whereas at Grand Turk the low is about 8 knots in October and 11 in June and July (fide Rabb and Hayden, 1957).

Hurricanes sweep through the Bahamas fairly frequently. Paths of 70 storms that have passed through the Bahamas during the period 1875-1975 are shown in Figure 5. Only those storms that have passed across an adjacent land mass have been included; Table 2 shows that the majority (38) of these have first passed over some part of Cuba before reaching the Bahamas. These data on hurricanes and tropical storms are from Cry (1965) for the years 1875 to 1958, and from the United States Weather Bureau, Mariners Weather Log (vols. 4-20), for the years 1959 to 1975.
In the Holdridge life zone classification system (Holdridge, 1967), based on indices of temperature and precipitation, the northern Bahamas belong to the "dry forest" plant formation, whereas the southernmost islands belong to the "very dry forest" formation. Mesic or semimesic woodland, which is a predominant feature in the northern islands, is scarce in the south where xerophytic scrub and woodlands predominate, at least the higher and drier regions. Mangrove communities commonly fringe sheltered bays, lagoons, saline ponds, and tidal creeks, and a broad zone of strand vegetation is found along most of the windward coasts. The smaller cays, in the main, support only a strand vegetation, occasionally with dense growths of cacti; most of the islands on the Turks Bank are of this type.

Stands of *Bucida buceras* ("Olive" or "Oak") at the west end of Great Inagua, and in the northwestern section of North Caicos, form woodlands with a relatively open understory; the trees are about 9 to 12 meters tall and are among the largest in the southern Bahamas. Large sinkholes, several meters deep and one to several decameters in diameter, are present on all major islands; they usually support a somewhat more mesic vegetation than that of the immediate vicinity. The largest trees in these sinkholes frequently are *Ficus* sp. (fig), *Swietenia mahogani* (mahogany), and *Hippomane mancinella* (manchineel). On Little Inagua, deep, wide, sinkholes—at least some of which have pools of fresh water—support the only known indigenous stands of Royal Palm (*Roystonea*) in the Bahamas. More detailed descriptions of the habitat where these palms are found have been given by Gillis *et al.* (1975) and Gillis (1977b, 1977c). According to Gillis (1977b) these palms are examples of *R. hispaniolana*
and probably were derived from populations on Hispaniola. The sinkhole habitats apparently are too small and disjunct to support a population of birds not found elsewhere on the islands, but birds generally are more abundant in the vicinity of these oases in the scrub.

Pines (Pinus caribaea) are present in the southern Bahamas on Pine Cay, North Caicos, and Middle Caicos. Elsewhere in the Bahamas pines are on the northernmost islands on Andros, New Providence, and the Little Bank islands. The pine stands in the southern Bahamas, however, are rather sparse and scrubby, and cover a much less extensive area on each island than is the case in the northern part of the chain. Several species of birds are characteristic of the pine woods in the northern Bahamas (Dendrocopos villosus, Tyrannus caudifasciatus, Contopus caribaeus, Callichelidon cyanoviridis, Sitta pusilla, Dendroica dominica, Dendroica pityophila, and Dendroica pinus), but the avifauna of the southern Bahamas pine woods apparently is comprised only of those species found in scrub throughout the region.

William T. Gillis, (pers. comm.) is preparing a flora of the Bahama Islands—a revision and expansion of the now much outdated "Flora of the Bahamas" by Britton and Millspaugh (1920). In a preliminary discussion of the phytogeography of the Bahamas, Gillis (1977a) pointed out that from north to south in the archipelago there is a general tendency toward broader leaves, more gray and less green coloration in the foliage, and a tendency for plants that are members of the strand community in the northern islands to be present in upland thickets in the south. These differences probably are associated with gradients in temperature and especially precipitation (Table 1).
ORNITHOLOGICAL EXPLORATIONS

Although ornithological studies of the southern Bahamas began more than 100 years ago, there have been relatively few expeditions to these islands until recent years. This situation may be attributed in part to the earlier inaccessibility of this region—naturalists of the 19th century and first half of the 20th century who visited this region often were members of yachting expeditions that spent one to several months cruising among, or passing through, the Bahamas; commercial travel to these islands was nonexistent or, if available, undependable. Furthermore, low-lying, scrub-covered islands that are relatively impoverished faunistically, as are the southern Bahamas, did not capture the attention of as many biologists as did regions with a more diversified fauna and flora.

Observations on the birds of Great Inagua during March and April 1866 by Henry Bigelow Bryant (Boston Society of Natural History) constitute much of the first report on birds in the southern Bahamas (Bryant, 1866). Many of the specimens collected by Bryant on Inagua and elsewhere in the Bahamas are now in the Museum of Comparative Zoology and the National Museum of Natural History.

Moore (1877) reported on birds that he saw on Fortune Island and Great Inagua during the months August through October 1876; his account is a brief but significant contribution to the scant information on fall migrants in this region.

In "Birds of the Bahama Islands", Cory (1880) included morphological descriptions, ranges, and life history notes on all species of birds reported from these islands, also incorporating his own observations
from the period December 1878-July 1879. Cory was in the southern
Bahamas on Great Inagua, the Mira Por Vos Cays, and several islands on
the Crooked-Acklins Bank in May and June 1879. During the early 1890's
Cory's associates (particularly Daniel J. Sweeting and Cyrus S. Winch)
amassed a large collection of bird skins from Great Inagua (Cory, 1891a,
1891c, 1892a), Mayaguana (Cory, 1892a), and the Caicos Islands (Cory,
1891a). Most of these specimens, along with Cory's own study skins, are
now in the Field Museum of Natural History.

Bonhote (1903a) reported on a small collection of birds taken on
Bird Rock in the fall of 1901; these specimens (at least the Mourning
Dove) are in the British Museum (Natural History).

Joseph H. Riley (National Museum of Natural History) was the
ornithologist of the Baltimore Geographic Society expedition to the
northern and central Bahamas in 1903. This expedition did not visit any
of the southern islands, but Riley (1905a) listed all of the birds then
known from the entire archipelago and included locality records (names
of islands) for each species. An annotated list of birds collected or
observed specifically during this expedition was published separately
(Riley, 1905b).

Under the auspices of Carnegie Museum of Natural History, W. W.
Worthington collected birds in the Bahamas from 28 December 1908 to 8 May
1909. Worthington and his assistants were in the southern Bahamas on
Bird Rock, Fortune Island, Castle Island, Crooked Island, Acklins Island,
and Great Inagua from 30 January to 9 March. An account of this expedition
including taxonomic analyses, life history notes, and many new locality
records, was presented by Todd and Worthington (1911).
The next "ornithological expedition" to the southern Bahamas did not occur until the summer of 1930 when Paul Bartsch (Curator of Molluscs at the National Museum of Natural History), along with four field assistants, visited this region, as well as the cays along the southern coast of Cuba, and the Cayman Islands (Bärtsch, 1931). Bartsch was interested primarily in the snail fauna but he and his associates prepared 374 study skins of birds from the southern Bahamas that were deposited in the National Museum. The ornithological results of this expedition never were reported although Bond (1956) included some of the locality records in his check-list of West Indian birds. However, Bartsch's unpublished field notes, on file at the National Museum, contain a wealth of information on the birds of this region, and I have incorporated these data in my species accounts. Members of this expedition visited many previously unexplored islands and some of these have not been revisited. Bartsch's field journal also is one of few mid-summer reports on southern Bahama birds.

During the last two weeks in July, Bartsch and his associates visited Crooked Island, Acklins Island, West Plana Cay, Mayaguana, Booby Cay, the Caicos Islands including Providenciales, Water Cay, Ft. George Cay, Parrot Cay, Stubbs Cay, Middle Caicos, East Caicos, Bell Cay (= Thatch Cay?), Iguana Cay, South Caicos, Long Cay, Dove Cay, and the Turks Islands including Grand Turk, and Salt Cay. In the period 1-10 August they were in the Turks Islands on Salt Cay, Penniston Cay, Long Cay, and Big Sand Cay, in the Caicos Islands on Bush Cay, South Caicos, Long Cay, the Six Hill Cays, French Cay, Providenciales, Baily's Island, and West Caicos, and in the Bahamas (sensu stricto) on Great Inagua and Little Inagua.
In 1933 and 1934 James C. Greenway, Jr., accompanied Thomas Barbour of the Museum of Comparative Zoology on two cruises to the West Indies in the yacht "Utowana". Dr. Greenway, now at the American Museum of Natural History, New York, provided me with notes on birds that he saw on Crooked Island, Fortune Island, East Plana Cay, and Great Inagua in February 1933, and on Great Inagua, Sheep Cay, Mayaguana, Crooked Island, Black Booby Cay, and the Mira Por Vos Cays during February and March 1934. He visited the Turks and Caicos Islands in March and April 1936, and a small collection of specimens from that trip was deposited in the Museum of Comparative Zoology.

In 1941 members of the fifth George Vanderbilt Expedition spent two to three days each (8-14 March) on Little Inagua, West Caicos, and Providenciales enroute to western Caribbean and eastern Pacific islands. Dawson Feathers, the expedition's bird collector, prepared 42 specimens from the southern Bahamas. An ornithological account of this expedition was given by Bond and Meyer de Schauensee (1944); the specimens were deposited in the Academy of Natural Sciences of Philadelphia.

James Bond, former Curator of Birds at the Academy of Natural Sciences of Philadelphia, has traveled extensively in the northern Bahamas and in the Greater and Lesser Antilles; in the southern Bahamas he has visited Great Inagua in the 1930's (fide Van Tyne, 1951) and Grand Turk in January, 1959 (Bond, 1959). Many Bahaman locality records compiled from varied sources are included in his check-list of birds of the West Indies (Bond, 1956) and in the yearly supplements to that check-list beginning with the first supplement in 1956.
In the period 12 December 1960 to 29 January 1961, Albert Schwartz and David Leber collected 190 specimens of birds from Great Inagua, South Caicos, West Six Hill Cay, Long Cay (Turks Islands), and Grand Turk. Some of this material was reported on by Schwartz and Klinikowski (1963) and all specimens were deposited in the Schwartz collection at 10000 SW 84th Street, Miami, Florida.

Garrett Clough and his associates visited East Plana Cay in 1967 and 1968 to study the ecology of the endemic rodent Geocapromys ingrahami. Notes on 37 species of birds that they observed there in October 1967 and in March and April 1968 were included in a report by Clough and Fulk (1971).

Ray and Sprunt (1971) prepared a preliminary ecological report on the Turks and Caicos Islands at the invitation of the Administrator at Grand Turk; they spent approximately two weeks there in August 1970. Although they primarily discussed shallow-water marine habitats, they did report on several breeding colonies of seabirds seen on some of the smaller and more remote cays during the course of aerial survey work.

Mary H. Clench, Associate Curator of Birds at the Carnegie Museum of Natural History was on Great Inagua from 28 November to 3 December 1973. She later visited Great Inagua, Little Inagua, West Plana Cay, Crooked Island, and Acklins Island during the period 10–20 March 1976 as a member of a Carnegie Museum Bahamas expedition. A brief description of this expedition was presented in the Bahamas Naturalist (Vol. 2, No. 1:44–45). Dr. Clench also visited the Turks and Caicos Islands including Providenciales, Parrot Cay, North Caicos, Middle Caicos, and Grand Turk during the period from 28 January to 13 February 1978. Her main
objective during these visits was to search for Kirtland's Warbler (Dendroica kirtlandii) on its wintering grounds, but her field notes, which she has made available to me, also contain numerous locality records as well as "early and late dates" for many species of birds.

James C. Dickinson, Jr. (Florida State Museum, University of Florida) kindly provided me with a list of the 33 species of birds that he observed on Pine Cay (Caicos Islands) during the period 14-22 August 1974. He collected specimens of nine species; these are in the Florida State Museum.

Karen Bjorndal, a graduate student in herpetology at the University of Florida, spent about 18 months on Great Inagua during the course of her study on the ecology of the Green Turtle (Chelonia mydas); I have incorporated some of her observations on the birds of that island for the periods December 1974, April-June 1975, January-August 1976, and June 1978 along with her notes on birds of Little Inagua taken in May 1975 and July 1976.

Arthur C. Watson, Governor of the Turks and Caicos Islands prepared an unpublished list of birds that he observed on Grand Turk during the years 1975-1977, and I have incorporated some of his records and notes into my species accounts.

In recent years many visitors to the southern Bahamas have kept lists of birds observed there and submitted them to James Bond for inclusion in his supplements to the West Indian check-list. I have not included the names of all these people in this account.
The time that I spent on each island is given in Table 3; a chronological list of the islands I visited is as follows:


8-17 March 1973—Crooked Island, Acklins Island.


25 March-13 April 1975—West Caicos, Providenciales, North Caicos, Middle Caicos.


29 September-19 October 1976—Mayaguana, Great Inagua.

7-14 April 1977—Great Inagua, Little Inagua.

19 March-4 April 1978—Providenciales, South Caicos, East Caicos.
Some islands mentioned in my species accounts are not included in Table 3. Baily's Island, on the Caicos Bank off the southern coast of Providenciales, is mentioned in Bartsch's field notes, but is not shown in any of the maps that I examined. Rolle Cay (= also Roller Cay?) is shown off the northwestern coast of Great Inagua, immediately east of Sheep Cay, in "Maps of the Bahamas" (Anonymous, 1926) but is not identified in any of the other more recent and more detailed maps that I have seen; it appears to be about one half the size of Sheep Cay. Also, some islands are known by names other than those given in Table 3, particularly in the early literature. These include Samana Cay (= Atwood Cay), Fortune Island (= Long Cay), Plana Cays (= French Cays), and Middle Caicos (= Grand Caicos).

Coordinates and dimensions in Table 3 were obtained from maps published by the Directorate of Overseas Surveys (London), by the Bahamas Lands and Surveys Department (Nassau, New Providence), from United States Naval Hydrographic Charts, and from data provided by the United States Board on Geographic Names (1955). Areas were determined by digitized map tracings done at the Louisiana State University Coastal Studies Institute.

FORMAT OF THE SPECIES ACCOUNTS

All species of birds reported from the southern Bahamas are included in the following accounts. Names of introduced species, as well as those of hypothetical status in the southern Bahamas, are enclosed in brackets. Nomenclature is mainly that of Bond (1956, 1971b), and partly that of the American Ornithologists' Union (1957, 1973a, 1973b, 1976); Meyer de Schauensee (1970) and Parkes (1978). I have coded some of the more
frequently used citations as well as references to field expeditions. 
The following is an alphabetized list of these codes along with a brief 
explanation for each one; more detailed explanations (in approximate 
chronological order) have been given above.

AS = Albert Schwärtz (catalog, personal collection)
BB = Brudenell-Bruce (1975)
B-MS = Bond and Meyer de Schauensee (1944)
CBC = Charles B. Cory (notes from personal catalog, and data from 
specimen labels, Field Museum of Natural History)
C-F = Clough and Fulk (1971)
JB = James Bond (from notes on file at the Institute of Jamaica)
JCD = J. C. Dickinson, Jr. (pers. comm.)
KB = Karen Bjorndal (pers. comm.)
MHC = Mary H. Clench (pers. comm.)
PB = Paul Bartsch (field notes, 1930 expedition)
R-S = Ray and Sprunt (1971)
S-K = Schwartz and Klinikowski (1963)
T-W = Todd and Worthington (1911)
* = personal observation (D. W. Buden)

The format of each account is determined by the kind and quantity 
of information presented, which varies from brief, single-sighting 
reports of transients or vagrants, to longer accounts involving evaluation 
of interisland and intraisland morphological variation in widespread 
resident species. Each account includes one or more sections as follows:

Records.—This section includes the names of the islands in the
southern Bahamas whence each species has been reported. Citations or references to individual records are included for species that are uncommon or poorly known in this region.

**Status.**—Unless otherwise stated, this section pertains only to the status of a species in the southern Bahamas. However, in cases where there are but few records from the southern Bahamas, and where there is some question concerning the status of a species in this region, I have included pertinent notes on distribution elsewhere in the West Indies, relying mostly on Brudenell-Bruce (1975) for distribution in the northern Bahamas and Bond (1956) for the West Indies in general.

Definitions of terms used in this section are as follows: **abundant**, observed regularly and in fairly large numbers during nearly any visit to suitable habitat; **common**, observed regularly, likely to be seen at least once during any visit to suitable habitat; **uncommon**, seen regularly but one sighting may require several visits to suitable habitat; **scarce** or **rare**, expected to be seen at times, but not during any one time in the field; **resident** (= permanent resident), present throughout the year, a breeding bird during the summer months, overwinters elsewhere; **winter visitor**, most likely to be seen only during the winter months, nests elsewhere, usually in continental North America; **transient** (= **migrant**), present during migration between breeding grounds and wintering grounds; **vagrant** (= **accidental**), known only from one or a few records and not likely to be observed at any particular time. The words **probably** and **apparently** qualify inferences of status in the southern Bahamas that are based in large measure on records from the northern Bahamas and the Greater Antilles.
Early and late dates of migrants, winter visitors, and summer residents also are included in this section as are notes on breeding.

**Variation.**—This section includes discussions on interisland and intraisland variation in morphology among resident species in the Bahamas, and pertinent comparisons between Bahaman, Antillean, and continental populations, along with taxonomic discussions and evaluations.

**Subspecies.**—In cases where I have not critically examined intraspecific variation, usually among wide-ranging populations of seabirds and waterbirds, or among transients from wide-ranging populations on the continent, I have given the subspecies name applied to Bahaman populations by Bond (1956). The absence of any reference to subspecies in an account indicates that the species is considered monotypic.

**Remarks.**—Notes that do not fit into any of the above categories are included here. Also, statements that might bridge several of the categories above, or several short statements, which could be placed in separate sections have, for convenience, been pooled into this one section.

**Subspecies Concepts**

I have not applied any rigid separation rules based on percentages in assigning subspecies names but have evaluated each situation independently and arrived at taxonomic conclusions that I believe best express zoogeographic patterns and probable phylogenetic relationships. I believe that evidence of local differentiation alone is not always sufficient justification for nomenclatorial recognition, particularly when working with populations in a highly fragmented archipelago and, in many cases, with relatively small samples. There are frequent
opportunities for recognizing or proposing subspecies names for populations in the Bahamas based on slight differences in coloration or in size, but I see no advantage in adding a suite of new or resurrected names to the literature. I have not proposed any new names in the following accounts, although I believe that cases may be made for new subspecific designations for the Caicos Islands populations of _Vireo crassirostris_ and _Loxigilla violacea_. In many cases I have placed names into synonymy.

I have not recognized separate subspecies among Bahaman populations that show fairly smooth clinal variation, even if both ends of the cline are completely separable, as is the case in populations of _Coereba flaveola_. However, in situations where a relatively large, geographically and morphologically intermediate population (usually on more than one island) shows consistency and uniformity in morphology, I have treated that population and adjacent populations as separate subspecies—variation in _Dendroica petechia_ approaches this situation.

Widely separated populations occasionally resemble each other in characters that distinguish them taxonomically from adjacent or immediately adjacent populations. The presence of small pale, individuals of _Columbina passerina_ in the southernmost Bahamas and on Mona Island (between Hispaniola and Puerto Rico), and the presence of particularly small individuals of _Loxigilla violacea_ in the Caicos Islands and on Beata (off the southern coast of Hispaniola) are cases in point. Beata, Mona, and the southernmost Bahamas all are low-lying, predominantly scrub-covered xeric islands. Convergent adaptations to local environmental conditions seem to me the most likely explanation of the morphological
similarity shared between these disjunct intraspecific populations and in most cases I would not treat such populations as members of the same subspecies, at least not according to morphological criteria alone. However, in the case of *Nyctanassa violacea* I have retained the trinomen *N. v. bancrofti* for the disjunct populations in the West Indies and in western Mexico mainly because I do not have sufficient data on the westernmost population or on the distributional history of this species in the geographically intermediate region to justify a change in nomenclature.

**SPECIES ACCOUNTS**

**Family PODICIPEDIDAE**

**Grebes**

*Podiceps dominicus* (Linnaeus): Least Grebe.

**Records:** Acklins (T-W), Great Inagua (T-W, KB-1978); in the Caicos Islands on Pine Cay (2 seen on 23 May 1970*, sight record mid-August 1974 JCD), North Caicos (specimen collected 19 February 1972*, sight record 2-12 February 1978 MHC), East Caicos (one seen on 28 February 1976*).

**Status:** Probably an uncommon to locally common resident. Todd and Worthington (1911) reported that a female taken on Great Inagua was "apparently brooding" on 23 February 1909. Karen Bjorndal (pers. comm.) found two nests on Great Inagua (at Stew Duck Pond and Grassy Pond), each with three eggs, in June 1978; the nests were of filamentous green algae.

**Variation:** *P. d. dominicus* is resident in the Greater Antilles and in the Bahamas at least as far north as New Providence (Bond, 1956;
Brudenell-Bruce, 1975). The seven specimens from the Bahamas that I examined are referable to this subspecies. They average slightly shorter in wing length than do five specimens from Cuba; the means (sample sizes in parentheses) are as follows: males—Cuba 100.0 (1), Bahamas 97.3 (3); females—Cuba 99.0 (3), Bahamas 93.5 (2); sex undetermined—Cuba 101.0 (1), Bahamas 95.0 (2). Measurements in Todd and Worthington (1911) also suggest that Least Grebes from the Bahamas average smaller (at least in wing length) than do those from Cuba. The one specimen form Puerto Rico that I have seen is similar to Bahaman specimens in this character. I have not seen others from elsewhere in the Antilles.

*Podilymbus podiceps* (Linnaeus): Pied-billed Grebe.

**Records:** Mayaguana* (one seen in surf off northern coast on 14 October 1976), Great Inagua (T-W), Little Inagua* (one seen on 31 December 1974).

**Status:** Present at least as a winter visitor, and probably an uncommon or occasional breeding resident. Brudenell-Bruce (1975) stated that *P. podiceps* is a common resident on New Providence but is more numerous there in winter than in summer. Three downy young were taken on Great Inagua in the period 20–22 February 1909 (Todd and Worthington, 1911).

**Variation:** The subspecies *P. p. podiceps* breeds throughout much of continental North America and has been reported in the West Indies in winter (Bond, 1956; Palmer, 1962). Members of the subspecies *P. p. antillarum* Bangs breed in the Greater and Lesser Antilles (Bond, 1956)—they differ from the nominate form mainly in having a shorter wing (Hellmayr and Conover, 1948; Wetmore, 1965; Blake, 1977). Blake (1977)
indicated that individuals of *P. p. antillarum* tend to have a relatively smaller throat patch and a less prominent black band on the bill than do individuals *P. p. podiceps*, but I found these characters too variable to be of use in distinguishing between these subspecies.

The taxonomic status of Pied-billed Grebes in the Bahamas is moot, mainly because of the nearly complete lack of specimens of known breeding birds from this region. Bond (1950b) included the Bahamas (at least Great Inagua) within the breeding range of *P. p. podiceps* on the basis of the wing length of "an adult male in the Carnegie Museum, Pittsburgh, taken at a pond on Great Inagua, together with downy young." However, wing measurements of 131 mm (Bond, 1950b) and 132 mm (Mary H. Clench, pers. comm.) for this specimen both fall within the narrow zone of overlap between my samples of 12 male *P. p. podiceps* from the continent (131–141, $\bar{x} = 135.9$) and eight males of *P. p. antillarum* from Hispaniola (121–132, $\bar{x} = 127.6$).

The only specimens of Pied-billed Grebes from the Bahamas that I have examined are three males (AS 1269, 1299, and 1319) taken on Andros in November 1960, and one male (AS 2892) collected on Eleuthera in October 1961. In wing length these specimens range from 133 to 140 mm ($\bar{x} = 136.0$); they resemble examples of *P. p. podiceps* in this character. But whether these Bahaman specimens represent breeding residents, migrants, or winter visitors, is unknown. The inclusion of the Bahamas within the breeding range of *P. p. podiceps* presently rests on tenuous grounds.
Family PROCELLARIIDAE
Shearwaters and Petrels

Puffinus puffinus (Brunnich): Manx Shearwater.

Records: Crooked—known only from skeletal remains (Wetmore, 1938).
Status: Former resident (?).
Remarks: Only members of the nominate subspecies have been recorded in the Caribbean. P. p. puffinus presently breeds in the eastern North Atlantic, but formerly bred in Bermuda as well (Palmer, 1962).

Puffinus lherminieri Lesson: Audubon's Shearwater.

Records: Crooked—known only from skeletal remains (Wetmore, 1938), near Fortune (Wetmore and Lincoln, 1933), off Castle (T-W), Great Inagua and vicinity (T-W; Wetmore and Lincoln, 1933; MHC-1976); in the Caicos Islands on Long Cay (PB), and West Six Hill Cay (AS); in the Turks Islands on East Cay*.

Status: Probably a fairly common resident. Reported in the southern Bahamas in the period January through July but probably present throughout the year; outside of the breeding season individuals are likely to be seen at sea.

Clough and Fulk (1971) reported that Audubon's Shearwaters were in or near caves on East Plana Cay in March 1968. I collected a male, along with one unpatterned white egg, under a rock on East Cay, on the Turks Bank, on 24 March 1972.

Subspecies: Puffinus lherminieri lherminieri Lesson.

Pterodroma hasitata (Kuhl): Black-capped Petrel.

Records: Crooked—known only from bone fragments (Wetmore, 1938).
Status: Former resident (?).

Remarks: Wetmore (1938) identified skeletal material from Crooked Island as belonging to the "Bermuda Petrel" or "Cahow" (P. h. cahow) although Palmer (1962) questioned the validity of this identification. Members of this subspecies presently are known to breed only in Bermuda—Slaughter (1975) indicated that the present population there is stable at about 25 pairs.

The nominate subspecies nested formerly on Jamaica, Guadaloupe, Dominica, and possibly Martinique (Bond, 1956). Breeding colonies have been rediscovered in the mountains of Hispaniola (Wingate, 1964a), and a new or previously unknown breeding colony apparently has been discovered in Cuba (Bond, 1978a).

Family HYDROBATIDAE

Storm-Petrels

Oceanodroma leucorhoa (Vieillot): Leach's Storm-Petrel.

Records: Off Great Inagua—three individuals observed by Mary H. Clench on 12 March 1976.

Status: Winter visitor or transient—breeds in high, northern latitudes.

Subspecies: Oceanodroma leucorhoa leucorhoa (Vieillot).

Oceanodroma oceanicus (Kuhl): Wilson's Storm-Petrel.

Records: Between Acklins and Great Inagua—three individuals observed by Mary H. Clench on 10 March 1976.

Status: Summer visitor or transient.

Remarks: Wilson's Storm-Petrels breed in high latitudes of the
southern hemisphere in "winter"—ca. December to April (Palmer, 1962).

Subspecies: Oceanites oceanicus oceanicus (Kuhl).

Family PHAETHONTIDAE

Tropicbirds

Phaethon lepturus Daudin: White-tailed Tropicbird.


Status: Fairly common summer resident, probably breeding in suitable habitats (e.g., coastal cliffs and ledges) throughout the Bahamas. Karen Bjorndal (pers. comm.) observed young of the year at the southwestern end of Great Inagua as early as the last week of March 1976. Early dates: 10 March (at sea between Rum Cay and Great Inagua MHC-1976), 18 March (in hole amongst rocks on Big Sand Cay 1972*). Late date: during the period 22–28 October (East Plana Cay C-F).

Subspecies: Phaethon lepturus catesbyi Brandt.

Family PELECANIDAE

Pelicans

Pelecanus occidentalis Linnaeus: Brown Pelican.

Records: Fortune (12 July PB), Mayaguana* (early October 1976), Booby Cay (21 July PB), Great Inagua including Rolle Cay (summer and winter records); in the Caicos Islands (summer and winter records) on

Status: Fairly common but local resident; some individuals may be winter visitors only.

I found a breeding colony that contained at least 10 adults, eight grayish-brown young, and one downy-white young at the northwestern end of East Caicos on 3 March 1976. The nests were in the tops of red mangrove (Rhizophora mangle) that formed a platform about three meters above ground along the shore of a salt pond.

Remarks: One female collected on Rolle Cay (off the west end of Great Inagua) on 4 June 1879 was identified as *P. o. occidentalis* by Wetmore (1945); members of this subspecies breed on many West Indian islands (Bond, 1956). I treat breeding populations of *Pelecanus* in the southern Bahamas as *P. o. occidentalis* largely on geographic grounds and on the basis of Wetmore's identification of the Rolle Cay specimen.

Members of the subspecies *P. o. carolinensis* breed along the coast of continental North America and frequently wander to the Bahamas and other West Indian islands; individuals banded in the United States have been taken in Cuba during every month of the year (Bond, 1956). However, I do not know of any records of *P. o. carolinensis* from the southern Bahamas nor, with the exception of the female from Rolle Cay, of any specimens of *Pelecanus* from these islands.
Family SULIDAE

Boobies

*Sula leucogaster* (Boddaert): Brown Booby.

**Records:** Samana Cay (American Ornithologists' Union, 1957), Crooked—known from bone fragments (Wetmore, 1938), near Fortune (T-W), south of Castle (T-W), Mira Por Vos Cays (Cory, 1880), East Plana Cay (C-F), between Acklins and Great Inagua (MHC-1976); in the Turks Islands on Grand Turk (ACW) and Penniston Cay ("boobies" seen by members of Bartsch expedition).

**Status:** Relatively uncommon resident; breeds on small, remote cays. Cory (1880) found adults and fully fledged young on the Mira Por Vos Cays during the last week of May 1879. Outside of the breeding season, members of this species are most likely to be seen at sea.

**Subspecies:** *Sula leucogaster leucogaster* (Boddaert).

Family PHALACROCORACIDAE

Cormorants

*Phalacrocorax olivaceus* (Humboldt): Olivaceous Cormorant.

**Records:** Fortune (?)* = Great Inagua, in the Turks Islands on Grand Turk (sight record, 17 October 1976 ACW).

**Remarks:** Known to breed in the Bahamas only on San Salvador and Great Inagua (Brudenell-Bruce, 1975). I saw one cormorant (unidentified to species) on Fortune Island on 17 April 1972.

**Subspecies:** *Phalacrocorax olivaceus mexicanus* Brandt.

Family FREGATIDAE

Frigatebirds

*Fregata magnificens* Mathews: Magnificent Frigatebird.
Records: Samana Cay, Acklins, Mayaguana, Booby Cay, Great Inagua; in the Caicos Islands on West Caicos, Providenciales, Middle Caicos, and East Six Hill Cay; in the Turks Islands on Grand Turk, Long Cay, and Penniston Cay.

Status: Relatively uncommon resident; apparently breeds mostly on small remote cays. Palmer (1962) reported that eggs of *F. magnificens* were found on Atwood Cay (= Samana Cay) on 9 February, and Ray and Sprunt (1971) reported that this species breeds on Penniston Cay on the Turks Bank. Arthur C. Watson (pers. comm.) observed a "colony" of frigatebirds at North Creek, Grand Turk, on 26 November 1977—the males were in "breeding condition."

I saw 18 individuals together on Grand Turk on 1 April 1972, but otherwise have seen only one to five individuals at any one time in the southern Bahamas. Mary H. Clench (pers. comm.) saw 27 Magnificent Frigatebirds soaring over Middle Caicos (heading WSW) on 9 February 1978.

Family ARDEIDAE
Hérons and Egrets

*Ardea herodias* Linnaeus: Great Blue Heron.

Records: Crooked*, Acklins, West Plana Cay, East Plana Cay, Great Inagua (many records), Little Inagua; in the Caicos Islands on West Caicos, Providenciales, Pine Cay, North Caicos, East Caicos*, and Little Ambergris Cay*; in the Turks Islands on Grand Turk.

Status: *A. herodias* may breed locally, at least on Great Inagua; Oberholser (1912) reported on two "breeding birds" taken on Great Inagua by C. J. Maynard in March 1888 and in March 1891, and Karen Bjorndal (pers. comm.) observed adults and a juvenile of this species there on
27 July 1976. However, most "Great Blues" in the southern Bahamas have been seen in winter, and a large number of these may be winter visitors or transients. Brudenell-Bruce (1975) stated that A. herodias is a fairly common winter visitor on New Providence where it is most numerous from November through April.

**Subspecies:** I have not examined any A. herodias from the Bahamas, but specimens from the Antilles are similar to those of A. h. herodias from eastern North America. Payne (in press) included populations of A. herodias from the West Indies and from eastern North America (excluding the southern tip of Florida and the Keys) as members of the nominate subspecies.

The "Great White Heron", which presently is treated as a white morph of the Great Blue Heron (American Ornithologists' Union, 1973) has not been recorded in the southern Bahamas, but has been reported from the northern part of the archipelago and is fairly common in Cuba and at the southern tip of Florida (Palmer, 1962).

**Butoxides virescens** (Linnaeus): Green Heron.


**Status:** Common resident.

**Variation:** Green Herons from the Bahamas, B. v. bahamensis (Brewster), are paler than those from the Greater Antilles, B. v.
maculatus (Boddaert), and paler, as well as smaller, than those from eastern continental North America, B. v. virescens (Linnaeus).

**Florida caerulea** (Linnaeus): Little Blue Heron.

**Records**: Crooked*, Acklins*, Mayaguana*, Great Inagua, Little Inagua; in the Caicos Islands on Providenciales*, North Caicos* and East Caicos*; in the Turks Islands on Grand Turk*.

**Status**: Apparently a fairly common winter visitor, although previously unreported from the southern Bahamas. Extreme dates: 18 October (Mayaguana* 1976), 22 April (Acklins* 1972).

**Bubulcus ibis** (Linnaeus): Cattle Egret.

**Records**: Mayaguana*, Great Inagua (AS), Little Inagua*; in the Caicos Islands on Providenciales*, North Caicos*, and South Caicos*; in the Turks Islands on Grand Turk (AS), and Salt Cay*.

**Status**: Common on South Caicos and Grand Turk but uncommon to fairly common locally elsewhere—probably resident on some of the larger islands in this region. Many on South Caicos were in breeding plumage in March and April 1978.

**Remarks**: Cattle Egrets were unknown in the West Indies prior to 1948 (Bond, 1971b), but within the next decade they were reported from throughout the Caribbean (Bond, 1959). This species was first reported in the Bahamas on Eleuthera in 1953 (Bond, 1959); two specimens (AS 1394 and 1395) collected on Great Inagua on 3 December 1960 are the first records of B. ibis from the southern Bahamas.

According to Crosby (1972), Cattle Egrets arrived naturally from Africa and first became established in the New World in South America.
in the early 1900's. He suggested that West Indian populations probably were derived from northern South America after the continental North American populations were already established.

**Subspecies:** Bubulcus ibis ibis (Linnaeus).

**Dichromannassa rufescens** (Gmelin): Reddish Egret.

**Records:** Samana Cay*, West Plana Cay, East Plana Cay, Mayaguana*, Great Inagua; in the Caicos Islands on West Caicos*, Providenciales, Pine Cay, North Caicos, Middle Caicos, East Caicos, and South Caicos; in the Turks Islands on Grand Turk, and Salt Cay*. Several specimens were collected in the "Caicos Islands" in January and February 1891 (Cory, 1891a).

**Status:** Fairly common resident, probably breeding on most islands whence it has been recorded; more numerous in summer than in winter.

Todd and Worthington (1911) reported the presence of "good-sized" young in nests on Great Inagua on 5 February 1909, and Allen (1955) found individuals incubating eggs on Great Inagua on 25 March 1953.

**Variation:** Allen (1955) reported that 89% of the Reddish Egrets he observed on Great Inagua (in March, April, and May) were of the white phase. I saw only white-phase individuals on Mayaguana in October 1976, but otherwise have seen approximately equal numbers of white-phase and dark-phase individuals in the southern Bahamas.

Bond (1956) included West Indian populations of *D. rufescens* in the subspecies *D. r. colorata* (Griscom); he stated that they differed from members of the nominate subspecies (in southern North America) in having a longer wing and (in the dark phase) a paler head and neck. I
found no differences in wing length between samples from Florida and the West Indies, but the three dark-phase individuals from Cuba that I examined are much paler than any of the Florida specimens. Tentatively I include the Bahamas and Greater Antilles within the breeding range of *D. r. colorata*, which I consider a weakly differentiated subspecies; however, Payne (in press) placed *D. rufescens colorata* in the synonymy of *D. r. rufescens*.

**Egretta alba** (Linnaeus): Great Egret.

**Records:** Mayaguana*, Great Inagua; in the Caicos Islands on Pine Cay, North Caicos, Middle Caicos, East Caicos*, and South Caicos.

**Status:** Uncommon; a scattering of summer and (mostly) winter records but no specific reports of nesting, although Holowesko (1978) photographed young on Great Inagua in April 1978. Great Egrets in the southern Bahamas may be visitors and/or members of local breeding population. Bond (1956) reported that this species breeds in the Bahamas, and that individuals banded in the United States had been found in the Greater Antilles. Brudenell-Bruce (1975) reported Great Egrets as uncommon winter visitors on New Providence.

**Subspecies:** *Egretta alba egretta* (Gmelin).

**Egretta thula** (Molina): Snowy Egret.

**Records:** Acklins, Mayaguana*, Great Inagua*; in the Caicos Islands on Middle Caicos*; in the Turks Islands on Grand Turk.

**Status:** Uncommon winter visitor but some individuals may be present throughout the year—observed on Great Inagua on 26 July 1976
(KB). The breeding range of the Snowy Egret includes the southeastern United States and the Greater Antilles, but there are no nesting records of this species from anywhere in the Bahamas.

Subspecies: *Egretta thula thula* (Molina).

**Hydranassa tricolor** (Muller): Louisiana Heron.

*Records*: Crooked, Fortune, Acklins, West Plana Cay, Mayaguana, Great Inagua, Roll Cay; in the Caicos Islands on West Caicos*, Providenciales*, North Caicos, Middle Caicos, East Caicos, and South Caicos; in the Turks Islands on Grand Turk, Cotton Cay*, and Salt Cay.

*Status*: Fairly common resident, probably breeding in mangrove swamps throughout this region. Cory (1880) found nests of this species on Great Inagua that contained two to four eggs each in late May 1879.

Subspecies: **Hydranassa tricolor ruficollis** (Gosse).

**Nycticorax nycticorax** (Linnaeus): Black-crowned Night-Heron.

*Records*: Great Inagua.

*Status*: Apparently a scarce and local resident. Karen Bjorndal (pers. comm.) has seen this species on Great Inagua throughout the year. Todd and Worthington (1911) reported on four young ("with remains of the natal down still adhering to the crown feathers") taken on Great Inagua in early February 1909.

Nonbreeding visitors may be present in the southern Bahamas at times—individuals banded in North America have been found in Cuba, Hispaniola, and Grand Cayman (Bond, 1956).

Subspecies: **Nycticorax nycticorax hoactli** (Gmelin).
*Nyctanassa violacea* (Linnaeus): Yellow-crowned Night-Heron.


**Status:** Common resident. Cory (1880) found many nests of this species on the Mira Por Vos Cays on 27 May 1879—most contained three to five eggs each. Members of the Bärsch expedition found a breeding colony on Acklins on 7 July 1930. I flushed two adults from an otherwise empty nest on Providenciales on 12 March 1976 and found a nest on Mayaguana that contained two eggs on 9 May 1972.

**Variation:** Bond (1956) included the Yellow-crowned Night-Herons of western Mexico, northwestern Nicaragua, and the West Indies as members of the subspecies *N. v. bancrofti* Huey. Paler coloration and a thicker (= deeper) bill are characteristics that distinguish this subspecies from *N. v. violacea*, which occurs from southern North America to Panama. This taxonomic treatment also has been followed by Palmer (1962), Wetmore (1965), and Blake (1977). Payne (in press), however, included the West Indies within the range of the nominate subspecies and retained the name *N. v. bancrofti* only for those populations occupying the Pacific coast from Mexico to Nicaragua.

Specimens from the Bahamas that I examined have bills that average much deeper than those from Florida (Figure 6); this difference is more
evident visually than is actually indicated by measurements. The Bahaman specimens also tend to be paler, particularly on the dorsum, but this character is extremely variable. Most specimens from the Greater and Lesser Antilles resemble Bahaman birds, but several collected in Cuba have extremely shallow bills; these were identified as members of the nominate subspecies by Alexander Wetmore and may have been visitors from continental North America—they were taken in the months of January, March, and September.

I tentatively treat the West Indian populations of *N. violacea* as members of the subspecies *N. v. bancrofti*. Whether pale coloration and large bill size, however, are characters that were derived independently in the two disjunct populations of *bancrofti*, or whether they are of some common origin is unknown.

Family THRESKIORNITHIDAE

**Ibis and Spoonbills**

**Plegadis falcinellus** (Linnaeus): Glossy Ibis.

**Records:** Great Inagua—Todd and Worthington (1911) reported that one individual was observed during the period 5 February–2 March 1909; Karen Bjorndal (pers. comm.) saw three individuals within the period 26 September to 2 October 1975, and one on 20 June 1976.

**Status:** Probably an uncommon transient and/or winter visitor. The June record is particularly unusual.

**Subspecies:** *Plegadis falcinellus falcinellus* (Linnaeus).

**Eudocimus albus** (Linnaeus): White Ibis.

**Records:** Crooked—from bone fragments only (Wetmore, 1938), Great Inagua (Bond, 1958; KB-1975).
Remarks: Probably an occasional wanderer to the southern Bahamas. Karen Bjorndal (pers. comm.) saw four individuals on Great Inagua in July 1975 and Robert Hanlon (fide Bond, 1958) saw two individuals on Great Inagua. Hanlon's sight record is undated but accompanies his sight record of Chlidonias niger dated 25 July.

_Ajaia ajaja_ (Linnaeus): Roseate Spoonbill.

**Records:** Great Inagua.

**Status:** Fairly common but local resident. Todd and Worthington (1911) reported that nests of this species contained young birds, or eggs in an advanced state of incubation, on 8 February 1909. Karen Bjorndal observed young spoonbills on Great Inagua on 27 April 1975; she saw a maximum of 29 adults at one time, on 19 June 1976. Holowesko (1978) photographed four young of the year in April 1978.

Family **PHOENICOPTERIDAE**

Flamingos

*Phoenicopterus ruber* (Linnaeus): American Flamingo.

**Records:** Crooked, Fortune, Acklins, Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos*, Providenciales*, North Caicos*, Middle Caicos, Iguana Cay, and Joe Grant's Cay*; in the Turks Islands on Grand Turk*.

**Status:** Fairly common resident on Great Inagua where the present population is estimated to be 30,000 to 40,000 individuals—over half the world population of this species (Annual Report of the Bahamas National Trust, 1976). Formerly, breeding populations were present in the Bahamas wherever there was suitable habitat, but persecution by
man has eliminated or at least greatly reduced the size of colonies outside of those on Great Inagua where the species has been given strict protection by Bahamas National Trust wardens for the past 25 years.

Breeding populations of flamingos have been reported in the Bahamas on Abaco, Andros, Mayaguana, and the Caicos Islands. Bond (1956) included Abaco within the present breeding range of this species, and Brudenell-Bruce (1975) stated that breeding populations may be present in the northern Bahamas on Andros and Abaco. However, in the Bahamas Naturalist (Vol. 2, No. 1, 1976) an anonymous statement reads "by the early 1950's the species no longer reproduced in the northern Bahamas (although it still returned to feed on Andros and Abaco) and the Bahamas National Trust reserve in Inagua became the last breeding foothold of the West Indian flamingo in the Bahamas."

Undetected populations of flamingos, however, may be present on a number of Bahama Islands. This species may have been resident on Acklins Island for many years but only recently has there been any documentation of nesting there. Bond (1967) indicated that when staff members of the Academy of Natural Sciences of Philadelphia visited the "Crooked Island group" in August and September 1958 they heard reports of the presence of a breeding colony of flamingos at a large salt pond southeast of Pompey Bay (Acklins Island), but none was there on 1 September of that year. However, David Blankenship found about 300 nest mounds inland from Pompey Bay in July 1976—seventy seven adults (but no juveniles) were seen in the vicinity (Anonymous, 1976).
I saw two individuals in a salt pond on West Caicos on 24 May 1970, but found no evidence of breeding there. Local citizens of the Turks and Caicos Islands report that flamingos are fairly common among those islands, particularly in winter, but no one knew of any active breeding colonies in that region. Paul Bartsch (field notes for 1930) indicated that, according to local villagers, flamingos were breeding on Mayaguana inland from Betsy Bay in July 1930. I visited Mayaguana in September and October 1976 and was told that flamingos nested formerly, and perhaps still nested in ponds at the northeastern end of the island. I saw a flock of about 75 individuals on a beach about 1 km east of the the eastern end of Salt Pond, but I saw no evidence of nesting in any of the nearby ponds that I visited; however, I had insufficient time to explore each one thoroughly. Also, high water in the ponds may have obscured the old nests. An alternative explanation is that many or all of the flamingos recently seen on Mayaguana and in the Turks and Caicos Islands may be visitors from Inagua (or from Acklins). Flamingos banded on Inagua have been recovered throughout Cuba and Hispaniola (Sprunt, 1975).

Outside of the Bahamas Phoenicopterus ruber breeds in the Greater Antilles, in Yucatan, on islands of the southern Caribbean, in the Galapagos, and in northern South America.

**Subspecies:** Phoenicopterus ruber Linnaeus.

**Family ANATIDAE**

**Geese and Ducks**

*Chen caerulescens* (Linnaeus): Snow Goose.
Records: Great Inagua where Daniel Sargent, American Vice-Consul there in the mid-1800's, reported the presence of a small flock of white birds of this species (fide Bryant, 1866).

Status: Vagrant or rare winter visitor.

Subspecies: Probably Chen caerulescens caerulescens (Linnaeus).

Dendrocygna bicolor (Vieillot): Fulvous Whistling-Duck.

Records: Great Inagua, whence reported occasionally in winter (Brudenell-Bruce, 1975); in the Caicos Islands on Middle Caicos* (two seen on 15 January 1972) and South Caicos (two specimens, 17 and 21 January 1961 AS).

Status: Apparently an uncommon winter visitor.

Remarks: According to Bond (1956) the breeding range of D. bicolor includes southern Asia, Africa, Madagascar, South America, and North America from southern California and Louisiana southward into Mexico. Baird (1963) indicated that in the 1950's fairly large numbers of D. bicolor began to disperse out of their breeding grounds in North America. By the mid-1960's D. bicolor was an established winter visitor in the southeastern United States and a regular visitor to the Northeast (Jones, 1966). Palmer (1976a) listed locality records for D. bicolor from Canada and from widely separated areas throughout continental United States along with breeding records from southern Florida.

D. bicolor was first recorded from the West Indies in Cuba in 1943 (Bond, 1964), and the first documentation of breeding there was in 1964 (Bond, 1965). There are no breeding records of this species elsewhere in the West Indies although there are numerous sightings from
throughout this region. Records for the Bahamas (excluding the Turks and Caicos Islands) are given by Brudenell-Bruce (1975) under the heading "accidentals"—all are "winter records."

*D. bicolor* became more widespread in the West Indies (at least as a winter visitor) shortly after it began to disperse in large numbers eastward and northward from the south-central United States. Baird (1963) suggested that members of this species seen in Puerto Rico in December 1960 probably were part of the dispersing continental population. However, dispersal northeastward and southeastward from Cuba may be a more likely possibility. Bond (1966) stated that "the great increase in the Cuban population may have instigated its extraordinary spread virtually throughout the Bahamas and Antilles noted from 1960 to 1965."

*Dendrocygna arborea* (Linnaeus): West Indian Whistling-Duck.

**Records:** Acklins, Great Inagua; in the Caicos Islands (?).

**Status:** Fairly common resident on Great Inagua; perhaps uncommon or local in more remote parts of other islands in this region. Bryant (1866) found downy young on Great Inagua in March, along with partially fledged individuals in early April. Todd and Worthington (1911) reported an abandoned nest on Inagua that contained four addled eggs on 20 February 1909.

**Remarks:** In the Caicos Islands Paul Bartsch noted "Tree Ducks" (= Whistling-Ducks) on Stubbs Cay on 25 July, and he also tentatively identified individuals in flight over Ft. George Cay on 24 July as "Tree Ducks". These sightings may pertain to *D. arborea*. 
David Blankinship (pers. comm.) saw about 20 individuals (in two flocks) of *D. arborea* at Pinefield Landing, Acklins Island; this is the first report of the species from Acklins. Local citizens indicated that *D. arborea* is not common there (Blankinship, pers. comm.)

*Branta canadensis* (Linnaeus): Canada Goose.

**Records:** In the Caicos Islands on Providenciales.

**Status:** Introduced. Mary H. Clench reported (pers. comm.) that two Canada Geese were present in the vicinity of the Third Turtle Inn in January 1978; I saw two individuals there in March 1978.

*Anas platyrhynchos* Linnaeus: Mallard.

**Records:** In the Caicos Islands on Providenciales.*

**Status:** Introduced. Tim Nicholls (pers. comm.) reported that about 25 pinioned individuals were released near the Third Turtle Inn around 1972, and that the population numbered 15-20 individuals in 1976. Mary H. Clench (pers. comm.) found only eight individuals there in 1978. Young are produced regularly there but many succumb to depredations of dogs and cats.

*Anas bahamensis* Linnaeus: Bahama Duck.

**Records:** Acklins, Fortune*, Mayaguana*, Great Inagua, Sheep Cay, Little Inagua; in the Caicos Islands on West Caicos*, Pine Cay, North Caicos, Middle Caicos, and East Caicos; in the Turks Islands on Grand Turk and Cotton Cay*.

**Status:** Fairly common resident but more numerous in late spring and summer than in winter; probably nests in the vicinity of ponds and
lagoons on most islands in this region. Cory (1880) found a nest on Great Inagua that contained 9 eggs on 27 May 1879, and Karen Bjorndal saw one individual there that was accompanied by four ducklings on 27 July 1976.

**Subspecies**: Anas bahamensis bahamensis Linnaeus.

**Anas discors** Linnaeus: Blue-winged Teal.

**Records**: Acklins*, Mayaguana*, Little Inagua*; in the Caicos Islands on Providenciales*, North Caicos*, and Middle Caicos*.

**Status**: Fairly common winter visitor, but previously unrecorded from this region. Extreme dates: 16 October (Mayaguana* 1976), 22 April (Acklins* 1972).

**Anas americana** Gmelin: American Wigeon.

**Records**: Acklins (Bond, 1956); in the Caicos Islands on East Caicos* (ca. twelve individuals seen on 3 March 1976).

**Status**: Uncommon transient or winter visitor.

**Anas clypeata** Linnaeus: Northern Shoveler.

**Records**: Middle Caicos* (two individuals observed on 17 January 1972).

**Status**: Probably an uncommon winter visitor. Reported as an occasional migrant on New Providence (Brudene11-Bruce 1975) and as a fairly common winter visitor to the Greater antilles (Bond, 1956).
Status: Probably a scarce winter visitor in the southern Bahamas, but Brudenell-Bruce (1975) stated that *A. collaris* is fairly common in winter on New Providence.

*Aythya affinis* (Eyton): Lesser Scaup.

**Records:** In the Caicos Islands on West Caicos (questionable sight record B-MS), North Caicos, Middle Caicos, and East Caicos.

**Status:** Probably an uncommon winter visitor. Three specimens from the Caicos Islands taken by C. S. Winch, 28–29 January 1891, are in the Field Museum of Natural History. None bears the name of a specific island locality; records specifically for North, Middle, and East Caicos are from Cory (1892b).

*Oxyura jamaicensis* (Gmelin): Ruddy Duck.

**Records:** Great Inagua (Bond, 1940).

**Status:** The Ruddy Duck probably is a rare resident and/or winter visitor in the southern Bahamas. In the northern Bahamas, breeding birds have been reported from the Exumas (Bond, 1968) and small breeding colonies, including broods of young, recently have been reported from New Providence (Brudenell-Bruce, 1975). Cory (1880) stated that Ruddy Ducks from the continent overwinter on New Providence; he found them abundant in December and January but did not see any there "after spring had set in."

**Variation:** Blake (1977) treated breeding populations of *O. jamaicensis* in continental North America and the West Indies as members of the nominate subspecies. Palmer (1976b) also treated Antillean populations as members of the nominate subspecies, but retained the name
O. j. rubida (Wilson) for those on the continent; he stated that the subspecific status of individuals reported from the Bahamas (on New Providence, Eleuthera, San Salvador, and Inagua) was unknown. Bond (1956) listed all West Indian records of Ruddy Ducks under the name O. j. jamaicensis but suggested that individuals from the continent may be present on these islands at times, and that all Bahama records possibly are referable to O. j. rubida.

Wing length in 17 males that I examined from the continent (collected throughout the year—nine in the months April through July) ranges from 145 to 153 mm ($\bar{x} = 148.2$); seven males from the Greater Antilles (4 taken in June, 2 in July, and 1 in April) have wing lengths ranging from 130 to 142 mm ($\bar{x} = 136.6$). I have not examined any specimens from the southern Bahamas, but one male taken on Eleuthera on 27 April 1962 (AS 6604) has a wing length of 131 mm, and another male taken there on 14 September 1963 (AS 6603) measures 137 mm. These figures are within the range of variation of the Antillean sample but below that of the continental sample. A female taken on Eleuthera on 14 November 1962 (AS 6605) has a wing that is shorter (129 mm) than that of any of the seven females I examined from the continent (136–149 mm, $\bar{x} = 142.9$). Schwartz and Klinikowski (1965) assigned the Eleuthera specimens to the subspecies O. j. rubida on the basis of bill length—they compared bill measurements of the Eleuthera specimens with measurements of rubida and jamaicensis given by Wetmore (1927). Wetmore's measurements of specimens of the nominate subspecies, however, are bracketed by those of O. j. rubida in each sex, and the ranges in variation in his samples nearly are
congruent. Bill length appears to be of no taxonomic value in separating continental from West Indian populations of *O. jamaicensis*.

That *rubida* and *jamaicensis* differ in wing length is supported by my data, but I was unable to make direct comparisons of enough skins to evaluate color differences; specimens of *rubida* reportedly are paler than those of *jamaicensis* (Hellmayr and Conover, 1948). Contrary to the opinion of Schwartz and Klinikowski (1965), I include the Bahamas within the range of the nominate subspecies on the basis of the wing measurements of three Eleuthera specimens in the Schwartz collection; that individuals of *O. j. rubida* visit the Bahamas from the continent in winter is likely but as yet undocumented.

### Family ACCIPITRIDAE

**Hawks**

**Accipiter striatus** Vieillot: Sharp-shinned Hawk.

**Records**: Acklins (early March T-W), Great Inagua (22 February, T-W).

**Remarks**: Probably an occasional winter visitor.

**Subspecies**: Presumably *A. s. velox* of eastern North America; however, Sharp-shinned Hawks in the southern Bahamas also may be vagrants from the Antilles. Cuba, Hispaniola, and Puerto Rico, each have an endemic resident subspecies of *A. striatus*.

**Buteo jamaicensis** (Gmelin): Red-tailed Hawk.

**Records**: Mayaguana (?)*, Great Inagua (Bryant, 1866).

**Status**: Probably an occasional winter visitor or vagrant in the southern Bahamas; there is only one definite record (Bryant, 1866),
but a large, pale, buteo that I saw soaring over Mayaguana in October 1976 was likely an immature of this species.

**Remarks:** Red-tailed Hawks apparently are regular residents in the Bahamas only on the northern islands of Grand Bahama, Abaco, and Andros, and are rarely present on other islands in this chain (Bond, 1971b). Bond (1956) included the Bahamas in the range of the subspecies *B. j. solitudinis* Barbour, which is found elsewhere only on Cuba and the Isle of Pines. "Red-tails" in the southern Bahamas could be members of this subspecies, or of the nominate subspecies (found on Jamaica, Hispaniola, and Puerto Rico and the Virgin Islands), or of one or more of the subspecies occurring in continental North America.

*Circus cyaneus* (Linnaeus): Northern Harrier.

**Records:** Mayaguana* (one female or immature seen on 10 October 1976), Great Inagua (Bryant, 1866).

**Status:** Occasional winter visitor.

**Subspecies:** *Circus cyaneus hudsonius* (Linnaeus).

**Family PANDIONIDAE**

Ospreys

*Pandion haliaetus* (Gmelin): Osprey.

**Records:** Black Booby Cay, Bird Rock, Crooked, Fortune, Fish Cay, Guana Cay, Acklins, Castle, East Plana Cay, Mayaguana, Booby Cay, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales, Pine Cay, Dellis Cay*, Ft. George Cay*, North Caicos, Middle Caicos, Joe Grant's Cay*, Iguana Cay, East Caicos and Dove Cay; in the Turks Islands on Grand Turk, Gibb's Cay*, East Cay*, and Cotton Cay*.
**Status**: Widespread and common resident. Tad Baran of Providenciales found a nest on that island that contained two "duck-sized", well-feathered, flightless young in early February 1976; the nest was empty when I visited it on 14 March and no Ospreys were seen in the vicinity. Arthur C. Watson (pers. comm.) found Ospreys nesting on Grand Turk and North Caicos. Also, a nest at Southwest Point, Little Inagua, contained one egg on 11 April 1977 (David Campbell, pers. comm.), and another nest on Water Cay, Caicos Islands, contained one young about 0.3 m long on 5 January 1978 (Beverlea Aldridge, pers. comm.).

**Remarks**: Ospreys that breed in the Bahamas belong to the subspecies *P. h. ridgwayi* Maynard, which is present also in Cuba (Garrido and Garcia Montaña, 1975) and parts of coastal Central America (Bond, 1956). Members of the subspecies *P. h. carolinensis* breed in North America and frequently overwinter in the West Indies (Bond, 1956). Brudenell-Bruce (1975) suggested that many Osprey records for New Providence pertain to the migrant subspecies, *P. h. carolinensis*; a specimen that I collected on the Cay Sal Bank on 22 April 1968 is an example of this subspecies (Buden and Schwartz, 1968). I do not know of any specimens of *P. h. carolinensis* from the southern Bahamas, but individuals of this subspecies are likely to be there at times. A white head and neck with little or no dark streaking distinguishes members of the resident populations from the North American visitors, even "on the wing"; in *P. h. carolinensis* the head and neck are boldly streaked with brown or black.

**Family FALCONIDAE**

**Falcons**

*Falco peregrinus* Tunstall: Peregrine Falcon.
Records: Mayaguana* (one seen on 3 October 1976), Great Inagua (Bryant, 1866; MHC-1973).

Remarks: Uncommon winter visitor and/or transient.

Subspecies: Falco peregrinus anatum Bonaparte.

Falco columbarius Linnaeus: Merlin.

Records: Crooked*, Mayaguana*, Great Inagua; in the Caicos Islands on Providenciales and North Caicos*; in the Turks Islands on Grand Turk.

Status: Uncommon winter visitor; more numerous during migration.

Extreme dates: 9 October (Mayaguana* 1976), 9 May (Mayaguana* 1972).

Remarks: Bond (1956) reported that F. c. bendirei Swann, which breeds in Western North America, has been taken in the Bahamas, and that F. c. columbarius (breeding in eastern North America) is found throughout the West Indies as a transient and/or winter visitor. However, I follow Temple (1972) in treating F. c. bendirei as a synonym of F. c. columbarius.

Falco sparverius Linnaeus: American Kestrel.

Records: Crooked*, Acklins, Mayaguana*, Great Inagua, Little Inagua; in the Caicos Islands on Providenciales*, Pine Cay (JCD), North Caicos*, Middle Caicos, and South Caicos; in the Turks Islands on Grand Turk (ACW).

Status: Uncommon to abundant (on Great Inagua) resident and probably present as a regular winter visitor and transient as well.

A specimen that I collected on Crooked Island on 14 April 1972 was one of two individuals in the vicinity of a dead coconut palm, which apparently served as a nesting site for these birds—a hole was in the
trunk about 5 m above ground, and a fragment of a kestrel egg was on the ground at the base of the tree.

Kestrels apparently have become established, or at least have become common, in the Caicos Islands recently. There are no previous accounts of *F. sparverius* breeding there; during the early 1970's I saw only a few *F. sparverius* and none that could be identified as a member of a resident population. However, Beverlea Aldridge (pers. comm.) saw several paired individuals on Providenciales from December 1977 through the winter and early spring of 1978. Also, Mary H. Clench (pers. comm.) saw many Kestrels on Providenciales, North Caicos, and Middle Caicos in January and February 1978; all were paired, and one pair near Bottle Creek, North Caicos, was seen copulating on 7 February 1978. Furthermore, Arthur C. Watson, who began observing birds on Grand Turk in 1975, reported (pers. comm.) *F. sparverius* as a resident on that island—this is the first report of the species on the Turks Bank.

In March and April 1978 I saw many kestrels on Providenciales and South Caicos, nearly all of which had very white venters as is characteristic of many individuals of resident populations elsewhere in the West Indies. Most of them were perched on telephone wires in settlements, or in the vicinity of airports, and I was unable to collect any specimens.

**Variation:** Resident populations of *F. s. sparverioides* Vigors have been reported from Cuba (including the Isle of Pines) and from the Bahamas on Great Inagua, Rum Cay, and San Salvador (Bond, 1978a). All specimens that I have examined from Great Inagua (9), Little Inagua (2), and Crooked Island (1) are referable to this subspecies. A
rufous-breasted phase is present in Cuba, Rum Cay, and San Salvador, but is unknown from the Inaguas, whence only the white-breasted phase has been reported.

In the Bahamas, kestrels with conspicuous, dark, streaked breasts probably are visitors from continental North America and members of the nominate subspecies; they are more wary and much more difficult to approach than are birds assumed to be members of resident populations (Paulson, 1966). A kestrel seen on South Caicos on 12 January 1961 (Schwartz and Klinikowski, 1963) and another that I saw on Providenciales on 10 January 1975 probably were visitors from the continent.

I know of only one specimen collected in the Caicos Islands and it raises more taxonomic and zoogeographic questions than it answers. J. C. Dickinson, Jr., of the University of Florida, collected a female on Pine Cay on 16 August 1974. Richard A. Bradley (pers. comm.) of the Florida State Museum compared this specimen (UF 19070) to other _F. sparverius_ in the University of Florida collection (including 2 females from Cuba and 3 from Hispaniola) and concluded that this individual probably was a vagrant _F. s. dominicensis_, a subspecies resident in Hispaniola (including several satellite islands), Mona, and Jamaica (Bond, 1956).

According to Hellmayr and Conover (1949) "_F. s. dominicensis_ Gmelin closely resembles _F. s. sparveroides_ but is somewhat larger and apparently never so strongly rufous below as a good many Cuban specimens." I examined the specimen from Pine Cay and compared it to females of _sparveriodes_ and _dominicensis_ in the Louisiana State University Museum of Zoology, the Museum of Comparative Zoology, and the
National Museum of Natural History. My measurements of the wing length and tail length of the Pine Cay specimen are 195.0 and 121.4 mm, respectively. In wing length 32 females from Cuba range from 177 to 194 mm ($\bar{x} = 185.5$), whereas 13 specimens from Hispaniola range from 183 to 197 mm ($\bar{x} = 190.2$); the Pine Cay specimens is at the upper range limit of the Hispaniolan sample and outside the range of the Cuban sample. In tail length, 24 specimens from Cuba range from 106.1 to 123.3 mm ($\bar{x} = 115.9$), and 12 specimens from Hispaniola range from 116.5 to 123.9 mm ($\bar{x} = 119.8$); the Pine Cay specimen is near the upper range limit of both the Cuban and Hispaniolan samples, but is closer to the mean of the latter. Although the differences between the means in Hispaniolan and Cuban samples are statistically significant at the 0.05 level in a Student's t-test comparison, the ranges overlap broadly and size (at least in wing length and tail length) is of little use in assigning individuals to one subspecies or the other.

Nine of 11 females from Hispaniola have pale buff or salmon coloration on the upper breast, but no more than 8 of 25 specimens from Cuba exhibit this feature; the breast is predominately white in the other 17 specimens. The specimen from Pine Cay resembles the majority of those from Cuba in this character.

There are several taxonomic interpretations possible: (1) the individual from Pine Cay may be an unusually large F. s. sparverioides; (2) it may be a color variant of F. s. dominicensis; (3) it may be a member of a population comprised largely of intergrades between the two rather weakly differentiated subspecies sparverioides and dominicensis; or (4) examination of additional material may demonstrate that F. s.
dominicensis is not a valid subspecies. Additional specimens of breeding birds from the Turks and Caicos Islands need to be acquired before more definite statements pertaining to the taxonomic status of these populations can be made.

Family PHASIANIDAE
Pheasants, Quail, Partridges and Allies

[Colinus virginianus (Linnaeus): Common Bobwhite.]

Remarks: Tim Nicholls (pers. comm.) reported that Common Bobwhites were introduced in the Caicos Islands on Providenciales and Parrot Cay circa 1972. None has been seen in recent years and they probably did not become established. This species has been introduced successfully on several islands in the northern Bahamas (Bond, 1971b).

[Alectoris chukar (Gray): Chukar.]

Remarks: Tim Nicholls (pers. comm.) reported that Chukars were introduced on Providenciales circa 1972. None has been seen recently; this species also probably did not become established.

Family NUMIDIDAE
Guinea Fowl

[Numida meleagris Pallas: Common Guinea Fowl.]

Records: In the Caicos Islands on Big Ambergris Cay.*

Status: Introduced and feral; I saw many in grassy swales at the south end of Big Ambergris Cay on 29 March 1972.

Family ARAMIDAE
Limpkins

Aramus guarauna (Linnaeus): Limpkin.
Records: Great Inagua (Bond, 1958); in the Turks Islands on Long Cay (?) PB.

Status: Vagrant (?)

Remarks: The Inagua record is based upon one individual seen by Robert Hanlon; no date is given, but another of Hanlon's Inaguan records accompanying this one includes a 25 July sighting of Chlidonias niger. The Long Cay record is from Bartsch's field notes for 1 August 1930—"There were no land birds on this Cay. We saw Brown Pelican, Sooty, Noddy, Bridled, Gull-billed and Least Terns, Tropic Birds, Oyster Catcher, Limkim [sic] and Laughing Gull.

According to Bond (1956), A. g. pictus of the southeastern United States, Cuba, the Isle of Pines, and Jamaica is accidental in the Bahamas on Cay Lobos; E. g. elucus is found in Hispaniola (including the satellite islands Gonâve and Tortue), and Puerto Rico.

Family RALLIDAE
Rails, Gallinules, and Coots

Rallus longirostris Boddaert: Clapper Rail.

Records: East Plana Cay, Mayaguana*, Great Inagua; in the Caicos Islands on Providenciales*, Pine Cay, and Middle Caicos.

Status: Almost certainly a fairly common resident in mangrove swamps throughout this region; the paucity of records is probably due to the secretive habits of members of this species.

Variation: Clapper Rails from the Bahamas that I examined were taken in the northern and central islands, and I include populations in the southern Bahamas as members of the subspecies R. l. coryi Maynard largely on the authority of Bond (1956) and Ripley (1977). Bahaman
specimens that I examined are relatively pale in comparison to examples from elsewhere in the West Indies, and those from eastern United States. However, Ripley (1977) stated that those from the Florida Keys, *R. l. insularum* Brooks, are nearly as pale as the Bahaman birds.

**Porzana carolina** (Linnaeus): Sora.

Records: Bird Rock, Mayaguana*, Great Inagua; in the Caicos Islands on Middle Caicos* and South Caicos.

Status: Winter visitor; probably more common than the scant records indicate. Extreme dates: 13 October (Mayaguana* 1976), 19 February (Great Inagua 1909 T-W).

**Porphyryula martinica** (Linnaeus): Purple Gallinule.

Records: Great Inagua.

Status: Occasional winter visitor? Reported once—an immature female was collected on 7 December 1960 (Schwartz and Klinikowski, 1963). Brudenell-Bruce (1975) indicated that this species is an uncommon transient and an occasional winter visitor on New Providence.

**Gallinula chloropus** (Linnaeus): Common Gallinule.

Records: Mayaguana* (one seen on 19 October 1976), Great Inagua (several reports); in the Caicos Island on Middle Caicos* (several seen on 24 January 1972).

Status: Probably a fairly common resident on Great Inagua; Todd and Worthington (1911) reported that a nest there contained seven eggs on 22 February 1909. Presumably resident (but probably uncommon) on other islands in the southern Bahamas.

Subspecies: **Gallinula chloropus cerceris** Bangs.
Fulica americana Gmelin: American Coot.

Records: Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales*, North Caicos*, Middle Caicos*, and South Caicos; in the Turks Islands on Grand Turk.

Status: Uncommon to common winter visitor. *F. americana* breeds in the northern Bahamas, at least on New Providence (Brudenell-Bruce, 1975), and in the Greater Antilles on Cuba and the Isle of Pines, Jamaica, and Grand Cayman (Ripley, 1977). There are no reports of this species nesting in the southern Bahamas and only one summer record from this region. Extreme dates: 27 July (Great Inagua KB-1976), 12 March (Providenciales* 1976).

Subspecies: *Fulica americana americana* Gmelin.

Remarks: The "Caribbean Coot" (*F. caribaea*), which may be only a morph of *F. americana* (fide Bond, 1976, 1978a), has not been reported from the Bahamas.

Family JACANIDAE

Jacanas

[Jacana spinosa (Linnaeus): Northern Jacana.]

Records: Great Inagua (?).

Remarks: A Jacana reportedly was killed near Matthewtown, but the specimen was not saved (Todd and Worthington, 1911). Bond (1956) listed this record as "doubtful". This species breeds in Central America and northern South America and in the Greater Antilles on Cuba, Jamaica, and Hispaniola (Bond, 1971b).
Family HAEMATOPODIDAE

Oystercatchers


**Status:** Common resident; probably breeding on all islands in the southern Bahamas whence it has been recorded.

**Variation:** Bond (1956) treated breeding population of *H. palliatus* (= *H. ostralegus* sensu Bond, 1956) in the West Indies as members of the subspecies *H. p. prattii* (Maynard). He reported (Bond, 1970) that specimens in the Academy of Natural Sciences of Philadelphia from the southern Bahamas have much thicker bills than do any in the ANSP series of *H. p. palliatus*. However, Wetmore (1965) indicated that this difference was not constant and stated that the trimonen *H. p. prattii* is of doubtful value. Blake (1977) treated *H. p. prattii* as a synonym *H. p. palliatus*.

I examined a total of 38 American Oystercatchers in the Louisiana State University Museum of Zoology, the Museum of Comparative Zoology, the National Museum of Natural History, and in the collection of Albert Schwartz; my data on bill width (measured at a point 20 mm anterior to the anterior border of the nostril) support Bond's taxonomic conclusions.

Seven males, nine females, and one specimen of unknown sex, all from the Bahamas, range from 5.8 to 7.0 mm (\( \bar{x} = 6.4 \)) in bill width,
whereas ten males and 11 females from the continent range from 4.1 to 5.0 mm ($\bar{x} = 4.6$) in width. Eight of the 17 Bahaman specimens are from the southern islands and all of these were taken in the months November through March. Eight additional specimens from the Bahamas in the Field Museum of Natural History were measured for me by Dianne Maurer—none has a bill less than 6.0 mm wide (recorded to the nearest millimeter).

The samples of 25 specimens from the Bahamas and 21 specimens from the continent show no overlap in bill width; I believe this mensural difference amply justifies recognition of H. p. prattii as a valid subspecies.

Family CHARADRIIDAE
Plovers
Charadrius semipalmatus Bonaparte: Semipalmated Plover.

_Records_: Crooked, East Plana Cay, Mayaguana*, Booby Cay, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales*, North Caicos, East Caicos*, and South Caicos; in the Turks Islands on Salt Cay.

_Status_: A fairly common transient in spring and fall but less common as a winter visitor; seen occasionally in summer.

Charadrius alexandrinus (Linnaeus): Snowy Plover.

_Records_: Crooked, Fortune, Acklins, Mayaguana*, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales*, Middle Caicos, and East Caicos*; in the Turks Islands on Grand Turk and Salt Cay.

_Status_: Resident, probably breeding in the vicinity of salinas and beaches throughout the southern Bahamas—common in summer but much less numerous in winter.
Remarks: I follow Bond (1956) and Blake (1977) in treating the name *C. alexandrinus tenuirostris* (Lawrence), which has been applied to breeding populations in the West Indies and the Gulf Coast of North America, as a synonym of *C. a. nivosus* (Cassin); the latter name previously has been applied only to those populations breeding in western North America.

*Charadrius wilsonius* Ord: Wilson's Plover.

**Records:** Bird Rock, Crooked, Acklins, Castle, Mira Por Vos Cays, West Plana Cay, East Plana Cay, Mayaguana, Booby Cay, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales, Pine Cay*, Middle Caicos, East Caicos*, and South Caicos; in the Turks Islands on Grand Turk, Cotton Cay, Salt Cay, and Big Sand Cay*.

**Status:** Common summer resident (many reported in the period March–August), probably breeding on most or all of the islands in the southern Bahamas whence it has been reported; relatively uncommon in winter. Cory (1880) found a nest on Great Inagua that contained three eggs on 27 May 1879.

**Subspecies:** *Charadrius wilsonius wilsonius* Ord.

*Charadrius vociferus* Linnaeus: Killdeer.

**Records:** Acklins, Mayaguana, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales*, Pine Cay, North Caicos*, Middle Caicos, East Caicos, and South Caicos; in the Turks Islands on Grand Turk, and Salt Cay.

**Status:** Common resident, probably breeding on most islands in the southern Bahamas; probably also present as a winter visitor or transient.
Variation: Bond (1956) indicated that resident populations of Killdeer in the Greater Antilles, Inagua, and the Turks and Caicos Islands belong to the subspecies *C. v. ternominatus* Bangs and Kennard, and that individuals of *C. v. vociferus* (from continental North America) commonly overwinter in the Bahamas and the Greater Antilles. *C. v. vociferus* has been reported in the southern Bahamas from Acklins Island (Todd and Worthington, 1911), and *C. v. ternominatus* has been reported as far north in the Bahamas as Eleuthera (Hellmayr and Conover, 1948).

All specimens from the southern Bahamas that I have examined (Bird Rock 1, Acklins 2, Mayaguana 1, Great Inagua 1, Caicos Islands 2, Turks Islands 6, are assigned to the subspecies *C. v. ternominatus*; these individuals are markedly smaller than those of the nominate subspecies. In wing length, for example, four males from the southern Bahamas range from 146 to 150 mm (\( \bar{x} = 147.8 \)) and eight females from this region range from 138 to 155 mm (\( \bar{x} = 149.6 \)). Among specimens from continental North America, the range in this measurement is 155 to 162 mm (\( \bar{x} = 159.7 \)) in six males, and 156 to 170 mm (\( \bar{x} = 163.2 \)) in five females.

*Pluvialis squatarola* (Linnaeus): Black-bellied Plover.

**Status:** Common transient and winter visitor; several summer records. Brudenell-Bruce (1975) states that nonbreeding individuals are fairly common on New Providence in summer.

**Subspecies:** *Arenaria interpres morinella* (Linnaeus).

**Family SCOLOPACIDAE**
**Snipes and Sandpipers**

*Capella gallinago* (Linnaeus): Common Snipe.

**Records:** Acklins*, Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales* and Middle Caicos*; in the Turks Islands on Grand Turk.

**Status:** Fairly common winter visitor. Extreme dates: 3 October Mayaguana* 1976), 17 March (Acklins* 1973).

**Subspecies:** *Capella gallinago delicata* (Ord).

*Numenius phaeopus* (Linnaeus): Whimbrel.

**Records:** In the Caicos Islands on French Cay.

**Status:** Accidental (?).

**Remarks:** Paul Bartsch collected one female (USNM 323294) on French Cay on 3 August 1930. The name "French Cays" occasionally is used synonymously with "Plana Cays" (Kline, 1976; United States Board on Geographic Names, 1955). A record of *N. phaeopus* from the Plana Cays (Bond, 1956) probably is in error, and likely is based upon the specimen collected by Bartsch on the Caicos Bank.

**Subspecies:** *Numenius phaeopus hudsonicus* Latham.

*Bartramia longicauda* (Bechstein): Upland Sandpiper.

**Records:** Mayaguana (one specimen collected on 31 August 1891 CBC).
Remarks: Uncommon autumn migrant and rare spring migrant on New Providence (Brudenell-Bruce, 1975); rare transient in the West Indies generally (Bond, 1956).

*Actitis macularia* (Linnaeus): Spotted Sandpiper.

Records: Bird Rock, Crooked*, Acklins*, Mira Por Vos Cays, Mayaguana*, Great Inagua, Little Inagua*, in the Caicos Islands on Providenciales*, and East Caicos*.

Status: A regular, but fairly uncommon winter visitor; more numerous as a transient. Extreme dates: 4 October (Mayaguana* 1976), 20 May (Bird Rock CBC-1879).

*Tringa solitaria* Wilson: Solitary Sandpiper.

Records: Fortune on 5 August (Moore, 1877), Mayaguana* (one seen on 2 October 1975), and Great Inagua in February (T-W).

Status: Probably an uncommon transient and/or winter visitor.

Subspecies: *Triga solitaria solitaria* Wilson

*Tringa melanoleuca* (Gmelin): Greater Yellowlegs.

Records: Crooked, Acklins*, Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales*, Middle Caicos, North Caicos, East Caicos*, and South Caicos; in the Turks Islands on Grand Turk.

Status: Fairly common winter visitor; more numerous as a migrant. Extreme dates: 26 July (Middle Caicos PB), 27 May (Great Inagua CBC-1879).
**Tringa flavipes** (Gmelin): Lesser Yellowlegs.

**Records:** Bird Rock, Crooked, Fortune Acklins*, Mayaguana, Booby Cay, Great Inagua; in the Caicos Islands on Pine Cay, Stubbs Cay, North Caicos, Middle Caicos, East Caicos*, and South Caicos; in the Turks Island on Grand Turk and Salt Cay.

**Status:** Common winter visitor, most numerous in spring and fall. Extreme dates: 15 July (Crooked PB), 22 April (Acklins* 1972).

**Catoptrophorus semipalmatus** (Gmelin): Willet.

**Records:** Fish Cay, Guana Cay, Acklins, West Plana Cay, Mayaguana, Booby Cay, Gréat Inagua, Little Inagua; in the Caicos Islands on West Caicos*, Providenciales, Pine Cay, Ft. George Cay, Stubbs Cay, North Caicos, Middle Caicos, East Caicos, and South Caicos, in the Turks Islands on Cotton Cay* and Salt Cay*.

**Status:** Common summer resident (many reported in the months March through August); scarce in winter. Cory (1880) "found this species very abundant and evidently preparing to breed" on Great Inagua in late May 1879. Willets probably breed on most islands throughout the Bahamas.

**Remarks:** *C. s. semipalmatus* (Gmelin) breeds in eastern North America, the Bahamas, and the Antilles (Bond, 1956). All individuals from the Bahamas that I have examined (24) are referable to this subspecies.

*C. s. inornatus* breeds in Western North America. Bond (1956, 1967) reported the occasional occurrence of members of this subspecies in the Antilles and I have examined several specimens of *C. s. inornatus* collected in southern Florida. Individuals of this larger, western, subspecies may be present in the Bahamas at times.
Calidris canutus (Wilson): Red Knot.

**Records:** Mayaguana* (one specimen collected on 13 October 1976).

**Status:** Rare transient. Recorded previously in the Bahamas on Andros in mid-May (Bond, 1969) and on Harbour Island (off the northern end of Eleuthera) on 11 November (Bond, 1962).

**Subspecies:** Calidris canutus rufa (Wilson).

Calidris melanotos (Vieillot): Pectoral Sandpiper.

**Records:** Fortune in August (Moore, 1877), Mayaguana (25 August CBC-1891; common during the period 1-17 October 1976*), and Great Inagua (Riley, 1905a).

**Status:** Probably a fairly common fall transient; the paucity of records may be attributed to relatively little field work done in the southern Bahamas during late summer and early fall.

Calidris fuscicollis (Vieillot): White-rumped Sandpiper.

**Records:** Fortune on 5 August (Moore, 1877), Great Inagua on 27 May (Cory, 1880); in the Turks Islands on Grand Turk* (29 May 1971).

**Status:** Scarce transient.

Calidris minutilla (Vieillot): Least Sandpiper.

**Records:** Crooked, Fortune, Fish Cay, Guana Cay, Acklins, Mayaguana, Booby Cay, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales*, North Caicos*, Middle Caicos, East Caicos*, and South Caicos; in the Turks Islands on Grand Turk, Cotton Cay*, and Salt Cay.
Status: Common transient and fairly common winter visitor.

Extreme dates: 11 July (Fish Cay PB), 24 May (West Caicos* 1970).

**Calidris alpina** (Linnaeus): Dunlin.

Records: Great Inagua where "a flock of this species was seen February 3, during the course of a sail from Mathewtown to Alfred Sound" (T-W); in the Caicos Islands on North Caicos where one individual was seen at close range in the period 25-27 January 1978 (MHC).

Status: Rare winter visitor (?). Bond (1956) listed this species as a vagrant in the West Indies; Brudenell-Bruce (1975) stated that it is a rare winter visitor on New providence.

Subspecies: **Calidris alpina pacifica** (Coues)

**Calidris pusilla** (Linnaeus): Semipalmated Sandpiper.

Records: West Plana Cay, Mayaguana*, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales*, North Caicos*, Middle Caicos, East Caicos* and French Cay; in the Turks Islands on Grand Turk and Salt Cay.

Status: Probably a scarce or uncommon winter visitor but fairly common during migration; observed frequently by members of the Bartsch Expedition in July and August 1930. Extreme dates: 17 July (West Plana Cay PB), 27 May on Great Inagua (Cory, 1880).

Remarks: Individuals of C. pusilla and C. mauri frequently are difficult to distinguish in the field and some sight records may not be reliable (Phillips, 1975). Bill length (in millimeters) in specimens of C. pusilla from the southern Bahamas that I have examined are as follows:
Calidris mauri (Cabanis): Western Sandpiper.

**Records:** Booby Cay (21 July 1930 PB), Great Inagua (8 December 1960 AS), Little Inagua (5 August 1930 PB); in the Turks Islands on Grand Turk (31 July 1930 PB, January 1959 JB).

**Status:** Apparently a relatively uncommon fall transient or winter visitor; individuals of *C. mauri* are difficult to distinguish from those of *C. pusilla* and may be more numerous than records indicate.

**Remarks:** Bill length (in millimeters) of specimens of *C. mauri* from the southern Bahamas that I have examined are as follows:

- **AS 1453** (♂) Great Inagua 8 December 1960 22.7
- **USNM 323285** (♂) Grand Turk 31 July 1930 21.7
- **USNM 323286** (♀) Booby Cay 21 July 1930 23.3
- **USNM 323287** (♀) Booby Cay 21 July 1930 27.2
- **USNM 323288** (♂) Booby Cay 21 July 1930 25.8

Calidris alba (Pallas): Sanderling.

**Records:** Bird rock, Crooked, Fortune, East Plana Cay, Mira Por Vos Cays, Great Inagua; in the Caicos Islands on Providenciales*, North Caicos*, Middle Caicos, and East Caicos*; in the Turks Islands on Grand Turk.
Status: Common transient and winter visitor. I have seen dowitchers in the southern Bahamas during the period 21 December (Little Inagua) to 31 May (Salt Cay), and members of the Bärsch Expedition encountered dowitchers in the Turks and Caicos Islands in July and August. Whether these sight records pertain to *L. griseus* or to *L. scolopaceus* (Long-billed Dowitcher) is not definitely known; however, the latter has not been reported from the Bahamas and it occurs only rarely elsewhere in the West Indies (Bond, 1956).

Variation: According to Pitelka (1950) there are three subspecies of *L. griseus*: *L. g. caurinus* Pitelka breeding in southern Alaska, *L. g. hendersoni* Rowan in north-central Canada, and *L. g. griseus* (Gmelin) in eastern Canada. These subspecies are distinguished largely by differences in size of bill, wing, and tarsus, as well as in coloration and pattern of the breeding plumage. However, there is much overlap in these characters in the three named populations and I am unable to identify with confidence any of the four specimens in nonbreeding plumage that I collected in the southern Bahamas in the months October through April.

One female collected on Little Inagua on 27 December 1974 and another female taken on East Caicos on 1 April 1978 have bill, wing (chord), and tarsus measurements (63.7, 60.8; 141.0, 141.0; 37.2, 36.6 mm, respectively) that most closely resemble those of *L. g. hendersoni*. Another December specimen from Little Inagua, and two from Mayaguana taken in October 1976, all of unknown sex, are smaller than these females in all measurements (bill: 53.2, 54.6, 57.5; wing: 133.0, 137.0, 138.0; tarsus: 36.5, 35.4, 35.5) and are well within the range of variation of *L. g. hendersoni* and/or *L. g. griseus*.
Micropalama himantopus (Bonaparte): Stilt Sandpiper.

Records: Fortune on 5 August (Moore, 1877), Mayaguana* (one seen on 8 October 1976), Great Inagua on 18 July (Brudenell-Bruce, 1975) and on 8 December 1970 (three specimens in the Schwartz collection); in the Turks Islands on Grand Turk* (several individuals observed on 10 March 1972).

Status: Uncommon transient.

Family RECURIROSTRIDAE
Avocets and Stilts

Himantopus mexicanus (Müller): Black-necked Stilt.

Records: Crooked, Fortune, Acklins, West Plana Cay, Mayaguana, Booby Cay, Great Inagua; in the Caicos Islands on West Caicos*, Pine Cay, North Caicos*, Middle Caicos, and South Caicos; in the Turks Islands on Grand Turk, Cotton Cay*, andSalt Cay.

Status: Apparently a common resident, probably breeding throughout this region although nesting has not been documented yet less common in winter than in summer. Brudenell-Bruce (1975) indicated that this species is not present in the northern Bahamas in winter. In the southern Bahamas, however, I have seen many *H. mexicanus* throughout the year—a flock of about 100 individuals was on Grand Turk on 3 February 1972. Also, Rabb and Hayden (1957) reported that Black-necked Stilts were present on Great Inagua in January, 1953. Whether the winter populations in the southern Bahamas are comprised predominately of permanent residents or of visitors from the north that have displaced the summer birds, which have moved elsewhere, is unknown.
Family LARIDAE
Gulls and Terns

Larus argentatus Pontoppidan: Herring Gull.

Records: South Caicos (one specimen collected 18 January 1961 S-K)

Status: Scarce (?) winter visitor. Uncommon in winter on New Providence (Brudenell-Bruce, 1975); generally rare in the West Indies (Bond, 1956).

Subspecies: Larus argentatus smithsonianus Coues

Larus delawarensis Ord: Ring-billed Gull.

Records: Mayaguana* (one seen on 16 October 1976), Great Inagua* (several seen on 24 December 1970), Little Inagua* (one seen on 25 December 1974).

Status: Scarce winter visitor.

Larus atricilla Linnaeus: Laughing Gull.


Status: Abundant summer resident (many records in the period April through August); scarce in winter.
Geolocheledon nilotica (Gmelin): Gull-billed Tern.

**Records:** Fortune, Acklins*, Mira Por Vos Cays, West Plana Cay, Mayaguana, Booby Cay, Great Inagua; in the Caicos Islands on West Caicos*, Ft. George Cay, North Caicos, and Middle Caicos; in the Turks Islands on Long Cay and Salt Cay.

**Status:** Uncommon to common summer resident, usually found in the vicinity of lagoons, ponds, and lakes. Probably breeding in suitable habitat throughout the Bahamas. Cory (1880) reported that G. nilotica was "...one of the most abundant species... at Inagua, where, in the month of June, it was evidently breeding." Early date: 21 March on Great Inagua (BB). Late date: 17 August (Mayaguana CBC-1891).

**Subspecies:** Geolocheledon nilotica aranea (Wilson).

Sterna hirundo Linnaeus: Common Tern.

**Records:** Acklins, whence known from one specimen collected in May 1879 (Cory, 1880), Mayaguana* (4-5 individuals seen daily 4-18 October 1976, one collected on 4 October 1976).

**Status:** Probably an uncommon transient, but may nest in the southern Bahamas in small numbers. Brudenell-Bruce (1975) reported that Common Terns are present, at least occasionally, on New Providence in summer, but he found no evidence of nesting there or on nearby islands. Paul Bartsch (field notes for 1930) found this species on the Anguilla Cays (Cay Sal Bank) on 21 June 1930. Leslie Rees (fide Bond, 1978a) reported that Common Terns nest on Stocking Cay in the Exumas (on the Great Bahama Bank). Elsewhere in the West Indies S. hirundo is known to breed only in the Virgin Islands (Bond, 1978a). This species is a common resident in coastal eastern North America.
Subspecies: *Sterna hirundo hirundo* Linnaeus.

*Sterna dougallii* Montagu: Roseate Tern.

**Records:** Bird Rock, Crooked, Acklins, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos*, Ft. George Cay, and Middle Caicos; in the Turks Islands on Round Cay*, Long Cay*, Salt Cay, and Big Sand Cay.

**Status:** Relatively uncommon but regular summer resident, reported from May through August.

Subspecies: *Sterna dougallii dougallii* Montagu.

*Sterna anaethetus* Scopoli: Bridled Tern.

**Records:** Mira Por Vos Cays; in the Caicos Islands on Iguana Cay, South Caicos, Long Cay, West Six Hill Cay, East Six Hill Cay, Bush Cay, and French Cay; in the Turks Islands on Gibb's Cay*, Round Cay, Long Cay, Penniston Cay, and Salt Cay.

**Status:** Common summer resident. Reported from May through August—usually nesting on remote uninhabited islets.

Bärtsch (field notes) found breeding colonies on Six Hill Cays, French Cay, and Penniston Cay during the first week of August 1930, and I saw many individuals that apparently were members of breeding colonies on Penniston Cay, Long Cay, Round Cay, and Gibb's Cay (all on the Turks Bank), in the period 28 May-3 June 1971.

Subspecies: *Sterna anaethetus recognita* Mathews.

*Sterna fuscata* Linnaeus: Sooty Tern.

**Records:** Guana Cay, Mira Por Vos Cays, West Plana Cay, Mayaguana;

**Status:** Abundant summer resident, at least on many of the small uninhabited cays. Reported on breeding grounds from May through August. Mary H. Clench (pers. comm.) saw three individuals at sea between Rum Cay and Great Inagua on 10 March 1976.

I have observed Sooty Terns incubating eggs on East Cay, Penniston Cay, Long Cay, and Round Cay (all on the Turks Bank) during the period 28 May-3 June 1971. Cory (1880) found many individuals incubating eggs on the Mira Por Vos Cays on 23 May 1879, and members of the Bartsch Expedition found breeding colonies on Penniston Cay, French Cay, and the Six Hill Cays in the period 1-3 August 1930. Also, Ray and Sprunt (1971) reported the presence of breeding colonies on White Cay, Bush Cay, and French Cay (all on the Caicos Bank) in August 1970.

**Subspecies:** Sterna fuscata fuscata Linnaeus.

Sterna albifrons Pallas: Least Tern.


**Status:** Common summer resident, particularly numerous in the
vicinity of salt flats and broad sandy beaches; probably nests in suitable habitat throughout this region.

Cory (1880) found eggs with well-developed embryos on 2 June 1879 on Rolle Cay. I saw large numbers of highly territorial individuals on Providenciales in mid-May 1978, and Karen Bjorndal (pers. comm.) found nesting birds guarding eggs on Little Inagua on 23 May 1975. Extreme dates: 28 April (Acklins* 1972), 10 October (Mayaguana* 1976, specimen collected).

Remarks: Specimens from the Bahamas that I have examined all fall within the range of variation of the subspecies Sterna albifrons antillarum Lesson. Breeding populations of this subspecies are present throughout the Caribbean and along the coast of eastern United States. The name S. a. athalassos Burleigh and Lowery has been assigned to populations in the Mississippi Basin, but I follow Monroe (1968) in treating S. a. athalassos as a synonym of S. a. antillarum. Individuals from that region may overwinter in the West Indies (Blake, 1977).

Sterna maxima Boddaert: Royal Tern.


Status: Common resident but more numerous in summer than in winter.
Subspecies: *Sterna maxima maxima* Boddaert.

*Sterna sandvicensis* Latham: Sandwich Tern.

**Records:** Bird Rock, Hogsty Reef, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales*, and Middle Caicos; in the Turks Islands on Round Cay* and Big Sand Cay.

**Status:** Uncommon to locally common summer resident. Cory (1880) stated that Sandwich Terns were "quite abundant," and "evidently preparing to breed" on Bird Rock in the latter part of May. Bond (1963b) reported the presence of a nesting colony on Hogsty Reef in May 1962. Early date: 23 March (Providenciales* 1978). Late date: 4 August (West Caicos PB).

Subspecies: *Sterna sandvicensis acuflavidus* (Cabot).

*Sterna caspia* Pallas: Caspian Tern.

**Records:** Great Inagua.

**Status:** Vagrant (?). One record, 10 April 1961 (BB).

*Chlidonias niger* (Linnaeus): Black Tern.

**Records:** Great Inagua.

**Status:** Scarce transient (?); reported on 11 April and 25 July (Bond, 1958; Brudenell-Bruce, 1975).

Subspecies: *Chlidonias niger surinamensis* (Gmelin).

*Anous stolidus* (Linnaeus): Brown Noddy.

**Records:** Samana Cay, Guana Cay, Acklins, Mira Por Vos Cays, West Plana Cay, Mayaguana; in the Caicos Islands on Iguana Cay, South Caicos, Dove Cay, Long Cay, West Six Hill Cay, East Six Hill Cay, Bush Cay,
and French Cay; in the Turks Islands on Round Cay*, Long Cay, Penniston Cay, and Salt Cay.

**Status:** Abundant summer resident throughout this region; reported on breeding grounds (on many of the small uninhabited cays) from May to August. Mary H. Clench (pers. comm.) saw five individuals at sea between Rum Cay and Great Inagua on 10 March 1976.

I observed many individuals incubating eggs on Penniston Cay, Long Cay, and Round Cay (all on the Turks Bank) during the period 28 May-3 June 1971. Cory (1880) found Brown Noddies guarding eggs on the Mira Por Vos Cays on 23 May, and Paul Bartsch found this species breeding on Penniston Cay, the Six Hill Cays, and French Cay during the period 1-3 August 1930.

**Family RYNCHOPIDAE**

**Skimmers**

*Rynchops niger* Linnaeus: Black Skimmer.

**Records:** Great Inagua (Bond, 1956).

**Status:** Bond (1956) treated this species as a casual winter visitor to the West Indies, and Brudenell-Bruce (1975) listed it as a vagrant in the Bahamas.

**Subspecies:** *Rynchops niger niger* Linnaeus.

**Family COLUMBIDAE**

**Pigeons and Doves**

*Columba leucocephala* Linnaeus: White-crowned Pigeon.

**Records:** Crooked, Fortune, Fish Cay, Guana Cay, Acklins, West Plana Cay, Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands

**Status:** Probably a fairly common (but local) resident on many densely wooded islands, particularly in coastal regions in mangrove swamps. Karen Bjorndal (pers. comm.) observed *C. leucocephala* nesting at Union Creek, Great Inagua in June 1978. Bond (1956) and Blankinship (1975) indicated that relatively widespread interisland movements are characteristic of this species. Two White-crowned Pigeons banded at Acklins were shot by hunters on Great Inagua and in the Dominican Republic (Anonymous, 1976).

**Zenaida macroura** (Linnaeus): Mourning Dove.

**Records:** Bird Rock, specimen collected on 29 November 1901 (Bonhote, 1903a); Acklins*, fairly common in the vicinity of Snug Corner in late April 1972 and in early March 1973, two specimens collected on 26 April 1972; Mayaguana*, specimen collected 11 May 1972; Great Inagua, one seen in July (Hanlon, 1955), one specimen collected on 12 December 1960 (Schwartz and Klinikowski, 1963), one seen on 15 May 1972* and one specimen collected on 12 April 1977*; in the Caicos Islands on Providenciales* (common in January 1975), North Caicos (fairly common in February 1972), Middle Caicos* (one seen on 30 January 1972), East Caicos* (several seen in January 1972, and in February and March 1976, specimen collected on 8 March 1976), South Caicos (one seen on 11 January 1961 S-K, several seen on 16 May 1970*), and Big Ambergris Cay (one seen on 13 January 1961 S-K); in the Turks Islands on Grand Turk (fairly common in March 1972*, two specimens collected on 16 March 1972; at least 25 individuals seen in the period 25-26 January 1978 MHC).
Status: Small breeding populations probably are resident in the southern Bahamas but nesting has not been documented yet in this region. Individuals from the Antilles and continental North America may be present at times, particularly in winter.

Variation: In their taxonomic review of Mourning Doves, Aldrich and Duvall (1958) reported that breeding populations in eastern continental North America and the Bahamas belong to the subspecies Z. m. carolinensis and that members of the subspecies Z. m. macroura inhabit the Florida Keys and the Greater Antilles. Individuals of Z. m. carolinensis banded in the United States have been recovered in Cuba (Winston, 1954), and some continental birds probably visit the Bahamas times. Although relatively few specimens have been taken in the Bahamas, both carolinensis and macroura have been reported there.

In comparison to continental birds, members of the Antillean and Florida Keys populations usually have a shorter wing and a darker (more buffy or rufescent) venter, but there is much overlap in these characters between the two named populations. Ventral coloration is particularly variable among Antillean birds. My color notes of 43 males taken in the Antilles from throughout the year, indicate 13 are pale (similar to average continental birds), 21 are dark, and nine are intermediate.

Mensural data on specimens that I examined from the Bahamas (26), Bermuda (11), the continental United States (63), the Florida Keys (10), and the Greater Antilles (117) are summarized in Figure 7 and Table 4. Because samples taken from late spring through mid-summer (= "breeding season") are less likely to include transients or winter visitors than those taken at other times of the year, I have treated specimens
collected during the period 15 April through the end of July as a separate group; males and females also are treated separately. Unless otherwise stated the following mensural comparisons include only specimens taken during the spring and summer period.

Morphologically, specimens from Bermuda usually are more similar to those of the continent, whereas specimens from the Keys resemble the smaller and darker individuals from the Antilles; the Keys population probably was derived from Cuba (Robertson and Kushlan, 1974). Specimens from Cuba (and the Keys) also average smaller in wing and tail length than do those from Hispaniola and its satellite islands, Tortue and Gonâve (Table 4).

Bailey (1923) proposed the name *Z. m. peninsulari* for the Mourning Doves of southern Florida after comparing four specimens taken at Miami Beach in February 1923 with material from more northern states; the Miami Beach birds are relatively small and dark (fide Bailey, 1923) but Peters (1937) treated *peninsulari* as a synonym of *Z. m. carolinensis*. Aldrich and Duvall (1958) did not examine any of Bailey's material but suggested that these four individuals might be visitors from the Keys (*Z. m. macroura*). I examined one of the paratypes of *peninsulari*—a female (USNM 525736) taken on 3 February 1923. This specimen is dark (similar to many Keys and Antillean birds) but has a wing length measurement (142 mm) that is outside the range of Antillean females, though within the range of continental females.

Specimens from the Bahamas mensurally are intermediate between Antillean and continental samples but average closer to the former; chromatically they are closer to continental birds. A male taken on
Great Inagua on 12 December 1960 (AS 1464) is the darkest, and one of the smallest, *Z. macroura* from the Bahamas that I have examined; it matches well with the dark birds from the Antilles and was identified as a *Z. m. macroura* by Schwartz and Klinikowski (1963). On the other hand, a male taken on Cay Sal on 18 April 1968 and identified as a *Z. m. macroura* by Buden and Schwartz (1968) is as pale as most specimens from the continent. In wing length (140 mm) this specimen lies within the range of both Antillean and continental samples; the tail is frazzled and was not measured. A male taken on Long Island on 16 July 1903 (USNM 189833) is the only Bahama specimen that was examined by Aldrich and Duvall (1958). It is pale and far larger than any other specimen from the Bahamas that I have examined (wing 151.0 mm, tail 151.8 mm). Aldrich and Duvall (1958) included the Bahamas within the breeding range of *Z. m. carolinensis* on the basis of this individual. A wing length of 136 mm (fide Bond, 1959) for a nesting female taken on New Providence on 19 April 1902 (Bonhote, 1903b) also is within the range of both Antillean and continental samples, but according to Bond (1959) this specimen is mensurally and chromatically indistinguishable from specimens of *Z. m. carolinensis*. It is the only specimen of a breeding Mourning Dove known from the Bahamas.

The Bahama sample is closer mensurally to the Hispaniola and Gonâve-Tortue samples than it is to the series from Cuba and the Florida Keys (Table 4). When the exceptionally large specimen from Long Island is excluded, the means in wing length and tail length for Bahaman and Hispaniolan-Gonâve-Tortue males are nearly identical.
Among Hispaniolan specimens, too, there are anomalies and much variation. A male (MCZ 143006) taken near Constanza in the Dominican Republic on 29 April 1919 was identified as a *macroura*, presumably by Alexander Wetmore ("AW" initialed on label). However, this specimen is pale and has a wing length measurement (150.0 mm) that not only falls within the range of *carolinensis* but is greater than that of any other specimen of *Z. m. macroura* I have examined. Also, Aldrich and Duvall (1958) listed a female taken at L'Atalaye (=St. Michèle l'Atalaye), Haiti, on 9 January 1929 under the name *Z. m. carolinensis*. They listed no other specimens from that locality and I assume that USNM 280011, a female from "L'Atalaye" that I examined is the specimen cited by these authors. The wing length (148 mm) of this specimen is within the range of *carolinensis*, but chromatically the bird resembles the dark specimens of *macroura*.

In summary, Mourning Doves from eastern continental North America and Bermuda are relatively large and pale—they belong to the subspecies *Z. m. carolinensis*. Those from the Greater Antilles are relatively small, and about 50% of the individuals that I examined are much darker than continental birds. Also, a population of Mourning Doves in the Florida Keys is comprised of relatively small and consistently dark birds. These Antillean and Florida Keys populations belong to the subspecies *Z. m. macroura*. My sample from peninsular Florida, although small, suggests the presence of intergradation between Keys populations and those from farther north.

For the most part, individuals from the Bahamas are mensurally and chromatically intermediate between *Z. m. carolinensis* and *Z. m. macroura*,

and there are few examples that clearly are members of one subspecies and not the other. I consider the Bahamas a region of intergradation between these two subspecies. I found no obvious differences between specimens from the northern and southern Bahamas but the only Bahaman specimen I examined that most definitely resembles a *Z. m. macroura* was taken on Great Inagua—the island that geographically is closest to the Antillean populations of this subspecies.

*Zenaïda aurita* (Temminck): Zenaïda Dove.

**Records:** Samana Cay*, Crooked, Fortune, Acklins, Fish Cay, Guana Cay, West Plana Cay, Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos*, Providenciales, Water Cay, Pine Cay, Ft. George Cay, Dellis Cay*, Parrot Cay*, North Caicos, Middle Caicos, West Caicos, and Big Ambergris Cay*; in the Turks Islands on Cotton Cay*.

**Status:** Common resident on most islands in the southern Bahamas; often in gardens and in xeric to mesic woodlands. This species may be only a vagrant in the Turks Islands where it has been recorded only once (pers. obs.), on Cotton Cay, on 28 May 1971.

I found one nest near Kew on North Caicos, which contained two eggs on 9 June 1971; an adult left the nest at my approach but remained in the vicinity and feigned a broken wing.

**Variation:** Zenaïda Doves from the Bahamas and Cuba (excluding the Isle of Pines) tend to have a longer wing and tail than do those from most islands in the Greater Antilles (Table 5)—measurements in Table 5 are my own combined with those provided by Mary H. Clench. The difference in size between Cuban and Isle of Pines specimens is
especially striking (albeit my samples are small) and warrants further investigation. I detected no consistent geographic differences in coloration but was able to make few direct comparisons of specimens from different islands. I follow Bond (1956) in treating Bahaman and Greater Antillean populations of Zenida Doves as members of the subspecies \( Z. \ a. \ aurita \).

**Zenaida asiatica** (Linnaeus): White-winged Dove.

**Records:** Acklins (6 July 1930 PB), Great Inagua (one seen on 15 May 1972*; 9 June 1891 specimen, FMNH 37245); in the Caicos Islands on Providenciales* (one seen on 18 May 1970), Pine Cay (mid-August, specimen collected JCD), North Caicos* (specimen collected on 4 February 1972, several seen on 6 June 1971), Middle Caicos* (one seen on 17 January 1972) and South Caicos (specimen collected on 23 January 1961 AS); in the Turks Islands on Grand Turk whence reported in October, March, April, June, and July by Mrs. R. E. Wainwright (fide Bond, 1971a), in January 1959 JB, in the period 12-20 March 1972* (several seen), in March 1936 (two specimens in MCZ collected by J. C. Greenway, Jr.) and on 1 June 1971* (six individuals), on Cotton Cay* (two seen on 20 March 1972), and on Salt Cay* (several seen on 31 May 1971).

**Status:** Apparently fairly common resident in xeric scrub and woodlands in the Turks and Caicos Islands but rare or uncommon elsewhere in the southern Bahamas. In the northern Bahamas *Z. asiatica* has been reported only on Grand Bahama (Kale et al., 1969). This species may be in the process of expanding its range northward through the archipelago.
Remarks: Bond (1956) and Saunders (1968) included the West Indies within the breeding range of the nominate subspecies. The wing, tail, and bill measurements of a female that I collected on Grand Turk on 17 March 1972 are well within the range of measurements recorded, for this subspecies by Saunders (1968).

Columbina passerina (Linnaeus): Common Ground-Dove.


Status: Abundant resident; present even on some of the most sparsely vegetated islets.

Cory (1880) reported a ground dove nest in the Mira Por Vos Cays that contained two eggs on 27 May 1879. I found one nest on Big Sand Cay, Turks Islands, which contained two eggs on 18 March 1972, and one nest on Mayaguana, which held two downy young on 13 May 1972; both nests were in a dense growth of cacti and were no more than two meters above the ground.

Variation: Bond (1945) noted that the ground doves of the extreme southern Bahamas are paler than those of the northern islands and he proposed the name C. p. volitans for the populations on the Inaguas and the Turks and Caicos Islands; he retained the name C. p. bahamensis
(Maynard) for all other Bahaman populations of *C. passerina*. Common
Ground-Doves from Great Inagua previously were included in the
subspecies *C. p. exigua* Riley, along with those from Mona, a tiny islet
between Hispaniola and Puerto Rico (Todd and Worthington, 1911; Todd,
1913; Ridgway, 1916; Bond, 1940; Hellmayr and Conover, 1942). Specimens
from Mona and the southern Bahamas are similar in paleness of coloration
but the former are distinguished by their small size, particularly in
wing length (Bond, 1945; Table 6, this account).

Schwartz (1970) examined specimens of *C. passerina* from the northern
Bahamas, Florida, and most of the islands of the Greater Antilles and
resurrected the name *C. p. aflatava* for the Cuban population. Although
he noted a similarity in size between specimens from Hispaniola, the
Cayman Islands, and Navassa (all in the subspecies *C. p. insularis*),
and those from the Bahamas, he retained *C. p. bahamensis* as a separate
subspecies because of "its distinctly paler coloration, both dorsally
and ventrally and in both sexes." I agree with the taxonomic
conclusions reached by Schwartz (1970), but additional comments on
Bahaman populations are in order, particularly since Schwartz did not
include any material from the southern Bahamas in his study.

I did not detect any differences among the relatively few females
I examined that would alter the conclusions I reached on the basis of
comparisons among males. Figure 8 shows that variation in wing length
among Bahaman samples is clinal; birds from the northern islands have
longer wings, on the average, than do those from the south, although
individuals from the Turks and Caicos Islands average slightly larger
than expected from the trend in variation. Variation in tail length
among these samples is more irregular, but southern birds average slightly smaller in this character as well. There are no consistent differences in bill length, but the base of the bill is usually darker (more nearly black) in southern birds than in northern birds (at least in dried skins).

Table 6 presents mensural data for pooled samples from several northern islands (New Providence, Eleuthera, and the Exumas) separately from data for pooled samples from the extreme southern islands (Great Inagua and the Turks and Caicos Islands). The Crooked-Acklins district and Mayaguana are intermediate geographically between the islands of these pooled samples. Bond (1945) indicated that the two specimens of C. passerina he examined from this geographically intermediate region more closely resembled individuals from the northern islands. However, the means in wing length and tail length for six males I examined from the Crooked-Acklins district and Mayaguana are 81.9 and 56.3 mm, respectively; these figures are closer to those of my southern samples (Table 6). Individuals from this geographically intermediate region also are more similar to "southern birds" in coloration. Furthermore, comparing ground doves from Rum Cay (also geographically intermediate between my pooled northern and southern samples) to those from New Providence, Todd (1913) stated that the former "are somewhat paler throughout—verging thus toward C. p. exigua."

Although there are differences in size and coloration between ground doves in the northern Bahamas (bahamensis) and those of the southern Bahamas (volitans) these characters show much overlap. I suggest that C. p. volitans be placed in the synonymy of C. p.
bahamensis, and I include the ground doves of Bermuda in this subspecies. Individuals of C. p. bahamensis are paler with a consistently darker bill base than are those of immediately adjacent populations and those from Puerto Rico and Jamaica.

Eight specimens I examined from Gonâve (off the west coast of Haiti) are very similar in size and coloration to those of the Hispaniolan mainland. But a series of six specimens from Törtue (off the north coast of Haiti) taken in January and February 1917 are uniformly and consistently darker than those from the adjacent mainland and, at least in coloration, are more like those from Cuba. Wetmore and Swales (1931) attribute this condition to wear and stain. Some effort, however, should be made to secure additional material from the island for further comparisons.

Geotrygon chrysa Bonaparte: Key West Quail-Dove

Records: North Caicos*.

Status: Uncommon to fairly common resident in woodlands near Kew. LSUMZ 70804 was taken on 13 February 1972, and LSUMZ 70805 was collected on 2 March 1972; both are males with enlarged testes (14 x 7 and 13 x 7 in LSUMZ 70804).

Family PSITTACIDAE

Parrots

Amazona leucocephala (Linnaeus): Cuban Parrot.

Records: Crooked, whence it is known only from one apparently Pre-Columbian premaxilla (Wetmore, 1938), Fortune (Bryant, 1866),
Acklins (Bryant, 1866; Todd and Worthington, 1911), and Great Inagua (many records).

**Status:** Fairly common resident on Great Inagua but presently known to breed elsewhere in the Bahamas only on Great Abaco. The Inagua and Abaco populations each contain about 400 to 1000 individuals (King, 1976; Anonymous, 1977, Bond, 1977; David Campbell, pers. comm). The species formerly was more widespread in the archipelago than it is at present. Parrots were reported from Acklins until the early 1940's (Bond, 1958), Brodkorb (1959) reported on fossilized remains of *A. leucocephala* from New Providence, and Bond (1956) included Long Island within the former range of this species. Cory (1891d) "... was told that a Parrot occurred on Mayaguana [sic]..." but I do not know of any definite record from Mayaguana. Also, Bond (1956) footnoted a questionable report of parrots from Andros.

**Variation:** Morphological differences between *A. leucocephala* from the Bahamas (*A. l. bahamensis*) and those from Cuba (*A. l. leucocephala*) have been described by Todd (in Todd and Worthington, 1911). Todd indicated that Inaguan birds probably have more red on the venter than do those from Acklins and thus approach the condition of individuals from Cuba—but he had only three specimens from Inagua for comparison with six from Acklins.

I have examined nine specimens from Inagua, five from Acklins, one from Abaco, and 15 from Cuba. In addition, Mary H. Clench provided wing measurements of the three males and two females from Acklins that now are in Carnegie Museum. Mensural data are summarized in Table 7.
The Inaguan specimens have more red on the venter than do those from Acklins but not nearly so much as do those from Cuba; also, the Inaguan birds are intermediate between Acklins and Cuban samples in wing length and bill length but are more similar to individuals from Acklins in this character as well. The one specimen from Abaco mensurally is more similar to individuals from Inagua but is closer chromatically to specimens from Acklins.

I agree with Todd's interpretation (Todd and Worthington, 1911) that the Bahama birds are sufficiently uniform among themselves but different enough from those of Cuba (in both size and coloration) to justify their recognition as a separate subspecies, Amazona leucocephala bahamensis (Bryant). Other subspecies of A. leucocephala are present on Grand Cayman (A. l. caymanensis) and on Little Cayman and Cayman Brac (A. l. hesterna).

Family CUCULIDAE
Cuckoos and Anis

Coccyzus minor (Gmelin): Mangrove Cuckoo.

Records: Crooked*, Acklins, Mayaguana*, Great Inagua, Sheep Cay; in the Caicos Islands on West Caicos*, Providenciales*, North Caicos, Middle Caicos, East Caicos, and South Caicos; in the Turks Islands on Grand Turk.

Status: Fairly common resident on most of the larger islands in this region; more numerous in dense scrub and woodlands than in mangroves, and more numerous in spring and fall than in winter—populations may be partially migratory.
Variation: Bond (1956) included the breeding populations of *Coccyzus minor* in the Bahamas, the Florida Keys, and Cuba in the subspecies *C. m. maynardi* Ridgway, and he treated all other Greater Antillean populations as members of the subspecies *C. m. nesiotes* Cabanis and Heine. Specimens that I have examined from the Bahamas and southern Florida tend to be much paler (less rufous) ventrally than those from Hispaniola; they overlap chromatically, but when series of specimens from the Bahamas are examined they are distinct from series of Great Antillean specimens collected east of the Windward Passage. Specimens from Hispaniola tend to average slightly smaller in wing and tail length than do those from the Bahamas, but all the samples overlap broadly in these measurements (Table 8). I found no differences between specimens from the southern Bahamas and those from the northern islands and I include all Bahaman populations in the subspecies *C. m. maynardi*.

Some specimens from the Bahamas have much rufous pigmentation ventrally; probably these are extreme variants of *maynardi* rather than vagrant *nesiotes* from the Antilles—a nesting female (USNM 68529) taken on New Providence on 25 May 1915 resembles *C. m. nesiotes* more than it does "typical" *maynardi*. Pale individuals occasionally are present within the range of *nesiotes*; these also may be variants but there is some evidence that populations of *C. m. maynardi* are partially migratory (Bond, 1976; Buden, pers. obs.); hence individuals of this subspecies may occur with *C. m. nesiotes* at times.

I have not examined any specimens from Jamaica, but those from the Caymans and Cuba that I have seen are somewhat intermediate chromatically between samples from the Bahamas and Hispaniola. Ridgway (1916) stated
that specimens from Grand Cayman resemble C. m. maynardi more closely than they do C. m. nesiotes, and Fisher and Wetmore (1931) identified the one specimen they collected on Grand Cayman as a C. m. maynardi. Bangs (1916), however, treated Cayman populations as members of the subspecies C. m. nesiotes. Cory (1918) maintained that the Cayman birds are intermediate between nesiotes and maynardi in coloration but sufficiently distinct to be treated as a separate subspecies, C. m. caymanensis Cory—this subspecies has not been recognized by most recent authors. Tentatively I follow Bond (1956) in treating Cuban and Cayman populations, along with those of the Bahamas and southern Florida, as members of the subspecies C. m. maynardi.

Coccyzus americanus (Linnaeus): Yellow-billed Cuckoo.

**Records:** Bird Rock, East Plana Cay, Mayaguana*, Great Inagua; in the Caicos Islands on North Caicos and Middle Caicos*; in the Turks Islands on Grand Turk.

**Status:** Apparently fairly common as a fall transient; less common as a winter visitor and spring transient. I saw Yellow-billed Cuckoos on Mayaguana nearly every day during the first three weeks in October 1976, and Bonhote (1903a) reported that 15 individuals struck the north side of the lighthouse on Bird Rock on 15 October 1901. Also, one individual was seen on East Plana Cay during the last two weeks in October 1967 (Clough and Fulk, 1971).

Bond (1971b) suggested that C. americanus may breed on some of the Bahama Islands but members of the Bartsch Expedition visited at least 30 islands and cays in the southern Bahamas in July and August
1930, and, judging by the absence of any mention of this species in Bartsch's field notes, they apparently did not encounter *C. americanus* there. Although no direct evidence exists that this species nests in the southern Bahamas, individuals are there in summer, at least occasionally; two specimens in the Field Museum of Natural History were collected on Great Inagua on 19 May 1891 and on 24 June 1891, respectively, and Karen Bjorndal (pers. comm.) observed *C. americanus* on Great Inagua in the period 13–28 June 1978. Whether these records pertain to breeding residents, to late migrants, or to nonbreeding, summering birds, is unknown.

**Subspecies:** *Coccyzus americanus americanus* (Linnaeus).

*Crotophaga ani* Linnaeus: Smooth-billed Ani.

**Records:** Crooked, Fortune, Acklins, Great Inagua; in the Caicos Islands on North Caicos, Middle Caicos, and East Caicos; in the Turks Islands on Grand Turk.

**Status:** Resident—uncommon to locally common, usually seen in small flocks of five to ten individuals.

**Remarks:** Most of the Smooth-billed Anis that I have seen in the southern Bahamas were along roadsides on North Caicos (in the vicinity of Whitby) and on Middle Caicos, between Conch Bar and Bambarra.

**Family TYTONIDAE**

**Barn Owls**

*Tyto alba* (Scopoli): Barn Owl.

**Records:** Crooked, Acklins*, Mayaguana*, Great Inagua; in the Caicos Islands on Providenciales*, Pine Cay*, and Middle Caicos.
**Status:** Fairly common resident in regions where there are caves and deep sinkholes.

**Variation:** Bond (1956), Cory (1918), and Ridgway (1914) used the name *T. a. lucayana* Riley for the population of Barn Owls in the Bahamas. Riley (1913) stated that individuals of this subspecies differed from *T. a. pratincola* (which breeds in eastern North America) in having fewer "grayish black-vermiculated tipped feathers" on the upperparts, smaller dusky spots on the inner webs of the outermost primaries, and larger feet than does *pratincola*.

There are few specimens of Barn Owl from the Bahamas in museum collections—Riley (1913) and Ridgway (1914) each examined four specimens of *lucayana*. My data on 4 males, 3 females, and 3 unsexed specimens from the Bahamas (3 AS, 1 FMNH, 2 LSUMZ, 2 MCZ, 2 USNM) include my own color notes and measurements pooled with those taken by other individuals at my request; all notes on coloration of dorsum and tail are my own. I noted that many specimens from the continent (*T. a. pratincola*) are much darker above (particularly on the tail) than are Bahaman specimens, but the latter do agree well with many continental birds in this feature. Of 19 specimens (8 males, 6 females, 5 unsexed) from Florida that I examined (MCZ and UM collections), at least four of the males and one female resemble "typical *lucayana*" in their particularly pale coloration overall. An additional three specimens from Florida in the Field Museum collection closely resemble Bahaman birds in this character, and two males (LSUMZ 2404, 32233) from Baton Rouge, Louisiana, are even paler than most specimens from the Bahamas.
Parkes and Phillips (1978) indicated that females of *T. a. pratincola* from North and Middle America are darker (with more buffy pigmentation) ventrally than are males. My notes, along with those provided for me by other individuals indicate that Bahaman specimens tend to be more pale below than are many continental individuals and do not show any marked sexual dimorphism in coloration; the three females included in my Bahaman sample are as pale as or paler than the males. The holotype of *T. a. lucayana* (USNM 189671, New Providence, male) is darker below than a topotypical female in the USNM collection (Charles Meisner, pers. comm.; Riley, 1913) and, judging from my color notes, darker than all other specimens from the Bahamas.

In wing length four males from the Bahamas range from 314 to 350 mm ($\bar{x} = 333.3$), whereas three females range from 342 to 359 mm ($\bar{x} = 350.0$); two unsexed specimens measure 330 and 332 mm. These figures agree reasonably well with those given for *T. a. pratincola* from the United States (excluding the Pacific states) by Parkes and Phillips (1978): 13 males, 322-357 mm ($\bar{x} = 341.3$); 13 females, 335-357 mm ($\bar{x} = 347.8$). Three of the four Bahaman males have wing measurements (327, 342, 350 mm) that fall well within the range of *T. a. pratincola* from eastern North America (Parkes and Phillips, 1978); the fourth (314 mm) is an exceptionally short-winged individual. I found no obvious differences in foot size between Bahaman and continental samples.

Bangs (1900) reported that in a letter pertaining to the identification of two Barn Owls taken on New Providence in 1897, Robert Ridgway of the National Museum of Natural History wrote "We can match your two Bahama specimens exactly with some in our series from
Washington, Arizona, etc.; we also have a Bahama skin, very much resembling yours."

Although specimens of _T. alba_ from the Bahamas tend to be somewhat paler than those from the continent I do not believe that they are sufficiently distinct to warrant their recognition as a separate subspecies and I suggest that _T. a. lucayana_ be placed in the synonymy of _T. a. pratincola_.

Members of the subspecies _T. a. furcata_ are present on Cuba, Jamaica, and the Cayman Islands. Individuals of these populations are eminently distinct from Bahaman and continental birds in having conspicuous pale patches on the wing and predominantly white rectrices. Parkes and Phillips (1978) proposed the name _T. a. niveicauda_ for Barn Owls on the Isle of Pines; they indicated that members of this population average smaller in tail length and wing length and tend to be paler than individuals of _T. a. furcata_ from Cuba.

_T. a. glaucops_, a relatively small Barn Owl with an ashy colored facial disc, long has been thought to be the only resident tytonid on Hispaniola, but numerous reports of _T. a. pratincola_ from that island (Bond, 1963b; Schwartz and Klinikowski, 1963; Schwartz, pers. comm.) are suggestive of the presence of two resident populations (probably separate species) of _Tyto_ there; ten specimens of _T. a. pratincola_ from Hispaniola, collected from June through October, are in the Schwartz collection.

**Family STRIGIDAE**

**Typical Owls**

_Speotyto cunicularia_ (Molina): Burrowing Owl.
Records: Samana Cay, Great Inagua.

Status: Uncommon to common resident, at least on Great Inagua.

Reports of Burrowing Owls on Samana Cay are based upon four specimens (FMNH 40482-85) taken by J. H. Ingraham in June 1891. These individuals probably were members of a resident population but the present status of *S. cunicularia* on this small and remote island is unknown.

There are no first-hand observations on *S. cunicularia* in the southern Bahamas published since the turn of the century; therefore I am particularly grateful to Karen Bjorndal for providing me with her recent notes on Burrowing Owls on Great Inagua: "20 March 1976, one pair still digging by Maroon Hill, two other pairs finished earlier in month; 8 April 1976, owl at nest at Crossing; 14 April 1976, pair seen at nest at Town Pans; 19 May 1976, burrow caved in at Crossing; 11 June 1976, Maroon Hill pair still protecting nest; 16 June 1976, pair still at Town Pans nest; 2 July 1976, burrow flooded at Maroon Hill; 7 July 1976, Town Pan pair gone, rock in burrow entrance."

Variation: Bill length in eight males from the Bahamas ranges from 13.5 to 14.5 mm ($\bar{x} = 14.1$) and from 11.8 to 13.9 mm ($\bar{x} = 13.1$) 13 males from Florida; seven females from the Bahamas and 12 from Florida average 13.8 and 13.5 mm, respectively, in this character. In all other characters that I examined (including coloration, amount of feathering on the tarsus, and the lengths of wing, tail, tarsus, and hind claw) I found no constant differences between Florida and Bahama samples in either sex—therefore I treat breeding populations of *S. cunicularia* from these regions as members of the subspecies *S. c. floridana*. 
Populations of Burrowing Owls discovered in Cuba in 1973 also have been tentatively assigned to the subspecies *S. c. floridana* (Garrido and Garcia Montaña, 1975). Elsewhere in the Greater Antilles *S. cunicularia* is found only on Hispaniola and some of its satellite islands. Individuals from Hispaniola (and from Beata and Gonâve) average smaller in most measurements than do Florida-Bahama birds and currently (Bond, 1956) are treated as members of an endemic subspecies, *S. c. troglodytes*.

**Asio flammeus** (Pontoppidan): Short-eared Owl.

**Records:** Grand Turk (S-K).

**Remarks:** Presumably vagrant from continental North America.

Schwartz and Klinikowski (1963) reported that two individuals were observed on 20 January 1961; one specimen was collected and identified as a member of the subspecies *A. f. flammeus*.

**Family CAPRIMULGIDAE**

**Nightjars**

**Caprimulgus carolinensis** Gmelin: Chuck-will's-widow.

**Records:** Great Inagua (Cory, 1892b; January KB-1976; 26 December* 1970), in the Caicos Islands on North Caicos* (specimen collected on 8 February 1972).

**Status:** Scarce winter visitor.

**Chordeiles gundlachii** Lawrence: West Indies Nighthawk.

**Records:** Samana Cay*, Bird Rock, Crooked, Acklins, Mayaguana*, West Plana Cay, Great Inagua, Rolle Cay, Little Inagua; in the Caicos
Islands on West Caicos, Providenciales, Water Cay, Pine Cay, Ft. George Cay, Parrot Cay, North Caicos*, and South Caicos; in the Turks Islands on Grand Turk*.

Status: Common summer resident, probably breeding on all islands in the southern Bahamas whence it has been recorded; reported in the period 25 April (Acklins I.* 1972) through August.

I found one individual incubating an egg on a sandy beach on Providenciales on 17 May 1970, and Cory found a nest with one egg on Rolle Cay on 2 June 1879 (Cory, personal catalog entry No. 1039). Karen BJORNDAL (pers. comm.) found a nest containing one young on Great Inagua on 4 June 1975, and Paul BARTSCH collected a downy young (total length of skin, 60 mm) on Pine Cay on 24 July 1930. BARTSCH'S specimen (USNM 323451) is pale sandy gray in coloration whereas an individual of similar size from Alabama (USNM 240151) is predominantly brown.

Remarks: I follow Eisenmann (1962), Robertson and Kushlan (1974), Lack (1976), and in treating West Indian populations of nighthawks as a species separate from C. minor. Individuals of C. minor (breeding populations in continental North America) have been recorded from the Antilles and the northern Bahamas (Bond, 1956), and undoubtedly are present in the southern Bahamas during migration, but as yet are unreported from this region.

Variation: Riley (1903) proposed the name Chordeiles virginianus vicinus for populations of nighthawks in the Bahamas. Bond (1956), however, stated that the Bahama birds are of a "grey-phase" that is uncommon in the Antilles; he treated all West Indian populations of nighthawks as members of the subspecies C. minor gundlachii.
I have examined 47 nighhawks from the Bahamas, 50 from Cuba, and 73 from elsewhere in the Antilles and from the eastern United States, and I believe that the trinomen C. gundlachii vicinus should be retained for breeding populations in the Bahamas. Also I believe that the range in variation in color is too great in these samples to assign individuals to either a rufous-phase or a gray-phase.

Among specimens from the West Indies the palest are from the Bahamas and the darkest are from Cuba (including the Isle of Pines). The paler regions of the dorsum usually are relatively large and are gray or white in the Bahama specimens; they are relatively small and buffy or yellowish brown in those from Cuba. These differences are most apparent in series comprised of specimens taken in the period May through July—samples from earlier or later in the year probably include migrants in addition to members of local populations.

Color notes that I took on specimens at the National Museum of Natural History are as follows: 16 females collected May-August in the Bahamas have a pale buffy abdomen; the ground color on the upper breast is mainly gray or white (tinged with buff in some individuals). The paler regions of the dorsum are largely gray or white in 15 of these specimens and yellowish brown in one individual. Five of six females collected in Cuba in the period April-August have a much darker venter than the Bahaman birds. Three other Cuban females collected September-October resemble Bahaman specimens in both dorsal and ventral coloration.

Twelve males from the Bahamas have a pale buffy abdomen; the pale regions of the dorsum are predominately gray or white in 11 of these specimens and yellowish brown in one individual. Thirteen males from
Cuba are much darker on the venter than are most Bahaman specimens; the remaining three specimens from Cuba (collected 15 August-8 September) resemble two of the darkest Bahaman males. With the exception of these three specimens, individuals from Cuba also have darker upper parts than do most of those from the Bahamas.

Other specimens (all females) included in these color comparisons are one from Haiti that is as dark as the darkest Cuban birds, three from Jamaica that are intermediate between Cuban and Bahaman samples but closer to the former, and four from Puerto Rico that are somewhat more variable. In ventral coloration the four specimens from Puerto Rico are intermediate between Cuban and Bahaman samples but closer to the former. In dorsal coloration two of these specimens resemble the darkest Bahaman birds and two are similar to the dark birds from Cuba.

Four specimens taken on Tortue in mid-May 1917 are very similar chromatically to individuals from the Bahamas.

A series of nighthawks from Hispaniola in the Schwartz collection have relatively broad pale regions on the dorsum, as do Bahama birds, but these regions are predominately yellowish brown or buffy and chromatically more closely resemble the condition in Cuban samples.

I found little variation in wing length and tail length among samples of nighthawks in the West Indies. The average wing length for 14 males from the Bahamas, 16 males from Cuba, and 14 males from Hispaniola is 177.1, 175.4, and 173.3 mm, respectively; the ranges of the Bahaman sample (169-185) and the Hispaniolan sample (168-177) are bracketed by the range of the Cuban sample (168-186). Tail length in 16 males from Cuba (81.4-95.6, $\bar{x} = 89.6$) and 14 males from Hispaniola
(83.8-95.0, \overline{x} = 89.7) averages slightly shorter than it does in 13 males from the Bahamas (86.0-98.8, \overline{x} = 92.5). Wing length averages 174.7 mm in 18 females from the Bahamas and 172.9 in seven females from Cuba; tail length averages 93.8 mm in 17 females from the Bahamas and 92.4 in six females from Cuba.

In summary, the palest of West Indian nighthawks are from the Bahamas; breeding populations on these islands may be assigned to the subspecies *C. g. vicinus*. If the coloration of the four individuals from Tortue that I examined is typical of breeding residents there, then Tortue also should be included within the range of *vicinus*. On the average, the darkest nighthawks are from Cuba including the Isle of Pines), and breeding populations there may be assigned to *C. g. gundlachii*. Individuals from Jamaica, the Cayman Islands, Hispaniola, and Puerto Rico are occasionally as dark as the Cuban birds, more often slightly paler, but hardly ever as pale as those from the Bahamas; populations on these Antillean islands also should be included within the range of *C. g. gundlachii*.

Family TROCHILIDAE
Hummingbirds

*[Chlorostilbon ricordii* (Gervais): Cuban Emerald.]*

**Records**: East Caicos (?).

**Remarks**: Bond (1956) indicated that Bartsch had seen this species on East Caicos, but the statement in Bartsch's field notes (for 27 July 1930) "At Jones' Point East Caicos I saw a large hummer, probably a Reccordia..." makes this record questionable. Except for this statement, all reports of hummingbirds in the southern Bahamas that I found in
Bartsch's notes pertain to Philodice evelynae. Chlorostilbon ricordii is common in Cuba and the northernmost Bahamas (Bond, 1956).

**Philodice evelynae** (Bourcier): Bahama Woodstar.

**Records:** Crooked, Fortune, Acklins, West Plana Cay (C-F—sight record, unidentified, but description fits this species), Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales, Water Cay, Pine Cay, Parrot Cay*, North Caicos, Middle Caicos, East Caicos, South Caicos, and Big Ambergris Cay*; in the Turks Islands on Grand Turk, Cotton Cay*, and Salt Cay.

**Status:** Abundant resident; particularly numerous among flowering ornamentals in the settlements, and among native flowering plants in xeric scrub and woodlands.

Members of this endemic Bahaman species are reported to breed at all times of the year (Brudenell-Bruce, 1975; Cory, 1880). Mary H. Clench (pers. comm.) observed a female woodstar on a nest on Grand Turk on 13 February 1978, Harry K. Clench (pers. comm.) observed a female tending a nest on Little Inagua on 7 April 1977 and Beverlea Aldridge (pers. comm.) found a nest containing two eggs on Providenciales on 11 December 1977. Two nestings in the Schwartz collection were taken on Grand Turk on 27 January 1961, and two eggs were present in a nest that I found on Grand Turk on 25 March 1972. I also found three active nests of this species on Mayaguana in October 1976; one nest was occupied by an adult female but otherwise was empty, one contained two eggs, and the third contained two nestlings.
Variation: In much of the literature of the past several decades *Philodice evelynae* has been treated as a member of the genus *Calliphlox*, but see Bond (1978a). Names and ranges of subspecies of *P. evelynae* listed in Bond (1956) are as follows: *P. e. lyura* (Gould), Great and Little Inagua; *P. e. salita* (Greenway) Turks and Caicos Islands; and *P. e. evelynae* (Bourcier), the Bahamas north of the ranges of lyura and salita.

Greenway (1936) examined four males and four females of *P. evelynae* from the Caicos Islands and indicated that the presence of a metallic sheen on the forehead and the absence of brown pigmentation on the tips of four inner rectrices were characteristics that distinguished males of *P. salita* from those of *P. e. evelynae*; he found no differences between the females. On the other hand, Schwartz and Klinikowski (1963) reported that their two male woodstars from South Caicos resembled specimens of *P. e. evelynae*, and did not fit the description of salita.

I have examined 57 male Bahama Woodstars (Grand Bahama 2, Abaco 1, New Providence 10, Andros 2, Eleuthera 1, Green Cay 1, Rum Cay 3, Crooked-Acklins Bank 6, Mayaguana 3, Great Inagua 14, Caicos Islands 8, Turks Islands 6) and agree with the suggestion tentatively proposed by Schwartz and Klinikowski (1963) that there are no marked differences between individuals on the Turks and Caicos banks and those on islands in the Bahamas to the north.

The holotype of *P. e. salita* (MCZ 171756, South Caicos) appears to be unique in coloration and pattern. No other specimen from the Turks and Caicos Islands that I have examined resembles this individual in having the "diagnostic characters of salita," and only a few individuals
have either a small number of "metallic" feathers at the base of the forehead or have one or more inner rectrices that lack pale brown pigmentation on the tip of the inner web. I recommend that P. e. salita be placed in the synonymy of P. e. evelynae. However, P. e. lyura of the Inaguas is unquestionably morphologically distinct from other populations of P. evelynae.

Family ALCEDINIDAE
Kingfishers
Ceryle alcyon (Linnaeus): Belted Kingfisher.


Status: Common winter visitor, but a few apparently nonbreeding birds may be present in summer. Karen Bjorndal (pers. comm.) saw Belted Kingfishers on Great Inagua on 9 July, 27 July, and on 5 August 1976. I saw one individual on Long Cay (Turks Islands) on 3 June 1971. Brudenell-Bruce (1975) indicated that C. alcyon is present on New Providence throughout the year but is much more numerous in winter than in summer.

Family PICIDAE
Woodpeckers
Sphyrapicus varius (Linnaeus): Yellow-bellied Sapsucker.

Records: Acklins, East Plana Cay, Great Inagua; in the Caicos Islands on Parrot Cay*, North Caicos, Middle Caicos, and East Caicos.
**Status:** Relatively uncommon but regular winter visitor; probably more common as a migrant. May be seen throughout the year; unusual summer records include 22 July on Acklins Island (Bond, 1958) and 13-28 June on Great Inagua (KB-1978).

**Remarks:** Rows of parallel holes, presumably excavated by members of this species, are common in the trunks of trees on many islands not included in the above list of localities.

**Family TYRANNIDAE**

**Tyrant Flycatchers**

*Tyrrannus dominicensis* (Gmelin): Gray Kingbird.


**Status:** Abundant summer resident, probably breeding on most islands throughout the archipelago. On Great Inagua Karen Bjorndal (pers. comm.) found one nest of *T. dominicensis* that contained three eggs on 15 June 1975, one nest that contained three young on 18 June 1976, and one nest with two young during the period 13-28 June 1978. Members of breeding populations in the southeastern United States as well as those from the northern Bahamas, probably are present in the southern Bahamas in migration.

I saw several Gray Kingbirds daily on Mayaguana during the last week of September and the first week of October 1976 but did not see or
hear any there after 9 October; I left the island on 19 October. However, several late fall and early winter records suggest that some Gray Kingbirds may be present in the southern Bahamas throughout the year (Mary H. Clench, pers. comm.; Schwärtz and Klinikowski, 1963), but as yet none has been reported in this region in January or February. Emlen (1977) reported *T. dominicensis* in the northern Bahamas on Grand Bahama on 10 January 1968.

**Extreme dates:** 26 March (Grand Turk* 1972), 12 December (Great Inagua S-K).

**Variation:** Brodkorb (1950) examined over 500 specimens of Gray Kingbirds from the United States, the Bahamas, and the Greater Antilles, and recognized three subspecies in this region—*T. d. fugax* in the United States and in the Bahamas (excluding Green Cay and Southern Ragged Island), *T. d. sequax* in Cuba, the Isle of Pines, the Cayman Islands, and the Bahamas (on Green Cay and Southern Ragged Island), and *T. d. dominicensis* in the Greater Antilles on Jamaica and islands east of Cuba. According to Brodkorb (1950) individuals of "sequax" average smaller than those of "fugax" and differ from *T. d. dominicensis* (sensu Brodkorb, 1950) in having a shorter tail and a lower tail-to-wing ratio.

My data (Table 9) show that tail length in Hispaniolan males averages larger than it does in Cuban males and is more similar to that of the Bahaman samples. In all other characters (in both sexes) the means of Cuban and Hispaniolan samples are similar to each other and usually are smaller than those of any of the Florida-Bahama samples.
However, differences between Antillean and Florida-Bahaman samples are diminished with the addition of material from Jamaica (1), Saona (3), Beata (2), Mona (2), Puerto Rico (2), and the Virgin Islands (3) that was not included in Table 9. Variation among all these samples is not clinal; the largest birds are from the southern Bahamas and the smallest are from nearby Hispaniola.

With the exception of 20 specimens from Great Inagua, most of my samples from the southern Bahamas (Bird Rock 5, Mayaguana 3, Caicos Islands 1) are too small to permit detailed discussion of variation within this region. However, the two females and three males from Bird Rock, all taken on 19 May 1879, are visibly larger than nearly all other specimens. In bill length, wing length, and tail length, these five specimens average, 26.8, 120.4, and 93.3 mm respectively.

My data, and those of Brodkorb (1950), show that there are several weakly differentiated populations of T. dominicensis in Florida, the Bahamas, and the Greater Antilles but I do not believe that these populations are sufficiently distinct to warrant separate names, and I treat all of them as members of the nominate subspecies. This taxonomic opinion also was expressed by Bond (1951) after he had examined the data presented by Brodkorb (1950).

_Tyrannus cubensis_ Richmond: Giant Kingbird.

_Records:_ Great Inagua; in the Caicos Islands on North Caicos, Middle Caicos, and East Caicos.

_Status:_ _Tyrannus cubensis_ probably is no longer extant in the southern Bahamas but likely was an uncommon resident there formerly.
Remarks: Specimens of Giant Kingbirds collected in the Caicos Islands by C. S. Winch in the period 4–6 January 1891 are entries 16189-16192 in Cory's catalog; four specimens from the Caicos Islands also were reported by Cory and Hellmayr (1927). I examined three of these specimens at the Field Museum of Natural History, but the fourth (Cory 16192 = FMNH 43090) could not be found. The statement "three specimens taken" made by Cory (1891a) leads me to suggest that a fourth specimen may never have existed.

None of the labels on these Caicos specimens that I examined bears the name of a specific island, but Cory (1892b) included North, Middle, and East Caicos in a list of islands whence this species had been recorded.

Winch collected a Giant Kingbird on Great Inagua on 2 March 1891 (FMNH 43093). Another specimen (USNM 106148), taken in the "Bahamas" by Bryant, bears no specific locality data or collecting date, but probably it is the one that Bryant shot on Great Inagua in the winter of 1865–1866 (Bryant, 1866). To the best of my knowledge, all reports of _Tyrannus cubensis_ from the Bahamas are based upon these five or six specimens that were collected in the period 1865 to 1892.

_Tyrannus cubensis_ presently is uncommon to locally common in Cuba and the Isle of Pines (Bond, 1956; Garrido and Garcia Mánta, 1975) and has been recorded also on Mujeres Island off the Yucatan Peninsula (Bond, 1956).

_Myiocharus sagræ_ (Gundlach): La Sagra's Flycatcher.

Records: Crooked, Acklins, Great Inagua.
Status: Relatively uncommon resident (in woodlands); more numerous on Inagua than on the Crooked-Acklins Bank.

Variation: I found no noteworthy differences between samples from the northern and southern Bahamas (Table 10) and I follow Lanyon (1967) in separating this species from *M. stolidus* and in treating all Bahaman populations as members of the subspecies *M. sagrae lucaysiensis*. La Sagra's Flycatcher (the nominate subspecies) also is present in Cuba, the Isle of Pines, and Grand Cayman (Lanyon, 1967).

*Contopus virens* (Linnaeus): Eastern Wood Pewee.

Records: Mayaguana* (one specimen collected on 7 October 1976).

Status: Brudenell-Bruce (1975) listed this species as an occasional migrant in the northern Bahamas.

Family HIRUNDINIDAE

Swallows

*Caliichelidon cyaneoviridis* (Bryant): Bahama Swallow.

Records: Great Inagua (3 February 1909 T-W; in the period 28 November to 2 December 1973, MHC).

Status: Scarce winter visitor or transient. The Bahama Swallow breeds in the northern Bahamas and migrates southward in winter at least as far as Cuba; some individuals remain in the Bahamas throughout the year (Bond, 1956).

*Progne subis* (Linnaeus): Purple Martin.

Records: Mayaguana*

Status: Probably a regular, but relatively uncommon transient, at least in the fall.
Remarks: One immature male (LSUMZ 81769) that I collected from a flock of about 10 individuals on Mayaguana on 10 October 1976, and another immature male (LSUMZ 81770) that I collected from a flock of about 30 individuals on 13 October 1976 (also on Mayaguana) are assigned to the subspecies _P. s. subis_.

A distinctly white-bellied individual that I saw on Mayaguana on 10 May 1972, and one that Mary H. Clench (pers. comm.) saw on Grand Turk on 26 January 1978, may have been vagrant _P. s. dominicensis_ from the Antilles. Breeding populations of this subspecies are present in Jamaica, Hispaniola, Puerto Rico, the Virgin Islands, and the Lesser Antilles. None has been reported from the Bahamas, but Wingate (1964b) collected a male in Bermuda on 17 January 1959).

_Hirundo rústica_ (Linnaeus): Barn Swallow.

_Records_: Crooked*, Acklins*, Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on North Caicos*.

_Status_: Uncommon to occasionally common transient. Fall dates: 24 August (Mayaguana CBC-1891), 24 December (Gréat Inagua* 1970).

Spring dates: 25 April (Acklins* 1972), 27 May (North Caicos* 1970). Also, there is one mid-summer (=early fall?) record—Karen Bjorndal (pers. comm.) reported that she saw this species on Little Inagua on 17 July 1976.

_Subspecies_: _Hirundo rústica erythrogaster_ (Boddaert).

Family CORVIDAE
Crows, Jays, and Magpies

_Corvus nasicus_ Temminck: Cuban Crow.
Records: Crooked (?); in the Caicos Islands on Providenciales*, Pine Cay, Parrot Cay*, North Caicos, and Middle Caicos.

Status: Common resident on islands in the northwestern part of the Caicos Bank. *C. nasicus* feeds on fruits (including many garden crops) and frequently is found in or near areas under cultivation.

Remarks: Outside of the Caicos Islands this species is found presently only on Cuba and the Isle of Pines. Wetmore (1937) reported skeletal remains of *C. nasicus* from Great Exuma in the Bahamas; he also reported (Wetmore, 1938) that a bone fragment taken on Crooked Island probably is from this species. Brodkorb (1959) proposed the name *Corvus wetmorei* for a crow known from Pleistocene deposits on New Providence and later (Brodkorb, 1978) included the bones from Great Exuma and, at least tentatively, those from Crooked Island as examples of this species.

Variation: Measurements (in millimeters) of nine specimens (6♂, 3♀) from Cuba and seven specimens (2♂, 1♀, 4 unsexed) from North Caicos, respectively, average as follows: wing length 270.4, 262.6; tail length 152.3, 147.4; bill length from nostril 40.9, 42.2; bill width at anterior border of nostril 14.3, 14.4; bill depth at nostril 19.4, 19.8. A somewhat greater amount of wear in specimens from North Caicos may account, at least in part, for the average smaller size in wing length and tail length in the Caicos sample.

Family MIMIDAE

Mockingbirds and Thrashers


Records: Crooked*, Fortune*, Acklins*, West Plana Cay, Mayaguana, Great Inagua; in the Caicos Islands on Providenciales*, Pine Cay,
Dellis Cay*, North Caicos, Middle Caicos, East Caicos*, and South Caicos; in the Turks Islands on Grand Turk.

**Status**: Uncommon to locally common resident; probably breeding on all or most of the islands in this region whence it has been reported. I found a nest on Providenciales that contained three eggs on 26 March 1978, and saw three fledglings on South Caicos on 29 March 1978. Todd and Worthington (1911) reported that fully grown young in the spotted plumage were taken on Great Inagua on 24 February 1909.

Remarks on distribution: In the southern Bahamas the Northern Mockingbird usually is found in or near settlements, or in sparse coastal scrub, whereas M. gundlachii, the Bahama Mockingbird, is more widely distributed (see following account) but appears to prefer dense scrub and woodlands over more open and exposed regions. There appears to be ample habitat suitable to M. polyglottos on West Caicos, but the Northern Mockingbird has not been reported there. M. gundlachii is one of the most common birds on West Caicos and may be excluding polyglottos from that island; M. polyglottos is fairly common in scrub on the adjacent island, Providenciales, less than 10 km away, and is present on all other major islands on the Caicos Bank.

**Variation**: Northern Mockingbirds in eastern continental North America (Mimus polyglottos polyglottos) are much more gray (less white) on the venter than are those from the West Indies. I have examined six specimens from the northern Bahamas, nine from the southern Bahamas, nine from Cuba, ten from Hispaniola, and two from Puerto Rico, I follow Todd and Worthington (1911) and Bond (1956) in treating the West Indian populations as members of the subspecies M. p. orpheus (Linnaeus).
Hellmayr (1934) indicated that the amount of white in the tail, particularly on the inner web of the third rectrix, is greater in specimens from the southern Bahamas than in those from the northern islands. However, as pointed out by Todd (Todd and Worthington, 1911), this character as well as wing and tail lengths show much intrasample variation. I did not examine as many specimens as did Hellmayr, but the three males I collected on Grand Turk in the southernmost Bahamas have relatively little white on the third rectrix whereas this feather is nearly completely white in the one specimen from New Providence that I examined. One of two specimens from Puerto Rico resembles the New Providence bird in this character, and the other resembles those from Grand Turk.

*Mimus gundlachii* Cabanis: Bahama Mockingbird.

**Records:** Samana Cay*, Bird Rock, Crooked, Fortune, Fish Cay, Acklins, West Plana Cay, East Plana Cay, Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales, Water Cay, Pine Cay, Parrot Cay*, North Caicos, Middle Caicos, East Caicos, and South Caicos; in the Turks Islands on Grand Turk and Cotton Cay*.

**Status:** Common to abundant resident in dense scrub and xeric woodlands throughout this region. Mary H. Clench (pers. comm.) saw a nest being built by *M. gundlachii* on Acklins on 17 March 1976, and I saw one being built on Providenciales on 24 March 1978. A nest that I found on Crooked Island contained two eggs on 3 May 1972.
Variation: Ridgway (1907) recognized two subspecies of M. gundlachii in the Bahamas—M. g. bahamensis in the northern Bahamas (southward at least to Conception Island and Green Cay), and the nominate subspecies in the southern Bahamas; he indicated that in comparison to M. g. gundlachii, specimens of M. g. bahamensis are smaller and have more brown pigment (less gray) on the dorsum. However, Todd (in Todd and Worthington, 1911) stated "I can find no differences whatsoever that would justify the recognition of a subspecies 'bahamensis'. There is certainly no constant difference in color, and the average difference in size between the Great Inagua and Andros birds is a negligible quantity." Todd and Worthington (1911) treated M. g. bahamensis as a synonym of M. g. gundlachii. I agree with this taxonomic treatment, but there are variational trends that bear further comment.

Tables 11 and 12 give the mean length of exposed culmen, wing, and tail, along with the ranges, in samples from 11 islands in the Bahamas listed geographically from north to south.

In wing and tail measurements, samples from the central part of the archipelago tend to average larger than those at the northern and southern ends, but interisland variation in bill length is more nearly clinal. Although this variation is not a smooth cline, individuals from the northern islands, have shorter bills on the average than those from the southern Bahama.

Specimens from New Providence tend to be smaller and have much more brown pigmentation on the dorsum than individuals in other samples. There may be justification for treating the population on New Providence as a separate subspecies, particularly when samples from this island are
compared to those of the southern Bahamas. In my opinion, however, the amount of overlap in pigmentation and mensuration between individuals from New Providence and those from elsewhere on the Great Bank, and between the latter samples and those from the southern Bahamas, suggests that these populations are best treated as members of one subspecies, *M. g. gundlachii*.

Specimens that I examined from the Berry Islands (3), South Bimini (1), and the Little Bahama Bank (4) are not included in Tables 11 and 12; these individuals agree in coloration and mensuration with those from Andros and Eleuthera on the northern end of the Great Bank.

Another subspecies, *M. g. hillii*, is known only from the semiarid limestone country of southern Jamaica. Specimens of *hillii* that I have examined usually have broader and more sharply defined streaks on the sides of the face and neck than do representatives of the nominate subspecies; however, according to my data (Tables 11 and 12), the mensural differences between *hillii* and *gundlachii* are not so great as those reported by Ridgway (1907).

*Margarops fuscatus* (Vieillot): Pearly-eyed Thrasher.

**Records:** Bird Rock, Crooked, Mayaguana, Great Inagua, Little Inagua*; in the Caicos Islands on Water Cay, Pine Cay, Parrot Cay*; North Caicos, Middle Caicos, and East Caicos.

**Status:** Common resident in mesic woodlands, but uncommon in, or absent from, other habitats.

**Variation:** I found no differences in bill length, wing length, tail length, or in coloration, between specimens from the southern Bahamas
(11 males, 3 females), and individuals of the nominate subspecies from Mona, Puerto Rico, and Tortola (5 males, 3 females). Sexes were treated separately and comparisons were made between individuals showing the same degree of wear.

**Dumetella carolinensis** (Linnaeus): Gray Catbird.

**Records:** Crooked*, Acklins*, West Plana Cay, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales*, North Caicos*, Middle Caicos, and East Caicos*; in the Turks Islands on Grand Turk*.

**Status:** Fairly common winter visitor. Extreme dates: 6 October (Grand Turk, ACW-1977), 1 May (Crooked* 1972).

**Family TURDIDAE**

**Thrushes**

**Mimocichla plumbea** (Linnaeus): Red-legged Thrush.

**Records:** Great Inagua—seen once by Alexander Sprunt, IV (Bond, 1962).

**Status:** Vagrant (?).

**Remarks:** This species is a fairly common resident in the northern Bahamas and in the Greater Antilles (Bond, 1956).

**Catharus minimus** (Lafresnaye): Gray-cheeked Thrush.

**Records:** Mayaguana* (two specimens netted in a Black Mangrove swamp at Curtiss Creek—one on 14–15 October 1976, the other on 18 October 1976).

**Status:** Probably an uncommon transient.

**Remarks:** On the basis of wing-length measurements, I assign the two specimens from Mayaguana to the nominate subspecies, which has not
been previously reported from the Bahamas although Bond (1960) suggested that Bahaman records of *C. minimus* may pertain to this subspecies. *Catharus minimus minimus* breeds from northeastern Siberia to Newfoundland.

*Catharus m. bicknelli* breeds in southeastern Canada and in the mountains of the northeastern United States. Individuals of this subspecies overwinter regularly in Hispaniola (Wallace, 1939; Bond, 1956, 1971a, 1971b), and probably are present in the southern Bahamas at times, at least as transients; Bond (1956) listed one record of this subspecies from the Bahamas, Cay Sal.

In the specimens (skins) of *C. minimus* that I examined, which were collected on their breeding grounds, wing length ranged from 96 to 108 mm ($\bar{x} = 101.7$) in 13 males and seven females of *C. m. minimus*, and from 82 to 97 mm ($\bar{x} = 91.6$) in seven males and five females of *C. m. bicknelli*. The two specimens from Mayaguana measured 103 mm (LSUMZ 83649) and 106 mm (LSUMZ 83650) in this character before being preserved in formalin.

**Family SYLVIIDAE**

**Old World Warblers, Gnatcatchers and Allies**

*Polioptila caerulea* (Linnaeus): Blue-gray Gnatcatcher.

**Records:** Samana Cay*, Bird Rock, Crooked, Fortune, Acklins, West Plana Cay, Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos*, Providenciales, Pine Cay, North Caicos, Middle Caicos, and East Caicos; in the Turks Islands on Grand Turk.

**Status:** Common to abundant resident in scrublands on the larger islands. Individuals from North America also overwinter in the Bahamas (Bond, 1956).
Cory (1880) found a nest of this species on Great Inagua that contained three eggs on 1 June 1879, and Bond (1956) reported that P. caerulea is a common breeding bird on that island. I do not know of any other reports of this species nesting in the southern Bahamas, but the abundance of gnatcatchers there throughout the year (pers. obs.) suggests the presence of a sizeable resident population.

Variation: Ridgway (1887) proposed the name P. c. caesiogaster for the Blue-gray Gnatcatchers of the Bahamas, claiming that the Bahaman birds are much darker than those from the continent (P. c. caerulea). The only difference that Todd (in Todd and Worthington, 1911) detected between the gnatcatchers from these two regions was that Bahaman birds average slightly smaller in wing length; he treated P. c. caesiogaster as a synonym of P. c. caerulea, as did Hellmayr (1934), Bond and Meyer de Schauensee (1944), and Bond (1956).

A discussion of interisland variation among P. caerulea in the Bahamas has been hindered, in large measure, by the paucity of specimens collected during the breeding season (ca. April–June). Ridgway (1904) examined 20 specimens from the Bahamas but did not select them by season, and only one of his specimens was from the southern part of the archipelago. Todd (in Todd and Worthington, 1911) indicated that of the 14 specimens he examined from New Providence, Abaco, and Great Inagua, only the Abaco sample (6) probably was comprised only of resident individuals. Bond and Meyer de Schauensee (1944) compared wing measurements among specimens from the Inaguas (4), New Providence (2), Little Abaco (1), and an unstated number from the continent; their samples, too, were not separated by season.
I have examined 26 specimens of *P. caerulea* from the Bahamas, along with 35 individuals from the continent, all taken within the period 15 April through 30 June. Mensural data are given in Table 13; the four localities are listed in sequence from north to south.

Gnatcatchers from the Bahamas tend to have a longer bill and shorter wings than do those from the continent; the variation is clinal and the ranges overlap broadly in nearly all adjacent samples. One exception is the disparity in bill length between males from the southern Bahamas and those from the northern islands, but even between these two samples there is some overlap. I detected no geographic differences in coloration among any of these samples.

I believe these data support the conclusion proposed first by Todd (in Todd and Worthington, 1911) that *P. c. caesiogaster* should be treated as a synonym of *P. c. caerulea*.

**Family BOMBYCILLIDAE**

**Waxwings**

*Bombycilla cedrorum* Vieillot: Cedar Waxwing

**Records**: Providencias (one individual observed in coastal scrub on 23 May 1970).

**Status**: Accidental. Brudenell-Bruce (1975) treated this species as an "accidental" in the Bahamas, and Bond (1956) stated that *B. cedrorum* is a rare visitor to the West Indies.

**Family STURNIDAE**

**Starlings**

*Sturnus vulgaris* Linnaeus: European Starling.
Records: Mayaguana* (two seen, one specimen collected, 16 October 1976); in the Turks Islands on Grand Turk (ACW— one seen on 18 October 1976, two seen on 2 December 1977).

Status: This species is treated as an uncommon winter visitor on New Providence by Brudenell-Bruce (1975); it has not been reported previously in the Bahamas south of San Salvador (Miller, 1978).

Family VIREONIDAE

Vireos

Vireo griseus (Boddaert): White-eyed Vireo.

Records: Mayaguana* (one found dead in road, 18 October 1976); in the Caicos Islands on Providenciales* (one seen on 12 March 1976) and East Caicos* (one specimen collected on 4 March 1976); in the Turks Islands on Grand Turk in February (Bond, 1971a).

Status: Probably a scarce to uncommon winter visitor and/or transient.

Variation: The two specimens that I collected in the southern Bahamas both have relatively bright yellow pigmentation on the sides as do most members of the weakly characterized subspecies V. g. noveboracensis (Gmelin). Members of this subspecies breed in the interior of the eastern United States whereas V. g. griseus breeds along the southeastern coastal plain. Both of these subspecies have been recorded in the West Indies, but only V. g. griseus previously has been reported from the Bahamas (Bond, 1956).

Vireo crassirostris (Bryant): Thick-billed Vireo.

Records: Samana Cay*, Crooked, Fortune*, Acklins, West Plana Cay,
Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos*, Providenciales, Bay Cay*, Water Cay, Pine Cay, Parrot Cay*, North Caicos*, Middle Caicos, East Caicos*, and South Caicos.

**Status:** Abundant resident in scrub and woodlands on most islands in the southern Bahamas, but unknown from the Turks Bank.

**Variation:** Ridgway (1887) proposed the name *V. c. flavescens* for the relatively bright yellow individuals of Thick-billed Vireos in the Bahamas that he found exclusively on Rum Cay and Conception Island and occurring along with members of the nominate subspecies on Galding Key, Cat Island, and Green Cay. He reported also that members of the nominate subspecies alone were present on Abaco and New Providence.

Todd and Worthington (1911) reported that specimens of *V. c. crassirostris* in the southern Bahamas are more yellow than are those from the northernmost islands, and that geographically intermediate samples include "puzzling series" of intergrades. They treated *V. c. flavescens* as a synonym of *V. c. crassirostris*, as did Bond (1956).

I examined coloration in 190 specimens of Thick-billed Vireos from the Bahamas and assigned each to one of four classes in ventral coloration ranging from white (= also grayish white) to yellow (Figure 9). Individuals that are relatively more yellow below also are relatively more yellow-green (less olive, brownish-green, or grayish-green) on the dorsum.

I did not find as much heterogeneity in coloration among samples from the middle of the archipelago as did Todd and Worthington (1911). My data show that individuals from the geographically intermediate islands are largely intermediate in coloration; only my samples from
New Providence and Eleuthera include representatives of all four color classes. Color variation in Bahaman samples of _V. crassirostris_ is not strictly clinal but approaches that condition.

Todd and Worthington (1911) did not discuss mensural variation in _V. crassirostris_, and no noteworthy differences in measurements among Bahama samples of this species were given by Ridgway (1904). But many of Ridgway's samples were extremely small and measurements of only two males and two females from Inagua comprised his mensural data on specimens from the southern Bahamas.

Means and sample sizes for wing length, tail length, bill length, and bill depth in Bahaman specimens that I examined are given in Table 14. There are no differences, or only slight differences between the means among 10 of 11 samples; the differences are not correlated with geography. With the exception of bill length, however, individuals of both sexes from the Caicos Islands average smaller than those of any other samples.

In figure 10 I have shown frequency distributions for the characters wing length, tail length, and bill depth in Caicos Islands specimens and in two samples representing the extremes in the range of means among the remaining samples. Except for some Caicos samples, only samples in which N>5 were selected. In situations where more than one sample was applicable I selected the one with the largest N.

In my opinion mensural differences between _V. crassirostris_ from the Caicos Islands and those from elsewhere in the Bahamas are noteworthy, but not great enough to warrant nomenclatural distinction; I treat all of these populations as members of the nominate subspecies.
According to Bangs (1916), Thick-billed Vireos of the Cayman Islands do not differ among themselves and are identical to "flavescens-like" individuals in the Bahamas—he treated V. c. allenii as a synonym of V. c. crassirostris and this taxonomic opinion has been accepted by Hellmayr (1935) and Bond (1956). I, too, include the Caymans within the range of the nominate subspecies, at least tentatively. However, most Cayman Islands specimens that I examined have bills that are much darker than in examples from the Bahamas. Also, I found evidence of interisland variation among Cayman specimens that previously has been unreported. In bill length, for example, specimens from Grand Cayman (6 males $\bar{x} = 11.5$, 5 females $\bar{x} = 10.8$) average shorter than do those from Cayman Brac (5 males $\bar{x} = 12.0$, 6 females $\bar{x} = 11.8$) and Little Cayman (5 males $\bar{x} = 11.9$). In comparison to specimens from Cayman Brac and Little Cayman those from Grand Cayman also have slightly smaller values for wing length, tail length, and bill depth.

Two other subspecies of V. crassirostris currently are recognized. According to Bond (1950b) specimens of V. c. approximans from Old Providence (in the western Caribbean) are barely separable morphologically from members of the nominate subspecies, but have a very different voice. V. c. tortugae is present on Tortue (off the northern coast of Haiti); members of this subspecies are browner below than are those from any other population of V. crassirostris.

Vireo flavifrons Vieillot: Yellow-throated Vireo.

Records: Mayaguana* (one specimen collected on 5 October 1976).

Status: Uncommon on New Providence in winter (Brudenell-Bruce,
1975). Records of this species from anywhere in the West Indies east of Cuba are scant (Bond, 1971b).

**Vireo olivaceus** (Linnaeus): Red-eyed Vireo.

**Records:** Mayaguana* (several individuals observed, two specimens collected—all in the period 1-17 October 1976), Great Inagua on 17 September 1891 (Cory 1892a).

**Status:** Uncommon fall transient.

**Vireo altiloquus** (Vieillot): Black-whiskered Vireo.

**Records:** Bird Rock, Fortune, Acklins*, Mayaguana*, Great Inagua; in the Caicos Islands on West Caicos*, Providenciales*, Pine Cay, and North Caicos; in the Turks Islands on Grand Turk and Salt Cay.

**Status:** Uncommon summer resident; probably breeds throughout this region although there are no definite nesting records. Extreme dates: 15 March (Grand Turk* 1972, specimens collected); October—Grand Turk (Bond, 1971a).

**Variation:** I have examined specimens from the Little Bahama Bank (5), the Great Bahama Bank (28), the southern Bahamas (13), and Cuba (22) and found no marked differences among these samples in coloration, wing length, tail length, bill length, bill width, or bill depth. However, the average wing length of four males from the southern Bahamas (76.8) is less than that of five males from the Little Bahama Bank (80.0), 19 from the Great Bahama Bank (80.2), and 15 from Cuba (79.2). Among females, four from the southern Bahamas average 77.8, six from the Great Bahama Bank average 76.2, and seven from Cuba average 77.0 mm in this character. Specimens of all Bahama samples tend to be slightly paler on
the dorsum and slightly more yellow on the flanks than do specimens from Cuba. I believe that these differences are taxonomically negligible and I follow Bond (1956) in treating populations of V. altiloquus in the Bahamas and Cuba (as well as those in the southeastern United States) as members of the subspecies V. a. barbatulus.

Members of the nominate subspecies that I examined from Hispaniola (23) and Jamaica (14) differ appreciably from V. a. barbatulus in having a longer bill length, buffy pigmentation on the pale parts of the head, and grayer (less white) underparts.

Family PARULIDAE
Wood Warblers

Mniotilta varia (Linnaeus): Black-and-white Warbler.


Protonotaria citrea (Boddaert): Prothonotary Warbler.

Records: Mayaguana*—several seen during the first two weeks in October 1976 (specimens collected on 12 October 1976); in the Turks Islands on Grand Turk (ACW—sight records for 27 August 1975, 5 September 1976, and 20 August 1977).

Status: Probably an uncommon but regular fall migrant. Brudenell-Bruce (1975) listed this species as an uncommon passage migrant on New
Providence, and Bond (1956) considered it a very rare transient in the West Indies.

**Helmitheros vermivorus** (Gmelin): Worm-eating Warbler.

**Records**: Crooked*, Acklins*, Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on North Caicos*; in the Turks Islands on Grand Turk.

**Status**: Probably a fairly common (but secretive) winter visitor. Extreme dates: 22 September on Great Inagua (Cory, 1892a), 18 April (Crooked* 1972).

**Vermivora pinus** (Linnaeus): Blue-winged Warbler.

**Records**: Providenciales* (I saw one individual on the northern coast near Blue Hills settlement on 30 March 1975, and Beverlea Aldridge photographed one individual at the same locality on 15 April 1975).

**Status**: Brudenell-Bruce (1975) listed this species as a rare migrant in the Bahamas, and Bond (1971a) listed it as a rare winter visitor or transient in the West Indies generally.

**Vermivora perigrina** (Wilson): Tennessee Warbler.

**Records**: Mayaguana*—several individuals seen during mid-October 1976, one specimen collected on 13 October 1976.

**Status**: Brudenell-Bruce (1975) listed this species as an uncommon migrant on New Providence.

**Parula americana** (Linnaeus): Northern Parula.

**Records**: Crooked*, Acklins*, Mayaguana*, East Plana Cay, Great
Inagua, Little Inagua*; in the Caicos Islands on Providenciales*, North Caicos, Middle Caicos, and East Caicos; in the Turks Islands on Grand Turk.

**Status:** Fairly common winter visitor. Extreme dates: 22 September (Grand Turk ACW-1977), 2 May (Great Inagua CBC-1891).

*Dendroica petechia* (Linnaeus): Yellow Warbler.


**Status:** Common to abundant resident in mangrove swamps, scarce in other habitats. Individuals from North America may overwinter in the Bahamas occasionally (Bond, 1956; Brudenell-Bruce 1975), but none has been reported from the southern islands.

**Variation:** *Dendroica petechia* breeds in North America, Central America, northern South America, and West Indies. Bond (1956) listed 12 resident subspecies in the West Indies; those in the Bahamas and Greater Antilles are as follows: *D. p. gundlachi* Baird on Cuba, the Isle of Pines, in the Bahamas, and in the Florida Keys; *D. p. eoa* (Gosse) on Jamaica and the Cayman Islands; *D. p. albicollis* (Gmelin) on Hispaniola, including the satellite islands Ile-à-Vache, Gonâve, and Tortue, and *D. p. cruciana* Sundevall on Puerto Rico and the Virgin Islands.
Chapman (1892) proposed the name *Dendroica petechia flaviceps* for populations in the Bahamas; he listed relatively small size, a weakly developed crown patch, and relatively "more" (= brighter) yellow coloration as diagnostic features. None of these characters, however, is unique to the Bahaman populations—specimens from these islands appear to have a composite of characters diagnostic of several subspecies in the Greater Antilles.

Ridgway (1902) reported that the Bahaman birds resemble, for the most part, those from Jamaica, but are brighter yellow below, have "heavier" or more numerous chestnut stripes on the chest and sides of the body, and have a crown that is less frequently tinged with ochraceous or tawny pigment. He also stated that some of the brighter and broader-striped examples are similar to specimens from Puerto Rico. Peters (1927), in his revision of Yellow Warblers, stated that the Bahaman birds generally resemble those from Jamaica in coloration, but are similar to those from Cuba and the Isle of Pines in having only a weakly developed crown patch; he indicated that the Bahaman birds have longer tarsi and a more rounded wing than do those from the Greater Antilles. Hellmayr (1935) also commented on the close resemblance of the Bahaman birds to those from Cuba and the Isle of Pines, but he retained the name *D. p. flaviceps* for the Bahaman populations. Bond (1942), however, stated that the Cuban-Bahaman samples he examined were indistinguishable from each other and he treated *D. p. flaviceps* as a synonym of *D. p. gundlachi*—this taxonomic treatment is the one currently accepted.
I have examined 98 specimens from the Bahamas, 41 from Cuba, 20 from Hispaniola, 26 from Puerto Rico, 12 from Jamaica, and 24 from the Cayman Islands. To minimize effects of feather wear, my comparisons in coloration, along with those of wing and tail measurements are based upon specimens in comparable plumage, from selected times of the year. I have limited the following comparisons to males largely because the females are nondescript in coloration and pattern and are generally similar in all Antillean and Bahaman populations.

Specimens from Cuba (and the Isle of Pines) generally have a ground color that is duller and more green (less yellow) than that of any other sample; the rufous stripes on the breast and sides of the body are weakly to moderately developed, and the rufous crown patch, which is a distinctive feature of other Antillean populations, usually is obsolete or completely absent in Cuban birds. Specimens from Puerto Rico generally are brighter yellow (less green) above and below and have broader and more numerous stripes on the venter than do those from elsewhere in the Antilles and the Bahamas; a crown patch usually is present. Specimens from Jamaica, the Cayman Islands, and Hispaniola have the most conspicuous crown patches, and are somewhat intermediate between Cuban and Puerto Rican samples in ground color and striping.

Specimens that I have examined from the Bahamas are closest to Cuban birds in dorsal coloration. Also, Cuban-Bahaman examples frequently lack a crown patch, or have an obsolete patch consisting of rufous pigmentation at the base of a few crown feathers. This "patch" becomes readily visible only after the tips of the feathers have worn away, as in many specimens collected from mid-May through mid-August. In ventral coloration
Bahama specimens generally are similar to those from Jamaica, the
caymans, and hispaniola; many are also as bright and as boldly streaked
as those from puerto rico. LSUMZ 70846 and 70847 from grand turk are
erythristic—they are more nearly orange than yellow.

Bill, wing, and tail measurements of five bahaman and five greater
antillean samples of D. petechia are presented in table 15; mensurally
there is much overlap among these samples. I have tarsal measurements
from only a few specimens; although there is some indication that
bahaman specimens tend to have longer tarsi than do those of the greater
antilles (as was pointed out by hellmayr, 1935), I have omitted this
measurement from my comparisons.

The difference in wing length between hispaniolan and jamaican
samples in table 15 probably is exaggerated because of the small sample
of specimens available for the months january through april. The mean
for wing length in specimens collected in june, july, and august is
63.6 mm in seven males from hispaniola, 64.8 in five from jamaica, and
63.5 in ten from the cayman islands; the respective ranges are 62.0–66.0,
64.0–66.0, and 61.0–66.0. I suggest that the jamaican–cayman–hispaniolan
populations be treated as members of one subspecies, D. p. albicollis,
primarily because of similarities in coloration and pattern, and because
of the lack of any distinctive mensural differences; this treatment would
place D. p. eoa of jamaica and the caymans in the synonymy of D. p.
albicollis.

In summary, I recognize three subspecies of Dendroica petechia
in the bahamas and greater antilles as follows:
D. p. gundlachi.—Cuba, the Isle of Pines, the Bahamas, and southern Florida. Dorsum generally dark yellowish green to olive, darker than in any other Greater Antillean population of D. petechia; crown patch generally absent or obsolete; ventral ground color usually dull yellow, occasionally bright yellow (the latter in the Bahamas); rufous streaks on sides of body usually narrow and relatively few in number (broad and numerous in some Bahaman populations).

D. p. cruciana.—Puerto Rico and the Virgin Islands. Dorsum bright yellow green; yellow pigmentation on head brighter and more extensive than in any other Greater Antillean or Bahaman population of D. petechia; crown patch fairly well developed; ventral ground color bright yellow, rufous streaks on breast and flanks broad and numerous.

D. p. albicollis.—Jamaica, the Cayman Islands, and Hispaniola and its satellite islands. Intermediate between Cuban and Puerto Rican samples in most characters; differs from the former mainly in having a well-developed crown patch, and a brighter yellow dorsum and venter; differs from the latter in having a duller, more greenish dorsum and venter, a slightly more extensive crown patch, and narrower rufous streaks on the breast and flanks.

With the exception of the sinking of D. p. eoae into D. p. albicollis this taxonomic arrangement is similar to the one given by Bond (1956).

Dendroica magnolia (Wilson): Magnolia Warbler.

Records: East Plana Cay, Mayaguana*, Great Inagua; in the Caicos Islands on Providenciales, North Caicos, and East Caicos; in the Turks Islands on Grand Turk.
**Status:** Relatively uncommon winter visitor. Extremes dates: 30 September (Mayaguana*), 30 April (Grand Turk ACW-1976).

*Dendroica tigrina* (Gmelin): Cape May Warbler.

**Records:** Crooked*, Acklins, West Plana Cay, Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on West Caicos*, Providenciales*, Parrot Cay*, North Caicos*, Middle Caicos*, East Caicos*, and South Caicos; in the Turks Islands on Grand Turk.

**Status:** Common winter visitor. Extreme dates: 22 September (Great Inagua CBC-1891), 1 May (Crooked* 1972).

*Dendroica caerulescens* (Gmelin): Black-throated Blue Warbler.

**Records:** Crooked*, Acklins*, East Plana Cay, Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales* and Middle Caicos*; in the Turks Islands on Grand Turk.

**Status:** Uncommon to fairly common winter visitor. Extreme dates: 15 September (Grand Turk ACW-1976), 7 May (Mayaguana* 1972).

**Subspecies:** One specimen of *D. c. cairnsi* Coues was collected on Great Inagua on 7 December 1960 (Schwartz and Klinikowski, 1963). Members of this subspecies breed in montane forests from Maryland to Georgia. All the Black-throated Blue Warblers that I have seen at close range in the southern Bahamas, as well as those seen by Mary H. Clench (pers. comm.) appeared to be members of the nominate subspecies (breeding populations in northeastern North America)—they lacked the black spotting on the dorsum that is characteristic of *D. c. cairnsi*. 
Dendroica coronata (Linnaeus): "Myrtle" Warbler.


Remarks: The American Ornithologists' Union (1973) now treats D. auduboni (Audubon's Warbler) as a subspecies of D. coronata (Myrtle Warbler). The common name Yellow-rumped Warbler is applied to this enlarged species group, but the names "Audubon's" Warbler and "Myrtle" Warbler are retained for the subspecies--only the "Myrtle Warbler", which breeds in eastern North America, is known from the Bahamas.

Dendroica virens (Gmelin): Black-throated Green Warbler.

Records: Crooked*, Mayaguana*, Great Inagua (several records); in the Caicos Islands on North Caicos*, Middle Caicos*, and East Caicos*; in the Turks Island on Grand Turk (ACW-1976).

Status: Uncommon but regular winter visitor; somewhat more numerous in migration. Extreme dates: 6 October (Mayaguana* 1976), 8 June (North Caicos* 1971).

Dendroica fusca (Muller): Blackburnian Warbler.

Records: Mayaguana*—one seen on 6 October 1976, another on 12 October 1976.

Status: Probably a scarce fall migrant. Brudenell-Bruce (1975)
treated this species as a rare autumn migrant on New Providence, and Bond (1971b) listed it as a rare transient in the West Indies.

**Dendroica dominica** (Linnaeus): Yellow-throated Warbler.

**Records:** Acklins*, West Plana Cay, Mayaguana, Great Inagua; in the Caicos Islands on Providenciales* and South Caicos; in the Turks Islands on Grand Turk.

**Status:** Relatively uncommon winter visitor, but fairly common in migration. Extreme dates: 22 August (Mayaguana CBC-1891), 26 March Providenciales* 1978).

**Subspecies:** Three subspecies of *D. dominica* breed in North America—

- **D. d. albilora** Ridgway (in the Mississippi Valley and adjacent areas),
- **D. d. stoddardi** Sutton (in northwestern Florida), and **D. d. dominica** (east of the ranges of stoddardi and albilora). A fourth subspecies, **D. d. flavescens** Todd, is endemic to the Little Bahama Bank where it is a permanent resident; however, I have seen examples of all three continental subspecies collected in the Antilles and the Bahamas outside of breeding season.

Most individuals of *D. dominica* that overwinter in, or migrate through, the Bahamas are members of the nominate subspecies. The first and previously only, record of *D. d. albilora* in the Bahamas was reported by Schwartz and Klinikowski (1963). I have also assigned to this subspecies a specimen of *D. dominica* that I collected on Providenciales (LSUMZ 71514, preserved in alcohol) on 23 February 1972; it lacks a yellow supraloral spot and measures 12.5 mm along the exposed culmen.

A specimen from Great Inagua (AS 1422) and one from Grand Turk (AS 1545) were identified as *D. d. stoddardi* by Schwartz. These individuals
may have been visitors from northwestern Florida, but Ficken et al. (1968) found that Yellow-throated Warblers in the pinewoods of the Delaware-Maryland-Virginia peninsula, also have the diagnostic characters of stoddardi and would be assigned to that subspecies on the basis of morphology.

*Dendroica pensylvanica* (Linnaeus): Chestnut-sided Warbler.

**Records:** Mayaguana*—one individual in breeding plumage observed on 14 May 1972; one specimen collected on 1 October 1976, and several others seen during the period 1-12 October 1976.

**Status:** Uncommon transient; apparently more numerous in fall than in spring.

*Dendroica striata* (Forster): Blackpoll Warbler.

**Records:** Bird Rock on 16 October (Bonhote, 1903a), East Plana Cay in October C-F, Mayaguana* in the period 30 September-19 October 1976, Great Inagua on 29 November (MHC-1973) and in the period 16-23 May (CBC-1891).

**Status:** Common fall transient, but scarce during spring migration.

*Dendroica discolor* (Vieillot): Prairie Warbler.

**Records:** Acklins, Mayaguana, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales, North Caicos, Middle Caicos, East Caicos, and South Caicos*; in the Turks Islands on Grand Turk.

**Status:** Common winter visitor and transient (reported most frequently in March). Extreme dates: 24 August (Mayaguana CBC-1891), 14 April (Great Inagua* 1977).
Remarks: Only members of the nominate subspecies have been reported from the Bahamas. *D. d. paludicola* Howell is a very weakly differentiated subspecies that breeds in peninsular Florida and the Keys and has been reported as a winter visitor on Cuba and St. Croix (Bond, 1956).

*Dendroica kirtlandii* (Baird): Kirtland's Warbler.

**Records:** Crooked on 11, 12, and 22 March 1973 (Radabaugh, 1974), Great Inagua whence seen by James Bond on 8 March in some year between 1935 and 1940 (*fide* Mayfield, 1960); in the Caicos Islands on North Caicos (one female seen near Bellefield Landing on 10 February 1978 MHC). Cory (1892b) reported this species from North, Middle, and East Caicos islands, but see remarks below.

**Status:** Rare winter visitor.

**Remarks:** The reports of *D. kirtlandii* from Crooked Island and Great Inagua are based on sight records of apparently one bird in each case. I have seen one female (Cory 15939=FMNH 8016) collected in the Caicos Islands by Cyrus Winch on 9 January 1891. This specimen, like all of Winch's Caicos material that I have examined, bears no additional locality data. Cory (1891a) stated that Winch collected two Kirtland's Warblers in the Caicos Islands, but I have not been able to locate a second specimen or even an entry for it in Cory's catalog. Also, I have not found any voucher specimens or references to sightings that would corroborate the records of *D. kirtlandii* from North, Middle, and East Caicos specifically listed by Cory (1892b).

*Dendroica palmarum* (Gmelin): Palm Warbler.

**Records:** Crooked*, Fortune, Acklins, West Plana Cay, East Plana Cay,
Mayaguana*, Great Inagua, Little Inagua; in the Caicos Islands on Providenciales, Parrot Cay*, North Caicos, Middle Caicos, East Caicos, South Caicos*, Big Ambergris Cay*, and Little Ambergris Cay*; in the Turks Islands on Grand Turk.

**Status:** Abundant winter visitor. Extreme dates: 29 September (Mayaguana* 1976), 14 June (Great Inagua KB-1976).

**Remarks:** Only individuals of the nominate subspecies have been recorded in the southern Bahamas.

*Seiurus aurocapillus* (Linnaeus): Ovenbird.

**Records:** Crooked*, Fortune*, Acklins, East Plana Cay, Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on West Caicos*, Providenciales*, North Caicos, Middle Caicos, East Caicos, and South Caicos; in the Turks Islands on Grand Turk.

**Status:** Common winter visitor; usually found in woodlands and dense scrub. Extreme dates: 19 September (Great Inagua CBC-1891), 15 May (Great Inagua CBC-1891).

**Remarks:** The subspecies *S. a. furvior* Batchelder of Newfoundland, *S. a. canivirens* Burleigh and Duvall of the southeastern United States, and *S. a. aurocapillus* of most of northeastern North America, have been reported in the Bahamas (Burleigh and Duvall, 1952). I have not studied variation in this species, but Monroe (1968) placed both *furvior* and *canivirens* in the synonymy of the nominate subspecies.

*Seiurus noveboracensis* (Gmelin): Northern Waterthrush.

**Records:** Crooked, Acklins*, West Plana Cay (a waterthrush in dense mangroves tentatively identified as this species MHC-1976),
Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales*, Pine Cay, Middle Caicos*, and East Caicos*; in the Turks Islands on Grand Turk.

Status: Common winter visitor; most numerous in mangrove swamps. Extreme dates: 18 August (Grand Turk ACW-1977), 14 May (Great Inagua CBC-1891).

Remarks: The name Seiurus noveboracensis notabilis Ridgway was proposed for populations of Northern Waterthrush in northwestern and north-central North America. Both this subspecies and S. n. novoboracensis (breeding populations in northeastern North America) have been reported from the Bahamas (Ridgway, 1902; Todd and Worthington, 1911; Hellmayr, 1935), the latter in greater numbers. Eaton (1957), however, studied geographic variation among Northern Waterthrushes collected on their breeding grounds and he recommended that S. novoboracensis be treated as a monotypic species.


Records: Mayaguana*—several individuals seen during the first two weeks of October 1976, one specimen collected on 2 October 1976.

Status: Brudenell-Bruce (1975) listed this species as a rare migrant on New Providence.

Oporornis formosus (Wilson): Kentucky Warbler.

Records: Great Inagua*—one individual observed at close range for several minutes on 29 December 1976; in the Turks Islands on Grand Turk (ACW—sight records for 27 August 1975 and 24 September 1976).
**Status**: Probably an uncommon but regular transient, at least in the fall. The 29 December record from Great Inagua may pertain to an overwintering individual. Bond (1971b) and Brudenell-Bruce (1975) listed this species as a rare transient in the Bahamas.

**Geothlypis rostrata** Bryant: Bahama Yellowthroat.

**Records**: Little Inagua—two individuals observed by Mary H. Clench, 14-15 March 1976.

**Status**: Vagrant (?).

**Remarks**: *Geothlypis rostrata* is an uncommon to common resident in the northern Bahamas on Grand Bahama, Abaco, Andros, New Providence, Eleuthera, and Cat islands (Brudenell-Bruce, 1975). Mary H. Clench (pers. comm.) saw one individual on Long Island, at the southern end of the Great Bank, on 22 March 1976. One individual was reported in Florida (Sykes, 1974), but Bond (1977) cast some doubt on this identification. Post (1978) included the Bahama Yellowthroat among the names of warblers he observed in Puerto Rico, but I believe that additional documentation is needed before this species can be accepted as a member of the Puerto Rican avifauna, even as a vagrant.

**Geothlypis trichas** (Linnaeus): Common Yellowthroat.

**Records**: Crooked*, Acklins*, Mayaguana*, Great Inagua, Little Inagua*; in the Caicos Islands on West Caicos*, Providenciales*, North Caicos*, Middle Caicos*, East Caicos*, and South Caicos*; in the Turks Islands on Grand Turk and Long Cay*.

**Status**: Fairly common winter visitor. Extreme dates: 30 September (Mayaguana*1976), 12 May (Great Inagua CBC-1891).
Remarks: Two subspecies of Yellowthroats have been reported from the Bahamas as winter visitors or transients from the continent—G. t. brachydactyla (Swainson) of northeastern North America, and the nominate subspecies, which breeds in much of the southeastern United States. Geothlypis trichas brachydactyla is said to differ from the latter mainly in having a longer wing and more extensive yellow pigmentation on the venter (Ridgway, 1902). Parkes (1954), however, after comparing specimens from within the breeding range of both these subspecies, stated that "individual variation within a given geographic area is fully as great as observed geographic trends in variation" and he synonymized brachydactyla with G. t. trichas. This taxonomic treatment was also adopted by Bond (1956) and the American Ornithologists' Union (1957), but Bond (1974) later stated that G. t. brachydactyla is a valid subspecies and is distinguished from trichas by those characters given by Ridgway (1902).

In wing length 22 male Yellowthroats, (collected in May and June) from Massachusetts (brachydactyla) that I examined range from 52.0 to 60.0 mm ($\bar{x} = 57.0$), whereas five males (1 collected in April, 3 in May, and 1 in June) from Washington D. C. (trichas) range from 51.0 to 56.0 mm ($\bar{x} = 54.2$). Nine males (taken in the months March through May) from the Bahamas range from 53.0 to 60.0 mm ($\bar{x} = 56.3$) and six of these fall within the zone of overlap between the Massachusetts and the D. C. samples. The yellow pigmentation on the venter tends to be brighter and more extensive in specimens from Massachusetts than in those from D. C.; the Bahaman specimens are more similar to the latter. Although the D. C. sample is quite small, my comparisons suggest that there is broad overlap chromatically and mensurally between brachydactyla and
trichas, and I follow Parkes (1954) and the American Ornithologists' Union (1957) in treating *G. t. brachydactyla* as a synonym of *G. t. trichas*.

**Wilsonia citrina** (Boddaert): Hooded Warbler.

*Records:* Acklins* (one seen on 11 March 1973), East Plana Cay in late October (C-F), Mayaguana* (one specimen collected and several others seen in a Black Mangrove swamp during the period 9-16 October 1976), Great Inagua on 29 November (Bond, 1974); in the Turks Islands on Grand Turk on 28 January 1961 (Schwartz and Klinikowski, 1963).

*Status:* Scarce winter visitor; uncommon transient.

**Setophaga ruticilla** (Linnaeus): American Redstart.


*Status:* Fairly common winter visitor. Extreme dates: 29 September (Great Inagua* 1976), 18 May (Great Inagua, CBC-1891).

*Remarks:* The subspecies *S. r. tricolora* (Muller) and *S. r. ruticilla* were listed as winter residents in the West Indies by Bond (1956), but Monroe (1968) presented evidence for placing *S. r. tricolora* in the synonymy of the nominate subspecies and for treating *T. ruticilla* as a monotypic species.

**Family COEREBIDAE**

**Honeycreepers**

**Coereba flaveola** (Linnaeus): Bananaquit.

Status: Common to abundant resident.

Variation: Specimens of *C. flaveola* from the Bahamas, *C. f. bahamensis* (Reichenbach), are larger in body size, and have a paler throat and less yellow on the venter (abdomen grayish white) than those from the Greater Antilles, including *C. f. sharpei* (Cory) in the Cayman Islands, *C. f. flaveola* (Linnaeus) on Jamaica, *C. f. bananivora* (Gmelin), on Hispaniola, *C. f. nectarea* Wetmore on Tortue, and *C. f. portoricensis* (Bryant) on Puerto Rico. I have not examined *C. f. nectarea* but Wetmore (1929a) indicated that specimens from Tortue have a darker throat and foreneck than do those from Hispaniola.

Individuals of *C. flaveola* from the northern Bahamas have, on the average, shorter bills than do those from the southern Bahamas; Figure 11 summarizes data on the length of exposed culmen in 90 males. Although there is no overlap in bill length between males from the Little Bahama Bank and those from the Caicos Bank, the measurements of males from geographically intermediate islands show that bill length increases clinally from north to south. Females average slightly smaller than do males in this character and show the same clinal variation; six females from New Providence average 13.5 mm in bill length and 13 females from the Caicos Bank average 14.8 mm in this character.
I found no appreciable geographic differences among these samples in pigmentation, wing length, or tail length. Wing length averages 64.3 mm in 19 males from New Providence and 63.7 mm in 10 males from the Caicos Bank. Six females from New Providence and 13 from the Caicos Bank average 62.0 mm and 61.5 mm, respectively, in this character. In tail length, 22 males from New Providence average 42.2 mm and eight males from the Caicos Bank average 42.5 mm; among females the means are 40.8 mm in seven specimens from New Providence and 39.9 mm in 13 specimens from the Caicos Bank.

Todd (in Todd and Worthington, 1911) indicated that the flesh around the gape is "whitish" in specimens from Great Inagua and red in those from New Providence. I do not have color notes on the soft parts of specimens that I collected in the southern Bahamas but can recall that many of these individuals had red pigmentation on the skin at the base of the bill; presently, pink coloration is barely evident in some of these study skins.

I do not find any differences among Bahaman populations of C. flaveola that I believe would justify the recognition of more than one subspecies in this region.

Family THRAUPIDAE
Tanagers

Spindalis zena (Linnaeus): Stripe-headed Tanager.

Records: Crooked*, Acklins, West Plana Cay, Mayaguana, Great Inagua, Little Inagua*; in the Caicos Islands on Providenciales*.

Status: Uncommon to locally common resident.
Remarks: I have discussed the distribution and taxonomic status of populations of this species elsewhere (Buden, in press)—Spindalis zena zena is present in the southern Bahamas as well as on the Great Bahama Bank. Other subspecies are S. z. townsendi Ridgway on the Little Bahama Bank, S. z. pretrei (Lesson) on Cuba and the Isle of Pines, S. z. salvini Cory on Grand Cayman, S. z. dominicensis (Bryant) on Hispaniola and Gonâve, S. z. portoricensis (Gryant) on Puerto Rico, S. z. nigricephala (Jameson) on Jamaica, and S. z. benedicti Ridgway on Cozumel Island.

Piranga olivacea (Gmelin): Scarlet Tanager.

Records: Grand Turk—reported within the period 13–19 May 1971 (Bond, 1971a).

Status: Brudenell-Bruce (1975) indicated that this species is occasionally found on New Providence during migration and Bond (1971b) stated that it is a rare transient in the West Indies generally.

Piranga rubra (Linnaeus): Summer Tanager.

Records: Mayaguana*—one male seen on 6 October 1976; in the Turks Islands on Grand Turk (ACW—sightings on 12 October 1975, and 18 September 1977).

Status: Probably scarce but regular fall transient.

Subspecies: Piranga rubra rubra.

Family Icteridae
Orioles and Allies

Molothrus ater (Boddaert): Brown-headed Cowbird.

Status: Vagrant (?); reported twice before in the Bahamas on New Providence (Brudenell-Bruce, 1975).

Icterus galbula (Linnaeus): Baltimore Oriole.

Records: Acklins*, Mayaguana*; in the Turks Islands on Grand Turk.

Status: Probably an uncommon transient. Fall dates: 6 October (Grand Turk ACW-1976) and on unspecified date(s) in October on Grand Turk (Bond, 1971a); Spring dates: 11 March (Acklins* 1973), 14 May (Mayaguana* 1972).

Dolichonyx oryzivorus (Linnaeus): Bobolink.

Records: Crooked*, Mayaguana*, Great Inagua; in the Turks Islands on Grand Turk.

Status: Apparently a fairly common fall transient— I observed flocks of up to 50 individuals nearly everyday on Mayaguana during the period 30 September to 19 October 1976, and Arthur C. Watson (pers. comm.) observed flocks on Grand Turk on 7 October 1976 and on 29 September 1977. Scarce in spring migration; reported on 3 May (Crooked* 1972) and 12 May (Great Inagua CBC-1891).

Family EMBERIZIDAE
Grosbeaks, Grassquits and Buntings

Pheucticus ludovicianus (Linnaeus): Rose-breasted Grosbeak.

Records: Crooked*, Mayaguana*, Great Inagua (BB,*); in the Caicos Islands on Providenciales* and North Caicos*; in the Turks Islands on Grand Turk (ACW,*).
Status: Uncommon winter visitor; somewhat more numerous as a
transient. Extreme dates: 5 October (Mayaguana* 1976), 15 May (Great
Inagua* 1972).

Guiraca caerulea (Linnaeus): Blue Grosbeak.

Records: Mayaguana* (one specimen collected on 30 September 1976,
many others seen during the first three weeks of October 1976); in the
Caicos Islands on Providenciales* (one seen on 30 March 1975).

Status: Probably a fairly common fall transient, but scarce during
spring migration. I do not know of any winter records of the Blue
Grosbeak in the southern Bahamas, but Bond (1971b) listed this species
as a rare transient and winter resident in the West Indies.

Subspecies: Guiraca caerulea caerulea (Linnaeus)

Passerina cyanea (Linnaeus): Indigo Bunting.

Records: Crooked*, Mayaguana*, Great Inagua; in the Caicos Islands
on Providenciales*, North Caicos*, and Middle Caicos*; in the Turks
Islands on Grand Turk.

Status: Uncommon to fairly common winter visitor, often abundant
during spring and fall migration. Extreme dates: 27 September (Grand
Turk ACW-1976), 8 June on Grand Turk (Bond, 1971a).

Loxigilla violacea (Linnaeus): Greater Antillean Bullfinch.

Records: Crooked*, Acklins, Mayaguana (?), Great Inagua, Little
Inagua*; in the Caicos Islands on North Caicos (?), Middle Caicos, and
East Caicos.

Status: L. violacea is a fairly common resident in dense scrub and
woodlands on most of the larger islands in the southern Bahamas, but its
distribution there is somewhat spotty.

Remarks on distribution: Cory (1892a) included Mayaguana among the
islands whence specimens of *L. violacea* had been taken by Winch in 1891.
Although most of Winch's (= also Cory's) southern Bahama material now is
at the Field Museum of Natural History, I did not find any specimens of
*L. violacea* from Mayaguana there, nor did I find any entries for such
specimens in the Field Museum catalog, or in Cory's personal catalog.
The collection and catalogs were reexamined for me by Dianne Maurer of
the Field Museum staff with similar results. Furthermore, I spent a
total of 29 days on Mayaguana (7-14 May 1972, 29 September-19 October
1976) without seeing a Bullfinch there, and Bartsch and his associates
apparently did not see any *L. violacea* during four days there in July
1930. In the absence of any substantial evidence proving that *L*
violacea inhabits, or did inhabit, Mayaguana I believe that reports of
its presence there should be treated as questionable.

Cory (1892b) also reported the presence of *L. violacea* on North,
Middle, and East Caicos Islands. I found only one specimen from the
Caicos Islands (no other locality given) in the Field Museum collection,
and only one FMNH specimen from these islands was listed by Hellmayr
(1938). I saw *L. violacea* frequently on Middle and East Caicos, but
did not see this species anywhere else on the Caicos Bank. *L. violacea*
was fairly common in dense scrub and woodlands on the west end of East
Caicos during my visits there in January 1972, and in February and March
1976, but I did not see any individuals at the more xeric and sparsely
vegetated eastern end (about 15 km away) during the period 30 March to
2 April 1978. The absence of *L. violacea* on the eastern end of East Caicos may be attributed to a lack of suitable habitat, or perhaps to recency of colonization from the west and insufficient time for spread to the eastern end. In view of the fact that *L. violacea* has been known from the Caicos Islands since the late 1800's, however, the latter possibility seems the less likely of the two.

That I did not see any Bullfinches during my 42 days on North Caicos, and that Mary H. Clench did not see any there during 10 days in February 1978, is particularly surprising because this inland is separated from Middle Caicos by a channel only several hundred to a thousand meters wide. The presence of *L. violacea* on North Caicos is expected on grounds of proximity to thriving populations and the availability of apparently suitable habitat, but in the absence of more conclusive documentation I treat Cory's record of the presence of this species there (Cory, 1892b) as a questionable one.

**Variation:** Bond (1956) recognized five subspecies of *Loxigilla violacea* as follows: *L. v. violacea* (Linnaeus) in the Bahamas, *L. v. ruficollis* (Gmelin) on Jamaica, *L. v. affinis* (Ridgway) on Hispaniola, as well as on Gonâve and Saona (islands off the western and southeastern coasts of Hispaniola, respectively), *L. v. maurella* Wetmore on Tortue (off the northern coast of Hispaniola), and *L. v. parishi* Wetmore on Ile-à-Vache, Beata, and Catalina (islands off the southwestern south-central, and southeastern coasts of Hispaniola, respectively). Schwartz and Klinikowski (1965) treated specimens from Catalina as members of the subspecies *L. v. affinis*, and Bond (1969) agreed with this change.
Also, Paynter (1970) assigned populations on Gonâve and Saona, in addition to the population on Tortue, to the subspecies *L. v. maurella*.

Subspecies of *L. violacea* are distinguished principally by slight differences in size (indicated mainly by wing and tail measurements) and slight differences in coloration. According to measurements given by Ridgway (1901) and Wetmore (1929b, 1931) a list of these subspecies in decreasing order of size reads *maurella*, *ruficollis*, *violacea*, *affinis*, and *parishi*. Except for a reversal in the order of the first two names, this sequence also would follow from the means of measurements I give in Figures 12 and 13. The ranges in variation among samples from the Bahamas and Hispaniola are given in Table 16; ranges for samples from the satellite islands off the coast of Hispaniola are in Table 17.

Specimens that I examined from Tortue (*maurella*) and Jamaica (*ruficollis*) are very similar in all mensural characters (Figure 12), however, in addition to their large size, adults of *L. v. ruficollis* are characterized by lustreless, gray-black coloration. Also, immatures of this subspecies are much darker (more olive and brown, less gray or white) than are those of any other population of *L. violacea*.

The three males from Tortue (*L. v. maurella*) that I examined are glossy black. These specimens have longer wings than do those from Hispaniola and its other satellite islands, as well as nearly all those from the Bahamas—one specimen from Cat Island is as large as the smallest specimen from Tortue. In tail length, bill length, bill width, and bill depth the Tortue material overlaps broadly with specimens from the Bahamas and Hispaniola. Bond (fide Paynter, 1970) indicated that specimens from Tortue, Gonâve, and Saona are indistinguishable from each
other; Paynter (1970) elected to include these three populations within the subspecies *L. v. maurella*. My samples from Gonâve, Catalina, and Saona, however, mensurally are near the upper extreme of the range of variation in the Hispaniolan sample; two of nine males from Gonâve are the only specimens in these samples that exceed the upper limit of the Hispaniolan sample in wing length, and by only one millimeter in each case. I include populations on these three islands within the range of *L. v. affinis*. Also, I include the population on Tortue in this subspecies, although a case could be made for maintaining *L. v. maurella* as a valid subspecies on the basis of longer wing length and larger body size (in study skins) in the few specimens available from Tortue.

*L. v. parishi*, which is known from Ile-à-Vache and Beata, supposedly is distinguished from all other populations of *L. violacea* by its smaller size (Wetmore, 1931). However, the ranges in wing length in six males from Ile-à-Vache and in four males from Beata are at the lower limits of the range of variation in 46 males from Hispaniola. In tail length, the range in four males from Ile-à-Vache also is bracketed by that of 46 males from Hispaniola, but the range in four males from Beata barely overlaps that of the Hispaniolan sample. In total length, bill length, bill width, and bill depth the Ile-à-Vache and Beata specimens both are within the range of variation of the Hispaniolan sample, and near the lower limits of those ranges. The one female from Ile-à-Vache, and the two from Beata that I examined correspondingly are similar to females from Hispaniola. I do not believe that the Ile-à-Vache population is sufficiently distinct from that of Hispaniola to warrant nomenclatorial recognition, and I treat *L. v. parishi* as a synonym of
L. v. affinis. Although individuals from Beata (at least males) tend to be smaller than those from Ile-à-Vache, I do not believe that differences between my samples from Hispaniola and Beata justify the proposal of a new subspecies name and I also include Beata within the range of L. v. affinis.

Samples from the Little Bahama Bank and Great Bahama Bank generally are similar to each other in mensuration although specimens from Cat Island tend to be slightly larger in wing and tail length than do those from elsewhere in the Bahamas (Figures 12 and 13). Among specimens from the southern Bahamas the small sample from Crooked-Acklins (three females) also is similar to those from the more northern islands. Individuals from the Caicos Bank, however, average smaller in wing length, tail length, total length, and bill width than do those of any other sample of two or more specimens (Figures 12 and 13). The small size of the Caicos specimens also is evident when their measurements are compared to those of the combined Bahaman samples and the Hispaniolan sample (Table 16). Specimens from the Great Inagua are intermediate in size between Caicos and the Great Bank samples; mensurally they are closer to specimens from Hispaniola (Figures 12 and 13). This variation among Bahaman samples is not clinal; individuals from the Little Bahama Bank, in the northernmost part of the archipelago, average about the same size as those from Inagua, whereas the largest birds are from Cat Island, near the middle of the island chain.

In coloration, specimens (particularly males) from Hispaniola tend to be darker (more black than gray) and more glossy than do those from
the Bahamas and the Caicos Islands. The immature individuals from the
Bahamas and the Caicos Islands tend to be paler (more white and gray,
less olivaceous) than those from Hispaniola, although one immature
specimen from Inagua resembles immatures from Haiti, and another from
Inagua is intermediate between Haitian and northern Bahaman specimens in
coloration. Also, two immature specimens from Beata are more similar
chromatically to those from the Bahamas than to those from Hispaniola.

The small size of individuals in the Caicos population may justify
nomenclatural recognition, but I do not believe it expedient to propose
a new subspecies name at this time. I treat all the Bahaman populations
of *Loxigilla violacea*, including those of the Caicos Islands, as members
of the nominate subspecies. Also, I retain the name *L. v. affinis* for
populations on Hispaniola and all of its satellite islands, but I do
so only on the most tenuous of grounds based mainly on slight differences
in coloration that are evident whenever series, but not necessarily
separate individuals, are compared to each other. *L. v. affinis*
typically is darker and glossier than *L. v. violacea*. Specimens from
the Caicos Islands mensurally are closer those from Hispaniola than to
those from the Bahamas, but chromatically they are much closer to the
latter.

I have considered the alternative of treating all *L. violacea* of
the Bahaman-Hispaniolan complex as members of the nominate subspecies
but in my opinion that treatment would be an oversimplication. In
coloration and body size (based on direct comparisons of study skins in
series) there is much consistency and uniformity among samples from the
Bahamas, albeit some slight local differentiation is evident. The extremely small size of Caicos birds is a notable exception.

Populations on Tortue, Gonâve, Ile-à-Vache, Beata, Catalina, and Saona, on the other hand, show much variation in size among themselves but in nearly all cases are within the range of variation of the Hispaniolan sample; the Tortue birds that I examined are slightly larger than any of those from Hispaniola and its other satellite islands, at least in wing length. Populations on all these satellite islands probably were derived by separate colonizations from adjacent regions of Hispaniola. The differences among these samples, as well as the lesser amount of variability within these satellite populations, probably can be attributed to a founder effect—I see no reason to have separate names for these slightly differentiated populations.

_Tiaris bicolor_ (Linnaeus): Black-faced Grassquit.

**Records:** Samana Cay*, Crooked, Fortune, Acklins, Castle, West Plana Cay, East Plana Cay, Mayaguana, Great Inagua, Little Inagua; in the Caicos Islands on West Caicos, Providenciales, Water Cay, Pine Cay, Parrot Cay, North Caicos, Middle Caicos, East Caicos, and South Caicos.

**Status:** Common resident on most islands, usually in scrub and along roadsides; notably absent from the Turks Bank.

**Variation:** There are no appreciable mensural differences among samples of _T. bicolor_ from the Bahamas (Table 18) and I found no consistent geographic differences in coloration among these samples. All Bahaman populations are included in the nominate subspecies, which is known to breed elsewhere only on the cays off the northern coast of Cuba. Other subspecies of _T. bicolor_ that are present in the Greater
Antilles are *T. b. marchii* (Baird) on Jamaica, Hispaniola, Gonâve, and Tortue, and *T. b. omissa* Jardine on Puerto Rico (and in the Lesser Antilles).

**Spiza americana** (Gmelin): Dickcissel.

**Records:** Great Inagua (Brudenell-Bruce, 1975); in the Turks Islands on Grand Turk in October (Bond, 1971).

**Status:** Scarce migrant (?).

**Ammodramus savannarum** (Gmelin): Grasshopper Sparrow.

**Records:** Crooked* (specimen collected 13 April 1972), East Plana Cay (October C-F).

**Status:** Probably an uncommon winter visitor and/or transient.

**Subspecies:** The specimen from Crooked Island (LSUMZ 71007) is within the range of variation of *A. s. pratensis* (Vieillot), which breeds in northeastern North America. Jamaica, Hispaniola, and Puerto Rico each have an endemic resident subspecies of *A. savannarum*.

**Zontrichia leucophrys** (Forster): White-crowned Sparrow.

**Records:** In the Caicos Islands on Middle Caicos* (immature specimen collected on 13 January 1972).

**Status:** Accidental(?). Brudenell-Bruce (1975) listed this species as a rare migrant on New Providence and Bond (1971b) noted that it is present occasionally in the northern Bahamas and on Cuba and Jamaica.

**Subspecies:** Presumably *Zonotrichia leucophrys leucophrys* (Forster), of eastern continental North America, which is the only subspecies of *Z. leucophrys* that has been reported from the West Indies.
Zonotrichia lincolnii (Audubon): Lincoln's Sparrow.

**Records:** Little Inagua* (specimens collected 9 April 1977).

**Status:** Accidental. Brudenell-Bruce (1975) listed this species as an occasional winter visitor in the northern Bahamas.

**Subspecies:** Only individuals of *Zonotrichia lincolnii lincolnii* (Audubon), from northern and eastern continental North America, have been reported from the West Indies (Bond, 1956); the specimen from Little Inagua falls within the range of variation of this subspecies.

Zonotrichia georgiana (Latham): Swamp Sparrow.

**Records:** Mayaguana on 10 April (*fide* Brudenell-Bruce, 1975).

**Remarks:** Vagrant (?).

**Subspecies:** Undetermined.

ANALYSIS OF THE AVIFAUNA

The Bahamas apparently never were connected to any other land mass and they were completely inundated, or nearly so, during the last Pleistocene sea level maximum (Schuchert, 1968); presumably the avifauna of these islands was derived via overwater dispersal from populations in the Antilles and on continental North America (Bond, 1948). Additional notes on the geological history and its probably effects upon the avifauna are treated in the introduction.

Rosen (1976) invoked a vicariance hypothesis to explain distributions of many invertebrates and vertebrates in the Caribbean. According to this hypothesis, which stems from the work of Croizat (1958), present-day distributions are largely a result of the subdivision of ancestral biotas brought about by historical changes in geography. I agree that vicariance may be a satisfactory explanation for the distribution of some
disparate populations in the Caribbean and outlying areas—see for example Buden and Felder (1977); but in the case of the avifauna of the southern Bahamas, a dispersal hypothesis provides a more plausible explanation of probable origins. Factors that favor a dispersal hypothesis in this case include (1) the vagility of birds, (2) the proximity of islands to potential sources of colonization, (3) the presence of deep channels between the southern Bahamas and adjacent land areas, and (4) a relatively recent avifauna as suggested by the paucity of endemics. A vicariant element, however, is present in the northern Bahamas where rising sea level during the Holocene transgression subdivided the Great Bahama Bank (including its fauna) and formed the present-day islands there. How the preceding factors relate to the distribution of birds in the southern Bahamas is discussed in this analysis.

Probable origins of the Bahama avifauna were first discussed by Chapman (1891). Although many of the Bahama Islands were unexplored at that time and the distributions of many of the birds were than largely unknown, Chapman's general conclusions are still valid. He pointed out: (1) that relatively few of the resident land birds in the Bahamas have been derived from populations in continental North America; (2) that most species of birds in the Bahamas are of relatively recent origin from Antillean populations; and that (3) Cuba has been the source of the greatest number of these species.

Riley (1905a) supported Chapman's conclusions, adding that there were differences in the composition of the avifauna between the northern and southern Bahamas, but he did not discuss these differences. Todd
(in Todd and Worthington, 1911) stated that the avifauna of the northern Bahamas resembles that of Cuba more closely than it does that of the southern Bahamas. This statement is true when the species shared only between Cuba and the Bahamas are compared; overall, however, the southern Bahama avifauna generally is similar to that of the northern islands—the southern avifauna differs in lacking many of the species that are shared by Cuba and the northern islands and in having two species characteristic of the Cuban fauna that do not occur in the northern islands. These distribution patterns are discussed at great length in the succeeding sections.

The relatively large number of species shared by Cuba and the northern Bahamas led Todd (in Todd and Worthington, 1911) also to suggest that many of the widely distributed species in the Bahamas may have first colonized the northern islands, then spread into the southern part of the archipelago. This is a likely route of dispersal, but in view of the ubiquity of many of these species, and the presence of only slight morphological variation among members of many of these populations, the possibility that the Bahamas may also have been colonized from one or more of the other Antillean islands, or from Cuba via the southern Bahamas, cannot be dismissed.

No other ornithogeographic analysis of the Bahamas has been published, although Bond (1934, 1948, 1963a, 1974, 1978b) has remarked on the distributions of some Bahaman species in his discussions of the derivations of the Antillean avifauna. In view of the additional information now available on distribution and variation in Bahaman birds, a re-examination of this avifauna seems timely.
I have listed 88 species of birds known to breed in the Bahamas (Table 19); other species, may breed there, but in the absence of documentation they have not been included—introduced species also have been excluded. In addition to references cited in the introduction, principal sources of information on the breeding status of Bahaman populations include Allen (1905), Bonhote (1903b), Bryant (1859), Emlen (1977), and Northrop (1891). Sources of breeding data on these 88 species outside of the Bahamas include Robertson and Kushlan (1974) and Stevenson (1976) for Florida; Garrido and García Montaña (1975) for Cuba; Wetmore and Swales (1931), Schwartz and Klinikowski (1965), and Dod (1978) for Hispaniola; Lack (1976) for Jamaica; and Wetmore (1927) and Philibosian and Yntema (1977) for Puerto Rico. Forty one (46.6%) of the 88 species are land birds, excluding raptors; six are raptors and the other 41 (46.6%) are treated categorically as water birds—see materials and methods section for definitions of these group names.

The Bahaman avifauna is predominately a subset of that of the Greater Antilles. Forty-eight (54.5%) of the 88 species that breed in the Bahamas also breed on each of the four major islands in the Greater Antilles (Cuba, Jamaica, Hispaniola, Puerto Rico), and many of these nest in continental North America as well (Table 19). I have included Anas bahamensis, Fulica americana, Charadrius alexandrinus, and Sterna sandvicensis in this list, although there is some question concerning their breeding status on one or two islands in the Antilles. Seven additional species are absent from only one of the four major Greater Antillean islands (Table 20). Eight other species (none of which is
truly a land bird) have a somewhat spotty distribution in the Caribbean, but are fairly widely distributed in tropical or temperate America; they are *Puffinus lherminieri*, *Sula dactylatra*, *Sula leucogaster*, *Ajaia ajaja*, *Phoenicopterus ruber*, *Pandion haliaetus*, *Gelochelidon nilotica*, and *Sterna hirundo*. The widespread distribution of these 63 species (71.6% of the breeding bird fauna) hinders any attempt to discover the most probable routes by which they invaded and colonized the Bahamas, particularly with regard to those species that show little or no geographic variation in morphology. Patterns of distribution are evident, however; among some of these examples at the subspecies level and these are discussed in the geographic comparisons that follow; recent range expansions also provide clues to routes of dispersal and colonization.

Cuba and the Bahamas

Nine of the 88 species of birds that breed in the Bahamas also occur on Cuba but not on any of the other major islands in the Greater Antilles (Table 21). Of these only *Phalacrocorax olivaceus* (Double-crested Cormorant) is not a land bird. This species also occurs in Mexico, Central America, and South America. *Melanerpes superciliaris* and *Myiarchus sagrae* also occur in the Cayman Islands; *Tyrannus cubensis*, which probably has been extirpated in the southern Bahamas, has been recorded once on Mujeres Island, off the Yucatan Peninsula. The other five species are not known outside of Cuba and the Bahamas.

Examples of subspecies that are found in Cuba and the Bahamas, but not on Jamaica, Hispaniola, or Puerto Rico, are *Buteo jamaicensis solitudinis*, *Pandion haliaetus ridgwayi*, *Falco sparverius sparverioides*
(but see species account), *Coccyzus minor maynardi*, *Mimus gundlachii gundlachii*, *Vireo altiloquus barbatulus*, *Denroica petechia gundlachi* and *Tiaris bicolor bicolor*. Of these, *C. m. maynardi*, *V. a. barbatulus*, and *D. p. gundlachi* also breed in the southeastern United States; *V. a. barbatulus* occurs regularly along the Gulf Coast at least as far west as Louisiana (Lowery, 1974), but the others are confined to southern Florida. The relatively recent expansion of these three subspecies northward from the Florida Keys suggests that the continental populations were derived from Antillean or Bahaman populations and not vice versa.

Both *M. g. gundlachii* and *T. b. bicolor* are largely restricted in Cuba to cays off the northern coast—Cuban populations of these two species may be of recent origin from the Bahamas, they may represent the full extent of the colonization of Cuba by these species, or they may be relicts of populations that were more widespread on the Cuban mainland in the past.

Excluding *M. gundlachii* and *T. bicolor*, which may have invaded Cuba from the Bahamas, at least 15 (17.2%) of the species of birds that breed in the Bahamas probably were derived from Cuba. Thirteen of these are land birds (Falconiformes and Columbiformes through Passeriformes) comprising 28.3 percent of the species of land birds in the Bahamas; they are almost evenly distributed between nonpasserines (7) and passerines (6). These figures are based mainly on the number of taxa shared exclusively by Cuba and the Bahamas; the true figures almost certainly are much greater because many of the more widespread species and subspecies also probably colonized the Bahamas from Cuba.
Hispaniola and the Bahamas

No species of bird is shared exclusively by Hispaniola and the Bahamas, and all the subspecies that they share are also found on Cuba. In view of the present distribution of some species, however, Hispaniola is the nearest potential source of the Bahaman populations. Coereba flaveola, Loxigilla violacea, and Tiaris bicolor fall into this category, the latter only marginally so because it breeds locally in northern Cuba. C. flaveola occasionally has been taken in Cuba but is not known to breed there; Loxigilla violacea has never been recorded from Cuba.

The proximity of present-day populations to each other, however, does not necessarily indicate the most probable colonization routes. In Coereba flaveola, for example, morphological evidence suggests that Bahaman populations were derived from a source other than Hispaniola. Bahaman individuals are much more similar to the relatively large, pale-throated birds found on the Cayman Islands and on the islands of the western Caribbean, than they are to the relatively small, dark-throated individuals on Hispaniola and the islands to the east and south. Bahaman populations of C. flaveola probably were derived from the west, but whether Cuba ever was inhabited by this species and used as a "stepping stone" to the Bahamas is unknown.

Populations of T. bicolor and L. violacea probably differentiated to the subspecific level in the Bahamas following colonization from their parent stock, but there is little evidence, aside from geographic proximity, that these species colonized the Bahamas from Hispaniola.
Loxigilla violacea bahamensis is barely separable, however, from L. v. affinis of Hispaniola; morphological differences between locally differentiated populations within each of these two subspecies are not so great as those between some local populations within the same subspecies (see species account).

Bond (1948) stated that there is no conclusive evidence to support a claim for Hispaniolan origin of any species of bird resident in the Bahamas; my own findings support this statement. He also suggested (Bond, 1939) that populations of L. violacea and T. bicolor in the Bahamas might have been derived from Cuban populations that have since become extirpated. This may indeed be the case, but as yet there is no evidence to support this hypothesis.

Derivation from a now-extirpated population could also explain the distribution of Margarops fuscatus in the Bahamas. The species is common in the Lesser Antilles, in Puerto Rico, and on many islands in the southern Bahamas. It is not present on Hispaniola, but it is common on Beata, a small islet only 4 km off the southern coast of Hispaniola. Whether Bahaman populations of M. fuscatus were derived directly from Puerto Rico, from populations now extirpated on Hispaniola, or from elsewhere in the Antilles is unknown.

Postulates of an Hispaniolan origin for birds in the southern Bahamas are largely a matter of conjecture, but the bat fauna of these islands, which presumably was derived in the same manner as the avifauna (i.e., via active, over-water dispersal) has elements in it that lend support to a proposed Hispaniola-southern Bahamas colonization route for some birds. There are at least two species of bats in the southern
Bahamas that almost certainly were derived from populations on Hispaniola and not from Cuba. In the case of *Macrotus waterhousii*, the nominate subspecies appears to have colonized the northern Bahamas via Cuba, whereas *M. w. jamaicensis* appears to have invaded the southern Bahamas via Jamaica and Hispaniola (Buden, 1975b). In the other example, it is the Hispaniolan rather than the Cuban subspecies of *Brachyphylla cavernarum* (sensu Buden, 1977) that is found in the Bahamas (Buden, 1977).

**Puerto Rico and the Bahamas**

No species or subspecies of birds, other than *Margarops f. fuscatus*, are shared by the Bahamas and Puerto Rico, but none of the other large islands in the Greater Antilles.

**Jamaica and the Bahamas**

No species or subspecies of bird is shared exclusively by Jamaica and the Bahamas. However, *Mimus gundlachii*, which is present in south-central Jamaica and throughout the Bahamas, resides elsewhere only on cays off the northern coast of Cuba. Bond (1963) indicated that *M. gundlachii* is..."closely related to *M. saturninus* and *M. longicaudatus* of South America but was probably derived from Central America at a time when a member of this group occurred there." However, there is not enough available information to propose any likely dispersal route to the Bahamas for this species.

**Continental North America and the Bahamas**

At least four species that breed in Florida (and throughout much of eastern North America) also breed in the Bahamas but nowhere else in the West Indies; they are *Dendrocoptes villosus, Sitta pusilla, Polioptila*
caerulea, and Dendroica dominica. Two others nearly fall into this category, but each of them also has an endemic subspecies on one of the main islands in the Antilles: Dendroica pinus inhabits pinewoods in the northern Bahamas as well as in Hispaniola, and Agelaius phoeniceus is present in freshwater marshes in the northernmost Bahamas and in western Cuba. On geographic grounds, Bahaman populations of D. pinus and A. phoeniceus most likely originated directly from the North American continent rather than by way of the Greater Antilles. However, since at least 28 percent of the land birds in the Bahamas have their closest taxonomic affinities with populations in Cuba, and probably were derived from that island, the possibility that Bahaman populations of A. phoeniceus were derived from the continent via Cuba should not be discounted completely.

Haematopus palliatus is another species in the Bahamas that probably was derived from continental populations. It is fairly common along the southeastern coast of North America and in the Bahamas, but elsewhere in the West Indies it is known to breed only in the Virgin Islands and in the Grenadines.

Subspecies uniquely shared by eastern North America and the Bahamas, are Podilymbus podiceps podiceps, Oxyura jamaicensis rubida, Tyto alba pratincola, and Chordeiles gundlachii vicinus. Florida populations of C. gundlachii are largely confined to the Florida Keys and presumably were derived from the West Indies relatively recently (Robertson, and Kushlan, 1974); Bahaman populations of this species likely were derived from the Antilles. Bahaman populations of P. podiceps, O. jamaicensis,
and *T. alba* presumably were derived from North America where they are fairly common and widespread.

*Speotyto cunicularia flordana* is resident in Florida and the Bahamas, but populations of Burrowing Owls recently discovered in Cuba may also belong to this subspecies (Garrido and Garcia Montaña, 1975). Burrowing Owls are known elsewhere in the West Indies only on Hispaniola (*S. c. troglodytes*); several different subspecies occur from western North America to southern South America. Whether the colonization of the Caribbean islands and Florida by *S. cunicularia* was from the Antilles northward through the Bahamas thence to Florida as hypothesized by Riley (1905a), or from Florida southward to the Antilles, or via some other route is a moot point with no evidence heavily in favor of one alternative over the other.

**Birds Endemic to the Bahamas**

Only three of the 88 species of birds that breed in the Bahamas are endemic there. One of these, *Geothlypis rostrata* (Bahama Yellowthroat) probably is no more than subspecifically distinct from *G. trichas* of continental North America as suggested by Phillips (1961). According to Schwartz (1970), however, there are four subspecies of *G. rostrata*: *G. r. tanneri* on the Little Bank, *G. r. ignota* on Andros, *G. r. rostrata* on New Providence, and *G. r. coryi* on Eleuthera and Cat islands.

*Callichelidon cyaneoviridis* (Bahama Swallow) is the only member of an endemic genus in the Bahamas; however, Bond (1977) placed *Callichelidon* in *Tachycineta*, a genus widespread in the New World.

*Philodice evelynae* (Bahama Woodstar) is the only endemic Bahaman species that is present in the southern islands; the only other member
of this genus is *P. bryanti* of Central America. The subspecies *P. e. evelynae* is found throughout the archipelago except on Great and Little Inagua islands, which are inhabited by the very distinctive subspecies, *P. e. lyura*.

The three endemic species comprise 6.5 percent of the Bahaman land bird fauna (including raptors). Nineteen other species (17 land birds), however, have one or more endemic subspecies in the Bahamas; thus 43.5 percent of the species of land birds in the Bahamas are endemic there or have subspecies that are endemic there. Of the 28 subspecies of land birds endemic to the Bahamas (Table 22), 20 are found only in the northern islands, 6 are found both in northern and southern islands, and one each is found on San Salvador and in the southern Bahamas.

Other species may have differentiated to the subspecies level in the Bahamas and later expanded their range (or were introduced elsewhere) out of the archipelago; *Columbina passerina bahamensis*, which is found elsewhere only in Bermuda, and *Tiaris bicolor bicolor*, which breeds outside of the Bahamas only locally in northern Cuba, are examples. Also in this category is *Chordeiles gundlachii vicinus*, which is a fairly common breeding bird throughout the Bahamas and has colonized the Florida Keys—apparently within the past several decades (Robertson and Kushlan, 1974). Furthermore, in the species accounts I have indicated that populations of *Vireo crassirostris* in the Cayman Islands may be subspecifically distinct from Bahaman populations, in which case *V. c. crassirostris* would be another Bahaman endemic. In all, about 50 percent of the indigenous land birds in the Bahamas appear to have differentiated there at least to the subspecies level, and more than half of these are
confined to the northern part of the archipelago. The low level of endemism in the southern islands is discussed in greater detail in the section on distribution patterns.

Intra-Bahaman Distributions

According to the equilibrium model of island biogeography (MacArthur and Wilson, 1963, 1967) island faunas are maintained by a balance between extinctions and colonizations in a relationship dependent mainly on island size and distance from potential colonists. Small islands are expected to have fewer species than larger ones, and small islands that are relatively close to sources of potential colonists are expected to have a higher turnover rate (i.e., a large number of extinctions balanced by an equally large number of colonizations) than do larger and/or more distant islands. The equilibrium theory, and its permutations, particularly in reference to avian distribution patterns, have been reviewed by Simberloff (1974) Diamond (1976), and Schoener (1976); many references in support of this theory are included in these accounts.

In many of the biogeographic studies of the past decade, island size generally has been considered the single best predictor of species richness—Schoener (1976) stated that "one of community ecology's few genuine laws is the regular increase of species number with increasing area." Data in Table 23, however, indicate that island size per se does not account for many of the differences in numbers of species of birds on islands in the Bahamas. In comparisons involving the families listed in Table 23, Andros, the largest island in the archipelago, has the same number of species as New Providence, one of the smallest islands in
the archipelago. Great Inagua has fewer species than New Providence but is about eight times larger than the latter. One possible explanation, for these anomalies is that islands on the Great Bank may have retained much of a relatively large and diversified avifauna from a time when the Great Bank was emergent probably as a one island. Rand (1969) and Williams (1969) indicated that differences in the number of species of anoline lizards between the islands of the Great Bahama Bank and those in the southern part of the chain probably developed in this manner. This explanation, however, only partially accounts for variation in bird species numbers among the Bahamas; it does not account for a relatively low number of species on Long Island at the south end of the Great Bank, nor for relatively greater number of species on the Little Bank, which is considerably smaller than the Great Bank.

Simberloff (1974) indicated that the effectiveness of area as a predictor of variation in species number "decreases markedly as better indicators of habitat diversity are used." Abbott (1974), for example, found that numbers of plant species accounted for about 70 percent of the variation in bird species numbers among 19 islands in the southern hemisphere, whereas area accounted for only 15 percent. Habitat was found the best predictor of the number of bird species on the California Islands (Power, 1972) and on montane "islands" in the Great Basin (Johnson, 1975). Also, Lack (1975) emphasized the importance of habitat (in his concept of "ecological impoverishment") in determining the number and kinds of birds on Jamaica and other islands in the West Indies.

According to Terborgh (1973), fortuitous effects of colonizations and extinctions, along with island position in reference to the source of
potential immigrants, accounted for the variation in bird species number among small islands (<160 mi²) in the northern Lesser Antilles; he stated that "it is difficult to single out any particular instance in which a species' occurrence seems plausibly to be limited by habitat." Terborgh et al. (1978) pointed out that the same species of birds had colonized both high, wet islands and low, dry islands in this region of the West Indies. Johnston (1975) suggested that fortuitous effects of colonization also accounted for the interrupted distributions in 12 of 28 species of land birds in the Cayman Islands, and Paulson (1966) indicated that the Bahaman avifauna probably is one of constantly fluctuating populations with local extinctions being countered by fortuitous recolonizations from surrounding islands.

I do not doubt that chance effects contribute to the distributions of birds in the Bahamas, but only as one factor of many, including island size, proximity to potential colonists, dispersal abilities, habitat availability, and competition. A review of the distributions of birds in the Bahamas indicates that, somewhat contrary to the findings of Terborgh (1973) for the Lesser Antillean avifauna, habitat effects in the Bahamas are particularly important. Additional information on ecological requirements of Bahaman birds, along with more detailed phytological data, however, are needed before all these parameters can be partitioned for each species. Nevertheless, distribution patterns of birds in the Bahamas reveal that most of these factors act in concert, and that the importance of each one varies both among islands and among species.

Birds of the northern islands.—Twenty of the 88 species that breed
in the Bahamas do not occur south of the Crooked Island Passage (Table 24); fifteen of 46 species (32.6%) of land birds (including raptors) are in this group. Eight of these land birds inhabit primarily pinewoods, at least during the breeding season, and their absence in the southern islands may be attributed largely to a scarcity of suitable habitat there; the sparse, scrubby pinewoods on the Caicos Islands are inhabited only by species of birds that occur in scrublands elsewhere on the bank. Among the species that inhabit the pinewoods of the northern Bahamas are *Dendrocopos villosus* (Hairy Woodpecker), *Tyrannus caudifasciatus* (Loggerhead Flycatcher), *Contopus caribaeus* (Greater Antillean Peewee) *Callichelidon cyaneoviridis* (Bahama Swallow), *Sitta pusilla* (Brown-headed Nuthatch), *Dendroica dominica* (Yellow-throated Warbler), *D. pityophila* (Olive-capped Warbler), and *D. pinus* (Pine Warbler).

None of the Bahaman populations of these species is known to breed outside of the region of the main pine-clad islands in the northern Bahamas (Grand Bahama, Abaco, Andros, and New Providence), although *Contopus caribaeus* has been reported from Eleuthera and Cat islands (Brudenell-Bruce, 1975). Not all of these species, however, are found on each of these northernmost islands—the presence of *Sitta pusilla* only on Grand Bahama and of *Dendroica dominica* and *D. pityophila* only on the Little Bank islands (Grand Bahama and Abaco) suggests that factors other than habitat differences have affected these distributions. *Sitta pusilla* and *D. dominica* may show a position effect in that they occupy the islands that are closest to their presumed source on the continent. However, the absence of *D. pityophila* on New Providence and especially on Andros, the largest island in the Bahamas, is somewhat surprising because
both islands are geographically intermediate between present populations on the Little Bahama Bank and Cuba, the presumed source of these populations. Perhaps *D. pityophila* once inhabited the Great Bank but has been extirpated there.

The possibility that the Little Bank may have been a refugium during periods of high sea level is at least suggested by the presence of an endemic species of boa there, *Epicrates exsul*. Phylogenetically and geographically the closest relative of this species is *E. gracilis* on Hispaniola, but *E. exsul* is well differentiated from its presumed immediate relatives suggesting a relatively long history in isolation (Schwartz, 1968).

The distribution of *Chlorostilbon ricordii* in the Bahamas also is limited to the northern pine-forest islands but the species is not limited to pinewoods habitats. Bond (1971b) indicated that *C. ricordii* inhabits woodlands and copses throughout its range, Garrido and Garcia Montaño (1975) stated that this species inhabits woodlands and gardens in Cuba, and Todd (1916) stated that, with the exception of swamps, the Cuban Emerald occurs almost everywhere on the Isle of Pines. One possible explanation for the absence of *C. ricordii* in the central and southern Bahamas, is that habitat diversity on these islands is not great enough to support more than one species of hummingbird, and *C. ricordii* is excluded or replaced there by *Philodice evelynae*, which is found throughout the Bahamas even on small sparsely vegetated cays.

A scarcity of freshwater marshes in the southern part of the archipelago may be a major factor contributing to the absence of both *Ixobrychus exilis* (Least Bittern) and *Agelaius phoeniceus* (Red-winged
Blackbird) there. The former has somewhat skulking habits, however, and its absence on some of the larger islands in the southern Bahamas (i.e., Crooked-Acklins and Great Inagua) may be an artifact of relatively little field work in this region.

No woodpeckers are resident in the southern Bahamas, but two species nest on some of the northern islands. *Dendrocopus villosus* (Hairy Woodpecker) is included in the list of species associated with pine woods. *Melanerpes superciliaris* (West Indian Red-bellied Woodpecker), on the other hand, has a predilection for palm groves and mesic woodlands, which also are scarce in the southern islands. *Melanerpes superciliaris* has a relictual distribution in the Bahamas; it is present on the Little Bahama Bank and on San Salvador but presently is not found on the Great Bank, although skeletal remains have been taken there on Great Exuma (Wetmore, 1937) and on New Providence (Brodkorb, 1959). In all probability *M. superciliaris* reached San Salvador from the Great Bank across a water barrier of about 50 to 75 km; Rum Cay may have been a stepping stone, although woodpeckers presently are not known from that island.

Johnston (1975) stated that island size and habitat diversity are important factors limiting the distribution of timber-probing species of woodpeckers, and data from Terborgh (1973) indicate that most of the Bahamas have far less than the minimum area expected to support at least one species of woodpecker. Yet woodpeckers do occur on many small islands in the Bahamas and Antilles. An endemic subspecies of *M. superciliaris* is present on the Cayos San Felipe between "mainland" Cuba and the Isle of Pines (Garrido, 1972). These islands are even smaller
than the Turks Bank islands. Furthermore, Grand Cayman, with a total land area of 185 km\(^2\) is smaller than many islands in the Bahamas that lack woodpeckers, but it supports two species, including an endemic subspecies of *M. superciliaris*. Grand Cayman also is geographically more distant from potential colonists than are many of the Bahamas.

Small island size and the lack or scarcity of suitable habitat in the Bahamas may be limiting factors, but I do not know of any feature of the vegetation of San Salvador that would account for the presence of *M. superciliaris* there and its absence on some of the larger islands in the southern part of the chain. An ecological study of *M. superciliaris* on San Salvador by J. Robert Miller is in progress and may provide additional data on the habitat preferences and requirements of this species.

The absence of *Mimocichla plumbea* (Red-legged Thrush) in the southern Bahamas can be accounted for by differences in habitat between the northern and southern Bahamas and by the effects of competition. The Red-legged Thrush inhabits mesic woodlands and dense thickets in the northern Bahamas. Vegetation generally is more xeromorphic in the southern islands, and regions that might support *M. plumbea* there are occupied by *Mimus gundlachii* (Bahama Mockingbird) and *Margarops fuscatus* (Pearly-eyed Thrasher). Both of these mimids are approximately the same size as *M. plumbea*, both feed on fruits and insects, and both frequently forage in leaf litter as do individuals of *M. plumbea* (Brudenell-Bruce, 1975; Todd and Worthington, 1911; Buden, pers. obs.). The Bahama Mockingbird is sympatric, but generally not syntopic, with *M. plumbea* on many of the northern islands; the former usually is found in scrub,
whereas the latter typically inhabits woodlands. On the other hand
the ranges of Mimocichla plumbea and Margarops fuscatus scarcely overlap
in the Bahamas; both species have been recorded from Eleuthera, Cat
Island, and the Exumas, but their present status on some of these islands
is not known. Margarops fuscatus appears to be expanding its range
northward in the Bahamas (Robertson, 1962; Paulson, 1966) and may be
displacing or replacing Mimocichla plumbea in the process. Paulson
(1966) cited relatively recent records for the Pearly-eyed Thrasher on
Eleuthera and Cat islands, but indicated that the Red-legged Thrush had
not been seen there in recent years.

Three relatively large raptors are resident the Bahamas and two of
these (Cathartes aura, Turkey Vulture, and Buteo jamaicensis, Red-tailed
Hawk) apparently breed only in the northern part of the archipelago.
Small island size and a limited food supply may be the main reasons why
these species do not nest in the southern part of the chain.

In the case of Buteo jamaicensis, persecution by man along with
small island size and its consequent limitation on breeding sites and
food supply probably inhibit the colonization of this species in the
southern Bahamas. Chickens are an important commodity for the Bahama
populace, particularly in the southern islands, which lack many of the
amenities of daily life such as well-stocked grocery stores that can be
found in the economically better-developed islands farther north. Large
hawks other than ospreys are treated as a potential threat to this
livestock and are shot whenever the opportunity is available. In the
Bahamas the name chicken-hawk frequently is used for any of several species
of large hawks.
Pandion haliaetus (Osprey), the only other large hawk resident in the Bahamas, feeds almost exclusively on marine fishes, a readily available resource. The Osprey is a common resident throughout the archipelago and nests on even the most barren cays.

Factors that contribute to the limitation of the ranges of the five remaining species in this northern group generally are more difficult to assess. Saurothera merlini (Great Lizard Cuckoo) is found in extremely dense thickets and woodlands in the northern tier of islands on the Great Bank (on Andros, New Providence, and Eleuthera). Bahaman populations of this species may have been derived from Cuba during a period of low sea level when the water gap between these two regions was much narrower than it is now. Saurothera merlini may have been more widely distributed over the Great Bank, but probably never became established on the Little Bank Islands. Following a rise in sea level and subsequent "fragmentation" of the Great Bank into many smaller islands, S. merlini may have found conditions suitable only in the more dense and somewhat more mesophytic woodlands in the extreme northern part of its range. Sedentary habits also may contribute to the presence of this species in the Bahamas on only a few islands.

Geothlypis rostrata (Bahama Yellowthroat) also inhabits dense thickets and woodlands frequented by S. merlini, but the former is more tolerant of drier and more open areas and has a much broader distribution in the Bahamas; G. rostrata is found on the Little and Great banks southward at least to Cat Island. Its absence at the southern end of the Great Bank on Long Island (except perhaps as a vagrant—see species account), the Exumas, and in the southern Bahamas, may be attributed to
differences in habitat perhaps associated with north-south gradients in temperature and precipitation (Table 1). Another possibility is that this species is still expanding its range southward through the Bahams and has not yet reach the southern half of the archipelago. However, if \textit{G. rostrata} has been in the Bahamas long enough to differentiate into four subspecies (\textit{fide} Schwartz 1970), it probably has had sufficient time to disperse into the southernmost islands.

I am unable to suggest any reasons for the limited distribution of \textit{Icterus dominicensis} in the Bahamas. This species inhabits all of the major islands in the Greater Antilles but in the Bahamas is found only on Andros and Abaco. Nor can I provide any satisfactory explanation for the absence of the two sea birds \textit{Sula dactylatra} (Blue-faced Booby) and \textit{Phalacrocorax auritus} (Double-crested Cormorant) in the southernmost Bahamas. The former species is widely distributed in tropical seas but is known to breed in the Bahamas only on Santo Domingo Cay, a remote islet at the southern end of the Great Bank. This species characteristically breeds on particularly remote islands (Nelson, 1978), but there are many far-flung islands in the Bahamas where this species apparently does not breed. \textit{Phalacrocorax auritus}, on the other hand, is found along the coast of Cuba and in the northern Bahamas, but is present only as a vagrant elsewhere in the West Indies (Bond, 1971b).

**Birds of the southern islands.**—Only five of the 88 species that breed in the Bahamas either do not occur in the northern islands or barely extend into this region (Table 24). \textit{Charadrius vociferus ternominatus} and \textit{Zenaida asiatica} are both fairly common in the southern Bahamas; they have been reported from the northern islands occasionally,
but their status there is unknown. An increase in the number of sightings of *Z. asiatica* in the Bahamas over the past several years suggests that this species may be expanding its range northward through the archipelago. Recent discoveries of resident populations of *Falco sparverius* (American Kestrel) on Rum Cay, Crooked Island, and in the Turks and Caicos Islands suggest that this species, too, may be undergoing a range expansion.

Two species show a reduction of their range in the southern Bahamas and one of these, *Tyrannus cubensis* (Giant Kingbird), probably has been extirpated there (see species account). The Giant Kingbird, is resident elsewhere only in fairly high elevation forests on Cuba and the Isle of Pines (Bond, 1971b; Garrido and Garcia Montaña, 1975). Birds of the high forests in the Antilles are not, for the most part, a part of the Bahamas avifauna, and *T. cubensis* may have been represented on Inagua and the Caicos Bank by fortuitous and short-lived populations.

*Corvus nasicus* (Cuban Crow) is another member of the Cuban avifauna with an outlying population in the southern Bahamas. Presently it occurs there only in the northwestern section of the Caicos Bank, but this species may have had a wider distribution in the Bahamas as indicated by bone fragments from Great Exuma (Wetmore, 1937) and Crooked Island (Wetmore, 1938).

The absence of this species on Great Inagua is somewhat surprising because this island is nearly midway between Cuba and the Caicos Bank, and apparently has suitable habitat. Great Inagua, however, supports a fairly large population of parrots and may lack the size or ecological diversity necessary to support two species of fairly large, similarly sized, frugivorous birds.
The distribution of *Phalacrocorax olivaceus* in the Bahamas is nearly limited to the southern part of the archipelago where it is found on Great Inagua; however, this species is sympatric with the Double-crested Cormorant (*P. auritus*) on San Salvador. I cannot provide any explanation for the absence of *P. olivaceus* on other islands where apparently suitable habitat, i.e., mangrove bordered ponds and lakes, are found. Perhaps this absence is an artifact of incomplete surveys of potential nesting sites.

**Patterns of Distribution in the Southern Bahamas**

The effects of habitat availability on the distribution of birds in the southern Bahamas are particularly apparent on the Caicos Bank. Vegetation on most islands there is mainly xerophytic scrub, but the vegetation on the northwestern section of the bank is much more mesophytic; woodlands are especially well-developed on North Caicos. *Geotrygon chrysea* (Key West Quail-Dove), *Corvus nasicus* (Cuban Crow), and *Margarops fuscatus* (Pearly-eyed Thrasher) breed there, but except for an occasional vagrant *C. nasicus*, they do not occur elsewhere on the bank. The northwestern section of the Caicos Bank constitutes the entire known present range of *C. nasicus* in the Bahamas and is the only place in the southern Bahamas from which *G. chrysea* has been recorded.

*Margarops fuscatus*, on the other hand, is widely distributed in the southern Bahamas, but usually is found mainly in the vicinity of gardens or in patches of woodland within the scrub. On Little Inagua, for example, I saw many Pearly-eyed Thrashers in the immediate vicinity of the sinkholes that contain the Royal Palms, fewer individuals in a narrow strip of xeromorphic woods between the beach and interior plateau, and
none in the relatively sparse scrub on the plateau. This species is sympatric with two other mimids on most of the larger islands in the southern Bahamas; *Mimus polyglottos* (Northern Mockingbird) is usually found in sparse coastal scrub and in the vicinity of settlements, whereas *Mimus gundlachii* (Bahama Mockingbird) usually inhabits dense scrub and thickets. This ecological segregation by habitat is not absolute— *Mimus gundlachii*, for example, frequently overlaps broadly with *Margarops fuscatus* in woodlands and with *Mimus polyglottos* in more open habitats, and all three species sometimes occur in settlements.

Islands of the Caicos Bank would lend themselves particularly well to a study of habitat utilization by and interaction among these three confamilial species. Many different combinations of sympatry or allopatry can be found on this relatively small bank and most of the islands can be reached easily. All three species are present in the northwestern section of North Caicos where *Margarops fuscatus* is dominant and *Mimus polyglottos* is the least common species. *Mimus polyglottos*, however, is abundant on South Caicos where *M. gundlachii* is scarce and *Margarops fuscatus* does not occur. *Margarops fuscatus* has not been reported on Providenciales, but both *Mimus polyglottos* and *M. gundlachii* are common there, and *Mimus gundlachii* appears to be the only mimid resident on West Caicos.

Although *Margarops fuscatus* is found on most of the larger islands in the southern Bahamas it is not found on Mayaguana where seemingly suitable habitat is present, at least in small amounts. Perhaps the amount of habitat available is insufficient, or too patchy, to support *M. fuscatus*. Other possibilities are that *M. fuscatus* has not reached Mayaguana or that populations there may have been extirpated.
Geographical isolation may be an important factor contributing to the absence of both *M. fuscatus* and *Loxigilla violacea* on Mayaguana. The latter species is widely distributed in scrublands and xeromorphic woodlands throughout the Bahamas but apparently does not occur on Mayaguana, although there is one questionable record for that island (see species account). Mayaguana also is one of few islands in the archipelago where *Crotophaga ani* (Smooth-billed Ani) has not been recorded. In most cases the Bahama Islands and their banks are fairly close to each other, and isolation probably is subordinate to many other factors in determining distribution there. Mayaguana, however, is farther from potential source populations, either in the Antilles or on the Great Bahama Bank, than are any of the other islands in the southern Bahamas. The probable effects of isolation on Mayaguana are strongly reflected in its particularly impoverished herpetofauna. Only two species of reptiles are known from Mayaguana—*Anolis scriptus*, which is widely distributed throughout the southern Bahamas, and *Sphaerodactylus mariguanae*, which is known elsewhere only from Grand Turk. Mayaguana is the only fairly large island (293 km²) in the Bahamas that does not have any snakes—members of the genera *Epicrates*, *Tropidophis*, *Alsophis*, and *Typhlops* are known from one end of the archipelago to the other.

Mayaguana may not be as diversified in habitat as are many of the other Bahaman islands of similar size, but almost certainly the paucity of reptiles on this island is not due mainly to ecological impoverishment. There are many islands smaller than Mayaguana, with as little habitat diversity, that support a much richer herpetofauna. Little Ambergris Cay, for example, a small (3 km²), predominantly scrub-covered island
(with a few widely scattered coconut trees) at the southeastern end of the Caicos Bank, hosts two species of snakes (*Epicrates chrysogaster*, *Tropidophis greenwayi*) and six species of lizards (*Aristelliger hechti*, *Sphaerodactylus caicosensis*, *Anolis scriptus*, *Cyclura carinata*, *Leiocephalus psammodromus*, *Mabuya mabouya*). Nearly all of these species are fairly common there—I was able to collect samples of all but *T. greenwayi* during a visit of only a few hours.

Geographical isolation may well play a role in the impoverishment of the avifauna of the Turks Islands, but the limiting effects of sparse vegetation and small island size are also much in evidence there. *Vireo crassirostris* and *Tiaris bicolor* occur from one end of the Bahama archipelago to the other, but they are not present on the Turks Bank. Both species are common residents on Old Providence, a small, remote island about 250 km off the coast of Nicaragua (Bond, 1956), and both are vagrants in southern Florida (Robertson and Kushlan, 1974).

This widespread distribution, along with vagrant status in Florida, suggest a high level of vagility in these species. In all probability, they have occasionally reached the Turks Islands from the Caicos Bank (across the 40-km-wide Turks Island Passage), where both species are fairly common. That they have not become established on the Turks Bank probably is a result of several factors, not the least of which is lack of optimal habitat on these relatively bleak and barren islands. *Vireo crassirostris* and *Tiaris bicolor* occasionally are found in sparse scrub on islands that are larger and more diversified in habitat than are the Turks Islands; however, habitat that is at best marginally suitable for these species is likely to be insufficient to support populations on very
small islands where environmental hazards such as storms, predation, and fluctuations in food supply are greatly magnified. According to descriptions by Pilsbry (1930), Fisher and Wetmore (1931), Bond (1950), and Proctor (1950), Old Providence is approximately the same size as Grand Turk in horizontal dimensions, but the elevation is about five times greater and the vegetation more dense and more diversified. These physiographic and phytographic features may be one reason why *V. crassirostris* and *T. bicolor* were able to colonize Old Providence but not Grand Turk, despite the greater proximity of the latter to potential colonists.

The necessity of fairly dense vegetation for these species is also evident in their distribution in the Biminis, a cluster of tiny islands (total area about 14 km$^2$) on the northwestern end of the Great Bahama Bank. Vaurie (1953) found five breeding pairs each of *V. crassirostris* and *T. bicolor* on South Bimini, but did not see individuals of either species on North Bimini; the two islands are separated by a channel less than one km wide. The southern island, however, is relatively undisturbed and has dense scrub and thickets; whereas beach strand, sparse scrub, and edificarian and ruderal habitats predominate on the northern island (fide Vaurie, 1953).

*Vireo crassirostris* is apparently resident on Cay Sal (Buden and Schwartz, 1968), a smaller and more isolated island than Grand Turk or the Biminis. The density of the vegetation on this islet, however, is enhanced by the abundance of a milkweed vine (*Cynanchum bahamense*), which covers much of the scrub. According to Gillis (1976), *C. bahamense* is found throughout the Bahamas but is nowhere more abundant than it is on
Cay Sal. This cloak of vegetation may be a key factor in supporting a population of *V. crassirostris* there.

That sparse vegetation is not the sole factor accounting for the absence of *V. crassirostris* and *T. bicolor* on the Turks Bank is evidenced by the presence of both species on South Caicos, which is only slightly larger than Grand Turk and has a similar form of vegetation. However, the proximity of South Caicos to the larger islands on the bank (a chain of cays almost makes it an appendage of East Caicos) probably facilitates a fairly regular influx of individuals from those islands and compensates for lack of optimum habitat there.

There is the possibility that *Vireo crassirostris* is competitively excluded on the Turks Bank. Two possible competitors are *V. altiloquus* (Black-whiskered Vireo) and *Polioptila caerulea* (Blue-gray Gnatcatcher). Emlen (1977) has demonstrated that all three species overlap broadly in the shrub-foliage gleaner guild on Grand Bahama. *Vireo altiloquus* has been reported on Grand Turk where presumably it is a summer resident; *P. caerulea* is common to abundant there throughout the year. *Dendroica petechia* (Yellow Warbler) is another potential competitor, although this species is confined largely to mangrove swamps throughout the Bahamas, and I have seldom seen it outside of mangrove habitats on Grand Turk. Additional data are needed on habitat utilization by these species in allopatry, and in different combinations of sympatry in the Bahamas.

*Zenaida aurita* (Zenaida Dove) is another widespread and common species in the Bahamas that probably does not breed in the Turks Islands mainly because of lack of suitable habitat and/or exclusion by congeners—the one individual that I saw on Cotton Cay on 28 May 1971 may have been
a vagrant. *Zenaida macroura* (Mourning Dove) and *Z. asiatica* (White-winged Dove), on the other hand, are relatively more abundant on Grand Turk than on any other island in the Bahamas. Where all three species occur sympatrically, both *Z. macroura* and *Z. asiatica* tend to occupy more sparsely vegetated habitats than does *Z. aurita*.

Other common and widely distributed species in the Bahamas that are not present on the Turks Bank include *Spindalis zena* (Stripe-headed Tanager) and *Loxigilla violacea* (Greater Antillean Bullfinch). Both species typically inhabit regions that are more thickly vegetated than the Turks Islands. The spotty distribution of *L. violacea* in the southern Bahamas has been discussed at length in the species accounts, and the distribution of *S. zena* in the Bahamas, particularly in reference to the recent discovery of a population on the Caicos Bank, has been discussed elsewhere (Buden, in press).

Two species with extremely limited ranges in the Bahamas have been discussed in the preceding section along with other Bahaman birds found only, or chiefly, in the southern part of the archipelago—they are the Giant Kingbird and the Cuban Crow.

*Amazona leucocephala* (Cuban Parrot) also has a restricted range in the southern Bahamas where it is found only on Great Inagua, but apparently this is a relict population of a species that once ranged widely throughout the archipelago. Presently the only other Bahaman population of *A. leucocephala* is on Abaco, at the northern end of the chain, but this species formerly occurred on New Providence, Long Island, Fortune Island, Crooked Island, and Acklins Island (Bond, 1956; Brodkorb, 1959). Reduction of island area during post-glacial rise in sea level
may have lowered population densities to a level at which they would be more susceptible to extirpation and persecution by man may have led to the elimination of this species on many islands. That island size alone, however, is not the main factor responsible for the absence of parrots on most of the islands in the Bahamas is evidenced by the presence of populations of *A. leucocephala* on all three Cayman Islands (Grand Cayman, 114 km$^2$; Cayman Brac, 21 km$^2$; and Little Cayman, 14 km$^2$). The Caymans also are farther from potential source populations than are many of the Bahamas.

Populations of *Myiarchus sagrae* (La Sagra's Flycatcher) are widespread in the northern Bahamas, but this species is found only in the woodlands on Crooked Island and Great Inagua among the southern islands. Its absence on the northwestern Caicos Islands, where apparently suitable habitat is available and where there are no obvious ecological counterparts, may be just an attribute of chance. Interestingly, this species is fairly common in woodlands at the northern end of Crooked Island but it is not known from Acklins, which is separated from Crooked Island only by a shallow passage that is about 2 to 3 km wide and is "bridged" by several small cays.

**Levels of endemism.**—A striking feature of the southern Bahaman avifauna is the complete absence of endemic species, and the presence of only one endemic subspecies, *Philodice evelynae lyura*, which is on the Inaguas. This low level of endemism may be attributed to (1) a fairly rapid turnover rate, as appears to be characteristic of many small islands generally (MacArthur and Wilson 1967; Terborgh, 1973), and (2) a high rate of gene flow between island populations that apparently were
derived from among the most vagile and opportunistic members of potential source populations in North America and the Antilles.

As pointed out by Mayr (1965) for bird distributions in general, and by Terborgh et al. (1978) for distributions of birds in the Lesser Antilles, those species that inhabit coastal scrub are superior to forest birds as colonizers; they are opportunistic and can adapt to a broad range of ecological conditions. Their widespread distribution on islands suggests that they are particularly effective at overwater dispersal. Birds of the southern Bahamas are, for the most part, members of this group; they are well represented in low, xeromorphic, coastal habitats in the Greater Antilles and/or Florida. That 16 of 26 species (61.5%) of land birds in the southern Bahamas apparently have reached Florida from the northern Bahamas or from Cuba is a good indication of their vagility (Table 25). All 13 of the species that inhabit the Turks Islands, which are among the most barren islands in the archipelago, and the ones farthest from North America, have also been recorded in Florida. Table 26 shows that the similarity coefficient between Turks Islands-Florida populations and Turks Islands-Hispaniola populations are identical despite the great disparity in distance between these regions.

**Taxon cycles.**---All 13 species on the Turks Bank, and 80% of the 25 species occurring in the southern Bahamas are in the early stages of the taxon cycle, within the limits defined and described by Ricklefs (1970) and Ricklefs and Cox (1972, 1978). The main concept of the taxon cycle is that populations proceed through stages of growth and development in many ways analogous to the ontogeny of individuals. By definition, species in the early stages of the cycle are widespread and ubiquitous; Stage II
species show a greater amount of local subspecific differentiation than do those in Stage I. Another characteristic of these early stage species (at least among members of the order Passeriformes) is their tendency to occupy lowland and more sparsely vegetated habitats than do species in the later stages of the cycle; the latter usually are found in tall forests or montane habitats. Species in Stage III of the cycle show disjunct distributions attributed mainly to local extirpations; Stage IV species are single-island endemics that eventually become extinct or initiate a new cycle.

Ricklefs (1970) stated that "because the taxon cycle is continuous the assignment of species to Stages I, II, and II... is often somewhat arbitrary." However each of the three studies that I have reviewed in which the taxon cycle concept has been applied to West Indian bird populations uses arbitrary decisions in allocating species in all stages of the cycle. In his study on the Jamaican avifauna, Ricklefs (1970) treated all species endemic to that island as members of Stage IV, but Ricklefs and Cox (1978) assigned single-island endemics to earlier stages if they were members of a superspecies confined largely to the West Indies. *Corvus jamaicensis* (Jamaican Crow) and *Vireo modestus* (Jamaican White-eyed Vireo), for example, are in Stage IV according to Ricklefs (1970), but are treated as Stage II species by Ricklefs and Cox (1978), presumably because members of their respective superspecies groups are found on other islands in the West Indies. Yet *Platypsaris niger* (Jamaican Becard), which is endemic to Jamaica but a member of a mainland superspecies group, is given Stage IV status in the Ricklefs/Cox system; *Myiarchus barbirostris* (Dusky-capped Flycatcher), which is closely related
to, and probably derived from M. tuberculifer, a wide-ranging species on
the continent (Lanyon, 1967); is also treated as member of Stage IV by
Ricklefs and Cox (1978).

I have not attempted to evaluate the concept of the taxon cycle
critically at this time, but I wish to point out that variations in
the way taxa have been assigned to different stages in the cycle must be
evaluated carefully before the results of different studies can be
compared. I have not attempted to analyse the Bahaman avifauna in terms of
all permutations of the taxon cycle concept, but in analyzing distribution
patterns of birds in this archipelago I believe it noteworthy that even
with the varied criteria used in assigning species to different stages,
the southern Bahama avifauna is comprised largely of species that would
be included in the very early stages of the cycle.

Comparisons With Other Vertebrates:
Levels of Endemism
and Probable Origins

A low level of endemism is also characteristic of the bat fauna of
the southern Bahamas. None of the nine species of bats that breed, or
portentially breed, in the southern Bahamas is endemic, even at the
subspecies level (Koopman et al., 1957; Buden, 1975a, 1975b, 1976, 1977,
MS). Although Baker and Genoways (1978) indicated that the level of
endemism in the Bahaman bat fauna is 60 percent, this figure is based
on the number of Antillean endemics in the Bahamas.

Of the nine species of bats in the southern Bahamas at least two
(Macrotus waterhousii waterhousii, Brachyphylla cavernarum pumila)
probably were derived from populations on Hispaniola; three others
(Artibeus jamaicensis, Erophylla sezekorni, Eptesicus fuscus) probably came from Cuba. The probable origins of the four remaining species (Noctilio leporinus, Monophyllus redmani, Lasiurus borealis, Tadarida brasiliensis) are somewhat more obscure. Relatively recent arrival in the Bahamas, along with the ability to cross water gaps with relative ease, may account for the lack of strong morphological differentiation among these populations, as is probably the case among birds.

The only other land mammal indigenous to the southern Bahamas is Geocapromys ingrahami, a fairly large rodent presently confined to a relictual population on East Plana Cay. Wing (1969) found bones of G. ingrahami on San Salvador. Clough (1972) indicated that fossils of this species had been collected on Abaco, Eleuthera, Long, Exuma, and Crooked islands. Barbour and Shreve (1935) reported that Geocapromys sp. probably was present on Samana Cay at least into the early 1930's. Clough (1972) stated that "the initial colonization of the genus to the Bahamas by either natural or human means must have been from Cuba early enough to have permitted differentiation into a distinct species." Three subspecies of G. ingrahami presently are recognized among both fossil and living material.

Reptiles are fairly widely distributed throughout the Bahamas but, unlike birds and bats, they demonstrate high incidence of endemism. In their check-list of West Indian amphibians and reptiles, Schwartz and Thomas (1975) listed 24 species of reptiles that are indigenous to the Bahamas; Aristelliger hechti, of the Caicos Islands, was subsequently described by Schwartz and Crombie (1975). Eighteen of these 25 species
are endemic to the southern Bahamas and five others have at least one endemic subspecies there. Two species of frogs (Eleutherodactylus planirostris, Osteopilus septentrionalis) are the only amphibians in the southern Bahamas—their spotty distribution in the vicinity of settlements and ports of entry, however, suggest relatively recent introduction by man and I have not included them in the comparisons.

The large endemic component among the reptiles of the southern Bahamas suggests that the most of the species have long been in isolation there. Schwartz (1968) has pointed out that "the very high number of forms that are specifically differentiated from their Greater Antillean relatives stands in strong contrast to that of the Great Bank fauna;" he also noted that many species in the southern Bahamas are so different from both their Great Bank and Greater Antillean congeners that their probable phyletic relationships and origins are greatly obscured. On the other hand, as pointed out in preceding sections of this discussion, probable colonization routes of birds in the southern Bahamas often are obscured because of the morphological similarity among interisland populations.

Of the 20 species of reptiles in the southern Bahamas whose ancestry can be traced with some confidence to probable relatives on one of the Greater Antillean islands, ten species appear to have originated from Hispaniola, eight from Cuba, and two from Puerto Rico. Most of the birds of this region, however, seem to have been derived from Cuba (see section on "Cuba and the Bahamas"), few, if any, from Hispaniola, and probably no more than one from Puerto Rico. Several species of birds have colonized the Bahamas from Florida; but apparently none of the reptiles has done so.
That the source of the southern Bahama avifauna differs geographically from that of the herpetofauna probably can be attributed to differences in the mode of dispersal between these two groups. Simpson (1956), in his discussion on the origin of West Indian mammals, suggested that animals that are airborne may show different routes of colonization from those that are waterborne. The reptiles of the southern Bahamas probably were rafted there from source populations in the Greater Antilles, in which case transport from Hispaniola (and to a lesser degree, from Puerto Rico) would have been facilitated by currents that sweep northwestward from the eastern end of the Antilles to the Bahamas. Birds, which are able to disperse actively from one island to another (perhaps "asisted" by storms) probably would take the shortest available route—in this case from Cuba to an exposed Great Bahama Bank or to Inagua and thence northward in a "stepping stone" fashion.

The length of time that the islands have been available for colonization undoubtedly varies among different taxa and may in part account for divergence from probable parental stock in the reptiles, and the relative lack of differentiation in the birds of this region. As the Bahamas emerged they probably went through one or more seral stages, beginning with exposed beach or rocky headland and proceeding to strand, sparse coastal scrub, and finally, dense interior scrub and woodlands. Most reptiles in the southern Bahamas are fairly common in coastal scrub habitats. They probably were able to achieve successful colonizations sooner than most land birds, which require somewhat more diversity or complexity of habitat, or at least a larger area, before effecting
successful colonization. The ability of reptiles and other ectotherms to maintain a relatively low metabolic rate in comparison to that of most birds and other endotherms may have favored the former in contending with fluctuations in the availability of food and made them less susceptible to extirpation. Many species of reptiles in the southern Bahamas maintain fairly dense populations in coastal scrub or even strand vegetation. Assuming that the same was true of the early colonists, any high land in the southern Bahamas that might have remained emergent during high sea levels could have served as refugia for reptiles even beyond the level of diminution in island area that probably could have supported bird populations.

Final Caveats

Although dispersal abilities and time in isolation are important determinants of endemism (or the lack of it), one should also keep in mind that comparisons between taxa may be affected by the differing philosophies and techniques of taxonomists. Morphological convergences among widespread populations with slight local differentiation also potentially contribute a bias to zoogeographic interpretations, particularly in cases where interpretations are based on distributions of weakly differentiated subspecies. Also, geographic proximity of present-day populations to each other need not reflect the most probable colonization routes (see discussion on "Hispaniola and the Bahamas"). In presenting what I believe the most plausible explanations for the distribution patterns and geographic origins of birds in the southern Bahamas I have taken these factors into consideration and my interpretations frequently are given as possible explanations rather than as more
definite statements. Habitat availability appears to be the most critical factor determining distributions of birds in this region but other factors that have been discussed (i.e., island size, proximity to potential colonists, competition, etc.) also are important. The importance of each factor appears to differ both among islands and among species; at present there is too little ecological data available on the birds of the southern Bahamas permit a more thorough analysis of these factors for each species.
Table 1. — Mean annual temperature (in degrees centigrade), and amount of precipitation (in millimeters) among islands in the Bahamas; numbers in parentheses indicate years averaged.

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<th>PRECIPITATION</th>
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<tr>
<td>(Matthew Town)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. — Routes of hurricanes and tropical storms that have reached the Bahamas from Florida and/or the Greater Antilles in the period 1875-1975; H = hurricane, T = tropical storm, X = tropical storm or hurricane; numbers in parentheses are totals. A "+" sign in the column for Cuba indicates the number of storms that first passed across a part of Florida before reaching the Bahamas, and a "+" sign in the column for Puerto Rico indicates the number of storms that first passed across a part of Hispaniola before reaching the Bahamas.

<table>
<thead>
<tr>
<th>From</th>
<th>Florida</th>
<th>Cuba</th>
<th>Hispaniola</th>
<th>Puerto Rico</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
<td>T</td>
<td>X</td>
<td>H</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to N. Bahamas only</td>
<td>2</td>
<td>3</td>
<td>0(5)</td>
<td>11+1</td>
</tr>
<tr>
<td>to S. Bahamas only</td>
<td>0</td>
<td>0</td>
<td>0(0)</td>
<td>1</td>
</tr>
<tr>
<td>to N. Bahamas via S. Bahamas</td>
<td>0</td>
<td>0</td>
<td>0(0)</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 3. — List of islands in the southern Bahamas included in species accounts; number of days visited pertains to author's field work only.

<table>
<thead>
<tr>
<th>Island</th>
<th>Coordinates</th>
<th>Approximate Dimensions (length x width in km)</th>
<th>Area ((\text{km}^2))</th>
<th>No. of Days Visited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samana Cay</td>
<td>23 06N, 73 42W</td>
<td>13.7 x 3.2</td>
<td>33.17</td>
<td>3</td>
</tr>
<tr>
<td>Black Booby Cay</td>
<td>23 05N, 73 39W</td>
<td>1.7 x 0.6</td>
<td>0.72</td>
<td>0</td>
</tr>
<tr>
<td>Bird Rock</td>
<td>22 51N, 74 22W</td>
<td>0.4 x 0.1</td>
<td>0.03</td>
<td>0</td>
</tr>
<tr>
<td>Crooked Island</td>
<td>22 45N, 74 13W</td>
<td>37.0 x 8.1</td>
<td>276.87</td>
<td>18</td>
</tr>
<tr>
<td>Fortune Island</td>
<td>22 37N, 74 20W</td>
<td>17.7 x 2.4</td>
<td>34.74</td>
<td>1</td>
</tr>
<tr>
<td>Fish Cay</td>
<td>22 29N, 74 15W</td>
<td>1.7 x 0.6</td>
<td>0.74</td>
<td>0</td>
</tr>
<tr>
<td>Guana Cay</td>
<td>22 27N, 74 13W</td>
<td>0.5 x 0.5</td>
<td>0.15</td>
<td>0</td>
</tr>
<tr>
<td>Acklins Island</td>
<td>22 26N, 73 58W</td>
<td>77.3 x 1.6 - 17.7</td>
<td>524.18</td>
<td>21</td>
</tr>
<tr>
<td>Castle Island</td>
<td>22 07N, 74 19W</td>
<td>3.4 x 0.5</td>
<td>2.09</td>
<td>0</td>
</tr>
<tr>
<td>Mira Por Vos Cays</td>
<td>22 06N, 74 38W</td>
<td>---</td>
<td>1.00</td>
<td>0</td>
</tr>
<tr>
<td>West Plana Cay</td>
<td>22 36N, 73 37W</td>
<td>5.3 x 2.5</td>
<td>8.77</td>
<td>0</td>
</tr>
<tr>
<td>East Plana Cay</td>
<td>22 36N, 73 30W</td>
<td>9.7 x 0.4 - 1.0</td>
<td>10.00</td>
<td>0</td>
</tr>
<tr>
<td>Mayaguana</td>
<td>22 23N, 72 57W</td>
<td>45.1 x 3.2 - 11.3</td>
<td>292.79</td>
<td>29</td>
</tr>
<tr>
<td>Booby Cay</td>
<td>22 19N, 72 43W</td>
<td>1.9 x 0.1 - 0.6</td>
<td>0.50</td>
<td>0</td>
</tr>
<tr>
<td>Island</td>
<td>Coordinates</td>
<td>Appropriate Dimensions (length x width in km)</td>
<td>Area (km²)</td>
<td>No. of Days Visited</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------</td>
<td>----------------------------------------------</td>
<td>------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Hogsty Reef</td>
<td>22 23N, 72 57W</td>
<td>---</td>
<td>&lt;1.00</td>
<td>0</td>
</tr>
<tr>
<td>Great Inagua</td>
<td>21 05N, 73 18W</td>
<td>80.5 x 11.3 - 32.2</td>
<td>1626.97</td>
<td>15</td>
</tr>
<tr>
<td>Sheep Cay</td>
<td>21 08N, 73 35W</td>
<td>0.8 x 0.3</td>
<td>0.22</td>
<td>0</td>
</tr>
<tr>
<td>Little Inagua</td>
<td>21 30N, 73 00W</td>
<td>14.5 x 9.0</td>
<td>134.07</td>
<td>22</td>
</tr>
<tr>
<td>West Caicos</td>
<td>21 39N, 72 28W</td>
<td>11.5 x 2.7</td>
<td>22.80</td>
<td>7</td>
</tr>
<tr>
<td>Providenciales</td>
<td>21 47N, 72 17W</td>
<td>23.0 x 2.0 - 11.5</td>
<td>116.64</td>
<td>33</td>
</tr>
<tr>
<td>Silly Cay</td>
<td>21 46N, 72 19W</td>
<td>1.0 x 0.9</td>
<td>0.17</td>
<td>0.5</td>
</tr>
<tr>
<td>Bay Cay</td>
<td>21 44N, 72 16W</td>
<td>0.5 x 0.03 - 0.2</td>
<td>0.05</td>
<td>0.5</td>
</tr>
<tr>
<td>Water Cay</td>
<td>21 51N, 72 07W</td>
<td>3.4 x 0.7 - 1.8</td>
<td>3.64</td>
<td>0.5</td>
</tr>
<tr>
<td>Pine Cay</td>
<td>21 53N, 72 06W</td>
<td>3.4 x 0.7 - 1.7</td>
<td>3.64</td>
<td>2</td>
</tr>
<tr>
<td>Ft. George Cay</td>
<td>21 54N, 72 06W</td>
<td>1.3 x 0.1 - 0.6</td>
<td>0.31</td>
<td>0.5</td>
</tr>
<tr>
<td>Dellis Cay</td>
<td>21 54N, 72 04W</td>
<td>2.1 x 0.7 - 1.1</td>
<td>1.49</td>
<td>0.5</td>
</tr>
<tr>
<td>Stubbs Cay</td>
<td>21 55N, 72 05W</td>
<td>0.9 x 0.8</td>
<td>0.52</td>
<td>0</td>
</tr>
<tr>
<td>Parrot Cay</td>
<td>21 55N, 72 04W</td>
<td>4.4 x 1.5</td>
<td>5.48</td>
<td>3</td>
</tr>
<tr>
<td>North Caicos</td>
<td>21 54N, 71 56W</td>
<td>24.6 x 12.0</td>
<td>204.47</td>
<td>42</td>
</tr>
<tr>
<td>Island</td>
<td>Coordinates</td>
<td>Appropriate Dimensions (length x width in km)</td>
<td>Area ($\text{km}^2$)</td>
<td>No. of Days Visited</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>---------------------------------------------</td>
<td>----------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Middle Caicos</td>
<td>21 47N, 71 45W</td>
<td>29.0 x 12.9</td>
<td>287.58</td>
<td>19</td>
</tr>
<tr>
<td>Pelican Cay</td>
<td>21 50N, 71 43W</td>
<td>0.1 x 0.05</td>
<td>&lt;0.01</td>
<td>0.5</td>
</tr>
<tr>
<td>Joe Grant's Cay</td>
<td>21 45N, 71 37W</td>
<td>3.6 x 1.8</td>
<td>4.57</td>
<td>0</td>
</tr>
<tr>
<td>Iguana Cay</td>
<td>21 46N, 71 36W</td>
<td>0.4 x 0.3</td>
<td>0.06</td>
<td>0</td>
</tr>
<tr>
<td>East Caicos</td>
<td>21 41N, 71 33W</td>
<td>18.6 x 8.3 - 15.0</td>
<td>178.16</td>
<td>20</td>
</tr>
<tr>
<td>South Caicos</td>
<td>21 31N, 71 31W</td>
<td>9.3 x 0.8 - 5.2</td>
<td>21.24</td>
<td>9</td>
</tr>
<tr>
<td>Dove Cay</td>
<td>21 29N, 71 32W</td>
<td>0.2 x 0.1</td>
<td>0.01</td>
<td>0</td>
</tr>
<tr>
<td>Long Cay</td>
<td>21 28N, 71 33W</td>
<td>3.8 x 0.1 - 0.7</td>
<td>1.04</td>
<td>0</td>
</tr>
<tr>
<td>West Six Hill Cay</td>
<td>21 27N, 71 38W</td>
<td>1.1 x 0.1</td>
<td>0.09</td>
<td>0.5</td>
</tr>
<tr>
<td>East Six Hill Cay</td>
<td>21 28N, 71 37W</td>
<td>0.8 x 0.08</td>
<td>0.05</td>
<td>0.5</td>
</tr>
<tr>
<td>Big Ambergris Cay</td>
<td>21 18N, 71 38W</td>
<td>5.3 x 0.6 - 2.0</td>
<td>4.26</td>
<td>0.5</td>
</tr>
<tr>
<td>Little Ambergris Cay</td>
<td>21 18N, 71 42W</td>
<td>7.0 x 1.6</td>
<td>3.28</td>
<td>1</td>
</tr>
<tr>
<td>Bush Cay</td>
<td>21 12N, 71 38W</td>
<td>0.7 x 0.4</td>
<td>0.16</td>
<td>0</td>
</tr>
<tr>
<td>White Cay</td>
<td>21 12N, 71 47W</td>
<td>0.2 x 0.2</td>
<td>0.02</td>
<td>0</td>
</tr>
<tr>
<td>French Cay</td>
<td>21 31N, 72 11W</td>
<td>0.4 x 0.3</td>
<td>0.08</td>
<td>0</td>
</tr>
<tr>
<td>Island</td>
<td>Coordinates</td>
<td>Appropriate Dimensions (length x width in km)</td>
<td>Area (km²)</td>
<td>No. of Days Visited</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------</td>
<td>----------------------------------------------</td>
<td>------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Grand Turk</td>
<td>21 28N, 71 08W</td>
<td>7.3 x 2.3</td>
<td>18.23</td>
<td>22</td>
</tr>
<tr>
<td>Gibb's Cay</td>
<td>21 27N, 71 07W</td>
<td>0.6 x 0.1</td>
<td>0.07</td>
<td>0.5</td>
</tr>
<tr>
<td>Round Cay</td>
<td>21 26N, 71 07W</td>
<td>0.2 x 0.1</td>
<td>0.01</td>
<td>0.5</td>
</tr>
<tr>
<td>Long Cay</td>
<td>21 25N, 71 06W</td>
<td>1.9 x 0.1 - 0.2</td>
<td>0.19</td>
<td>1</td>
</tr>
<tr>
<td>Pear Cay</td>
<td>21 22N, 71 05W</td>
<td>0.7 x 0.1 - 0.3</td>
<td>0.11</td>
<td>0.5</td>
</tr>
<tr>
<td>East Cay</td>
<td>21 21N, 71 05W</td>
<td>1.5 x 0.2 - 0.6</td>
<td>0.45</td>
<td>0.5</td>
</tr>
<tr>
<td>Penniston Cay</td>
<td>21 23N, 71 07W</td>
<td>0.6 x 0.1</td>
<td>0.04</td>
<td>0.5</td>
</tr>
<tr>
<td>Cotton Cay</td>
<td>21 22N, 71 09W</td>
<td>2.5 x 0.3 - 0.9</td>
<td>1.11</td>
<td>1</td>
</tr>
<tr>
<td>Salt Cay</td>
<td>21 20N, 71 12W</td>
<td>6.2 x 2.3</td>
<td>6.69</td>
<td>2</td>
</tr>
<tr>
<td>Big Sand Cay</td>
<td>21 12N, 71 15W</td>
<td>2.5 x 0.1 - 0.3</td>
<td>0.52</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4. — Means for the measurements wing length and tail length in seven samples of *Zenaida macroura* collected in the period 15 April through 31 July; sample size in parentheses; all measurements in millimeters.

<table>
<thead>
<tr>
<th>Location</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wing</td>
<td>Tail</td>
</tr>
<tr>
<td>Bermuda</td>
<td>147.9(7)</td>
<td>142.5(4)</td>
</tr>
<tr>
<td>North America (excluding Florida)</td>
<td>148.5(13)</td>
<td>138.5(10)</td>
</tr>
<tr>
<td>Florida peninsula</td>
<td>145.0(5)</td>
<td>134.8(3)</td>
</tr>
<tr>
<td>Florida Keys</td>
<td>139.7(7)</td>
<td>120.3(5)</td>
</tr>
<tr>
<td>Cuba + Isle of Pines</td>
<td>139.2(10)</td>
<td>123.8(5)</td>
</tr>
<tr>
<td>Hispaniola + Tortue + Gonâve</td>
<td>141.5(11)</td>
<td>126.9(9)</td>
</tr>
<tr>
<td>Bahamas</td>
<td>143.3(6)</td>
<td>129.2(8)</td>
</tr>
</tbody>
</table>
Table 5. — Summary of data on wing length and tail length among five samples of *Zenaida aurita* from the Bahamas and Greater Antilles; each fraction shows number of individuals in indicated size class over total number examined; M = male, F = female, ? = sex undetermined; all measurements in millimeters.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Wing length &gt; 158.0mm</th>
<th>Tail length &gt; 90.0mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Bahamas</td>
<td>6/8=75% (3M,5F)</td>
<td>6/7=88% (3M,4F)</td>
</tr>
<tr>
<td>Southern Bahamas</td>
<td>9/12=75% (6M,4F,2?)</td>
<td>9/12=75% (6M,4F,2?)</td>
</tr>
<tr>
<td>Cuba</td>
<td>3/3=100% (2M,1F)</td>
<td>3/3=100% (2M,1F)</td>
</tr>
<tr>
<td>Isle of Pines</td>
<td>1/9=11% (5M,4F)</td>
<td>0/10=0% (5M,5F)</td>
</tr>
<tr>
<td>Other Islands</td>
<td>0/5=0% (3M,2F)</td>
<td>1/5=20% (3M,2F)</td>
</tr>
</tbody>
</table>
Table 6. — Measurements (in millimeters) of three characters for eight samples of *Columbina passerina* (males only). Each set includes range and sample size (row 1) and mean and twice the standard error of the mean (row 2).

<table>
<thead>
<tr>
<th>Location</th>
<th>Wing Length</th>
<th>Tail Length</th>
<th>Bill Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Providence + Eleuthera + Exumas</td>
<td>80-89(27)</td>
<td>53.2-61.7(23)</td>
<td>10.0-11.9(27)</td>
</tr>
<tr>
<td></td>
<td>83.6±0.80</td>
<td>58.4±0.96</td>
<td>10.9±0.18</td>
</tr>
<tr>
<td>Turks and Caicos Ids. + Great Inagua</td>
<td>78-85(19)</td>
<td>52.5-59.4(20)</td>
<td>9.5-11.8(18)</td>
</tr>
<tr>
<td></td>
<td>81.2±0.74</td>
<td>56.6±0.86</td>
<td>10.9±0.24</td>
</tr>
<tr>
<td>Hispaniola</td>
<td>79-87(25)</td>
<td>50.5-60.0(18)</td>
<td>10.0-11.4(21)</td>
</tr>
<tr>
<td></td>
<td>82.7±0.72</td>
<td>55.5±1.28</td>
<td>10.7±0.20</td>
</tr>
<tr>
<td>Mona</td>
<td>75-79(13)</td>
<td>51.5-56.5(12)</td>
<td>9.8-11.8(14)</td>
</tr>
<tr>
<td></td>
<td>77.5±0.80</td>
<td>54.4±1.02</td>
<td>10.7±0.26</td>
</tr>
<tr>
<td>Cuba</td>
<td>83-89(34)</td>
<td>56.2-65.4(32)</td>
<td>10.1-12.6(23)</td>
</tr>
<tr>
<td></td>
<td>85.9±0.58</td>
<td>60.2±0.78</td>
<td>11.0±0.26</td>
</tr>
<tr>
<td>Jamaica</td>
<td>80-85(18)</td>
<td>52.4-61.5(16)</td>
<td>10.6-12.0(15)</td>
</tr>
<tr>
<td></td>
<td>82.8±0.78</td>
<td>56.7±1.28</td>
<td>11.5±0.22</td>
</tr>
<tr>
<td>Florida</td>
<td>84-90(11)</td>
<td>57.7-66.0(13)</td>
<td>11.4-12.4(12)</td>
</tr>
<tr>
<td></td>
<td>88.2±1.04</td>
<td>62.9±1.46</td>
<td>11.8±0.20</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>79-85(11)</td>
<td>53.3-61.2(12)</td>
<td>9.7-11.2(10)</td>
</tr>
<tr>
<td></td>
<td>81.9±1.08</td>
<td>56.7±1.52</td>
<td>10.6±0.36</td>
</tr>
</tbody>
</table>
Table 7. — Wing length and bill length (from anterodorsal edge of cere to tip of culmen) in four samples of *Amazona leucocephala*; each set of numbers includes mean, range (in parentheses) and sample size; all measurements in millimeters.

<table>
<thead>
<tr>
<th>Characters and Sex</th>
<th>Cuba</th>
<th>Great Inagua</th>
<th>Acklins</th>
<th>Abaco</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>192.8(182.0-200.0)(9)</td>
<td>205.2(199.0-211.0)(5)</td>
<td>212.5(210.0-215.0)(4)</td>
<td>206.0(-)(1)</td>
</tr>
<tr>
<td>Females</td>
<td>191.7(185.0-198.0)(6)</td>
<td>202.8(196.0-210.0)(4)</td>
<td>205.8(203.0-208.0)(4)</td>
<td>---</td>
</tr>
<tr>
<td>Bill</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>26.6(25.7-27.4)(6)</td>
<td>28.9(28.0-30.2)(5)</td>
<td>34.5(-)(1)</td>
<td>26.7(-)(1)</td>
</tr>
<tr>
<td>Females</td>
<td>24.9(22.3-27.3)(6)</td>
<td>28.2(27.1-29.0)(3)</td>
<td>29.6(29.4-29.8)(2)</td>
<td>---</td>
</tr>
</tbody>
</table>
Table 8.— Mean, range, and sample size for the measurements of three characters in three samples of *Coccyzus minor*; all measurements in millimeters.

<table>
<thead>
<tr>
<th>Characters and Sex</th>
<th>Northern Bahamas</th>
<th>Southern Bahamas</th>
<th>Hispaniola</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MALES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bill</td>
<td>24.6 (23.5 - 26.0) 10</td>
<td>25.3 (23.1 - 28.3) 9</td>
<td>24.9 (23.7 - 27.5) 14</td>
</tr>
<tr>
<td>Wing</td>
<td>131.5 (128.0 - 137.0) 11</td>
<td>133.8 (128.0 - 141.0) 9</td>
<td>128.7 (123.0 - 136.0) 12</td>
</tr>
<tr>
<td>Tail</td>
<td>157.9 (146.2 - 173.3) 11</td>
<td>156.8 (147.5 - 171.7) 9</td>
<td>155.2 (148.4 - 166.6) 14</td>
</tr>
<tr>
<td><strong>FEMALES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bill</td>
<td>25.2 (23.2 - 27.1) 7</td>
<td>25.6 (24.1 - 28.3) 11</td>
<td>25.0 (23.8 - 26.8) 7</td>
</tr>
<tr>
<td>Wing</td>
<td>131.6 (125.0 - 136.0) 8</td>
<td>134.9 (128.0 - 140.0) 10</td>
<td>128.0 (124.0 - 130.0) 7</td>
</tr>
<tr>
<td>Tail</td>
<td>158.2 (153.0 - 162.1) 7</td>
<td>158.6 (150.2 - 167.2) 9</td>
<td>156.9 (150.2 - 159.6) 5</td>
</tr>
</tbody>
</table>
Table 9. -- Mensural data for three characters in five samples of *Tyrannus domicensis* (sexes separate); each set of numbers includes the mean and sample size (row 1), range (row 2), and one standard deviation and one standard error on each side of the mean (row 3); all measurements in millimeters.

<table>
<thead>
<tr>
<th>Characters and Sex</th>
<th>Florida</th>
<th>N. Bahamas</th>
<th>S. Bahamas</th>
<th>Cuba</th>
<th>Hispaniola</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MALES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bill length</td>
<td>25.5(22)</td>
<td>25.7(7)</td>
<td>26.1(15)</td>
<td>23.9(8)</td>
<td>23.5(10)</td>
</tr>
<tr>
<td>Wing length</td>
<td>24.0-27.3</td>
<td>24.1-26.7</td>
<td>24.2-27.4</td>
<td>23.2-24.6</td>
<td>22.6-26.1</td>
</tr>
<tr>
<td></td>
<td>1.13-0.24</td>
<td>0.81-0.31</td>
<td>0.88-0.23</td>
<td>0.39-0.14</td>
<td>1.25-0.40</td>
</tr>
<tr>
<td>Bill length</td>
<td>117.4(22)</td>
<td>118.5(6)</td>
<td>121.3(11)</td>
<td>114.5(13)</td>
<td>114.1(9)</td>
</tr>
<tr>
<td>Wing length</td>
<td>111.0-123.0</td>
<td>118.0-119.0</td>
<td>118.0-124.0</td>
<td>113.0-117.0</td>
<td>111.0-117.0</td>
</tr>
<tr>
<td></td>
<td>3.36-0.72</td>
<td>0.55-0.22</td>
<td>2.20-0.66</td>
<td>1.66-0.46</td>
<td>2.03-0.68</td>
</tr>
<tr>
<td>Tail length</td>
<td>89.0(19)</td>
<td>90.8(6)</td>
<td>93.0(13)</td>
<td>86.9(8)</td>
<td>90.4(9)</td>
</tr>
<tr>
<td>Wing length</td>
<td>83.6-95.5</td>
<td>88.9-93.3</td>
<td>88.7-96.2</td>
<td>82.4-89.9</td>
<td>81.2-93.9</td>
</tr>
<tr>
<td></td>
<td>2.61-0.60</td>
<td>1.96-0.74</td>
<td>2.14-0.60</td>
<td>2.85-1.00</td>
<td>3.81-1.27</td>
</tr>
<tr>
<td><strong>FEMALES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bill length</td>
<td>24.7(9)</td>
<td>24.5(6)</td>
<td>25.9(13)</td>
<td>23.8(5)</td>
<td>23.5(7)</td>
</tr>
<tr>
<td>Wing length</td>
<td>22.4-25.7</td>
<td>22.3-27.2</td>
<td>25.0-27.1</td>
<td>22.5-25.4</td>
<td>22.4-24.4</td>
</tr>
<tr>
<td></td>
<td>1.13-0.38</td>
<td>1.81-0.74</td>
<td>0.80-0.22</td>
<td>1.09-0.48</td>
<td>0.74-0.28</td>
</tr>
<tr>
<td>Wing length</td>
<td>114.0(10)</td>
<td>115.3(6)</td>
<td>118.5(6)</td>
<td>112.6(9)</td>
<td>109.3(4)</td>
</tr>
<tr>
<td>Tail length</td>
<td>110.0-118.0</td>
<td>112.0-119.0</td>
<td>116.0-122.0</td>
<td>111.0-114.0</td>
<td>106.0-115.0</td>
</tr>
<tr>
<td></td>
<td>2.94-0.93</td>
<td>3.08-1.26</td>
<td>1.98-0.81</td>
<td>1.51-0.50</td>
<td>4.27-2.14</td>
</tr>
<tr>
<td>Tail length</td>
<td>84.7(8)</td>
<td>85.9(5)</td>
<td>90.6(13)</td>
<td>84.8(5)</td>
<td>84.7(6)</td>
</tr>
<tr>
<td></td>
<td>81.5-87.5</td>
<td>83.0-89.5</td>
<td>86.9-94.4</td>
<td>82.1-87.3</td>
<td>76.7-91.1</td>
</tr>
<tr>
<td></td>
<td>1.91-0.68</td>
<td>2.93-1.31</td>
<td>2.61-0.75</td>
<td>2.16-0.97</td>
<td>5.10-2.08</td>
</tr>
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</table>
Table 10. — Mean, range, and sample size for the measurements of eight characters for three samples of *Myiarchus sagræ*; all measurements in millimeters.

<table>
<thead>
<tr>
<th>Characters and sex</th>
<th>Northern Bahamas</th>
<th>Southern Bahamas</th>
<th>Cuba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing length</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>87.1(82.0-90.0)13</td>
<td>82.8(79.0-87.0)4</td>
<td>84.3(81.0-87.0)10</td>
</tr>
<tr>
<td>females</td>
<td>83.4(81.0-86.0)16</td>
<td>82.8(79.0-85.0)4</td>
<td>80.2(78.0-83.0)10</td>
</tr>
<tr>
<td>Tail length</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>80.6(73.0-84.5)16</td>
<td>78.6(76.2-81.5)6</td>
<td>77.4(70.2-82.5)10</td>
</tr>
<tr>
<td>females</td>
<td>77.1(72.8-79.1,19</td>
<td>78.1(76.0-81.7)6</td>
<td>74.6(70.8-76.0)10</td>
</tr>
<tr>
<td>Bill length</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>17.2(15.4-18.8)15</td>
<td>17.5(15.8-19.0)13</td>
<td>16.7(15.0-17.8)10</td>
</tr>
<tr>
<td>females</td>
<td>16.9(15.8-18.1)18</td>
<td>17.1(16.1-18.0)8</td>
<td>16.0(14.8-17.9)10</td>
</tr>
<tr>
<td>Bill width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>7.2(6.7-7.6)15</td>
<td>7.4(7.0-8.0)13</td>
<td>7.1(6.8-7.7)10</td>
</tr>
<tr>
<td>females</td>
<td>7.3(6.9-7.7)18</td>
<td>7.2(6.7-7.5)9</td>
<td>7.1(6.8-7.5)10</td>
</tr>
</tbody>
</table>
Table 11. — Mean, range, and sample size for three measurements (in millimeters) in 11 samples of male Mimis gundlachii from the Bahamas and one from Jamaica; wing and tail measurements are from specimens collected only in the months December through March.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Bill Length</th>
<th>Wing Length</th>
<th>Tail Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andros</td>
<td>19.4 (17.6 - 21.5) 10</td>
<td>114.0 (----------) 1</td>
<td>121.4 (--------) 1</td>
</tr>
<tr>
<td>New Providence</td>
<td>19.4 (18.4 - 21.1) 9</td>
<td>116.6 (111.0 - 121.0) 5</td>
<td>118.9 (112.6 - 129.4) 9</td>
</tr>
<tr>
<td>Eleuthera</td>
<td>19.3 (18.1 - 21.0) 13</td>
<td>121.6 (118.0 - 124.0) 5</td>
<td>127.9 (125.3 - 131.0) 6</td>
</tr>
<tr>
<td>Conception</td>
<td>20.1 (19.5 - 21.2) 5</td>
<td>122.0 (119.0 - 126.0) 5</td>
<td>127.5 (122.6 - 133.9) 5</td>
</tr>
<tr>
<td>Exumas</td>
<td>20.9 (20.3 - 21.5) 6</td>
<td>120.6 (115.0 - 124.0) 5</td>
<td>124.4 (115.0 - 130.4) 5</td>
</tr>
<tr>
<td>San Salvador</td>
<td>19.4 (18.0 - 21.6) 9</td>
<td>119.0 (116.0 - 124.0) 5</td>
<td>124.8 (122.5 - 128.7) 4</td>
</tr>
<tr>
<td>Rum Cay</td>
<td>20.5 (20.1 - 20.7) 6</td>
<td>120.0 (115.0 - 123.0) 5</td>
<td>127.1 (121.4 - 131.6) 5</td>
</tr>
<tr>
<td>Crooked-Acklins</td>
<td>21.0 (20.2 - 22.4) 7</td>
<td>124.0 (----------) 1</td>
<td>-- (---------)</td>
</tr>
<tr>
<td>Mayaguana</td>
<td>20.7 (19.3 - 21.8) 9</td>
<td>116.3 (112.0 - 124.0) 3</td>
<td>126.9 (122.2 - 134.2) 3</td>
</tr>
<tr>
<td>Great Inagua</td>
<td>20.3 (18.6 - 22.0) 18</td>
<td>116.3 (113.0 - 122.0) 6</td>
<td>125.2 (117.6 - 132.5) 10</td>
</tr>
<tr>
<td>Caicos Bank</td>
<td>20.6 (18.7 - 23.2) 23</td>
<td>118.9 (112.0 - 123.0) 8</td>
<td>123.9 (115.9 - 129.2) .8</td>
</tr>
<tr>
<td>Jamaica</td>
<td>20.7 (20.0 - 22.0) 6</td>
<td>126.0 (119.0 - 129.0) 6</td>
<td>131.2 (124.7 - 135.1) 6</td>
</tr>
</tbody>
</table>
Table 12. — Mean, range, and sample size for three measurements (in millimeters) in 11 samples of female *Mimus gundlachii* from the Bahamas and one from Jamaica; wing and tail measurements are from specimens collected only in the months December through March.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Bill Length</th>
<th>Wing Length</th>
<th>Tail Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andros</td>
<td>19.4 (18.3 - 21.2) 8</td>
<td>113.0 (110.0 - 118.0) 4</td>
<td>116.4 (112.0 - 121.0) 4</td>
</tr>
<tr>
<td>New Providence</td>
<td>18.4 (17.0 - 19.7) 14</td>
<td>109.5 (104.0 - 117.0) 6</td>
<td>113.2 (105.0 - 119.9) 12</td>
</tr>
<tr>
<td>Eleuthera</td>
<td>19.6 (17.8 - 20.7) 13</td>
<td>110.0 ( -------- ) 2</td>
<td>116.1 (112.2 - 119.9) 2</td>
</tr>
<tr>
<td>Conception</td>
<td>19.5 (18.0 - 20.7) 3</td>
<td>116.0 ( -------- ) 1</td>
<td>120.9 (119.6 - 123.0) 3</td>
</tr>
<tr>
<td>Exumas</td>
<td>20.7 (19.9 - 21.5) 2</td>
<td>120.0 (118.0 - 122.0) 3</td>
<td>127.4 (124.8 - 129.9) 2</td>
</tr>
<tr>
<td>San Salvador</td>
<td>19.9 (18.8 - 21.2) 7</td>
<td>120.0 (113.0 - 127.0) 2</td>
<td>120.1 (115.1 - 123.3) 3</td>
</tr>
<tr>
<td>Rum Cay</td>
<td>19.8 (19.6 - 20.0) 2</td>
<td>114.5 (113.0 - 116.0) 2</td>
<td>128.3 ( -------- ) 1</td>
</tr>
<tr>
<td>Crooked-Acklins</td>
<td>20.2 (19.7 - 20.5) 5</td>
<td>----- ( -------- ) -</td>
<td>----- ( -------- ) -</td>
</tr>
<tr>
<td>Mayaguana</td>
<td>20.6 (19.0 - 22.3) 6</td>
<td>----- ( -------- ) -</td>
<td>----- ( -------- ) -</td>
</tr>
<tr>
<td>Great Inagua</td>
<td>20.1 (19.0 - 22.1) 12</td>
<td>117.0 (116.0 - 118.0) 3</td>
<td>122.9 (116.8 - 128.0) 4</td>
</tr>
<tr>
<td>Caicos Bank</td>
<td>20.3 (18.4 - 22.4) 18</td>
<td>117.0 ( -------- ) 1</td>
<td>124.1 (122.6 - 125.6) 2</td>
</tr>
<tr>
<td>Jamaica</td>
<td>20.9 (20.5 - 21.4) 4</td>
<td>119.8 (117.0 - 123.0) 4</td>
<td>123.9 (119.3 - 126.1) 4</td>
</tr>
</tbody>
</table>
Table 13. — Wing length and bill length (in millimeters) in four samples of *Polioptila caerulea*. Each set of numbers includes the mean and one standard deviation of the mean (row 1), along with the range and sample size (row 2).

<table>
<thead>
<tr>
<th>Location</th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wing</td>
<td>Bill</td>
<td>Wing</td>
<td>Bill</td>
</tr>
<tr>
<td>Eastern U.S. (excl. Florida) + Canada</td>
<td>52.6 ± 1.27</td>
<td>9.6 ± 0.40</td>
<td>50.7 ± 1.50</td>
<td>9.4 ± 0.38</td>
</tr>
<tr>
<td></td>
<td>50.0 - 54.0 (17)</td>
<td>8.8 - 10.2 (16)</td>
<td>48.0 - 52.0 (7)</td>
<td>8.9 - 9.7 (6)</td>
</tr>
<tr>
<td>Florida</td>
<td>50.6 ± 1.43</td>
<td>9.7 ± 0.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>49.0 - 53.0 (10)</td>
<td>9.1 - 10.3 (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Bahamas</td>
<td>49.6 ± 1.13</td>
<td>9.9 ± 0.31</td>
<td>47.1 ± 1.55</td>
<td>10.0 ± 0.67</td>
</tr>
<tr>
<td></td>
<td>48.0 - 51.0 (7)</td>
<td>9.5 - 10.3 (7)</td>
<td>45.0 - 50.0 (8)</td>
<td>8.9 - 11.2 (8)</td>
</tr>
<tr>
<td>Southern Bahamas</td>
<td>48.3 ± 1.49</td>
<td>10.5 ± 0.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>47.0 - 51.0 (8)</td>
<td>10.0 - 11.0 (10)</td>
<td></td>
<td>(1)</td>
</tr>
</tbody>
</table>

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Table 14. — Mean, and sample size (row 1) and range (row 2) for four measurements in 11 samples of *Vireo crassirostris* from the Bahamas; wing and tail measurements are of specimens collected only during the months January through April; all measurements in millimeters.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wing Length</td>
<td>Tail Length</td>
</tr>
<tr>
<td>Little Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>63.8 (10)</td>
<td>49.4 (11)</td>
<td>11.8 (19)</td>
</tr>
<tr>
<td>62.0-66.0</td>
<td>47.0-52.0</td>
<td>10.4-12.8</td>
</tr>
<tr>
<td>Andros</td>
<td>63.0 (2)</td>
<td>50.6 (2)</td>
</tr>
<tr>
<td>62.0-64.0</td>
<td>49.1-52.0</td>
<td>10.8-12.0</td>
</tr>
<tr>
<td>New Providence</td>
<td>62.5 (16)</td>
<td>49.5 (20)</td>
</tr>
<tr>
<td>60.0-65.0</td>
<td>44.1-52.6</td>
<td>11.0-12.7</td>
</tr>
<tr>
<td>Eleuthera</td>
<td>62.8 (10)</td>
<td>50.2 (10)</td>
</tr>
<tr>
<td>60.0-65.0</td>
<td>47.3-51.8</td>
<td>11.2-13.0</td>
</tr>
<tr>
<td>Cat</td>
<td>63.3 (6)</td>
<td>49.4 (6)</td>
</tr>
<tr>
<td>61.0-66.0</td>
<td>47.2-52.1</td>
<td>11.5-12.8</td>
</tr>
<tr>
<td>Green Cay</td>
<td>63.5 (2)</td>
<td>49.2 (2)</td>
</tr>
<tr>
<td>63.0-64.0</td>
<td>47.2-51.2</td>
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</tr>
<tr>
<td>Exumas</td>
<td>63.3 (8)</td>
<td>48.5 (8)</td>
</tr>
<tr>
<td>60.0-65.0</td>
<td>45.2-51.0</td>
<td>11.1-12.7</td>
</tr>
<tr>
<td>Locality</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td>Wing Length</td>
<td>Tail Length</td>
</tr>
<tr>
<td>Rum Cay</td>
<td>63.7 (3)</td>
<td>49.9 (3)</td>
</tr>
<tr>
<td></td>
<td>63.0-64.0</td>
<td>49.6-50.1</td>
</tr>
<tr>
<td>Crooked-Acklins</td>
<td>63.0 (3)</td>
<td>47.6 (3)</td>
</tr>
<tr>
<td></td>
<td>62.0-64.0</td>
<td>45.8-48.2</td>
</tr>
<tr>
<td>Great Inagua</td>
<td>62.3 (3)</td>
<td>48.8 (5)</td>
</tr>
<tr>
<td></td>
<td>61.0-64.0</td>
<td>47.3-50.3</td>
</tr>
<tr>
<td>Caicos Bank</td>
<td>59.4 (9)</td>
<td>44.7 (13)</td>
</tr>
<tr>
<td></td>
<td>57.0-61.0</td>
<td>42.4-46.9</td>
</tr>
<tr>
<td>Location</td>
<td>Bill Length</td>
<td>Bill Width</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>Little Bahama Bank</td>
<td>10.4 (10.0-10.6) 4</td>
<td>3.5 (3.3-3.7) 4</td>
</tr>
<tr>
<td></td>
<td>0.27, 0.14</td>
<td>0.16, 0.08</td>
</tr>
<tr>
<td>Great Bahama Bank</td>
<td>10.3 (9.9-10.5) 7</td>
<td>3.2 (3.1-3.2) 4</td>
</tr>
<tr>
<td></td>
<td>0.24, 0.09</td>
<td>0.05, 0.03</td>
</tr>
<tr>
<td>Rum Cay</td>
<td>10.3 (9.9-10.7) 10</td>
<td>3.2 (2.9-3.4) 10</td>
</tr>
<tr>
<td></td>
<td>0.33, 0.11</td>
<td>0.15, 0.05</td>
</tr>
<tr>
<td>Turks and Caicos Islands</td>
<td>10.3 (9.4-11.4) 27</td>
<td>3.3 (2.9-3.8) 28</td>
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<tr>
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<td>0.24, 0.05</td>
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<td>3.7 (3.3-4.0) 21</td>
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<td>0.38, 0.08</td>
<td>0.17, 0.04</td>
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<td>Cuba</td>
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<td>3.1 (2.7-3.5) 30</td>
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<td>0.18, 0.03</td>
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<td>Hispaniola</td>
<td>10.5 (9.3-11.4) 17</td>
<td>3.1 (3.0-3.6) 18</td>
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<td>0.51, 0.12</td>
<td>0.16, 0.04</td>
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<td>3.2 (3.0-3.4) 11</td>
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<td>0.56, 0.18</td>
<td>0.17, 0.05</td>
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<td>10.6 (9.8-11.7) 21</td>
<td>3.5 (3.0-3.9) 22</td>
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<td>0.51, 0.11</td>
<td>0.20, 0.04</td>
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<td>Puerto Rico</td>
<td>10.7 (10.1-11.4) 25</td>
<td>3.4 (3.1-3.7) 24</td>
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<tr>
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<td>0.34, 0.07</td>
<td>0.16, 0.03</td>
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Table 16. — Mean, range, and sample size for measurements of six characters in three samples of *Loxigilla violacea*; all measurements in millimeters.

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<th>Caicos Islands</th>
<th>Hispaniola</th>
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<tr>
<td>Males</td>
<td>77.4 (72.0 - 82.0) 50</td>
<td>73.3 (71.0 - 77.0) 8</td>
<td>75.8 (69.0 - 80.0) 46</td>
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<tr>
<td>Females</td>
<td>73.1 (70.0 - 79.0) 18</td>
<td>67.8 (66.0 - 69.0) 8</td>
<td>72.0 (68.0 - 77.0) 22</td>
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<tr>
<td>Tail Length</td>
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</tr>
<tr>
<td>Males</td>
<td>66.8 (62.1 - 74.5) 62</td>
<td>62.0 (57.9 - 65.3) 8</td>
<td>65.2 (60.6 - 71.1) 46</td>
</tr>
<tr>
<td>Females</td>
<td>62.2 (57.6 - 66.0) 19</td>
<td>56.5 (54.8 - 59.0) 9</td>
<td>61.3 (56.1 - 65.3) 21</td>
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<td>Total Length</td>
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<td>Males</td>
<td>159.8 (153.0-172.0) 11</td>
<td>148.8 (141.0-155.0) 8</td>
<td>156.3 (140.0-168.0) 34</td>
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<td>147.7 (135.0-155.0) 3</td>
<td>138.9 (128.0-147.0) 8</td>
<td>152.2 (142.0-164.0) 10</td>
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<td>14.6 (13.9 - 15.3) 8</td>
<td>14.0 (11.8 - 15.7) 46</td>
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<td>12.6 (12.0 - 13.3) 9</td>
<td>12.6 (11.2 - 14.9) 22</td>
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<td>Bill Width</td>
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<tr>
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<td>7.3 (6.8 - 7.9) 8</td>
<td>7.6 (6.8 - 8.5) 46</td>
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<td>9.7 (9.4 - 10.4) 7</td>
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Table 17. -- Mean, range, and sample size in wing length and tail length of *Loxigilla violacea* from satellite islands off the coast of Hispaniola; all measurements in millimeters.

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<td>TAIL</td>
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<td>Tortue</td>
<td>83.3 (82.0-84.0) 3</td>
<td>69.3 (67.7-70.1) 3</td>
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<td>Gonâve</td>
<td>78.1 (75.0-81.0) 9</td>
<td>64.9 (61.9-67.3) 8</td>
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<td>Ile-à-Vache</td>
<td>74.2 (72.0-76.0) 6</td>
<td>64.7 (61.4-67.2) 6</td>
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<td>Beata</td>
<td>73.5 (72.0-75.0) 4</td>
<td>58.3 (54.9-60.8) 4</td>
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<td>(--------) 1</td>
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<td>Saona</td>
<td>80.0 (--------) 2</td>
<td>69.6 (69.4-69.8) 2</td>
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Table 18. — Mean, range, and sample size for measurements of four characters in five samples of *Tiaris bicolor* from the Bahamas; all measurements in millimeters.

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<th>Tail Length</th>
<th>Bill Length</th>
<th>Bill Width</th>
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<td>42.3 (38.4-44.9) 17</td>
<td>8.6 (8.2-9.4) 18</td>
<td>3.8 (3.3-4.1) 18</td>
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<td>Bank</td>
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<tr>
<td>Crooked-Acklins</td>
<td>54.7 (54.0-55.0) 3</td>
<td>40.7 (40.1-41.5) 3</td>
<td>9.0 (8.6-9.5) 3</td>
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<td>41.6 (40.2-42.6) 4</td>
<td>8.9 (8.4-9.1) 4</td>
<td>4.0 (3.9-4.1) 4</td>
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<tr>
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<td>40.2 (38.9-41.4) 5</td>
<td>8.4 (7.7-9.4) 7</td>
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<td>43.2 (41.2-44.6) 7</td>
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<td>9.1 (9.0-9.1) 2</td>
<td>4.0 (3.9-4.0) 2</td>
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Table 19.—List of the native breeding birds of the Bahamas; their breeding status in Florida (FL), on Cuba (CU), on the Little Bahama Bank (LB), on the Great Bahama Bank (GB), in the southern Bahamas (SB), on Hispaniola (HI), on Jamaica (JA), and on Puerto Rico (PR); * = breeding, *? = probably breeding but further documentation required, ? = few records, status unknown, E = extirpated, 0 = not present as a breeding bird, I = introduced; lower case letters indicate presence of different subspecies.

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Table 19.—Continued

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<tr>
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<td>*</td>
<td>*</td>
<td>*</td>
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<td>*xb</td>
<td>*xb</td>
<td>*xb</td>
<td>*xb</td>
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<td>*b</td>
<td>*b</td>
<td>*b</td>
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<td>*a</td>
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<td>*b</td>
<td>*c</td>
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<td>Myiarchus sagrae</td>
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<td>*b</td>
<td>*b</td>
<td>*b</td>
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<td>Corvus nasicus</td>
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Table 19.—Continued

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<th>LB</th>
<th>GB</th>
<th>SE</th>
<th>HI</th>
<th>JA</th>
<th>PR</th>
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<td>*b</td>
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<td>0</td>
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<td>*</td>
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<td>*a</td>
<td>*a</td>
<td>*a</td>
<td>*b</td>
<td>*b</td>
<td>*b</td>
<td>*b</td>
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<td>Dendroica petechia</td>
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<td>*a</td>
<td>*a</td>
<td>*a</td>
<td>*b</td>
<td>*b</td>
<td>*b</td>
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<td>*c</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td>Dendroica pityophila</td>
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<td>*</td>
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<td>0</td>
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<td>0</td>
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<td>Dendroica pinus</td>
<td>*a</td>
<td>0</td>
<td>*b</td>
<td>*b</td>
<td>0</td>
<td>*c</td>
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<td>Geothlypis rostrata</td>
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<td>*a</td>
<td>*b+c</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>Coereba flaveola</td>
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<td>0</td>
<td>*a</td>
<td>*a</td>
<td>*a</td>
<td>*b</td>
<td>*c</td>
<td>*d</td>
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<td>*a</td>
<td>*b</td>
<td>*c</td>
<td>*?c</td>
<td>*d</td>
<td>*e</td>
<td>*f</td>
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<tr>
<td>Icterus dominicensis</td>
<td>0</td>
<td>*a</td>
<td>*b</td>
<td>*b</td>
<td>0</td>
<td>*c</td>
<td>0</td>
<td>*d</td>
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<tr>
<td>Agelaius phoeniceus</td>
<td>*a+b</td>
<td>*e</td>
<td>*f</td>
<td>*f</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Loxigilla violacea</td>
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<td>0</td>
<td>*a</td>
<td>*a</td>
<td>*a</td>
<td>*b</td>
<td>*c</td>
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<td>Tiaris bicolor</td>
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<td>*a</td>
<td>*a</td>
<td>*a</td>
<td>*b</td>
<td>*b</td>
<td>*c</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 20. — Widespread species present in the Bahamas and on all but one of the major islands in the Greater Antilles; island whence species is absent indicated as follows (C) Cuba, (H) Hispaniola (J) Jamaica, (P) Puerto Rico.

<table>
<thead>
<tr>
<th>Species</th>
<th>Island of Absence</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Dichromanssa rufescens</em></td>
<td>(P)</td>
</tr>
<tr>
<td><em>Geotrygon chrysia</em></td>
<td>(J)</td>
</tr>
<tr>
<td><em>Contopus caribaeus</em></td>
<td>(P)</td>
</tr>
<tr>
<td><em>Mimocichla plumbea</em></td>
<td>(J)</td>
</tr>
<tr>
<td><em>Coereba flaveola</em></td>
<td>(C)</td>
</tr>
<tr>
<td><em>Icterus dominicensis</em></td>
<td>(J)</td>
</tr>
<tr>
<td><em>Tyto alba</em></td>
<td>(P)</td>
</tr>
</tbody>
</table>
Table 21. -- Examples of species found in Cuba and the Bahamas but not on any of the other major islands in the Antilles.

<table>
<thead>
<tr>
<th>Phalacrocorax olivaceus</th>
<th>Tyrannus cubensis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazona leucocephala</td>
<td>Myiarchus sagrae</td>
</tr>
<tr>
<td>Saurothera merlini</td>
<td>Corvus nasicus</td>
</tr>
<tr>
<td>Chlorostilbon ricordii</td>
<td>Dendroica pityophila</td>
</tr>
<tr>
<td>Melanerpes superciliaris</td>
<td></td>
</tr>
</tbody>
</table>
Table 22. — List of subspecies of birds endemic to the Bahamas; an asterisk indicates species that are not land birds. Distributions are indicated as follows: N = northern Bahamas, S = southern Bahamas, ss = San Salvador only.

<table>
<thead>
<tr>
<th>Species</th>
<th>Distribution</th>
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<tbody>
<tr>
<td>Butorides virescens bahamensis*</td>
<td>(NS)</td>
</tr>
<tr>
<td>Rallus longirostris coryi*</td>
<td>(NS)</td>
</tr>
<tr>
<td>Amazona leucocephala bahamensis</td>
<td>(NS)</td>
</tr>
<tr>
<td>Saurothera merlini andria</td>
<td>(N)</td>
</tr>
<tr>
<td>Saurothera merlini bahamensis</td>
<td>(N)</td>
</tr>
<tr>
<td>Chlorostilbon ricordii braceii</td>
<td>(N)</td>
</tr>
<tr>
<td>Philodice evelynae evelynae</td>
<td>(NS)</td>
</tr>
<tr>
<td>Philodice evelynae lyura</td>
<td>(S)</td>
</tr>
<tr>
<td>Melanerpes superciliaris blakei</td>
<td>(N)</td>
</tr>
<tr>
<td>Melanerpes superciliaris bahamensis</td>
<td>(N)</td>
</tr>
<tr>
<td>Melanerpes superciliaris nyeanus</td>
<td>(SS)</td>
</tr>
<tr>
<td>Dendrocopus villosus maynardi</td>
<td>(N)</td>
</tr>
<tr>
<td>Dendrocopus villosus piger</td>
<td>(N)</td>
</tr>
<tr>
<td>Tyrannus caudifasciatus bahamensis</td>
<td>(N)</td>
</tr>
<tr>
<td>Myiarchus sagrae lucaysiensis</td>
<td>(NS)</td>
</tr>
<tr>
<td>Contopus caribaeus bahamensis</td>
<td>(N)</td>
</tr>
<tr>
<td>Sitta pusilla insularis</td>
<td>(N)</td>
</tr>
<tr>
<td>Mimocichla plumbea plumbea</td>
<td>(N)</td>
</tr>
<tr>
<td>Dendroica dominica flavescens</td>
<td>(N)</td>
</tr>
<tr>
<td>Dendroica pinus achrustera</td>
<td>(N)</td>
</tr>
<tr>
<td>Geothlypis rostrata tanneri</td>
<td>(N)</td>
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<tr>
<td>Geothlypis rostrata ignota</td>
<td>(N)</td>
</tr>
<tr>
<td>Geothlypis rostrata rostrata</td>
<td>(N)</td>
</tr>
<tr>
<td>Geothlypis rostrata coryi</td>
<td>(N)</td>
</tr>
<tr>
<td>Coereba flaveola bahamensis</td>
<td>(NS)</td>
</tr>
<tr>
<td>Spindalis zena townsendi</td>
<td>(N)</td>
</tr>
<tr>
<td>Spindalis zena zena</td>
<td>(NS)</td>
</tr>
<tr>
<td>Icterus dominicensis northropi</td>
<td>(N)</td>
</tr>
<tr>
<td>Agelaius phoeniceus bryanti</td>
<td>(N)</td>
</tr>
<tr>
<td>Loxigilla violacea violacea</td>
<td>(NS)</td>
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</table>
Table 23.—Numbers of species in each of eight families of birds found on six Bahama Islands of three different size classes; expected number of species for each size class are from Terborgh (1973). Names of islands are coded as follows: Cr=Crooked Island, NP=New Providence, LG=Long Island, GI=Great Inagua, An=Andros; regions of the archipelago in parentheses, coded as follows: S=Southern Bahamas, GB=Great Bahama Bank, LB=Little Bahama Bank.

<table>
<thead>
<tr>
<th>Families</th>
<th>Area 50 mi² to 100 mi²</th>
<th>Cr(S)</th>
<th>NP(GB)</th>
<th>Lg(GB)</th>
<th>Area 500 mi² to 100 mi²</th>
<th>GB(LB)</th>
<th>GI(S)</th>
<th>Area 2000 mi²</th>
<th>An(GB) 2300 mi²</th>
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<td>3-5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5-6</td>
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<td>5</td>
<td>7</td>
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<td>2</td>
<td>1</td>
<td>2-3</td>
<td>2</td>
<td>1</td>
<td>2-3</td>
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<tr>
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<td>0</td>
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<td>Tyrannidae</td>
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<td>2</td>
<td>4</td>
<td>1</td>
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<td>4</td>
<td>2</td>
<td>4-5</td>
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<td>2</td>
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<td>2-3</td>
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<td>Parulidae</td>
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<td>3</td>
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<td>23</td>
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<td>Total number of land birds (excluding raptors):</td>
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<td>32</td>
<td>20</td>
<td>36</td>
<td>25</td>
<td>34</td>
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</table>
Table 24. — Distribution of resident breeding birds in the Bahamas; 
E = extirpated, ? = Status uncertain.

<table>
<thead>
<tr>
<th>Species</th>
<th>Examples of species found in the northern islands only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sula dactylatra</td>
<td>Contopus caribaeus</td>
</tr>
<tr>
<td>Phalacrocorax auritus</td>
<td>Callichelidon cyaneoviridis</td>
</tr>
<tr>
<td>Ixobrychus exilis</td>
<td>Sitta pusilla</td>
</tr>
<tr>
<td>Cathartes aura</td>
<td>Mimocichla plumbea</td>
</tr>
<tr>
<td>Buteo jamaicensis</td>
<td>Dendroica dominica</td>
</tr>
<tr>
<td>Saurothera merlini</td>
<td>Dendroica pityophila</td>
</tr>
<tr>
<td>Chlorostilbon ricordii</td>
<td>Dendroica pinus</td>
</tr>
<tr>
<td>Melanerpes superciliaris</td>
<td>Geothlypis rostrata</td>
</tr>
<tr>
<td>Dendrocopos villosus</td>
<td>Icterus dominicensis</td>
</tr>
<tr>
<td>Tyrannus caudifasciatus</td>
<td>Agelaius phoeniceus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Examples of species found in the southern islands only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falco sparverius</td>
<td>Zenaida asiatica (?)</td>
</tr>
<tr>
<td>Charadrius vociferus (?)</td>
<td>Tyrannus cubensis (E)</td>
</tr>
<tr>
<td></td>
<td>Corvus nasicus</td>
</tr>
</tbody>
</table>
Table 25.—Distribution of resident land birds (excluding raptors) among the islands of the southern Bahamas: C-A = Crooked-Acklins, GI = Great Inagua, Ma = Mayaguana, Ca = Caicos Islands, Tu = Turks Islands, + = known or presumed breeding populations, 0 = unrecorded or vagrant. E = extirpated. Roman numerals indicate stages in the taxon cycle within the limits set by Ricklefs (1970) and Ricklefs and Cox (1972, 1978). Asterisks denote species that have reached Florida, presumably from Cuba and/or the Bahamas; R = resident, v = vagrant.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>C-A</th>
<th>GI</th>
<th>Ma</th>
<th>Ca</th>
<th>Tu</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Columba leucocephala</strong></td>
<td>I * R</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Zenaida macroura</strong></td>
<td>I * R</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Zenaida aurita</strong></td>
<td>I * E</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Zenaida asiatica</strong></td>
<td>I * (?)</td>
<td>?</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td><strong>Columbina passerina</strong></td>
<td>II</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Geotrygon chrysia</strong></td>
<td>I * v</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td><strong>Amazona leucocephala</strong></td>
<td>III</td>
<td>E</td>
<td>+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Coccyzus minor</strong></td>
<td>II * R</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Crotophaga ani</strong></td>
<td>I * R</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td><strong>Chordeiles gundlachii</strong></td>
<td>I * R</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Philodice evelynae</strong></td>
<td>I * v</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Tyrannus dominicensis</strong></td>
<td>I * R</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Tyrannus cubensis</strong></td>
<td>IV</td>
<td>0</td>
<td>E</td>
<td>0</td>
<td>E</td>
</tr>
<tr>
<td><strong>Myiarchus sagrae</strong></td>
<td>II</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Corvus nasicus</strong></td>
<td>III</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td><strong>Mimus polyglottos</strong></td>
<td>I</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Mimus gundlachii</strong></td>
<td>III * v</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Margarops fuscatus</strong></td>
<td>I</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td><strong>Polioptila caerulea</strong></td>
<td>I</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Vireo crassirostris</strong></td>
<td>III * v</td>
<td>+</td>
<td>+</td>
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</table>
Table 25. — Continued

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>C-A</th>
<th>GI</th>
<th>Ma</th>
<th>Ca</th>
<th>Tu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vireo altiloguus</td>
<td>I * R</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Dendroica petechia</td>
<td>II * R</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Coereba flaveola</td>
<td>II * v</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Spindalis zena</td>
<td>III * v</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Loxigilla violacea</td>
<td>II</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>Tiaris bicolor</td>
<td>I * v</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Totals</td>
<td></td>
<td>21</td>
<td>23</td>
<td>16</td>
<td>23</td>
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<tr>
<td>Area (Km²)</td>
<td></td>
<td>836</td>
<td>1627</td>
<td>293</td>
<td>860</td>
</tr>
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</table>
Table 26.—Similarity coefficient matrix for the land birds (Columbiformes through Passeriformes) of the Bahamas and adjacent areas. TI = Turks Islands, SB = southern Bahamas (excl. TI), NB = northern Bahamas, Fl = southern Florida, Cu = Cuba, Hi = Hispaniola. Numbers in boldface indicate total number of species; numbers above those in boldface indicate shared species, those below indicate percent of smaller fauna shared with larger.

<table>
<thead>
<tr>
<th></th>
<th>TI</th>
<th>SB</th>
<th>NB</th>
<th>Fl</th>
<th>Cu</th>
<th>Hi</th>
</tr>
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<tbody>
<tr>
<td>TI</td>
<td>13</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>SB</td>
<td>100.0</td>
<td>28</td>
<td>25</td>
<td>15</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>NB</td>
<td>92.3</td>
<td>89.3</td>
<td>40</td>
<td>20</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Fl</td>
<td>76.9</td>
<td>53.5</td>
<td>50.0</td>
<td>60</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Cu</td>
<td>69.2</td>
<td>71.4</td>
<td>62.5</td>
<td>31.6</td>
<td>70</td>
<td>36</td>
</tr>
<tr>
<td>Hi</td>
<td>76.9</td>
<td>67.8</td>
<td>55.5</td>
<td>26.6</td>
<td>51.4</td>
<td>74</td>
</tr>
</tbody>
</table>
Figure 1.—Map of the West Indies.
Figure 2.—Map of the Bahama Islands; stippling denotes area above the 100 fathom line and approximates the outline of the banks.
Figure 3.—Map of the southern Bahamas, exclusive of the Turks and Caicos Islands; broken lines show the main banks.
Figure 4.—Map of the Turks and Caicos Islands.
Figure 5.—Tracks of hurricanes and tropical storms that have reached the Bahamas from Florida and/or the Greater Antilles in the period 1875–1975.
HURRICANE: WIND SPEED > 63 KT (73 MPH)
TROPICAL STORM: WIND SPEED 34-63KT (39-73 MPH)
TROPICAL STORM OR HURRICANE

--- 300 KM
Figure 6.—Histograms showing relative distribution in bill depth measurements (in millimeters) among specimens of Nyctanassa violacea; number after each locality is sample size, broken lines indicate specimens that probably were visitors to the locality in which they taken (see text, p.39).
Figure 7.—Histograms showing wing length (in millimeters) in five samples of *Zenaida macroura*; solid ovals = males, open ovals = females, ovals above line = specimens taken in the period 15 April through 31 July, ovals below line = specimens taken at all other times of the year.
Figure 8.—Population-range diagram showing wing length in males of *Columbina passerina* from the Bahamas; horizontal line = range, vertical line = mean, open rectangle = one standard deviation on either side of the mean, numbers adjacent to encircled sample localities are sample sizes. Names of islands and number of specimens from each one as follows: A—Grand Bahama 2, Abaco 2; B—New Providence 20; C—Eleuthera 4; D—Green Cay 1, Exumas 3, Cat Island 1; E—Rum Cay 9, San Salvador 4; F—Crooked Island 1, Acklins Island 2, Mayaguana 4; G—Great Inagua 10; H—Middle Caicos 4, East Caicos 1, French Cay 1, Grand Turk 3. All measurements in millimeters.
Figure 9.—Distribution of 190 specimens of *Vireo crassirostris* from the Bahamas in four categories of ventral coloration ranging from predominately white (1) to predominately yellow (4) given as males/females for each sample; localities as follows: A = Little Bahama Bank, B = Andros, C = New Providence, D = Eleuthera, E = Green Cay, F = Exumas, G = Cat Island, H = Long Island, I = Rum Cay, J = Crooked–Acklins + Mayaguana, K = Great Inagua, L = Caicos Islands.
WHITE → YELLOW

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>A</td>
<td>6%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>B</td>
<td>1%</td>
<td>2%</td>
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<td>0%</td>
</tr>
<tr>
<td>C</td>
<td>13%</td>
<td>15%</td>
<td>3%</td>
<td>0%</td>
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<tr>
<td>D</td>
<td>1%</td>
<td>6%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>E</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>F</td>
<td>0%</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>G</td>
<td>0%</td>
<td>5%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>H</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>I</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>J</td>
<td>0%</td>
<td>0%</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>K</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>L</td>
<td>0%</td>
<td>0%</td>
<td>10%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Legend:
- A: White
- B: Yellow
- C: Blue
- D: Green
- E: Red
- F: Black
- G: Orange
- H: Purple
- I: Pink
- J: Brown
- K: Grey
- L: Grey

Arrow: -
Figure 10.—Histograms showing wing length, tail length, and bill depth in selected Bahaman samples of *Vireo crassirostris*; in each set the Caicos sample (middle) is compared to the Bahaman sample with the largest mean (above) and the one with the smallest mean (below). Localities are abbreviated as follows: Ca = Caicos, El = Eleuthera, Ex = Exumas, GI = Great Inagua, LB = Little Bahama Bank, NP = New Providence. All measurements in millimeters.
<table>
<thead>
<tr>
<th></th>
<th>MALES</th>
<th></th>
<th>FEMALES</th>
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</thead>
<tbody>
<tr>
<td>WING LENGTH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>LB</td>
<td>55</td>
<td>El</td>
</tr>
<tr>
<td>60</td>
<td>Ca</td>
<td>60</td>
<td>Ca</td>
</tr>
<tr>
<td>65</td>
<td>NP</td>
<td>65</td>
<td>NP</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>TAIL LENGTH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>El</td>
<td>40</td>
<td>El</td>
</tr>
<tr>
<td>45</td>
<td>Ca</td>
<td>45</td>
<td>Ca</td>
</tr>
<tr>
<td>50</td>
<td>Ex</td>
<td>50</td>
<td>GI</td>
</tr>
<tr>
<td>55</td>
<td></td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>BILL DEPTH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>GI</td>
<td>35</td>
<td>LB</td>
</tr>
<tr>
<td>40</td>
<td>Ca</td>
<td>40</td>
<td>Ca</td>
</tr>
<tr>
<td>45</td>
<td>El</td>
<td>45</td>
<td>NP</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
Figure 11.—Population-range diagram showing bill length in males of *Coereba flaveola* from the Bahamas; horizontal line = range, vertical line = mean, open rectangle = one standard deviation on either side of the mean; numbers adjacent to encircled sample localities are sample sizes. Names of islands and number of specimens from each one are as follows: A—Grand Bahama 9, Abaco (including Great and Little Abaco and Green Turtle Cay) 7; B—Andros 4, Frazer's Hog Cay 1; C—New Providence 23; D—Eleuthera 11; E—Cat Island 1, Conception Island 3; F—Long Island 1, Rum Cay 5, San Salvador 7; G—Crooked Island 1, Fortune Island 1, Acklins Island 1, West Plana Cay 2, Mayaguana 2; H—Providenciales 4, North Caicos 3, Middle Caicos 1, East Caicos 3. All measurements in millimeters.
Figure 12.—Means (row 1) and sample sizes (row 2) for the series of measurements wing length-tail length-total length (from fresh specimens only)—bill length—bill depth—bill width in 22 samples of males of Loxigilla violacea; N = no measurements. Names of Bahaman localities abbreviated as follows: LB = Little Bahama Bank, BI = Berry Islands, NP = New Providence, An = Andros, El = Eleuthera, Ct = Cat Island, GI = Great Inagua, Ca = Caicos Islands. Localities on Hispaniola and its satellite islands coded as follows: Haiti—L = south island, b = north island; Dominican Republic—c = Monte Cristi and Puerto Plata Provinces, d = La Romana and La Altagracia Provinces, e = La Vega Province, f = Azua and Peravia Provinces, g = Pedernales Province, H = Gonâve, I = Tortue, J = Saona, K = Catalina, L = Beata, M = Ile-à-Vache. All measurements in millimeters.
Figure 13.—Mensural data for female *Loxigilla violacea*. C-A = Crooked-Acklins Bank; all other abbreviations, along with sequence of measurements, as in Figure 12.


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VITA

Donald W. Buden was born in Worcester, Massachusetts, on 7 May 1943. He graduated from Classical High School in Worcester in June 1961. He received a Bachelor of Science degree from the University of Miami in Coral Gables, Florida in June 1965. In September 1968, he entered the Louisiana State University Graduate School in the Department of Zoology and Physiology where he received a Master of Science degree (January 1971), and now is a candidate for the Doctor of Philosophy degree.
EXAMINATION AND THESIS REPORT

Candidate: Donald W. Buden

Major Field: Zoology

Title of Thesis: Ornithogeography of the Southern Bahamas

Approved:

[Signatures]

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

20 Apr. 1, 1979