STUDIES ON THE FAUNA OF CURAÇAO AND OTHER CARIBBEAN ISLANDS: No. 29.

THE BIRDS OF ARUBA, CURAÇAO, AND BONAIRE

by

K. H. VOOUS

(Zoölogisch Museum, Amsterdam)

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This is the second and concluding part of a report on the birds of the Netherlands Antilles, the first part dealt with the birds of St. Martin, Saba, and St. Eustatius (*Studies fauna Curaçao Car. Is. 6*, no. 25, 1955, p. 1–82). The present part will give a full account of the birds of Aruba, Curaçao, and Bonaire.

Accompanied by my wife I stayed in these islands from September 22, 1951 until April 19, 1952, only interrupted by a week's visit to Venezuela and the period between February 1 and March 14, 1952, when we were working in St. Martin, Saba, and St. Eustatius. Our collection of birds from Aruba, Curaçao, and Bonaire comprizes 986 specimens, representing 103 species, all of which have been deposited in the Zoological Museum of Amsterdam. Although part of the collection has been prepared in the field by my wife and me, a not unimportant number of collected birds was kept in the freezing rooms of the Abattoir of the Veterinary Service in Curaçao (Parera) and Aruba (Oranjestad), from where it was shipped to Holland under deep-freezing temperatures and subsequently prepared by

the taxidermists of the Zoological Museum of Amsterdam. For most valuable help in this matter of preserving our specimens, which considerably facilitated our work in the field, we are greatly indebted to Mr. J. W. M. DIEMONT, Director, Mr. B. A. BITTER, and other employees of the Veterinary Service of the Netherlands Antilles.

For further introductory remarks and acknowledgements I may refer to the introduction to my first paper (VOOUS 1955) in order to avoid repetition. Still, I feel I can hardly omit mentioning the names of those persons, among the very great number of helpful people in the islands, who assisted us in a way hardly to be surpassed; in *Curaçao*: board and members of the Natural Sciences Study Group Netherlands Antilles (*"Natuurwetenschappelijke Werkgroep Nederlandse Antillen"*), among which were Mr. and Mrs. B. A. BITTER, Mr. and Mrs. J. G. DE JONG, Mr. and Mrs. P. A. VAN DER WERF; in *Aruba*: Mr. and Mrs. E. BARTELS; in *Bonaire*: Mr. and Mrs X. M. C. H. KRUGERS, Mr. L. D. GERHARTS, and Mr. J. VALKENBERG. To all these persons and to the very many others not mentioned here the sincerest thanks of the author and his wife are most heartily rendered.

After our return to the Netherlands interesting ornithological reports from Curaçao, often substantiated by skinned specimens and colour-slides, have been received from the following persons, to all of whom I wish to express my sincerest thanks: Mr. F. H. ANSINGH, Mr. P. H. A. BRONNEBERG, Mr. J. G. DE JONG, Mr. H. J. KOELERS, Mr. P. A. VAN DER WERF; in addition magnificent colour-slides from K. MAYER (Bonaire). In the following chapters of this publication full credit will be given to their records.

Our collection of 986 skins from Aruba, Curaçao, and Bonaire has been studied in direct comparison with 156 birds from the collection of RUTTEN in the Leiden Museum and with 103 specimens from other sources. Among these latter are specimens collected in Aruba, Curaçao, or Bonaire by (1) F. H. ANSINGH (Collection Ansingh, Curaçao; Amsterdam Museum), (2) Jhr. Dr. V. H. VAN DEN BERGH (Amsterdam Museum; Leiden Museum), (3) H. W. E. CROOCKEWIT (Amsterdam Museum), (4) J. F. FERRY (Chicago Natural History Museum), (5) Dr. ERNST HARTERT (American Museum of Natural History, New York), (6) Dr. C. J. VAN DER HORST (Amsterdam

Museum), (7) Brother M. REALINO (Leiden Museum), (8) H. J. KOELERS (Collection Koelers, Curaçao; Amsterdam Museum), (9) Dr. K. MARTIN (Leiden Museum), (10) ERNST PETERS (Senckenberg Museum, Frankfurt), (11) Messrs. W. H. PHELPS, father and son (Collection Phelps, Caracas).

This study could not have been completed without the help of a great many of colleagues from other institutions, whom I take pleasure in mentioning below and to whom I wish to express my deep appreciation for their kind help: Dr. D. AMADON (New York), Prof. Dr. J. BERLIOZ (Paris), Mr. E. R. BLAKE (Chicago), Mr. J. BOND (Philadelphia), Dr. H. FRIEDMANN (Washington), Dr. G. C. A. JUNGE (Leiden), Mr. J. D. MACDONALD (London), Prof. Dr. A. H. MILLER (Berkeley), Dr. W. H. PHELPS (Caracas), Mr. W. H. PHELPS, Jr. (Caracas), Dr. F. A. PITELKA (Berkeley), Mr. A. L. RAND (Chicago), Dr. E. SCHÄFER (Maracay), Dr. J. STEINBACHER (Frankfurt), Mr. J. VAN TYNE (Ann Arbor), Dr. A. WETMORE (Washington), Dr. J. T. ZIMMER (New York).

Various other assistance has been received from the following persons: Prof. Dr. L. F. DE BEAUFORT (Amersfoort) identified the fishes taken from the stomachs of various water and sea-birds. Mrs. W. S. S. VAN DER FEEN (Miss VAN BENTHEM JUTTING) (Amsterdam) identified some molluscs found in the stomachs of shore-birds. Dr. P. WAGENAAR HUMMELINCK (Utrecht) assisted with the identification of various invertebrates found as stomach-contents. Miss THERESA CLAY (London) identified various Mallophaga from our bird-specimens. Mr. C. NEIJSSEL (Amsterdam) took measurements and made various comparative descriptions of the collected eggs. To all persons mentioned above, and last but not least to my wife, who was my constant help both in the field and in the museum, this paper is dedicated in great appreciation to their helpful efforts.

One new subspecies, *Coereba flaveola bonairensis*, based on the collected material, has been described in another place (*Studies fauna Curaçao Car.Is. 6*, no. 26, 1955, p. 83–85).

In order to present a complete review of the birds of the Netherlands Antilles in a comprehensive form, which could stimulate the

study and the protection of the birds in the islands, a field-book on the "Birds of the Netherlands Antilles" by the present author has been published — with the cooperation of the Foundation for Scientific Research in Surinam and the Netherlands Antilles, Utrecht — by the Natural Sciences Study Group Netherlands Antilles (*"Natuurwetenschappelijke Werkgroep Nederlandse Antillen"*) in March 1955 (*De Vogels van de Nederlandse Antillen* — Nijhoff, The Hague; Salas, Curaçao). This work is profusely illustrated with coloured and plain figures by H. J. SLIJPER, some of which are added to the present paper, and contain most of the up to that date unpublished records in a preliminary form.

The following 43 species have been recorded from Aruba, Curaçao and Bonaire in this paper for the first time:

* observed, not collected
** from colour-picture
*** not yet mentioned by VOOUS,
De Vogels van de Nederlandse Antillen, 1955

****Puffinus lherminieri lherminieri*
Podiceps dominicus speciosus
Podilymbus podiceps antillarum
Phaëthon aethereus mesonauta
Anas americana
Aythya affinis
**Milvago chimachima cordata*
Falco columbarius columbarius
Porphyrula martinica
****Fulica caribaea*
Pluvialis dominica dominica
Charadrius vociferus vociferus
Catoptrophorus semipalmatus semipalmatus
Limnodromus griseus griseus
Capella gallinago
**Calidris canutus rufa*
Calidris mauri
Micropalama himantopus
Stercorarius parasiticus
***Anoüs minutus americanus*
Guira guira
****Chordeiles minor gundlachii*
****Chordeiles minor minor*
Sphyrapicus varius varius
Muscivora tyrannus tyrannus
Elaenia chiriquensis albivertex
Progne subis subis
****Progne chalybea chalybea*
Petrochelidon pyrrhonota pyrrhoncla
Riparia riparia riparia
Hylocichla mustelina
Hylocichla ustulata swainsoni
Hylocichla fuscescens fuscescens
Vireo olivaceus olivaceus
****Mniotilta varia*
****Protonotaria citrea*
****Dendroica fusca*
**Dendroica castanea*
Dendroica striata
Seiurus aurocapillus
Oporornis agilis
**Oporornis philadelphia*
Piranga olivacea
Passerina cyanea

In addition there are 7 additional subspecies of which first records from Aruba, Curaçao, and Bonaire have been published here for the first time:

Pelecanus occidentalis carolinensis
Ardea herodias repens
Butorides virescens virescens
Charadrius wilsonia wilsonia
Vireo altiloquus barbatulus
Seiurus noveboracensis noveboracensis
Seiurus noveboracensis limnaeus

In the present paper records have been included as late as from 31 December, 1955.

Some general information concerning the islands of Aruba, Curaçao, and Bonaire — including maps and photographs — are to be found in the 1st, 4th, and 17th papers of these *Studies*, vols. I (1940), II (1940), and IV (1953).

HISTORICAL

In spite of their favourable geographic position it cannot be said that the islands of Aruba, Curaçao, and Bonaire have attracted much attention by ornithologists. Still, there seem to be at least five species of birds from these islands that were known to scientists as early as in the days of LINNEAUS or shortly afterwards. Probably these specimens were brought home to Europe by those early voyagers who, apart from their commercial aim, took an interest in the natural history of the islands. These five species have been described or mentioned under the following names:

Psittacus pertinax Linnaeus 1758 (substituted Curaçao) = *Aratinga pertinax pertinax.*

Tetrao cristatus Linnaeus 1766 (substituted Curaçao) = *Colinus cristatus cristatus.*

Falco (Cheriway) Jacquin 1784, Aruba = *Polyborus cheriway cheriway.*

Psittacus barbadensis Gmelin 1788 (substituted Aruba) = *Amazona barbadensis barbadensis.*

Pandion Caracara? Gray 1829, Curaçao = *Polyborus cheriway cheriway.*

Additions to the knowledge of the avifauna of Aruba, Curaçao, and Bonaire followed only slowly.

In 1850 BONAPARTE described *Conurus xanthogenius* from a unique specimen without known locality in the Leiden Museum. It was HARTERT who in 1893 and later in 1902 succeeded in proving that this specimen could only have originated from Bonaire, and, thus, represented the first authenticated record of any bird species from the island.

In 1868 G. J. SIMONS, who was a clergyman in Curaçao, published a list — compiled by a government surgeon, N. ANSLIJN — comprising 28 birds said to occur in Curaçao. Some of his names, which are conspicuous by their orthographical errors, remain indeterminable, but others have been substantiated in later years by the collecting of specimens.

In the meantime individual North American amateur-ornithologists occasionally visited the islands, bringing home specimens which subsequently served as the type specimens of descriptions made by leading American ornithologists in Washington and New York:

Shortly before 1874, collected by HENRY H. RAVEN: *Chlorostilbon caribaeus* Lawrence 1874 = *Chlorostilbon mellisugus caribaeus*.

Shortly before 1882, obtained from Dr. A. A. JULIEN as a cage bird from (?) Aruba: *Chrysotis canifrons* Lawrence 1883 = *Amazona barbadensis barbadensis*.

February 1884, collected in Curaçao by J. E. BENEDICT and W. NYE during the cruise of the United States Fish Commission Steamer "Albatross":

Ardea herodias, mentioned by RIDGWAY 1884 = *Ardea herodias adoxa* Oberholser 1939 = *Ardea herodias herodias*.

Zenaida vinaceo-rufa Ridgway 1884 = *Zenaidura auriculata vinaceo-rufa*.

Mimus gilvus rostratus Ridgway 1884 = *Mimus gilvus rostratus*.

Dendroica rufopileata Ridgway 1884 = *Dendroica petechia rufopileata*.

Icterus curasoënsis Ridgway 1884 = *Icterus nigrogularis curasoënsis*.

In January and February 1885 K. MARTIN, professor in geology at Leiden University, made geological explorations in Aruba, Curaçao, and Bonaire. In the report of his journey, published in 1888, this author mentions the presence of 2 species of birds in Aruba, 9 in Curaçao, and 2 in Bonaire, some of them having been substantiated by specimens brought home and deposited in the Leiden Museum. MARTIN's species list is as follows:

Aruba: *Amazona barbadensis*
Aratinga pertinax

Curaçao: *Polyborus cheriway*
Falco sparverius
Columbigallina passerina
Aratinga pertinax
Chlorostilbon mellisugus
Chrysolampis mosquitus
Mimus gilvus
Coereba flaveola
Icterus icterus

Bonaire: *Columbigallina passerina*
Aratinga pertinax

The first regular report on the birds of one of the islands of the Netherlands Leeward Group appeared in 1892, when H. VON BERLEPSCH published a list of the birds collected for him in Curaçao between August 21 and September 5, 1890 by ERNST PETERS, a German clergyman working in Venezuela. Hist list, to which interesting diary-extracts by PETERS himself are added, contains the names of 19 species, among which were the following 3 new descriptions and names:

Buteo albicaudatus colonus = *Buteo albicaudatus colonus*.

Tinnunculus sparverius brevipennis = *Falco sparverius brevipennis*.

Coereba uropygialis = *Coereba flaveola uropygialis*.

In addition PETERS listed the names of 35 species observed but not collected, some of which probably were erroneously identified and others never substantiated by specimens collected by subsequent ornithologists.

In 1892 Dr. ERNST HARTERT accompanied by his wife CLAUDIA started a first thorough investigation of the bird life of all three islands, collecting specimens for the Rothschild Collection at Tring. HARTERT visited Aruba, Curaçao, and Bonaire in the months June and July, reports on his journey being published in 1892, 1893, and 1902. These works still remain the firm basis of present knowledge on the birds of Aruba, Curaçao, and Bonaire. HARTERT has described no less than 8 new subspecies of birds from the Netherlands Leeward Group, all but one having been proved in later years to be valid:

Columbigallina passerina perpallida 1893, Curaçao = *Columbigallina passerina albivitta.*

Chrysotis rothschildi 1892, Bonaire = *Amazona barbadensis rothschildi.*

Conurus arubensis 1892, Aruba = *Aratinga pertinax arubensis.*

Strix flammea bargei 1892, Curaçao = *Tyto alba bargei.*

Myiarchus brevipennis 1892, Aruba, Curaçao, Bonaire = *Myiarchus tyrannulus brevipennis.*

Xanthornus icterus ridgwayi 1902, Aruba = *Icterus icterus ridgwayi.*

Euetheia sharpei 1893, Curaçao = *Tiaris bicolor sharpei.*

Coturniculus savannarum caribaeus 1902, Bonaire = *Ammodramus savannarum caribaeus.*

In the same year, in 1892, an American amateur ornithologist, WIRT ROBINSON, visited Curaçao on a holiday trip to Colombia and collected a few specimens for the United States National Museum. A report on the birds observed in Curaçao appeared in 1893 in the form of a narrative of his journey. One of his specimens subsequently became the type-specimen of *Brachyspiza capensis insularis* Ridgway 1898 = *Zonotrichia capensis insularis.* The same author must have visited Curaçao again in 1900, since the type-specimen of *Stenopsis cayennensis insularis* Richmond 1902 = *Caprimulgus cayennensis insularis* is stated to have been collected in Curaçao by "Captain Wirt Robinson", June 1900.

In 1908 ornithological explorations were made in Aruba, Curaçao, and Bonaire on behalf of the Field Museum of Natural History,

Chicago: J. F. FERRY collecting in Aruba from April 22 – May 16 and in Bonaire from May 16 – 21; Dr. N. DEARBORN collecting in Curaçao from March 24 – 31. A report on the collection was published by CORY in 1909. The most noteworthy result of these collecting trips was the discovery of the presence of a burrowing owl in Aruba, which later proved to belong to an undescribed insular race: *Speotyto cunicularia arubensis* Cory 1915. The following species appeared to represent new records for the islands, those marked (*) having remained the only record of the species for the Leeward Group up to the present time (1955):

Florida caerulea
**Ajaia ajaja*
Charadrius hiaticula
Tringa solitaria
Calidris alba
Calidris pusilla
Calidris melanotos
Sterna fuscata
Sterna eurygnatha
**Phaetusa simplex*
Coccyzus minor
Coccyzus americanus
Speotyto cunicularia
**Florisuga mellivora*
Tyrannus melancholicus
Vireo altiloquus
Spiza americana
Dolichonyx oryzivorus

In addition one species collected by FERRY in Aruba, but omitted in CORY's account, is included in HELLMAYR & CONOVER's *Catalogue of the Birds of the Americas and the Adjacent Islands*, representing the first record of the species in the Netherlands Leeward Group:

Calidris fuscicollis.

In the following period of fully twenty years nothing happened to add to the knowledge of the avifauna of the islands, except for a visit by the Norwegian zoologist Dr. ALF WOLLEBAEK in 1925. However, his publication on Curaçao, which appeared in 1934, contributed nothing of particular ornithological interest.

Finally, in 1930, it was a happy circumstance that during an excursion of geological students of the University of Utrecht under the leadership of Prof. Dr. L. M. R. RUTTEN from April to July 1930 some of these students took interest in birds. This resulted in a collection of birds from all three islands made by P. J. PIJPERS, M. G. RUTTEN, and L. W. J. VERMUNT and subsequently reported upon by M. G. RUTTEN in 1931. The birds, which were originally preserved in spirits, were presented to the Leiden Museum, where

the specimens were made into (unfortunately rather bad) study-skins. The present author has had the privilege of examining the whole material, which comprised 46 skins from Aruba, 43 skins from Curaçao, and 66 skins from Bonaire, being a total of 155 skins, representing 51 species. RUTTEN's publication, which gives an account of all birds known by that time from Aruba, Curaçao, and Bonaire, excels in originality and in the clear separation of personal observations and records in the literature. Mention is made of the occurrence of 80 species of which 47 were collected and in addition 16 observed by the author and his companions; 8 species were new to the islands' avifaunal list:

Egretta alba
Dichromanassa rufescens
Nycticorax nycticorax
Nyctanassa violacea
Anas bahamensis
Charadrius alexandrinus
Numenius phaeopus
Ceryle alcyon

Through the intermediation of Brother M. REALINO of St. Thomas College on Curaçao RUTTEN could add the following 5 species new for Curaçao in two subsequent notes in 1934 and 1935, respectively:

Pandion haliaetus
Porzana carolina
Burhinus bistriatus
Anoüs stolidus
Coccyzus americanus

A further noteworthy addition to the avifauna of Curaçao was equally based upon a single individual caught by Brother M. REALINO in 1932, sent to the Leiden Museum, and subsequently reported upon by Dr. G. C. A. JUNGE in 1951:

Pheucticus ludovicianus.

In 1938 a rather romantic, but noteworthy book appeared on the flamingos of Bonaire with text and photographs by ALFONS GABRIEL, government surgeon in Bonaire between about 1920 and 1925. Shortly afterwards a full historical account of the breeding colony of the flamingos in Bonaire by Prof. A. E. H. SWAEN was published in 1943. In this paper the oldest literature starting with the travels of WILLIAM DAMPIER in 1681 is dealt with in considerable detail. In SWAEN's paper mention is also made of a popular article on flamingos by Father P. A. EUWENS (Bonaire) in 1909.

In the meantime the interest in nature in general and birds in

particular was considerably aroused in the islands by the publication of popular articles and nature stories written by M. DE JONG, subaltern officer of the Netherlands Navy, detached in the Netherlands Antilles during World War II. DE JONG's articles appeared under the pseudonym *Vogelvriend* in the local daily paper called *Beurs- en Nieuwsberichten* and in the youth-journals *Hou en Trouw* and *Jeugdland*. A summary of his observations, together with a compilation of RUTTEN's previous papers, appeared in 1948. Although some of DE JONG's observations do not seem able to withstand full criticism (*Haliaetus leucocephalus*!) and observations of the melanistic juvenile plumage of *Buteo albicaudatus* are erroneously recorded under the name *Buteo albonotatus*, the following four species seem to have been recorded from Curaçao with certainty for the first time:

Anas discors
Forpus passerinus
Setophaga ruticilla
Pheucticus ludovicianus (see, however, above)

A very noteworthy addition to the avifauna of the Leeward Group was the observation of a specimen of the recent Old World immigrant into South America,

Bubulcus ibis ibis,

in March or April 1944 in Aruba by W. H. DRURY, Jr., who at that time visited the oil-harbour of Aruba with a U.S. Navy tanker and, in this connection, was not allowed to keep written notes of the journey (See: *Auk 70*, 1953, p. 365).

In November 1947 a party of Venezuelan ornithologists, Dr. W. H. PHELPS, Mr. W. H. PHELPS, Jr., and Mrs. KATHLEEN PHELPS, visited Bonaire, making a small, but interesting collection of birds, which the present author had the privilege of examining in the "Colección Ornitológica Phelps" in Caracas. Although in their report of 1951 they could add only one new species to the known list of birds occurring in the Netherlands Leeward Group (*Seiurus noveboracensis*), they subsequently could clear up the systematic position of two interesting species, both by that time considered to be restricted to Bonaire and described as new insular subspecies by PHELPS, father and son, in 1948:

Margarops fuscatus bonairensis
Vireo altiloquus bonairensis

In 1948 Prof. Dr. G. J. VAN OORDT, accompanied by Dr. P. F. Baron VAN HEERDT and Mr. H. W. E. CROOCKEWIT, visited Curaçao and Bonaire from February 18 – March 1, observing birds and collecting a few specimens, which afterwards found their way to the Zoological Museum of Amsterdam. VAN OORDT published some additions to the known avifauna of Curaçao and Bonaire in 1949; whereas a report of a lecture for the Netherlands Ornithological Society on this journey by CROOCKEWIT appeared in the same year. In the short period of his stay VAN OORDT observed one species new for both Curaçao and Bonaire (*Falco peregrinus*); in addition his diary-reports, kindly put at my disposal, make mention of the presence of several individuals of *Calidris canutus*, a species never before, nor afterwards, recorded in the Netherlands Leeward Group.

Although Dr. P. WAGENAAR HUMMELINCK has taken great interest in the fauna of the Netherlands Leeward Islands from the time of his first excursion to the islands in company with the geological students in 1930 onwards, his large zoological collections contain hardly any bird specimens. The majority of the few specimens preserved in spirits have been presented to the Leiden Museum; some have accidentally reached the Amsterdam Museum, but all of them have been included in the present paper.

After our collecting trip in 1951–52, a party of North American ornithologists and bird-photographers, Messrs. ROBERT P. ALLEN, BAYARD READ, and GARDNER D. STOUT, paid a short visit to Bonaire in 1953, taking particular interest in the flamingos and parrots of this island. From their observations the first breeding record of *Podilymbus podiceps* in the Netherlands Leeward Islands has been mentioned in the present paper by quoting part of a letter of Mr. STOUT to Mr. J. G. DE JONG (Curaçao). Mr. STOUT also states having observed and collected a specimen of *Fulica americana*, but this record has not been confirmed and the specimen seems to have got lost. However, among the specimens recently sent in from Curaçao by Messrs. ANSINGH and KOELERS for identification and inspection there was also a specimen of *Fulica caribaea* collected in the spring of 1955, confirming STOUT's record of the occurrence of a species of coot in the islands and at the same time representing the first record of this species in the Netherlands Antilles.

After my departure from Curaçao field-ornithologists residing on the island have collected specimens of the following 10 species which have proved new to the avifauna of the Netherlands Leeward Group (specimens examined and verified by the present author):

Puffinus lherminieri lherminieri (by KOELERS, 1954)
Porphyrula martinica (by VAN DER WERF, 1954)
Fulica caribaea (by ANSINGH and KOELERS, 1954)
Guira guira (by ANSINGH, 1954)
Chordeiles minor gundlachii (by ANSINGH and KOELERS, 1955)
Chordeiles minor minor (by ANSINGH and KOELERS, 1955)
Progne chalybea chalybea (by ANSINGH and KOELERS, 1955)
Hylocichla fuscescens fuscescens (by ANSINGH, 1954)
Mniotilta varia (by ANSINGH and KOELERS, 1955)
Protonotaria citrea (by ANSINGH and KOELERS, 1955)
Dendroica fusca (by KOELERS, 1955)

In addition, after my departure from Curaçao, ANSINGH and KOELERS have also succeeded in collecting specimens of several of those species, which had been hitherto known only from field-observations by RUTTEN and by the present author. These specimens, which have also been examined by the present author and referred to in the present paper, include the following species:

Podilymbus podiceps antarcticus
Nycticorax nycticorax hoactli
Limnodromus griseus griseus
Seiurus aurocapillus aurocapillus

A review of the ornithological research in the Netherlands Antilles up to 1951 has been given by VOOUS (1954).

THE ISLANDS

In this report a detailed description of the geographical and vegetational appearance of the islands would be out of place. Rather, in this chapter the islands will be described separately from the point of view of their importance to bird life. However, mentioning a few geographical features common to all three islands cannot be omitted here, since they contribute considerably to the characterization of the whole terrestrial fauna. First, there is the practical absence of running fresh water except for one or two insignificant brooklets in Curaçao. The rainfall is light, showing in Curaçao (Willemstad) an annual mean of 559 mm. This figure is composed of 200 mm in the "dry" season (February–September inclusive) and 350 mm in the "wet" season (October–January inclusive). The above indicated relative scarcity of fresh water is the more impressive since the temperature is high (annual mean in Willemstad, Curaçao, 27.2° C), generally varying (daily and annually) not more than between about 24.5° and 30.0° C. In addition the winds show a remarkable constancy in direction and force, the mean wind force in Curaçao being over 3 degrees Beaufort (eastern trade wind). Fresh water birds are consequently very rare in the islands, but during the exceptionally rainy periods 1954 and 1955 various species of fresh water birds suddenly appeared and were even found breeding (*Podiceps dominicus, Podilymbus podiceps, Porphyrula martinica, Fulica caribaea*).

Apart from the xerophytic vegetation, in which a wealth of cacti and thorny acacias predominate, colourful birds and scores of lizards cannot fail to attract the attention of every nature-minded visitor. The great number of lizards, of which particularly the vivid species of *Anolis* and *Cnemidophorus* are extremely abundant, form the staple diet of the birds of prey (*Buteo albicaudatus, Polyborus cheriway, Falco sparverius*). Lizards have in addition been found in the stomachs of the following species, bringing the total of lizard-eating birds up to 10 species: *Falco columbarius, Coccyzus americanus, Crotophaga sulcirostris, Tyto alba, Speotyto cunicularia, Mimus gilvus, Margarops fuscatus.* These birds include no less than 14% of the 71 known species of land birds, or 8 (= 17%) of the 47

species of recorded breeding birds. On the other hand there are but 7 species, or 10% of the land birds, known to feed upon the flesh or the fruits of the various kinds of cacti.

The number of sea birds known to breed in Aruba, Curaçao, and Bonaire is remarkably small. Breeding colonies of several species of tern have been discovered in former and recent times and represent — together with *Fregata magnificens* — the only sea birds regularly nesting in the islands. The significance of Aruba, Curaçao, and Bonaire for South American sea birds has been dealt with by MURPHY in his *Oceanic Birds of South America*, 1, 1936, p. 121–122 (New York).

ARUBA

Aruba measures about 175 km², its greatest length being 30 km. Its landscape is more barren and its vegetation poorer than in Curaçao and Bonaire, the island being exceedingly eroded, showing deep erosion guts, which, except for rare periods of heavy rainfall, are dry throughout the year. Stone deserts and *Opuntia* scrub have extended considerably at the expense of the original low, thorny, xerophytic forest, which no longer exists. In addition the oil-refinery industry of the Esso concern (LAGO), with its extensive "plants", villages, and sporting grounds for its thousands of employees, has fundamentally changed the whole southern part of the island. Furthermore, the harbour of Sint Nicolaas has taken possession of the reef islands off the coast of Ceru Colorado, where HARTERT in 1892 found breeding colonies of several species of tern (*Sterna dougallii, Sterna anaethetus*), which afterwards have never again been recorded in Aruba. The reef islands and the lagoon on the west coast of the island with its bright beach of coral sand still possess great splendour and harbour a good lot of birds. *Calidris alba* and *Pluvialis squatarola* pass the winter and part of the summer along the tropical sandy beach; whereas many *Pelecanus occidentalis* regularly join the bathing people in the clear and rather shallow waters of Palm Beach and Malmok. Numbers of *Fregata magnificens* are always sailing over the harbour of Oranjestad and aggregate in large sleeping companies in one or more of the mangrove islands which protect the Paardenbaai against the force of the open sea.

Various species of terns (*Sterna maxima, Sterna hirundo*), some of which undoubtedly breed on the nearby Monges Islands off the coast of the Goajira Peninsula, *Larus atricilla, Sula leucogaster,* and *Pandion haliaetus* seem to be more than occasional visitors to the Paardenbaai and the lagoon inside the reef islands, while solitary individuals of *Dichromanassa rufescens,* which behave like a kind of "reef heron", can regularly be seen fishing in the shallow waters close to the coast. The mangroves of Bucuti and other reef islands are the sleeping and feeding places of several species of herons, among which is *Hydranassa tricolor,* of which RUTTEN, PIJPERS and VERMUNT found a small breeding colony in June 1930. Large flocks of *Egretta thula, Florida caerulea* and *Hydranassa tricolor* also inhabit the mangroves bordering the Spaans Lagoen, where in addition *Butorides virescens* and *Seiurus noveboracensis* find shelter in the darkness of the rhizophore vegetation. Behind the mangroves of the Spaans Lagoen we found in December 1951 a zone of mud and shallow water, where we observed numbers of *Tringa melanoleuca, Tringa flavipes, Charadrius hiaticula,* various species of herons, *Anas discors,* and *Aythya affinis.* On our return in April the next year the whole mud flat appeared to have been dried up and instead of waders, herons, and ducks, flocks of goats and sheep were grazing in this place!

The interior of Aruba is barren and hot and shows great quantities of diorite boulders of various, often gigantic size. Fields of aloes with asymmetrical dividivi trees (*Caesalpinia coriaria*), and surrounded by stony walls and spiny acacias and agaves, form a kind of artificial savannah in which bird life is scarce. *Mimus gilvus* and after it *Columbigallina passerina* are the most conspicuous and numerous of the avian features. *Coereba flaveola* and *Tiaris bicolor,* which otherwise are famous for their ubiquitous habits, are, however, remarkably rare, although they do occur and even have to be considered to be among the commonest of the species of birds occurring around human dwellings. Rather extensive stone deserts along the northeast coast of the island are devoid of bird life, safe for a stray specimen or two of *Falco sparverius* hunting after lizards or occasional insects. Stony deserts interspersed with patches of softer soil and strewn with solitary organpipe cacti are

the haunts of *Speotyto cunicularia*, which, however, seemed to be rather rare.

Screaming parroquets (*Aratinga pertinax*) and whistling troupials (*Icterus icterus*) are found in the cultivated regions, where they feed upon the fruits of dividivi (parroquets!) and organpipe cacti (both species!). They are more numerous, however, in the hills in the Southeast (Arikok, Jamanota, Baranca Cora). In the latter region xerophytic scrub and semi-desert vegetation (*Acacia tortuosa, Haematoxylon brasilletto*) represent the remains of the former dense xerophytic forest. Down in the valleys, which are dry river beds full of pebbles and pieces of rock, the vegetation is somewhat more luxurious, with dense patches of *Bontia daphnoides* in moist places. *Zonotrichia capensis*, two species of hummingbirds (*Chrysolampis mosquitus, Chlorostilbon mellisugus*), *Dendroica petechia*, and a single *Caprimulgus cayennensis* are the most characteristic birds of these deserted valleys and hill slopes. These hills apparently represent the last stronghold of the original Aruban bird life. The island's human population density is high, and little room is left for the fauna. Thus, *Amazona barbadensis*, which still was present — though extremely wild! — in the days of HARTERT (1892) and RUTTEN (1930), has been almost exterminated; the last living individuals were seen between 1944 and 1947 in the cactus vegetation along the steep rocky walls of the Rooi Francees and, fortunately, again in 1955. The breeding stocks of *Columba corensis, Columba squamosa, Tyrannus dominicensis*, and *Elaenia martinica* probably have also disappeared, whereas the remaining species of land birds are conspicuously scarcer in Aruba than in Curaçao or Bonaire! Therefore preservation of nature and protection of bird life in Aruba are very urgent.

The number of bird species recorded in Aruba is 87; among these are 34 breeding birds and 28 passenger migrants or winter visitors from North America. Two subspecies of birds are restricted to Aruba: *Aratinga pertinax arubensis* and *Speotyto cunicularia arubensis*.

We visited Aruba in the periods December 7–21, 1951, and April 7–10, 1952, thus 19 days in total. We collected 121 specimens,

belonging to 36 species. In addition we observed another 21 species, making a total record of 57 species, the following 13 of which are new to the known list:

* observed, not collected

Sula leucogaster leucogaster
**Dichromanassa rufescens*
**Anas discors*
**Aythya affinis*
**Pandion haliaetus carolinensis*
**Falco peregrinus anatum*
**Falco columbarius columbarius*
Charadrius vociferus vociferus
**Calidris mauri*
Crotophaga sulcirostris sulcirostris
Caprimulgus cayennensis insularis
Vireo altiloquus bonairensis
**Piranga olivacea*

Finally, we saw a freshly mounted specimen of the only species of woodpecker known from the Netherlands Antilles (*Sphyrapicus varius varius*). This specimen, which had been caught in Aruba, remained in private possession; it brings the total of new records from Aruba up to 14.

CURAÇAO

Curaçao measures about 425 km² without inland waters, its greatest length being 59 km. In spite of the local destruction of natural land-habitats by the oil-refinery industry of the SHELL concern (CPIM), particularly along the northern border of the Schottegat and the southern bays, and notwithstanding the noteworthy desiccation of the island as a result of human influence, Curaçao still possesses a great variety of biotopes and a remarkably rich bird life. Secondary acacia scrub (*Prosopis juliflora, Caesalpinia coriaria, Acacia tortuosa*), cactus scrub (e.g. *Cereus repandus, Lemaireocereus griseus, Opuntia wentiana*) and semi-deserts are prevalent on the island. There are, on the other hand, a good many fruit plantations, locally called *hoffis*, coconut groves, and manchioneel thickets (*Hippomane mancinella*), particularly in the lower places, where bird life is rich in species and individuals. Practically none of the species, however, is restricted to one of these habitats. *Coereba flaveola, Columbigallina passerina, Mimus gilvus, Tiaris bicolor*, and *Chlorostilbon mellisugus* are among the most abundant of the species and found in nearly all habitats, including roadsides and country yards. *Aratinga pertinax, Icterus icterus, Icterus nigrogularis* and several species of pigeons and doves (*Columba*

corensis, Leptotila verreauxi, Zenaidura auriculata) also belong to the commonest birds. The only known exceptions to the rule that sedentary birds of Curaçao are ubiquitous and do not keep to any special biotope are (1) *Sublegatus modestus*, which seems to be almost restricted to the dry scrub and semi-desert vegetation and never occurs in shady fruit plantations and gardens, and (2) *Ammodramus savannarum*, which lives in dry grassy plains only.

In dry periods of the year, when fresh water is scarce, the greater part of the bird population seems to be concentrated around the small number of fresh water pools, locally called *tankis*. Throughout the year, but particularly in periods of drought, large flocks of pigeons and doves visit the scarce drinking pools and under these circumstances are often shot in considerable numbers. In spite of the scarcity of fresh water in Curaçao *Podiceps dominicus*, typically inhabitant of fresh water marshes, has been collected in the *tanki* of Groot Santa Marta in January 1952. The sight of a solitary grebe or a pair of *Anas discors* in a minute fresh water pool with no (or hardly any) plant cover or shelter against the heat of the tropical sun is most curious and belongs to the many ornithological paradoxes of Curaçao. *Seiurus noveboracensis* also frequent the edges of fresh water, but these birds seem to be also attracted by any wet and shady place, including mangroves and well-shaded bushes of manchioneel (*Hippomane mancinella*).

Curaçao does not possess a fringing reef like Aruba; pelicans, boobies, gulls, and terns are, therefore, less often observed. Still, *Fregata magnificens* can daily be seen sailing over the entrance of the Sint Annabaai and the Schottegat, where in addition *Pandion haliaetus* has been found fishing in practically every month of the year.

The shores of the salt lagoons and the mud flats of the saliñas (Grote Knip!), which periodically fall totally dry, are the favourable feeding places of scores of plovers, sandpipers and other waders. Among these *Calidris pusilla* and *Calidris minutilla* are by far the commonest. Most of the wader species do not show any preference for either fresh or salt water. Only *Tringa solitaria* generally occurs along fresh water only. Two species of plover are breeding in Curaçao: *Charadrius wilsonia*, which prefers limestone plateaus, or at all

events stony places, and *Charadrius alexandrinus*, frequenting the hot, sandy shores and the salt-encrusted walls separating old salt pans. Of the terns, *Sterna hirundo* has been found breeding in the Jan Thiel lagoon, as well as on Isla Macuacu in the Sint Joris Baai; it probably is also a regular breeding bird on various of the small islands in the Spaanse Water. In 1952 BRONNEBERG and VAN DER WERF found the egg-shells and the young of the rare *Sterna eurygnatha* on a small island in the Jan Thiel lagoon, which is the first authenticated breeding place of this tern. A large breeding colony of *Sterna eurygnatha* was found on the same islet in 1954 together with *Sterna dougallii* and *Sterna albifrons*. Breeding colonies of *Sterna albifrons* have been regularly reported from the limestone plateau of Hato, as well as from the artificial plains of sand, coral debris, and shells on the east coast of the Schottegat (Koningsplein).

The mangroves (*Rhizophora, Avicennia*), which fringe the bays on the south coast of Curaçao, are the breeding places of *Butorides virescens, Hydranassa tricolor, Egretta thula,* and *Nyctanassa violacea*; several other non-breeding species of heron find there shelter and food. In this biotope every species of heron seems to make its own choice from the abundant food supply: *Hydranassa tricolor* and *Egretta thula* mainly catch small fish; whereas *Florida caerulea* feeds upon crabs, particularly small fiddler-crabs. Mangroves are also the favoured breeding places of *Columba corensis* and are the only habitat in Curaçao where *Coereba flaveola* is decidedly outnumbered by *Dendroica petechia*.

In the hilly northwestern part of Curaçao, the region of Christoffel Mountain (372 m alt., highest point of the island), the rainfall is slightly heavier than in the lower areas, and, consequently, the vegetation is of a kind of seasonal forest in which lianas of the genus *Cissus*, terrestrial and epiphytic bromeliads, and orchids flourish. Bird life, however, is hardly different, and there is not one species of bird that exclusively occurs in this more or less mountainous region. *Buteo albicaudatus*, which has a very restricted breeding range on the island, is known to have inhabited the Christoffel region from the time of the first ornithological exploration of Curaçao in 1890 onwards, whereas also *Columba squamosa* has here one of its very few breeding places, the other ones being the cliffs of

the Tafelberg of Santa Barbara in the opposite part of the island.

Curaçao possesses many limestone caves, where in addition to great quantities of bats one of the smallest of the known forms of *Tyto alba* seems to have its regular sleeping (and breeding?) places (*"White owl of Hato"*).

KLEIN CURAÇAO measures about 1.2 km², its greatest length being 2.4 km. Except for a few lighthouse-keepers, there are no inhabitants. Thick beds of guano, mined and exported in the periods 1871–1888 and 1906–1913 by an English company, are the unmistakable testimony of the breeding of sea birds during some time in the past. Large flocks of breeding "boobies" were officially reported by the Dutch Government in the year 1737, when legal protection was proclaimed for these birds, which, by their great numbers, supposedly marked the position of this flat and dangerous rocky island to approaching ships (see also: P. A. EUWENS, *West-Indische Gids 7*, 1926, p. 401–410). At present definite records of sea birds breeding at Klein Curaçao are limited to those referring to *Sterna albifrons*. The local lighthouse-keepers informed us of having collected annually in spring and early summer eggs of *bubi chiquitu* (i.e. little booby), by which name probably various species of tern were meant, such as *Sterna hirundo* and *Sterna eurygnatha*, of which courtship followed by copulations have been observed and specimens with enlarged gonads collected by KOELERS and VAN DER WERF on April 11, 1952 and by KOELERS on July 3, 1953. *Haematopus palliatus* and *Larus atricilla* probably also belong to the regular breeding birds of Klein Curaçao.

The number of bird species recorded in Curaçao (including Klein Curaçao) is 126; among these are 42 breeding birds and 55 passenger migrants or winter visitors from North America. Two subspecies of birds are restricted to Curaçao: *Aratinga pertinax pertinax* and *Tyto alba bargei* (if not occurring in Bonaire).

We visited Curaçao in the periods September 22–November 1, December 1–6, December 22–January 6, January 12–31, March 15–23, March 30–April 6, April 11–19, 1951/1952, thus 98 days in total. We collected 587 specimens belonging to 83 species. In addition we

observed another 17 species, making a total record of 100 species, the following 32 of which are new to the known list:

* observed, not collected

Podiceps dominicus speciosus
**Podilymbus podiceps antarcticus*
Anas americana
Aythya affinis
**Milvago chimachima cordatus*
Falco columbarius columbarius
Pluvialis dominica dominica
**Charadrius vociferus vociferus*
**Limnodromus griseus*
Capella gallinago delicata
**Calidris mauri*
Calidris minutilla
**Calidris fuscicollis*
Calidris melanotos
Stercorarius parasiticus
Sterna eurygnatha
Muscivora tyrannus tyrannus
**Progne subis*
Petrochelidon pyrrhonota pyrrhonota
Riparia riparia riparia
Hylocichla mustelina
Hylocichla ustulata swainsoni
Vireo olivaceus olivaceus
Vireo altiloquus bonairensis
**Dendroica castanea*
Dendroica striata
**Seiurus aurocapillus*
Seiurus noveboracensis noveboracensis
Seiurus noveboracensis limnaeus
Seiurus noveboracensis notabilis
Oporornis agilis
**Oporornis philadelphia*
Piranga olivacea
Passerina cyanea

After our return to the Netherlands ANSINGH and KOELERS collected specimens in Curaçao of the following 9 species not yet recorded from any of the islands of the Netherlands Leeward Group:

Puffinus lherminieri lherminieri
Fulica caribaea
Guira guira
Chordeiles minor gundlachii
Chordeiles minor minor
Progne chalybea chalybea
Hylocichla fuscescens fuscescens
Mniotilta varia
Protonotaria citrea
Dendroica fusca

VAN DER WERF collected a specimen of *Porphyrula martinica*, until that time unknown from the Netherlands Antilles.

ANSINGH and KOELERS also collected specimens of the following 2 species, which had already been recorded from other islands of the Leeward Group, but were unknown from Curaçao:

Catoptrophorus semipalmatus semipalmatus *Spiza americana*

In addition KOELERS observed several specimens of *Dolichonyx oryzivorus*, which, up to that time, had not yet been recorded from Curaçao.

Finally, KOELERS collected one specimen of *Sterna anaethetus*

melanoptera and ANSINGH one of *Sterna fuscata fuscata* at Klein Curaçao, which equally represent new records for the island list.

These bring the total of new records from Curaçao up to 47.

BONAIRE

Bonaire measures about 272 km², without inland waters, but including the small, flat island of Klein Bonaire (7 km²); the greatest length is 35 km. The general landscape of the island is not unlike that of Curaçao, but there are only very few luxuriant fruit plantations. All birds of the xerophytic and thorny scrubs and woods and of the cactus deserts, known from the other islands, are also common in Bonaire. Among these, *Coereba flaveola* is by far the commonest. *Dendroica petechia, Mimus gilvus, Columbigallina passerina, Sublegatus modestus,* and *Myiarchus tyrannulus* are also conspicuously numerous, as are *Aratinga pertinax* and the two species of hummingbirds, particularly *Chrysolampis mosquitus. Tyrannus dominicensis* can be seen more often on Bonaire than on the other islands as they perch at regular distances on the telephone wires along the road between Kralendijk and Rincon. *Icterus nigrogularis* is rare; *Icterus icterus* is for some unknown reason even totally lacking.

In the northwestern part of Bonaire hills of diabasic formation prevail, culminating in the porphyritic intrusion of the Brandaris Mountain (243 m alt.), which is the highest point of the island. In this part of Bonaire a vegetation occurs suggesting the original seasonal forest, with an abundance of *Guaiacum officinale, Haematoxylon brasilletto, Tecoma chrysantha,* as well as fine gum trees (*Bursera simaruba*) with umbrella-shaped crowns and smooth orange-red bark, the whole vegetation intermixed, of course, with the inevitable wealth of spiny acacias, organpipe cacti and opuntias. Here is the home of *Amazona barbadensis,* which, although at present still occurring in fairly good numbers, must be the object of careful protection in order to be saved for extinction.

Along the north coast of the island horizontal terraces of coral limestone, separated by steep rocky walls, form extensive stony plains, locally with a peculiar growth of gigantic organpipe cacti (Piedra Cruz). These are the hunting grounds of *Buteo albicaudatus* and the home of flocks of screaming *Aratinga pertinax.* In the crevices

and clefts of the limestone escarpment, which nowhere seems to be higher than 50 meters, *Amazona barbadensis* and *Columba squamosa* find breeding places almost inaccessible to man. Although in this region limestone caves are no less numerous than in Curaçao, one small white breast feather found in one of the grottoes of Spelonk, is the only evidence of the occurrence of a species of owl (*Tyto alba*) in Bonaire. A small spring of fresh water irrigates the famous fruit plantation of Fontein, close to Rincon, where coconut palms, mangoes (*Mangifera indica*), sapodillas (*Achras sapota*), papayas (*Carica papaya*) and several other tropical fruits are cultivated, attracting birds from all directions (pigeons, parrots, parroquets, mocking-birds). This is also the very place where HARTERT in 1892 found a small colony of *Margarops fuscatus*, a species of typically Caribbean distribution which not only thrives here to-day, but is generally restricted to the immediate vicinity of Fontein.

The greater part of the southern half of Bonaire is a flat plateau of coral limestone covered with scattered acacias, and locally with an almost impenetrable wilderness of *Opuntia wentiana*, *Croton*, and *Conocarpus*. *Coereba flaveola*, *Columbigallina passerina*, *Sublegatus modestus*, *Zenaidura auriculata*, and *Aratinga pertinax* are the characteristic species of this region. One may, however, look in vain for *Colinus cristatus*, a species which is totally absent in Bonaire; hence, its Aruban name *patrushi* is employed here for *Leptotila verreauxi*, a species of dove of similar size and equally terrestrial habits. After heavy rains large parts of the lowlands are flooded and thence become the favoured biotope of various long-legged waders (*Tringa flavipes*, *T. melanoleuca*, *Himantopus himantopus*, *Numenius phaeopus*) and small flocks of ducks (*Anas discors*), which all move around cacti, spiny acacias, and *Conocarpus* rising out of the shallow layers of mud and fresh water!

Above all, Bonaire is the island of extensive saline mud flats and salt pans, both in the north (Slagbaai, Playa Frans, Goto, Palu Lechi) and in the south (Pekelmeer), where hundreds of plovers, sandpipers, and others waders find a resting place on their long migration routes, or stay throughout the winter. Particularly along the edges of the Pekelmeer large flocks composed of various species of waders are continually feasting upon the abundance of salt flies

(*Ephydra*) and their aquatic larvae, which appear by the thousands in the stomachs of all waders collected in the place. In addition other small insects, brine shrimps (*Artemia salina*), and occasionally small lagoon snails (*Cerithium*) are added to the diet of these birds, which live there almost undisturbed by man. They are, however, regularly hunted by wintering *Falco peregrinus* and *Falco columbarius*. Near the Pekelmeer is the breeding and feeding place of a colony of over 1000 pairs of *Phoenicopterus ruber*, which seems to have been breeding there from time immemorial. The Saliña Grandi of Goto is also an important feeding ground of large flocks of these birds; perhaps they still breed there in small numbers. Outside the breeding time flamingos also appear in the saliña of Slagbaai, where they feed alongside of *Pelecanus occidentalis* and various species of herons. So far as is known their food there consists of the larvae of the salt fly (*Ephydra*), brine shrimps (*Artemia salina*), and an occasional fish (*Cyprinodon*) of minute size. In the same region, in one of the salt pans on the western side of the Pekelmeer, an interesting breeding colony of *Sterna eurygnatha* with a few pairs of *Sterna maxima* and probably also *Sterna dougallii* was discovered by the expert photographer K. MAYER (Bonaire) in 1955. When carefully studied in spring and summer many other species of birds probably will be found breeding on the shores of the Pekelmeer.

Extensive mangroves of *Rhizophora* and *Avicennia* border the shallow bay of Lac and its complicated system of mud flats and low sand dunes. *Hydranassa tricolor* and *Florida caerulea* are extremely common along the edges of the mangroves, where they feed according to their specific habits upon small fish or fiddler-crabs, which are teaming in the shallow waters and the zones of wet mud, respectively.

Dichromanassa rufescens, *Egretta thula*, and *Ardea herodias* are common visitors of the lagoon, but apparently do not breed there. In fact, not one positive date for the nesting of any species of heron in Bonaire seems to exist, not even of *Butorides virescens* which is an abundant resident bird of trees and shrubs bordering fresh and salt water. The mangroves of Lac are likely to be the home of a breeding colony of *Fregata magnificens*, but positive evidence is lacking.

Along the sandy beach of Lac and the mud flats of Slagbaai and Goto, *Charadrius alexandrinus*, *Charadrius collaris*, and *Sterna*

albifrons have been recorded as breeding. It seems very likely that the breeding of these species in the region around Lac will be confirmed in the near future and that also such species as *Sterna hirundo*, and probably *Larus atricilla*, will be added to the list of known breeding birds of Bonaire.

The number of bird species recorded in Bonaire (including Klein Bonaire) is 90; among these are 39 breeding birds and 34 passenger migrants or winter visitors from North America. Two subspecies of birds are restricted to Bonaire: *Aratinga pertinax xanthogenius* and *Coereba flaveola bonairensis*.

We visited Bonaire in the periods November 1–30, 1951 and March 24–29, 1952, thus 35 days in total. We collected 278 specimens belonging to 64 species. In addition we observed another 23 species, making a total record of 87 species, the following 25 of which are new to the known list:

* observed, not collected

Podiceps dominicus speciosus
**Sula leucogaster leucogaster*
Florida caerulea
**Anas discors*
Falco columbarius columbarius
Porzana carolina
Charadrius vociferus vociferus
**Catoptrophorus semipalmatus semipalmatus*
Capella gallinago delicata
Calidris mauri
**Calidris fuscicollis*
Calidris melanotos
Micropalama himantopus
**Sterna dougallii dougallii*
**Anoüs minutus americanus*
Coccyzus minor maynardi
**Coccyzus americanus americanus*
Tyrannus melancholicus chloronotus
Elaenia chiriquensis albivertex
**Petrochelidon pyrrhonota pyrrhonota*
**Riparia riparia riparia*
**Dendroica striata*
Setophaga ruticilla ruticilla
Dolichonyx oryzivorus
**Pheucticus ludovicianus*

In 1953 the breeding of *Podilymbus podiceps antarcticus* was recorded in the fresh water pool of Onima by Messrs ALLEN, READ, and STOUT, bringing the total of new records for Bonaire up to 26.

MIGRATION

The geographical position of Aruba, Curaçao, and Bonaire has made these islands most favourable stepping stones to migrating North American birds on their yearly routes to and from South America. A short account of migration phenomena observed in the Netherlands Leeward Islands has been published elsewhere (VOOUS 1953). Notwithstanding the fact that the main migration route of North American migrants goes through Mexico and Central America quite a lot of species are known to pass the West Indies and travel across the Caribbean Sea. Among these are several species of waders and other water birds, but there are also small passerine birds that have to make admirable overseas flights in order to reach their winter quarters in the South American tropics. Some of the species recorded beneath probably arrive in the Netherlands Leeward Islands as casual visitors only.

Of the total of 137 species known from Aruba, Curaçao, and Bonaire no less than 57 (41,5%) are passenger migrants or winter visitors from North America. These species are tabulated below:

* also recorded in the Venezuelan Islands

Anas discors
Anas americana
Aythya affinis
**Pandion haliaetus*
**Falco peregrinus*
Falco columbarius
Porzana carolina
Arenaria interpres
Pluvialis squatarola
Pluvialis dominica
Charadrius hiaticula
Charadrius vociferus
Numenius phaeopus
Tringa flavipes
Tringa melanoleuca
Tringa solitaria
Actitis macularia
Catoptrophorus semipalmatus
Limnodromus griseus
Capella gallinago
Calidris canutus
**Calidris alba*
**Calidris pusilla*
**Calidris mauri*
**Calidris minutilla*
**Calidris fuscicollis*
Calidris melanotos
Micropalama himantopus
Coccyzus americanus
Coccyzus minor (maynardi)
Ceryle alcyon
Sphyrapicus varius
Progne subis
**Progne chalybea*
Petrochelidon pyrrhonota
Riparia riparia
Hirundo rustica
Hylocichla mustelina
Hylocichla ustulata
Hylocichla fuscescens
Vireo olivaceus
Mniotilta varia
Protonotaria citrea
Dendroica fusca

Dendroica castanea
Dendroica striata
Seiurus aurocapillus
Seiurus noveboracensis
Oporornis agillis
Oporornis philadelphia
**Setophaga ruticilla*
Dolichonyx oryzivorus
Piranga olivacea
Pheucticus ludovicianus
Passerina cyanea
Spiza americana

In addition to migratory forms from continental North America, there is at least one migrant which comes from the Bahama Islands and the Greater Antilles, *viz. Chordeiles minor gundlachii. Coccyzus minor maynardi* probably also belongs in this group.

There are also records of migratory subspecies of northern origin, belonging to such species of which other subspecies occur as residents in the Netherlands Leeward Group or in some other islands in the South Caribbean region:

Pelecanus occidentalis carolinensis (against *P.o. occidentalis*)
Ardea herodias herodias (against *A.h. repens*)
Butorides virescens virescens (against *B.v. curacensis*)
Charadrius wilsonia wilsonia (against *C.w. cinnamominus*)
Vireo altiloquus barbatulus (against *V.a. bonairensis*)

The great majority of the migratory species (96%) have also been recorded in northern South America (Venezuela, Colombia); only two of them (*Sphyrapicus varius, Hylocichla mustelina*) seem to have reached in the Netherlands Antilles the southern limits of their wintering range.

It is almost certain that waves of northern migrants comparable to those recorded from Aruba, Curaçao, and Bonaire eventually also pass and settle on the chain of Venezuelan islands. At present the number of migratory species recorded from these islands is, however, exceedingly small (8), being only 16% of the total number of migrants known from Aruba, Curaçao, and Bonaire. Among these, seven species have also been found in the Netherlands Leeward Islands (species marked * in the above list), an eighth being *Buteo platypterus*, one record of which is known from the Testigos Islands (LOWE, *Ibis* 1909, p. 313). There is a probable field record of this species during the autumn migration in Curaçao by KOELERS (*in litt.*).

WETMORE (*Proc. U.S. Nat. Mus. 87*, 1939, p. 178–179) has described with vivid clearness the enormous strength laid upon the hosts of small nocturnal migrants that annually have to cross the stretch of about 800 km of Caribbean Sea between Hispaniola and the north coast of Venezuela. From his records the exceedingly great loss of lives during this journey has become evident. We observed the same phenomenon as did WETMORE on the Caribbean coast of Venezuela, when in October 1951 hundreds of small birds suddenly appeared in Curaçao in such a state of exhaustion that their bodies were hardly more than an assemblage of bones and dry muscles. Particularly many blackpoll warblers (*Dendroica striata*) and yellow-billed cuckoos (*Coccyzus americanus*) swarmed all over the island, appearing in every nook and corner generally too tired to take wing or else flying away too late to avoid being captured by a hand or hit by a stone. The body-weights of these birds were extremely low, in some instances being only slightly more than 50% of the body-weight recorded by BEEBE (*Zoologica 32*, 1947, p.158) from individuals caught in April in northern Venezuela just before the return flight to their North American breeding homes. The weights taken in life of two additional individuals of *Coccyzus americanus* caught by KOELERS (*in litt.*) in Curaçao one year later (October 1952) were 30 and 37 grams respectively, being about 49% and 61%, respectively of the average of 61.2 grams of 15 North American specimens weighed by VAN TYNE (*in litt.*). However, these individuals proved to be too exhausted to recover and died soon afterwards.

Regular migratory movements, so characteristic in temperate and cold regions, have not been observed in Aruba, Curaçao, or Bonaire; the mere appearance and the subsequent sudden absence of few or many individuals of a certain species are, however, conspicuous evidence of both nocturnal and diurnal migration activity.

Spring migration, in contrast to a strong passage in the autumn, has up to now hardly been noticed in the Netherlands Leeward Islands.

It is unknown how many of the migrant species winter regularly in the Netherlands Leeward Islands. The species listed below have been observed by me in Curaçao during the month of January (1952) and, thus, can fairly well be considered to be winter residents.

Others, like *Ceryle alcyon* and *Setophaga ruticilla*, also seem to stay throughout the winter, but records of these species are lacking from January, although I noticed them in December. Some other species have been added based on other evidence.

Ardea herodias (*herodias*)
Anas discors
Anas americana
Aythya affinis (ANSINGH, KOELERS)
Pandion haliaetus
Porzana carolina (ANSINGH, KOELERS)
Arenaria interpres
Pluvialis squatarola
Charadrius hiaticula
Charadrius vociferus
Tringa flavipes
Tringa melanoleuca
Tringa solitaria
Actitis macularia
Capella gallinago (ANSINGH, KOELERS)
Calidris alba
Calidris pusilla
Calidris minutilla
Hirundo rustica (various observers)
Seiurus noveboracensis

Apart from migrants from the northern hemisphere, at least one migrant from the southern hemisphere has been noticed in Curaçao, *viz. Muscivora tyrannus*. Several individuals of this species have been observed and collected in October 1951 and again between August 21, and October 22, 1955, which is just before the time these birds have to leave for the southern summer in their breeding places in southern Brazil and Argentina. Several specimens of *Progne chalybea*, collected in Curaçao in October 1955, may also prove to belong to a South American breeding stock (*domestica*), rather than to migratory populations from North or Central America. It is unknown at present whether the specimen of *Guira guira*, collected in Curaçao on June 12, 1954, represents a South American migrant or a stray specimen which lost its way.

ZOOGEOGRAPHY

PRESENT AVIFAUNA OF ARUBA, CURAÇAO, AND BONAIRE

The number of species at present known from Aruba, Curaçao, and Bonaire is 137. These species can be classified as follows.

	Aruba	*Curaçao*	*Bonaire*	*Three islands combined*
Breeding species	34	42	39	48
Regular visitors of which breeding has not (yet) been recorded	19	18	15	15
Passenger migrants and winter visitors	28	55	34	57
Summer visitors [1])	—	1	—	1
Casual visitors	6	10	2	16
Total	87	126	90	137

[1]) *Muscivora tyrannus.*

GEOLOGICAL HISTORY OF ARUBA, CURAÇAO, AND BONAIRE

The islands of Aruba, Curaçao (and Klein Curaçao), and Bonaire (and Klein Bonaire), although situated close to the north coast of Venezuela, appear to be totally different from continental South America in geological history. In contrast to northern Venezuela the islands seem to have originated through volcanic activity in middle Cretaceous times, followed by violent orogenetic movements during the beginning of the Tertiary Period. Whereas in Venezuela Tertiary sediments are known amounting to strata of thousands of meters height, there is no evidence in the islands of any considerable

sedimentation in Tertiary times. Added to the nucleous of diabasic rocks, at present forming large parts of the denudated surface of the islands, are diorite intrusions from Tertiary times and extensive plateaus of coral limestone formations from the youngest Tertiary and Quaternary Periods (see: J. H. WESTERMANN, *Meded. Kon. Ver. Ind. Inst. 85, Trop. Prod. 35,* 1949). Present geological data therefore, seem to indicate that the islands of Aruba, Curaçao, and Bonaire never have been part of the South American mainland in any geological time. Instead, they have remained "oceanic" islands from their very origin in the middle of the Cretaceous Period. This is the more remarkable since the distances between the islands and the mainland are very small:

Aruba	— Goajira Peninsula	— 200 km
Aruba	— Paraguana Peninsula	— 27 km
Curaçao	— mainland of Venezuela	— 64 km
Bonaire	— mainland of Venezuela	— 87 km

In contrast, the sea depths separating the islands from the mainland are in view of the small distances remarkably large: between Bonaire and the mainland depths have been sounded of 1700 m and between Curaçao and the mainland of 1350 m. Aruba is situated within the 200 m line from the Paraguana Peninsula and might possibly be considered on this ground to have been part of the South American continent. As will be seen below, there is, however, no zoogeographical evidence supporting this supposition.

In view of the former considerable orogenetic movements in this region it would seem uncertain if the islands have always remained separate or have formed part of one greater island. At present the considerable sea depths of over 1500 m between Aruba and Curaçao and of over 1580 m between Curaçao and Bonaire should indicate at least a relatively long period of independent existence.

Among many more geological instances the presence of phosphatic limestones originating from bird guano found at the top of a number of flat hills in Aruba (Ceru Colorado, Ceru Culebra) and Curaçao (Tafelberg of Santa Barbara) is considered to be indicative of a period of relatively high sea level in the Pleistocene during which these hills served as the breeding places of sea birds (WESTERMANN, *l.c.*, p. 102–107).

Distributional Affinities of the Birds of Aruba, Curaçao, and Bonaire

Any study of the origin of the bird fauna of Aruba, Curaçao, and Bonaire must start with the question of how many of the species at present known from the islands also occur on the continent. Of the 137 species recorded from the islands 121 (88%) occur in continental Venezuela and 113 (82%) in Colombia. Among these, however, are a great many non-breeding, mainly migratory or wintering species. The number of breeding birds recorded in Aruba, Curaçao, and Bonaire is 48, only 40 (83%) also occurring in Venezuela and 39 (81%) in Colombia. These birds are listed below.

1. Breeding birds from Aruba, Curaçao, and Bonaire also recorded from Venezuela and Colombia (38 species):

Podilymbus podiceps
Egretta thula
Hydranassa tricolor
Nyctanassa violacea
Phoenicopterus ruber
Anas bahamensis
Buteo albicaudatus
Polyborus cheriway
Falco sparverius
Colinus cristatus
Haematopus palliatus
Charadrius collaris
Charadrius wilsonia
Himantopus himantopus
Sterna hirundo
Sterna maxima
Sterna sandvicensis
Columba corensis
Zenaidura auriculata
Columbigallina passerina
Leptotila verreauxi
Aratinga pertinax
Crotophaga sulcirostris
Tyto alba
Speotyto cunicularia
Caprimulgus cayennensis
Chlorostilbon mellisugus
Chrysolampis mosquitus
Tyrannus dominicensis
Myiarchus tyrannulus
Sublegatus modestus
Mimus gilvus
Coereba flaveola
Dendroica petechia
Icterus nigrogularis
Icterus icterus
Tiaris bicolor
Zonotrichia capensis

2. Breeding birds from Aruba, Curaçao, and Bonaire also recorded from Venezuela, but *not* from Colombia (1 species):

Amazona barbadensis

3. Breeding birds from Aruba, Curaçao, and Bonaire also recorded from Colombia, but *not* from Venezuela (2 species):

Sterna albifrons
Ammodramus savannarum

4. Breeding birds from Aruba (A), Curaçao (C), and Bonaire (B) not recorded from continental South America (7 species):

Butorides virescens[1]) (A,C,B)
Charadrius alexandrinus (C,B)
Sterna dougallii (A,C,B)
Columba squamosa (A,C,B)
Elaenia martinica (A,C,B)
Margarops fuscatus (B)
Vireo altiloquus[1]) (A,C,B)

Thus, from the total of 48 breeding species not more than 41 (85%) are also known from continental South America. Particularly the absence of *Butorides virescens, Columba squamosa, Elaenia martinica, Margarops fuscatus,* and *Vireo altiloquus* in continental South America indicates that the avifauna of Aruba, Curaçao, and Bonaire is not merely an impoverished continental one, but in addition contains some Caribbean elements which do not seem to have reached the islands from South America, but from the West Indian Islands: (13%) from 31 species of land birds.

After a comparison of species one of subspecies has to be made. Thus, the breeding species shared by the continent and the islands fall into the following categories.

1. Breeding birds from Aruba, Curaçao, and Bonaire occurring in the same subspecies as on the continent (26 species = 54% of total of breeding birds):

Podilymbus podiceps antarcticus
Egretta thula thula
Hydranassa tricolor ruficollis
Nyctanassa violacea bancrofti [2])
Phoenicopterus ruber ruber [3])
Anas bahamensis bahamensis
Buteo albicaudatus colonus
Polyborus cheriway cheriway
Colinus cristatus cristatus
Haematopus palliatus palliatus [4])
Charadrius collaris
Charadrius wilsonia cinnamominus
Himantopus himantopus mexicanus
Sterna hirundo hirundo [3])
Sterna albifrons antillarum [3])
Sterna maxima maxima
Sterna sandvicensis eurygnatha
Columba corensis
Columbigallina passerina albivitta
Leptotila verreauxi verreauxi
Amazona barbadensis barbadensis [5])
Crotophaga sulcirostris sulcirostris
Chlorostilbon mellisugus caribaeus [6])
Chrysolampis mosquitus
Tyrannus dominicensis dominicensis [7]
Icterus icterus ridgwayi

[1]) Migrant races recorded from South America!
[2]) Different subspecies in Venezuela.
[3]) Breeding on the South American continent not recorded.
[4]) Intermediate between *palliatus* and *prattii*.
[5]) Aruba; different subspecies on Bonaire.
[6]) Different subspecies in Colombia.
[7]) Breeding on the South American continent uncertain.

2. Breeding birds from Aruba, Curaçao, and Bonaire occurring in a slightly distinct subspecies on the continent, indicating a kind of clinal variation (11 species = 23% of total of breeding birds):

Falco sparverius brevipennis
Zenaidura auriculata vinaceo-rufa
Amazona barbadensis rothschildi [1])
Aratinga pertinax arubensis [2])
Speotyto cunicularia arubensis
Caprimulgus cayennensis insularis
Myiarchus tyrannulus brevipennis
Sublegatus modestus pallens
Dendroica petechia rufopileata
Icterus nigrogularis curasoënsis
Tiaris bicolor sharpei

3. Breeding birds from Aruba, Curaçao, and Bonaire occurring in a very distinct subspecies on the continent, indicating a relatively long lasted period of isolation (3 species = 6% of total of breeding birds):

Aratinga pertinax pertinax
Aratinga pertinax xanthogenius
Mimus gilvus rostratus
Zonotrichia capensis insularis

4. Breeding birds from Aruba, Curaçao, and Bonaire occurring in a subspecies belonging to a West Indian, not a South American group of subspecies (3 species = 6% of total of breeding birds):

Tyto alba bargei
Coereba flaveola uropygialis
Coereba flaveola bonairensis
Ammodramus savannarum caribaeus

The total number of South American immigrants among the 17 species of breeding water birds is therefore 8 (= 47%).

Nothing conflicts with the supposition that the 22 species of land birds mentioned above under (1) and (2) have colonized Aruba, Curaçao, and Bonaire from South America, the only probable exception being *Tyrannus dominicensis*, which has a wide breeding range throughout the West Indies, but apparently visits continental South America only on migration. The species [3]) listed above under (3) seem to have their closest relatives in the nearby continent and may therefore have colonized the islands from that direction. This brings the number of South American immigrants up to 23, which is 74% of the total of 31 species of breeding land birds.

The following species of water birds listed above under (1) seem to have South American, rather than Caribbean distributional affinities, or must at all

[1]) Bonaire; continental subspecies in Aruba.
[2]) Aruba; very distinct subspecies in Curaçao and Bonaire.
[3]) One species, *Aratinga pertinax*, having been already mentioned under (2).

events be considered to have reached the islands from South America (based on present distribution-patterns of the species):

Podilymbus podiceps antarcticus
Egretta thula thula
Hydranassa tricolor ruficollis
Nyctanassa violacea bancrofti
Anas bahamensis bahamensis
Charadrius collaris
Charadrius wilsonia cinnamominus
Sterna sandvicensis eurygnatha

The following species of water birds listed under (1) seem to have been of a Caribbean rather than of a South American origin (*Phoenicopterus ruber, Haematopus palliatus, Himantopus himantopus,* and *Sterna maxima* remaining undeterminable):

Sterna hirundo hirundo
Sterna albifrons antillarum

Thus, of 48 species breeding in Aruba, Curaçao, and Bonaire 31 (65%) probably are of a South American or at all events southern origin, 13 (27%) are of a Caribbean or at all events northern origin, and 4 (8%) remain undeterminable.

Distributional Affinities of Other Land Animals of Aruba, Curaçao, and Bonaire

Few species of mammals occur in Aruba, Curaçao, and Bonaire. Wagenaar Hummelinck (*Studies fauna Curaçao 1*, 1940) lists not more than 12 species (p. 110), 3 or 4 of them having been introduced from South America or being cosmopolitans following human culture (*Epimys, Mus, Odocoileus, Sylvilagus*), the remaining ones having undoubtable distributional affinities to South America.

Of the 15 species of lizards known from Aruba, Curaçao, and Bonaire only one (6.7%) seems to have distributional affinities to the Greater Antilles and not to South America (*Anolis bonairensis*; Wagenaar Hummelinck, *l.c.*, p. 123)!

Amphibians do not seem to be indigeneous in Aruba, Curaçao, and Bonaire, two species having been introduced from South America (*Pleurodema brachyops, Bufo marinus*).

Of the 34 species of land and fresh water snails mentioned by Wagenaar Hummelinck (*l.c.*, p. 116) as occurring in Aruba, Curaçao, and Bonaire, 23.5% are considered by this author (p. 123–124) to

have Greater Antillean rather than South American distributional affinities (*Stoastomops walkeri, Cistulops raveni, Tudora megacheilos, T. rupis, T. aurantia, T. maculata, Cerion uva, Microceramus bonairensis*).

Comparison of the Avifauna of Aruba, Curaçao, and Bonaire with that of Continental South America

From the calculations given above it appears that the Caribbean element in the islands of Aruba, Curaçao, and Bonaire is stronger than would have been expected from the short stretch of sea separating the islands from the continent. Indeed, the South American element is dominant, but such North American and Caribbean species as *Ardea herodias* (against *A. cocoi* from South America), *Butorides virescens* (against *B. striatus*), *Elaenia martinica* (against *E. flavogaster*), and *Vireo altiloquus* (against *V. chivi*) have their southern distributional limits south of Aruba, Curaçao, and Bonaire, instead of north of these islands. The absence of many typically South American families of pro-passerine and passerine birds, which on the South American mainland occur in a great variety of species, is also indicative of the fact that the avifauna of the islands is not purely South American. The following passerine families are absent in Aruba, Curaçao, and Bonaire, but occur in Venezuela and Colombia (number of species known from Venezuela and Colombia, respectively, added in parentheses):

Dendrocolaptidae (24–25)
Furnariidae (52–66)
Formicariidae (83–121)
Conopophagidae (1–3)
Rhinocryptidae (4–8)
Cotingidae (43–45)
Rupicolidae (2–2)
Pipridae (25–24)
Oxyruncidae (1–0)
Alaudidae (0–1)
Corvidae (6–7)
Troglodytidae (20–30)
Sylviidae (4–5)
Motacillidae (2–2)
Tersinidae (1–1)
Catamblyrhynchidae (1–1)

The contrast between the bird life of Aruba, Curaçao, and Bonaire and the nearby continental coast can also be illustrated by the absence in the islands of *Coragyps atratus*, which along the whole coast of Venezuela occurs as an abundant scavenger, sharing its

sanitary duties with *Polyborus cheriway* which on its turn seems to be more numerous in the islands than on the continent. The contrast is, of course, exaggerated by the absence in the islands of humid tropical vegetations. However, even the following species, which SCHÄFER (*Journ. f. Orn. 93*, 1952, p. 328–336) recorded as common birds in the xerophytic scrub and coastal "espinar" of the province of Aragua in northern Venezuela, are unknown in similar habitats in the islands:

Dendrocolaptidae:	*Dendroplex picus*
Tyrannidae:	*Euscarthmornis margaritaceiventer*
Fringillidae:	*Spermophila intermedia*
	Spermophila minuta
	Volatinia jacarina
	Sicalis flaveola
	Arremon conirostris

The narrow sea passage between Aruba, Curaçao, and Bonaire and the continent has of course occasionally been crossed by a number of South American birds, which have been recorded as "casualties"; in the future some of these may turn out to have become new colonizers! These South American stragglers, however, do not constitute more than nearly 6% of the total number of species known from the islands:

Milvago chimachima
Porphyrula martinica
Burhinus bistriatus
Phaetusa simplex
Coccyzus minor minor [1])
Guira guira
Florisuga mellivora
Elaenia chiriquensis

On the other hand, there are habitats in the islands which seem to be still unoccupied by birds and therefore have to be considered as open "niches", for which new colonizers may turn up in the future. For example, the stony deserts of Aruba appeared to be devoid of any resident birds and were, therefore, of an impressive desolation. The biotope probably would very well fit rock-wrens and terrestrial thrashers, but these birds do not appear on the nearby coast of Colombia and Venezuela and I am not aware of any other species on the South American mainland (peninsulas of Paraguana and

[1]) Another subspecies, *Coccyzus minor maynardi*, which is a migrant from North America, has also been recorded from the islands!

Goajira) which occurs in similar habitats. To a certain extent the place of a terrestrial, deserticolous species has been occupied by *Mimus gilvus*. This species not only manifest an extremely variable diet (from juicy fruits and ripening millet (*Andropogon sorghum*) to insects, small lizards, and the eggs of passerine birds, plovers and terns!), but also occurs in practically every biotope, being among the commonest of the bird species in Aruba, Curaçao, and Bonaire. Although I personally have not noticed even this ubiquitous bird in the stony deserts of Aruba, it *does* occur in those biotopes when the localities are only of a limited extent. One does not need to have a great phantasy to assume that the extremely variable but usually considerable length and strength of the bill, particularly in Aruban specimens of the species, have something to do with these relatively newly acquired terrestrial thrasher-like adaptations in habitat! The necessary equipment of any prospective colonizer of the islands or of one of the unoccupied habitats has to be a considerable elasticity in food and feeding habits. The most recent invader, *Crotophaga sulcirostris*, actually shows an astoundingly great variability as regards the choice of its food. About the history of the colonization of this species the following is known: in 1892 not found by HARTERT in Aruba and Bonaire and only extremely rare in Curaçao; first recorded in Bonaire in 1930, but by that time still absent in Aruba; the first pertinent record in Aruba is from 1951, although the species may have invaded the island as early as 1941.

In this connection it is not at all astounding that the five more or less resident species of Tyrannidae from Aruba, Curaçao, and Bonaire not only have different feeding habits, but are also subordinated to each other in interspecific competition in the sequence of their respective body-size:

1. *Tyrannus melancholicus*: length 23 cm; most pugnacious and aggressive; takes possession of the highest and most exposed perches; food, large and medium-sized insects, in addition fleshy fruits (over 50%).
2. *Tyrannus dominicensis*: length 23 cm; less pugnacious, but still very aggressive; takes, when possible, possession of the highest and most exposed perches, but is driven away by the previous species; food, large and medium-sized insects, in addition fleshy fruits (less than 25%).
3. *Myiarchus tyrannulus*: length 20 cm; not pugnacious, and hardly aggressive; takes exposed perches below the summit of the trees, usually under the cover of low trees; food, insects of various sizes, in addition fruits (up to 20%).

4. *Sublegatus modestus*: length 14 cm; not pugnacious and not aggressive; remains under the cover of xerophytic scrub and often takes food from the ground; food, exclusively small insects, mainly ants (70%).

5. *Elaenia martinica*: length 15 cm; not pugnacious and not aggressive; least active; remains hidden in dense foliage of trees and shrubs; food, small insects (less than 30%), in addition various kinds of vegetable matter, among which fruits and blossoms (over 90%).

Of all three islands Aruba is most continental in the composition of its avifauna, showing the following taxonomic peculiarities: (1) the almost extinct *Amazona barbadensis* from Aruba cannot be distinguished from the continental race (*barbadensis*), whereas the parrots from Bonaire are subspecifically distinct (*rothschildi*); (2) *Aratinga pertinax* and *Speotyto cunicularia* from Aruba are only very slightly distinct from their relatives inhabiting the Paraguana Peninsula of Venezuela, whereas the parroquets from Curaçao and Bonaire are totally different and the burrowing owl is absent in these islands; (3) *Icterus icterus* and *Icterus nigrogularis* from Aruba form a kind of transition between the insular races from Curaçao (and Bonaire) and those from the continent. Still, in the absence from Aruba of 30 species of non-migratory land birds known from Paraguana (57% of total of land birds from Paraguana) and the presence in Aruba of 5 species of resident land birds which do not occur in Paraguana (18% of total of land birds from Aruba) sufficient evidence is available in favour of the "oceanic" character of the avifauna of this island. The exclusive occurrence in the Netherlands Antilles of a kind of rattlesnake (*Crotalus durissus*) in Aruba, alongside the burrowing owl (*Speotyto cunicularia*), which is absent in the other islands too, can hardly be considered proof of a land connection of Aruba with the continent in recent geological time.

BARNES & PHELPS, Sr. (*Bol. Soc. Venez. Cienc. Nat. 46*, 1940, p. 269–301) mention the following 30 species of non-migratory land birds occurring in the Peninsula of Paraguana (xerophytic scrub and dry seasonal forest), but absent in the nearby island of Aruba (distance 27 km):

Cathartidae:	*Coragyps atratus*	Bucconidae:	*Hypnelus ruficollis*
	Cathartes urubitinga	Picidae:	*Centurus rubricapillus*
Accipitridae:	*Parabuteo unicinctus*	Dendrocolaptidae:	*Dendroplex picirostris*
Cracidae:	*Ortalis ruficauda*		*Synallaxis albescens*
Strigidae:	*Otus choliba*		*Poecilurus candei*
Trochilidae:	*Leucippus fallax*		

Formicariidae:	*Sakesphorus canadensis*	Cyclarhidae:	*Cyclarhis gujanensis*
	Thamnophilus doliatus	Vireonidae:	*Vireo (olivaceus) chivi*
	Formicivora grisea	Thraupidae	*Thraupis sayaca*
Tyrannidae:	*Pyrocephalus rubinus*	Fringillidae:	*Saltator coerulescens*
	Machetornis rixosa		*Saltator striatipectus*
	Elaenia flavogaster		*Richmondena phoenicea*
	Camptostoma obsoletum		*Volatinia jacarina*
Troglodytidae:	*Heleodytes minor*		*Coryphospingus pileatus*
Turdidae:	*Turdus leucomelas*		*Arremonopsis tocuyensis*
Sylviidae:	*Polioptila plumbea*		

The following species of non-migratory land birds occur in Aruba, but are absent in Paraguana:

Columba squamosa
Chrysolampis mosquitus
Elaenia martinica
Vireo altiloquus
Zonotrichia capensis

Bonaire has the strongest "oceanic" character in its present avifauna. Not only are 4 species of South American origin occurring in Curaçao and Aruba absent in Bonaire (*Falco sparverius, Colinus cristatus, Icterus icterus, Zonotrichia capensis*), but such species as *Amazona barbadensis* (*rothschildi*), *Aratinga pertinax* (*xanthogenius*), and *Coereba flaveola* (*bonairensis*) have developed distinct insular races.

Comparison of the Avifauna of Aruba, Curaçao, and Bonaire with that of the Venezuelan Islands

The origin of the avifauna of the Venezuelan islands does not seem to have been principally different from that of Aruba, Curaçao, and Bonaire. Only Margarita Island has to be excepted, for several reasons. Not only is Margarita of a considerably larger size than the other islands (about 850 km², without inland waters, against about 870 km² for Aruba, Curaçao, and Bonaire combined), but it shows in addition a much greater variety of biotopes, including tropical rain forest in the mountains. It is important to know that the present sea passage which separates Margarita from the north coast of Venezuela is not over 50 m deep. From this Wagenaar Hummelinck

(*Studies fauna Curaçao 1*, 1940, p. 125) came to the conclusion that there was formerly a well-wooded land connection between Margarita and the mainland. Actually, the following faunistical peculiarities of Margarita are strongly in favour of this suggestion. There are several South American mammals, snakes, a crocodile, and mollusks, in addition to no less than 48 species of birds belonging to 10 families which are known from Margarita, but are absent in the other coastal islands off Venezuela, including Bonaire, Curaçao, and Aruba, (YÉPEZ, BENEDETTI & PHELPS, Sr., *Bol. Soc. Ven. Cienc. Nat. 43*, 1940, p. 91–132).

Of the 137 species of birds known from Aruba, Curaçao, and Bonaire 88 (64%) have also been recorded from one or more of the Venezuelan islands (including Margarita).

Of the 48 breeding species of Aruba, Curaçao, and Bonaire 29 (62.5%) are known from the Venezuelan islands (excluding Margarita), the species lacking being (those marked * occurring on Margarita):

**Podilymbus podiceps*
**Egretta thula*
Anas bahamensis
**Buteo albicaudatus*
**Falco sparverius*
**Colinus cristatus*
**Columba corensis*
Crotophaga sulcirostris
Tyto alba
**Speotyto cunicularia*
**Caprimulgus cayennensis*
**Chlorostilbon mellisugus*
Elaenia martinica
**Vireo altiloquus*
**Icterus nigrogularis*
**Icterus icterus*
Ammodramus savannarum
Zonotrichia capensis

In contrast to the relatively large number of species shared by the Venezuelan islands, Bonaire, Curaçao, and Aruba there are 12 others which have been recorded from the Venezuelan islands only (Margarita excluded):

Oceanites oceanicus (5) [1])
Sula dactylatra (2, 5)
Sula sula (5, 9)
Pilherodias pileatus (2)
Butorides striatus (6)
Buteo platypterus (9)
Scardafella squammata (8)
Leucippus fallax (4, 6)
Chloroceryle amazona (6)
Quiscalus lugubris (5, 9)
Richmondena phoenicea (8)
Spermophila minuta (8)

[1]) The Venezuelan islands have been numbered as follows: 1 Las Aves, 2 Los Roques, 3 Orchila, 4 Blanquilla, 5 Los Hermanos, 6 Tortuga, 7 Margarita, 8 Los Frailes, 9 Los Testigos.

Among these are 3 sea birds, 1 migrant from North America (*Buteo platypterus*), the remaining ones (8) being South American species, which may either be local breeding birds or fall under the category of South American "casualties" (*Pilherodias pileatus*!). None of these species is of a Caribbean distributional origin, which fact stresses once more the peculiar Caribbean faunal affinities of Aruba, Curaçao, and Bonaire in contrast to the purely South American affinities of the Venezuelan islands.

In order to examine in additional detail the question of the origin of the species inhabiting Aruba, Curaçao, Bonaire, and the Venezuelan islands an analysis has been made of the distributional origin of the 29 species of birds occurring in all of these island groups (except Margarita): 17 species probably are of a South American origin, 8 species are of a Caribbean origin, 4 species are indeterminable. The Caribbean species, or at all events those which probably have had a northern route of colonization, are:

Butorides virescens (2, 4)
Charadrius alexandrinus (2)
Sterna hirundo (2)
Sterna albifrons (2)
Columba squamosa (8, 9)
Tyrannus dominicensis (1, 2, 4, 6)
Margarops fuscatus (5)
Coereba flaveola (2, 5, 6, 7, 8, 9)

A final step in the analysis of the origin of the insular avifauna is a comparison of the subspecific status of the 29 species of breeding birds from Aruba, Curaçao, and Bonaire also occurring in the Venezuelan islands:

(a) Species (3) without known subspecific variation; these being of no further use in the present analysis:

Charadrius collaris (9)[1]
Columba squamosa (8, 9)
Chrysolampis mosquitus (4, 6, 9)

(b) Species (11) occurring in different subspecies; the distributional origin of these forms has to be discussed in each single case:

Butorides virescens
B. v. curacensis (A, C, B) [2]
B. v. maculatus (2, 4)

[1] The numbers after the species names refer to the Venezuelan islands, mentioned on p. 42 (foot-note).
[2] A – Aruba, C – Curaçao, B – Bonaire.

Nyctanassa violacea [1])
N. v. bancrofti (A, C, B)
N. v. cayennensis (1?, 2, 7)

Haematopus palliatus
H. p. palliatus ≶ *prattii* (A, C, B)
H. p. prattii (1, 2, 4, 5, 9)

Zenaidura auriculata
Z. a. vinaceo-rufa (A, C, B)
Z. a. stenura (6, 7, 8)

Columbigallina passerina [2])
C. p. albivitta (A, C, B)
C. p. tortuguensis (6)

Aratinga pertinax
A. p. arubensis (A)
A. p. pertinax (C)
A. p. xanthogenius (B)
A. p. tortugensis (6)
A. p. margaritensis (7, 8)

Myiarchus tyrannulus [3])
M. t. brevipennis (A, C, B)
M. t. tyrannulus (6, 7, 8, 9)
M. t. blanquillae (4)

Mimus gilvus [4])
M. g. rostratus (A, C, B)
M. g. melanopterus (7, 8, 9)

Coereba flaveola
C. f. uropygialis (A, C)
C. f. bonairensis (B)
C. f. lowii (2)
C. f. frailensis (5, 8)
C. f. laurae (9)
C. f. ferryi (6)
C. f. luteola (7)

Dendroica petechia [5])
D. p. rufopileata (A, C, B)
D. p. obscura (1, 2)
D. p. aurifrons (6)

Tiaris bicolor
T. b. sharpei (A, C, B)
T. b. omissa (4, 5, 6)

[1]) Also occurring in the Venezuelan islands (4, 9) in the race *bancrofti*.
[2]) Also occurring in the Venezuelan islands (2, 4, 5, 8, 9) in the race *albivitta*.
[3]) Also occurring in the Venezuelan islands (2) in the race *brevipennis*.
[4]) Also occurring in the Venezuelan islands (3, 4, 6) in the race *rostratus*.
[5]) Also occurring in the Venezuelan islands (3, 4, 9) in the race *rufopileata*.

(c) Species (21) occurring in the same subspecies; these being of no further use in the present analysis:

Hydranassa tricolor ruficollis (2)
Nyctanassa violacea bancrofti (4, 9) [1])
Phoenicopterus ruber ruber (2, 3)
Polyborus cheriway cheriway (4)
Charadrius alexandrinus nivosus (2)
Charadrius wilsonia cinnamominus (1,2)
Himantopus himantopus himantopus (1, 2, 6, 7)
Sterna hirundo hirundo (2)
Sterna dougallii dougallii (2)
Sterna albifrons antillarum (2)
Sterna maxima maxima (1, 2, 4, 5, 6)
Sterna sandvicensis eurygnatha (2)
Columbigallina passerina albivitta (2, 4, 5, 8, 9) [1])
Leptotila verreauxi verreauxi (9)
Amazona barbadensis rothschildi (4)
Tyrannus dominicensis dominicensis (1, 2, 4, 6)
Myiarchus tyrannulus brevipennis (2) [1])
Sublegatus modestus pallens (2, 6)
Mimus gilvus rostratus (3, 4, 6) [1])
Margarops fuscatus bonairensis (5)
Dendroica petechia rufopileata (3, 4, 9) [1])

1. *Butorides virescens curacensis* — Restricted to Aruba, Curaçao, and Bonaire. Only slightly differentiated from the West Indian race *maculatus*, which has colonized Los Roques and Blanquilla, whereas the South American representative species *B. striatus* has colonized Tortuga. *B. v. curacensis* must therefore have arisen through independent insular isolation from a Caribbean stock.

2. *Nyctanassa violacea bancrofti* — Inhabits the West Indian islands, Central America, and Colombia; in addition Aruba, Curaçao, Bonaire, Blanquilla, and Los Testigos. Colonization from Colombia or from the Antilles. The race *cayennensis*, which occurs in Venezuela, has colonized Los Roques and probably also Las Aves from continental Venezuela.

3. *Haematopus palliatus palliatus* $\lesssim$ *prattii* — Morphologically intermediate populations between the continental race *palliatus* and the West Indian race *prattii*. Almost pure *prattii* have been collected in Bonaire, whereas the most obvious influence of *palliatus* was present in a specimen from Aruba. There is apparently a considerable exchange of individuals between the populations of the various islands and the continent.

4. *Zenaidura auriculata vinaceo-rufa* — Restricted to Aruba, Curaçao and Bonaire. Only slightly differentiated through a cline of growing paleness from the continental form *stenura*. The latter form has also colonized Tortuga and Los Frailes without having grown different.

5. *Columbigallina passerina albivitta* — Occurs all along the Caribbean coastal

[1]) Also occurring in the Venezuelan islands in a different subspecies.

districts of Colombia and Venezuela, including the islands of Aruba, Curaçao, Bonaire, Los Roques, Blanquilla, Los Hermanos, Los Frailes, and Los Testigos. On only one of the Venezuelan islands (Tortuga) a still slightly paler race has developed probably by independent insular isolation from a South American stock.

6. *Aratinga pertinax arubensis* — Restricted to Aruba. Only slightly differentiated from the continental form *venezuelae*, from which it has arisen by independent insular isolation. Closely resembles the race *margaritensis* from Margarita and Los Frailes, which has an independent origin from *venezuelae* similar to *arubensis*. Colonization of Los Frailes through Margarita. The race *tortugensis* from Tortuga has also derived from the continental stock (*venezuelae*), but the effect of the isolation is somewhat more marked.

Aratinga pertinax pertinax — *Aratinga pertinax xanthogenius* — The effect of independent insular isolation from a South American stock is strongly evident in these races which are restricted to Curaçao and Bonaire respectively.

7. *Myiarchus tyrannulus brevipennis* — Restricted to Aruba, Curaçao, Bonaire, and Los Roques. Only very slightly differentiated from the continental form *tyrannulus* (which in addition occurs in Tortuga, Margarita, Los Frailes, and Los Testigos) and from *blanquillae* from Blanquilla. All these populations have derived by colonization of the continental form, which itself has remained unchanged in the eastern island groups, but differentiated in Los Roques, Bonaire, Curaçao, and Aruba along independent lines of insular isolation.

8. *Mimus gilvus rostratus* — Occurs in Aruba, Curaçao, Bonaire, Orchila, Blanquilla, and Tortuga. Slightly differentiated through insular isolation from the form *melanopterus* from continental Venezuela and Colombia, the latter form having also colonized Margarita, Los Frailes, and Los Testigos without notable change.

9. *Coereba flaveola uropygialis* — Restricted to Aruba and Curaçao.

Coereba flaveola bonairensis — Restricted to Bonaire.

These subspecies belong to a group of subspecies differing from those inhabiting continental Venezuela and Colombia, but agreeing with the Lesser Antillean group of *martinica* (Sa Lucia, Martinique). It is noteworthy that the Bonaire form is closer to *martinica* than the race inhabiting Curaçao and Aruba. *C. f. luteola* from the coastal districts of Venezuela and Colombia has apparently recently colonized Margarita (*luteola!*) and Tortuga, the latter populations (*ferryi*) having become slightly differentiated from *luteola*. The other insular populations (Los Roques, Los Hermanos, Los Frailes, Los Testigos), although apparently also having derived from continental populations, have changed more conspicuously, probably as a result of a longer time of isolation.

10. *Dendroica petechia rufopileata* — Inhabits Los Testigos, Margarita, Blanquilla, Orchila, Bonaire, Curaçao, and Aruba. These birds closely resemble the race *barbadensis* from the southern Lesser Antilles (Barbados) and apparently have the same distributional origin. The race *aurifrons* inhabiting the coast of northern Venezuela (Anzoategui and Sucre) probably takes an intermediate place, both in distribution and taxonomy, as do also the populations from Tortuga (*aurifrons*) and those from Los Roques and Las Aves (*obscura*), which at present differ slightly from both *aurifrons* and *rufopileata*. The *rufopileata* group of subspecies is therefore probably of a common origin, the birds having colonized both the islands and coastal parts of the mainland and having become differentiated in certain local populations.

11. *Tiaris bicolor sharpei* — Restricted to Aruba, Curaçao, and Bonaire. The populations inhabiting Los Hermanos, Tortuga, and Los Frailes do not differ from

those occurring along the north coast of Venezuela and Colombia. The race *sharpei* represents an isolated group from the same stock as *omissa* in which a tendency towards growing paleness has been realized.

We can therefore summarize the origin of the 11 species showing subspecific variation in the inhabited area of Aruba, Curaçao, Bonaire, and the Venezuelan islands (excluding Margarita) as follows (see also: VOOUS, *Acta XI Congr. Int. Ornith.* Basel (1954), 1955, p. 410–414):

(1) Subspecies of a probably South American distributional origin, both in Aruba, Curaçao, and Bonaire, and in the Venezuelan islands, in the latter islands mainly occurring in slightly (or conspicuously) differentiated subspecies:

Zenaidura auriculata vinaceo-rufa
Columbigallina passerina albivitta
Aratinga pertinax arubensis
Aratinga pertinax pertinax
Aratinga pertinax xanthogenius
Myiarchus tyrannulus brevipennis
Mimus gilvus rostratus
Tiaris bicolor sharpei

(2) Subspecies of a probably South American distributional origin in Aruba, Curaçao, and Bonaire, whereas those in the Venezuelan islands are of a Caribbean origin:

none

(3) Subspecies of a probably Caribbean distributional origin in Aruba, Curaçao, and Bonaire, whereas those in the Venezuelan islands are of a South American origin:

Butorides virescens curacensis (against *B. striatus*)
Coereba flaveola bonairensis
Coereba flaveola uropygialis

(4) Subspecies of a probably Caribbean distributional origin, both in Aruba, Curaçao, and Bonaire and in the Venezuelan islands:

Butorides virescens curacensis (part)

(5) Subspecies of indefinite distributional origin:

Nyctanassa violacea bancrofti
Dendroica petechia rufopileata
Haematopus palliatus palliatus ≶ *prattii*

As a final result we can group the 48 breeding birds of Aruba, Curaçao, and Bonaire as follows (slightly amended from the preliminary conclusion reached on p. 36):

(1) of a South American origin: 29 species (59%).

(2) of a Caribbean (or at all events northern) origin: 13 species (27%).

(3) of unknown or indefinite origin: 6 species.

SYSTEMATIC LIST

In the following chapter all species of birds known to have occurred in the islands of Aruba, Curaçao, and Bonaire (*Netherlands Leeward Group*) have been treated separately. The sequence of species is the same as that in K. H. VOOUS, *De Vogels van de Nederlandse Antillen* (Birds of the Netherlands Antilles), 1955.

A few particulars on the manner of treatment of each species, which is kept uniform throughout, should perhaps be stated here.

Under *native names* only the names currently used in the *Papiamento* language have been mentioned; those printed in *italics* have been recorded or confirmed by the author through personal experience. The spelling of the names has been corrected by Mr. ENR. R. GOILO (Curaçao), a fact which is here thankfully acknowledged.

In the paragraph mentioning the total of specimens examined by the author the names of those *localities* in which the author himself has collected specimens have been printed in *italics*.

Immediately following the paragraph mentioning the *status* of each species in Aruba, Curaçao, and Bonaire, the distribution of the species in the *Venezuelan islands* is given as a means of facilitating a direct comparison.

All *measurements* are in millimeters (mm) unless stated otherwise.

Measurements of *eggs* have been made by Mr. C. NEIJSSEL, honorary oologist at the Zoological Museum, Amsterdam, unless stated otherwise.

1 **Podiceps dominicus speciosus** Lynch Arribálzaga

Short-Billed Grebe

Podiceps speciosus LYNCH ARRIBÁLZAGA, La Ley, Buenos Aires, 1877, p. 1 — Isla de Baradero, Province Buenos Aires, Argentina (see: WETMORE, Proc. U.S. Nat. Mus. *87*, 1939, p. 180 and HELLMAYR & CONOVER, *1* (*2*), 1948, p. 21).
Podiceps dominicus speciosus, VOOUS 1955, p. 28 (Curaçao, Bonaire).

Native name — unknown.

CURAÇAO, BONAIRE. — Breeding not recorded.

CURAÇAO: *Groot Santa Marta*, 20.I.1952 (1 ♀). BONAIRE: near *Kralendijk*, 23.XI.1951 (1 ♂).

Taxonomy — The female from Curaçao is in almost adult breeding dress, whereas the male from Bonaire is in winter or immature plumage with white throat, brownish breast band and white under parts. These birds possess the conspicuous brownish barring on the flanks, resulting in a reduction of the white area on the under parts, and the short bill, characteristic of the race *speciosus*. Central American specimens (*brachypterus*) lack the barring on the flanks, even in winter dress, when the whole of the under parts are silky white. The collected specimens have been compared with birds originating from Mexico (winter dress), Costa Rica, Cuba, Brazil, and Argentina. For taxonomic notes on the species, see: CHAPMAN, Bull. Am. Mus. Nat. Hist. *12*, 1899, p. 255–256.

Iris golden yellow; bill (♀ ad.) blue-grey, base of lower mandible yellowish; legs and feet dark horn-grey.

Measurements — CURAÇAO: ♀, wing 97.5, bill (exposed culmen) 19. BONAIRE, ♂, wing 98, bill 22.

Comparative measurements: Mexico and Costa Rica: wing 95.5, 96, bill 20, 23. Cuba: 101, bill 26.5. Brazil and Argentina: wing 99.5, 101, bill 18, 21.

Status — Not previously recorded.

Apart from the two — solitary — specimens collected in Curaçao and Bonaire we did not otherwise met with this species. We were informed that small "divers" occasionally occurred throughout the year in Curaçao. In the exceptionally rainy year of 1955 the species was again observed and collected by ANSINGH and KOELERS (*in litt.*) at the fresh water pool of Muizenberg, Curaçao, from 26.V – 1.VII. At least 4 specimens were present.

Not recorded from the Venezuelan islands.

Biotope — Minute fresh water ponds of hardly over 10 m in diameter, in both cases observed by us without any protective plant cover.

Food — The stomachs contained the remains of many insects, among which were three large larvae of Odonata (Curaçao); also some vegetable matter (Bonaire).

Reproduction cycle — The male (Bonaire), though in a non-breeding plumage, had rather large testes (6 × 5 mm); the female had the ovary active, with follicles of 3 mm in diameter, and the oviduct swollen and twisted. Breeding of this species in the islands cannot therefore be excluded.

Zoogeography — *Podiceps d. speciosus* ranges throughout the fresh waters of tropical South America, including Trinidad and Tobago and the Paraguana Peninsula of Venezuela (BARNES & PHELPS, Sr., 1940, p. 14), but not the Goajira Peninsula, though occurring in other parts of Colombia (DE SCHAUENSEE 1948, p. 349). It has apparently reached Curaçao and Bonaire from South America.

Protective measures — Not protected by law.

2 **Podilymbus podiceps antarcticus** (Lesson)

Pied-Billed Grebe

Podiceps antarcticus LESSON, Rev. Zool. *5*, 1842, p. 209 — Valparaiso, Chile.
Podilymbus podiceps antarcticus, VOOUS 1955, p. 29 (Curaçao, Bonaire).

Native name — unknown.

CURAÇAO, BONAIRE. — Breeding bird.

CURAÇAO: Muizenberg, 26.II.1955 (1 ♀ juv.; Collection Koelers, Curaçao).

Taxonomy — The specimen is in juvenile plumage and has the bill thin and pointed, not swollen as in adult state. Upper parts from crown to tail are decidedly more greyish, less brownish-black than in two North American juveniles (Wisconsin) of the race *podiceps* in comparative stage of development. Under parts not pure white as in the North American specimens, but variegated with ill-defined greyish-brown spots.

Iris brown; bill pale flesh-colour; legs bluish-grey with black.

Measurements — CURAÇAO: ♀ juv., wing 129, tarsus 40.

Status — Not previously recorded.

We observed this species once in Curaçao, *viz.* on 2.IV.1952, a solitary individual in the Schottegat near Parera. The bird was constantly diving in the shallow water on the leeward side of a small, mangrove-fringed island, close to a group of feeding *Egretta thula*. Chin and throat of this bird were creamy-white and the chin was uniform yellowish without any black, proving that the bird was in a non-breeding plumage.

An additional observation was made by Messrs. GARDNER D. STOUT and BAYARD READ during their stay in Bonaire early in 1953. In order to give full credit to this observation I cite in detail part of a letter by Mr. STOUT addressed to Mr. J. G. DE JONG, President of the Natural Sciences Study Group of the Netherlands Antilles:

"The pied-billed grebe with three young was seen at Onima Plantation. There is a fresh water pond in the valley formed by a concrete dam. Two grebes were seen in this pond on March 2 and one was carrying their young on her back. I watched them for about an hour through a 20 power telescope on a tripot. At one time while I was trying to make a closer approach the female dived and let the young afloat. After a few minutes the young also dove but reappeared very quickly. After I had observed mother and young I searched for the floating nest which I found about 500 feet out in the pond. I managed to pick it up and examined it closely with Mrs. Stout and Mr. Read. It was entirely typical of other pied-billed grebe nests that I had seen in the United States".

From 26.XII.1954–14.VII.1955 the species was present in the fresh water pool at Muizenberg, Curaçao, where ANSINGH and KOELERS (*in litt.*) observed at least 6 specimens together (26.V.1955) and collected a juvenile bird on 26.II.1955. The birds were extremely shy and probably had bred.

Not recorded from the Venezuelan islands.

Zoogeography — *Podilymbus p. antarcticus* breeds throughout the whole of South America from the Panama Canal Zone through Colombia, Venezuela, Trinidad, and Tobago, south to Argentina and Chile. It is a not uncommon breeding bird in the shallow lagoons on the north coast of Venezuela (MARTIN, Mem. Soc. Cienc. Nat. La Salle, Caracas, 9 (24), 1949, p. 189). It is a South American element in the avifauna of the Netherlands Leeward Islands.

Protective measures — Not protected by law.

3 **Puffinus lherminieri lherminieri** Lesson

Dusky or Audubon's Shearwater

Pufflnus (*sic*!) *lherminieri* LESSON, Rev. Zool. 1839, p. 102 — "ad ripas Antillarum".

Native name — unknown.

CURAÇAO. — Casual visitor.

CURAÇAO: Willemstad (Otrabanda), 9.XII.1954 (1 ♂; Collection Koelers, Curaçao).

Taxonomy — Iris dark brown; bill dark bluish-grey, tip blackish; legs and feet including webs fleshy-grey, but posterior and lateral sides of tarsus, outer toe, and underside of median and inner toes black.

Measurements — CURAÇAO: ♂, wing 208, tail 87, bill (exposed culmen) 29, tarsus 44.

Status — Not previously recorded and not observed by us.

Only known from one adult specimen, which was caught by hand in the night of 9.XII.1954 in Willemstad (Otrabanda), Curaçao (KOELERS *in litt.*).

In the Venezuelan islands reported from Los Roques (PHELPS & PHELPS 1951, p. 5) and Los Hermanos (PHELPS, Jr., 1948, p. 107), where the species has been found breeding. We observed these birds in rather large numbers on the sea off the north coast of Los Hermanos and Blanquilla on 20.IX.1951.

Food — The stomach of the collected specimen contained about 200 beaks of cephalopods, varying in length between 1 and 3 mm; only very few fragments of eye-lenses were present in addition.

Reproduction cycle — The testes of the collected specimen were swollen, measuring about 17 × 7 mm.

Distribution — *Puffinus l. lherminieri* is the Caribbean representative of a world-wide tropical and subtropical species which is known to breed in some of the Venezuelan islands, many of the Lesser Antilles, and in the Bahama and Bermuda Islands.

Protective measures — Not protected by law.

4 **Phaëthon aethereus mesonauta** Peters

Red-Billed Tropic Bird

Phaëthon aethereus mesonauta PETERS, Occ. Pap. Boston Soc. Nat. Hist. 5, 1930, p. 261 — Swan Key, Almirante Bay, Panama.
"Phaëton flavirostris. Brand", SIMONS 1868, p. 153 (Curaçao).
Phaëthon aethereus mesonauta, VOOUS 1955, p. 31 (Curaçao).

Native name — unknown,

CURAÇAO. — Casual visitor.

CURAÇAO: off the south coast, 7.II.1939 (1 ♀ ad., collected by H. W. G. Cossee; Leiden Mus.).

Taxonomy — Bill carmine-red (in the skin).

Measurements — CURAÇAO: ♀, wing 308, bill (exposed culmen) 60.

Status — Only known from one specimen caught on board a ship off the south coast of Curaçao on 7.II.1939. As early as 1868, however, the occurrence of some species of *Phaëthon* had been mentioned by SIMONS.

In the Venezuelan islands the species has been recorded only from Los Hermanos (PHELPS, Jr., 1948, p. 108), but the Amsterdam Museum also possesses a specimen from the lighthouse island (Farallon) Centinela (♂, 24.XI.1921).

Distribution — *Phaëthon a. mesonauta* ranges from the tropical and subtropical Atlantic Ocean and the Caribbean Sea to the tropical Pacific coasts of Central and South America. It is, however, a rare bird along the north coast of Venezuela and not yet known from the Caribbean coast of Colombia (DE SCHAUENSEE 1948, p. 352).

Protective measures — Not protected by law.

5A **Pelecanus occidentalis occidentalis** Linnaeus

Brown Pelican

Pelecanus occidentalis LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 215 — Jamaica.

5B **Pelecanus occidentalis carolinensis** Gmelin

Pelecanus carolinensis GMELIN, Syst. Nat. *1*, *2*, 1789, p. 571 — South Carolina.

Pelecanus fuscus, PETERS 1892, p.122 (Curaçao); HARTERT 1893, p. 308 (Aruba), 326 (Curaçao), 336 (Bonaire); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 163 (Curaçao); HARTERT 1902, p. 307 (Aruba, Curaçao, Bonaire).

Pelecanus occidentalis, CORY 1909, p. 195 (Aruba); RUTTEN 1931, p. 125 (Aruba, Curaçao, Bonaire): DE JONG 1948, p. 2 (Aruba, Curaçao, Bonaire).

Pelecanus occidentalis occidentalis, WETMORE, Auk *62*, 1945, p. 578, 579 (Aruba, probably also Curaçao); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Bonaire); PHELPS & PHELPS 1951, p. 4 (Bonaire); VOOUS 1955, p. 34 (Aruba, Curaçao, Bonaire).

Pelecanus occidentalis carolinensis, VOOUS 1955, p. 34 (Aruba).

Native name — *Ganshi*.

ARUBA, CURAÇAO, BONAIRE (*occidentalis*). — Resident; breeding not recorded.
ARUBA (*carolinensis*). — Non-breeding visitor.

ARUBA (*occidentalis*): *Paardenbaai*, 8.IV.1952 (2 ♀ juv.). BONAIRE (*occidentalis*): *coast of Palu Lechi*, 26.III.1952 (2 ♂ juv.).
ARUBA (*carolinensis*): *Paardenbaai*, 18.XII.1951 (1 ♂ ad.), 8.IV.1952 (1 ♂ juv.).

Taxonomy — According to WETMORE's recent revision of this species the smaller juvenile specimens (wing ♂, 467, 470, ♀, 440, 455) have to be considered as belonging to the West Indian breeding population (*occidentalis*), the wing length of which may not exceed 496 mm in males and 486 mm in females. According to the same author the other specimens, which are considerably larger (wing ♂ ad., 540, ♂ juv., 509), must be non-breeding visitors from more northerly populations (*carolinensis*), the wing length of which varying between 500 and 550 mm in males and between 483 and 528 mm in females. The body weights of our specimens of *occidentalis* (2.4 kg on the average) are considerably smaller than those of the specimens of

carolinensis (3.5 kg on the average). With one exception our juvenile specimens of *occidentalis* are first-year birds, apparently quite recently fledged; the feathers of head and neck are loose and downy and the body feathers are new and rather soft and do not show signs of wear; nor do these birds show any moult of the body feathers or of the quills. Sternum and furcula were not yet fully ossified (2 ♂ juv., 26.III; 1 ♀ juv., 8.IV). The adult specimen of *carolinensis* is in the non-breeding adult plumage with the neck whitish instead of chestnut. Its under parts are lighter, more dusky grey, less blackish, than in 4 breeding specimens from St. Martin (*occidentalis*). The juvenile specimen of *carolinensis* is darker greyish-brown above, less pure brown than are the juveniles of *occidentalis*.

Iris light grey in adult ♂, brown in juveniles; bill reddish, paler near the base, with orange, black-tipped nail in adult ♂, brownish or bluish-grey in juveniles; naked orbital skin and gular pouch olive-brown in adult ♂, light olive-greyish in juveniles; legs and feet blackish in adult ♂, flesh colour or fleshy-grey in juveniles.

Measurements — ARUBA (*occidentalis*): ♀ juv., wing 440, 450, tail 113, 128, bill (exposed culmen) 247, 264. BONAIRE (*occidentalis*): ♂ juv., wing 467, 470, tail 127, 129, bill 285, 300.

ARUBA (*carolinensis*): ♂ ad., wing 540, tail 147, bill 330; ♂ juv., wing 509, tail 135, bill 315.

Status — Although observed or collected by most of the previous ornithologists along the coasts of all three islands, the species has not yet been found breeding in Aruba, Curaçao, or Bonaire. The statement by DE JONG (*l.c.*) of the possible breeding of the pelican on the Reef of Aruba has never been verified.

We found pelicans common in December and April along the west coast of Aruba. By December most of these birds were adults in a non-breeding plumage, but by April — when the total number seemed smaller — the situation was the reverse, adults being extremely scarce. — Pelicans were only very occasionally seen in Curaçao waters. — Equally, in Bonaire 3 non-breeding adult specimens were the only pelicans that came to notice during the whole month of November, but in March juvenile pelicans were common in the sea north and south of Kralendijk, at Slagbaai, Lac, and in the Pekelmeer. We did not notice any breeding activity, but J. G. DE JONG (*in litt.*) informs me of a regular sleeping and roosting place of this species in the trees bordering "Pelican Bay", east of Fuik Baai, Curaçao. It thus seems clear that during the winter months of 1951–1952 the islands were visited by quite a lot of non-breeding adults and some juveniles, the majority of which probably originated from northerly populations (*carolinensis*). Juveniles, which were common in March and April, probably originated from nearby breeding places (*occidentalis*).

In the Venezuelan islands pelicans have been recorded from Las Aves, Los Roques, Orchila, Blanquilla, Tortuga, Margarita, Las Frailes, Los Testigos. In these islands breeding colonies are known from Tortuga (CORY 1909, p. 220) and Los Frailes (nests with large young found and photographed by WAGENAAR HUMMELINCK on 18.VI.1936).

Biotope — Pelicans have been found fishing exclusively in shallow coastal waters.

Food — Exclusively fish. The contents of 6 stomachs examined have kindly been identified by Prof. Dr. L. F. DE BEAUFORT:

1. Paardenbaai, Aruba, 18.XII.1951: At least 8 herring (*Clupea spec.*) of up to 10 cm length.

2. Paardenbaai, Aruba, 8.IV.1952: At least 250 anchovies (*Engraulis* (*Stolephorus*) *spec.*) of approximately 7 cm length and a small number of *Sardinella spec.* of 6–8 cm length.

3. Paardenbaai, Aruba, 8.IV.1952: A great quantity of anchovies and a few *Sardinella spec.*

4. Paardenbaai, Aruba, 8.IV.1952: At least 50 *Jenkinsia lamprotaenia* of 4–5 cm length and 1 *Sardinella spec.* of 9 cm length.

5. Kralendijk, Bonaire, 26.III.1952: At least 27 fishes belonging to 2 species of horse mackerel, *viz. Caranx* (*Selar*) *spec.* of 10–14 cm length and *Caranx* (*Caranx*) *carangus* of 12 cm length.

6. Kralendijk, Bonaire, 26.III.1952: Many fishes varying in length between 4 and 12 cm and belonging to *Engraulis* (*Stolephorus*) *spec.* and *Sardinella spec.*

Parasites — Miss THERESA CLAY (London) kindly identified the Mallophaga found inside the gular pouch of one of the juvenile males collected 26.III.1952 at Bonaire as *Piagetiella bursaepelecani* (Perry) and *Pectinopygus occidentalis* Thompson.

Distribution — *Pelecanus o. occidentalis* breeds throughout the West Indies, including some of the South Caribbean islands and islets off the coast of Venezuela (WETMORE, Proc. U.S. Nat. Mus. *87*, 1939, p. 181), among which Morro de Esmerarda (West of Carúpano) (10.VI. 1936; WAGENAAR HUMMELINCK *in litt.*).

Pelecanus o. carolinensis ranges north of the area inhabited by *occidentalis*, from the coast of the southeastern United States southward to the northern Bahama Islands and the north coast of Cuba. It winters throughout the West Indies and along the coast of Venezuela (PHELPS, Jr., 1948, p. 95) and Colombia (DE SCHAUENSEE 1948, p. 352), where it has been regularly found in company with individuals of the resident race *occidentalis*.

Protective measures — Protected by law (WESTERMANN 1946, p. 81).

6 **Sula leucogaster leucogaster** (Boddaert)

Brown Booby

Pelecanus leucogaster BODDAERT, Tabl. Pl. Enl. 1783, p. 57, no. 973 — Cayenne.
Sula leucogaster, DE JONG 1948, p. 3 (Curaçao).
Sula leucogaster leucogaster VOOUS 1955, p. 36 (Aruba, Curaçao, Bonaire).

Native name — *Bubi*.

ARUBA, CURAÇAO, BONAIRE. — Non-breeding visitor.

ARUBA: *Paardenbaai*, 18.XII.1951 (1 ♂ juv.), 8. IV. 1952 (1 ♂ juv., 1 ♀ juv.).
CURAÇAO: *Fuik Baai*, 11.IV.1952 (1 ♀ juv.).

Taxonomy — All specimens are in immature plumage. Head and neck are a shade darker than the back, thus differing from juvenile individuals of the adjacent Pacific race, in which head and neck are uniform with the back.

Iris light grey or greyish-white; bill light bluish-grey, becoming greenish or greenish-yellow towards the lores; legs and feet, including the webs, dull yellow.

Measurements — ARUBA: ♂ juv., wing 382, 402, tail 179+, 194, bill (exposed culmen) 93, 99; ♀ juv., wing 382, tail 166+, bill 98.5. CURAÇAO: ♀ juv., wing 382, tail 191, bill 95.

Status — Previously only recorded by DE JONG from the coasts of Curaçao (and other islands?). DE JONG states having seen mainly juvenile birds and having found two "oil-victims" at the entrance of the Annabaai, Curaçao. WESTERMANN (West Ind. Gids *28*, 1947, p. 210–211) suggests that it may have been this species that formerly nested in great numbers in the island of Klein Curaçao and produced the thick layers of guano dug out half a century ago.

We observed this species along the coasts of all three islands, but it was by no means common and only immature birds came to notice. It seemed to have there its regular feeding grounds, for both in December and in April solitary individuals were fishing in the sea just outside the Paardenbaai, Aruba. Along the south coast of Curaçao the species has more than once been observed in the seas close to Fuik Baai. In Bonaire it seemed to be a regular visitor of Lac. Apart from fishing in the open sea the species has been observed resting on a buoy, or, in Lac, on a dead stump of a rhizophore rising out of the shallow water.

This species of booby is one of the commonest of sea birds off the north coast of Venezuela, whence it has been recorded from several of the Venezuelan islands: Las Aves (breeding), Los Roques, Blanquilla, Los Hermanos (breeding), Tortuga, Margarita, Los Frailes (found breeding and photographed by WAGENAAR HUMMELINCK on La Pecha, 19.VI. 1936), Los Testigos (breeding; PHELPS, Jr., 1948, p. 110–111), as well as from the Soldado Rock in the Gulf of Paria (breeding).

Food — Four stomachs examined contained the remains of fishes from up to 30 cm length; one stomach contained in addition at least 14 jaws of a cephalopod (18.XII.1951, Aruba). The fishes have been identified by Prof. Dr. L. F. DE BEAUFORT as *Belone ardeola* C.V. (6 specimens) and *Hemiramphus spec.* (3 specimens).

Distribution — *Sula l. leucogaster* is a breeding bird throughout the West Indies, including the islands in the South Caribbean Sea; it also breeds on islands in the tropical Atlantic Ocean. It is numerous off the north coast of Venezuela, but very rare along the Caribbean coast of Colombia (DE SCHAUENSEE 1948, p. 354).

Protective measures — Not protected by law.

7 **Phalacrocorax brasilianus brasilianus** (Gmelin)

Brazilian or Bigua Cormorant

Procellaria brasiliana GMELIN, Syst. Nat. *1, 2*, 1789, p. 564 — N.E. Brazil.

"*Mergus cristatus* — Duikelaar", SIMONS 1868, p. 153 (Curaçao).

"*Phalacrocorax brasilianus?*", PETERS 1892, p. 122 (Curaçao).

Phalacrocorax brasilianus, HARTERT 1893, p. 308 (Aruba), p. 326 (Curaçao); HARTERT 1902, p. 308 (Aruba, Curaçao).

Phalacrocorax vigua, CORY 1909, p. 195 (Aruba, Curaçao); RUTTEN 1931, p. 123 (Aruba, Curaçao, Bonaire).

Phalacrocorax olivaceus, DE JONG 1948, p. 3 (Aruba, Curaçao, Bonaire); VAN OORDT 1949, p. 323 (Curaçao).

Phalacrocorax brasilianus brasilianus, HELLMAYR & CONOVER *1 (2)*, 1948, p. 145 (Aruba); PHELPS & PHELPS 1951, p. 5 (Bonaire); VOOUS 1955, p. 37 (Aruba, Curaçao, Bonaire).

Native name — Duikelaar, Duikla, Dekla; also *Patu morèkè*.

ARUBA, CURAÇAO, BONAIRE. — Non-breeding visitor.

CURAÇAO: Fresh water pool near *Rustenburgh*, 15.IV.1952 (2 ♀ imm.).

Taxonomy — Both specimens are in immature plumage, though in different stages of moult into adult dress. Wing quills and tail feathers have been wholly or partly renewed.

Iris light green; bill, upper mandible, dark horn brown, lower mandible, yellowish brown; legs and feet black.

Measurements — CURAÇAO: ♂, wing 272, 277, tail 170, 171, bill (exposed culmen) 51, 52.5, tarsus 53, 55. Two immature specimens from Brazil and one from Cayenne in the Leiden Museum measure as follows: wing 269, 276, 292, tail 161, 167, 168.

For critical notes on the recognition of subspecies of *Phalacrocorax brasilianus* based on measurements, see: JOUANIN, Proc. X. Int. Orn. Congr. (Uppsala 1950) 1951, p. 197–198.

Status — The species has been recorded from all three islands by all previous authors; it was apparently also known to SIMONS from Curaçao prior to 1868.

We found small numbers of these cormorants on Curaçao and Aruba from 26.XII.1951 onwards, the species being absent during the earlier months of our visit (September–December). They have been observed fishing in the Rifwater of Curaçao and were found to be constant inhabitants of the Schottegat, where — in spite of VAN OORDT's (*l.c.*) statements — they have been regularly observed swimming and diving in the locally polluted water. They were noteworthily common in the fresh water pool near Rustenburgh, Rio Canario, where over 30 individuals have been observed at one time. They were still present there on 25.VI.1952 (ANSINGH *in litt.*). Adult specimens were very rare, if present at all, practically all specimens being juveniles in various stages of moult towards the adult plumage. — In Aruba it was only observed fishing in the Paardenbaai. We did not met with it in Bonaire. — The cormorant is generally considered by the inhabitants of the Netherlands Antilles to be a long-billed, unpalatable species of duck ("*patu*"!).

In the Venezuelan islands apparently only recorded from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 14).

Food — The stomach of one specimen examined contained the remains of various cyprinodonts (*Mollienesia, Cyprinodon*).

Distribution — *Phalacrocorax b. brasilianus* is a breeding bird from practically all over South America, north to Costa Rica. It is a regular inhabitant of the coastal lagoons of Colombia and Venezuela. In the West Indies it occurs in the Bahama Islands and Cuba only, where it is represented by the race *mexicanus*.

Protective measures — Not protected by law.

8 **Fregata magnificens** Mathews

American Frigate-Bird or Man-o'-war Bird

Fregata minor magnificens MATHEWS, Austr. Av. Rec. *2*, 1914, p. 120 — Barrington Island, Galapagos Islands.
"Tachypetes aquila", PETERS 1892, p. 121 (Curaçao).
Fregata aquila, HARTERT 1893, p. 308 (Aruba), 326 (Curaçao), 336 (Bonaire); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 163 (Curaçao); HARTERT 1902, p. 308 (Aruba, Curaçao, Bonaire); CORY 1909, p. 195 (Aruba).
Fregata minor rothschildi MATHEWS, Birds Austr. *4*, 1915, p. 280 — Aruba.
Fregata magnificens, ROTHSCHILD, Nov. Zool. *22*, 1915, p. 145 (Aruba); RUTTEN 1931, p. 124 (Aruba, Curaçao, Bonaire); HELLMAYR & CONOVER *1* (*2*), 1948, p. 164 (Bonaire); DE JONG 1948, p. 3 (Aruba, Curaçao, Bonaire); VAN OORDT 1949, p. 324 (Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 5 (Bonaire); VOOUS 1955, p. 39 (Aruba, Curaçao, Klein Curaçao, Bonaire, Klein Bonaire).
Fregata magnificens rothschildi, LOWE, Nov. Zool. *31*, 1924, p. 305 (Aruba).
Fregata magnificens subspec., CROOCKEWIT, Ardea *36*, 1949, p.281 (Bonaire).

Native names — *Macuacu, Skerchi*; *Manuwá* (Bonaire).

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE, KLEIN BONAIRE. — Resident; breeding not positively recorded.

CURAÇAO: south coast, 6.V.1930 (1 ♂ ad., collected by PIJPERS, RUTTEN & VERMUNT; Leiden Mus.); *southeast coast*, 26.I.1952 (2 ♂ juv.); *Schottegat*, 8.XI. 1951 (1 ♀ juv.); *Spaanse Water*, 11.IV.1952 (1 ♂ semi-ad., 1 ♂ juv.); *Isla Macuacu*, Sint Joris Baai, 4.X.1951 (1 ♂ ad.). KLEIN CURAÇAO: 26.I.1952 (1 ♂ semi-ad.).

Taxonomy — After the elucidating reviews by ROTHSCHILD (Nov. Zool. *22*, 1915, p. 145–146) and LOWE (Nov. Zool. *31*, 1924, p. 299–305) nothing has to be added to the specific identification of the frigate-birds inhabiting tropical American waters. It has been suggested, however, that Caribbean birds (*rothschildi*) should have the tail shorter (ROTHSCHILD, Nov. Zool. *31*, 1924, p. 313), or else be generally smaller (MURPHY, Oceanic Birds South Am., *2*, 1936, p. 927) than those inhabiting the Pacific coast of tropical America (*magnificens*), but recent authors have doubted the significance of these differences (HELLMAYR & CONOVER; BOND 1950). I have not been in the situation to go into this matter personally.

Iris dark brown; bill dark horn-brown (adult ♂), or light bluish-grey (juv. ♂); legs and feet greyish, underside of toes pale fleshy-yellow.

Measurements — CURAÇAO: ♂ ad., wing 560, 635, tail 410, 450, bill (exposed culmen) 110, 110; ♂ imm., wing 605, 615, 620, 630, 630, 640, tail 395, 410, 410, 415, 420, 430, bill 105, 113, 114.5, 115, 120, 125.

One male from the Galapagos Islands measured according to MURPHY (*l.c.*, p. 927) as follows: wing 651, tail 465, bill 111.2, thus being decidedly larger than South Caribbean birds.

Status — From the times of ERNST PETERS's visit (1890) onwards this con-

spicuous bird has been regularly recorded from Aruba, Curaçao, and Bonaire, but its breeding has not yet been definitely established in these islands. It has been suggested, however, that the small Isla Macuacu in the Sint Joris Baai, Curaçao, should harbour a breeding colony of the species (DE JONG, VAN OORDT). Breeding records from the mangroves of Lac, Bonaire (29.II.1948, VAN OORDT), are even more pertinent, but they too have not been confirmed.

We found this species common along the coast of all three islands. At least two or three individuals could be daily seen "hanging" in the air over the entrance of Curaçao's harbour. They also appeared in the Schottegat and were common visitors of the harbours of Oranjestad, Aruba, and Kralendijk, Bonaire. — We did not find nests, but we were impressed by the great number of these birds (over 80) which we observed flying over the mangroves of Lac, Bonaire (28.III.1952), and settling in the trees. Unfortunately we had no time to penetrate into the mangroves, but we noticed that all adult males had their gular-sacs inflated to large red balloons. — Although frigate-birds had definite roosting places in the mangroves of Isla Macuacu and of some of the smaller islands of the reef wall off the west coast of Aruba, none of these sleeping places proved to be nesting localities. We were informed by inhabitants of Curaçao that at least the sleeping place on Isla Macuacu in the Sint Joris Baai had been in use by frigate-birds since their boyhood. When we visited Isla Macuacu shortly before dusk on 4.X.1951 over 100 birds raised from their roosting places in the mangroves, but no nests were present. One third of this roosting flock consisted of adult males, some of which had swollen gular sacs, one third were adult females and one third were juveniles.

In the Venezuelan islands the species is generally distributed, but definite breeding localities seem to be scarce.

Food — Remains of rather large fish were present in 5 of 6 stomachs examined; one stomach contained animal matter which proved to be unidentifiable. Among the fishes present flying fish of the genus *Exocoetus* have been found in two instances; in addition several specimens of the gar pike (*Belone*), one *Blenniid* and one *Perciform* fish have been identified by Prof. Dr. L. F. DE BEAUFORT. The presence of large fragments of the shell of *Spirula australis* (11.IV.1952, Spaanse Water, Curaçao) and of shells containing considerable parts of the animals themselves (26.I.1952, south-east coast of Curaçao) not only provides a noteworthy addition to the known diet of these birds, but also furnishes new grounds for interesting speculations on the vertical distribution of *Spirula*, which is usually considered to live bathy-pelagically. In addition two stomachs proved to contain jaws and eye-lenses of other cephalopods.

We never saw frigate-birds rob other species of sea birds off their prey, although — when small companies of frigate-birds were out at sea fishing — they were constantly in ardent pursuit of each other as soon as one of them had caught a prey. The birds invariably followed small fisher boats out at sea and were regular visitors of the harbour of Kralendijk, Bonaire, where usually small quantities of fish offal were daily available.

Reproduction cycle — Apart from males exhibiting fully inflated red throat-sacs on 4.X.1951 at Macuacu Island, Curaçao, on 15.XI.1951 at Kralendijk, Bonaire, and on 28.III.1952 at Lac, Bonaire, no other indications of breeding activity of this species have been observed by us.

Distribution — *Fregata magnificens* ranges throughout the Caribbean Sea, the tropical Pacific coast of the Americas, and the tropical Atlantic Ocean, particularly along the South American coast. It is a common bird on the Caribbean coast

of Colombia and Venezuela, where it is known to breed. It is an autochthonous species of the tropical American seas.

Protective measures — Not protected by law.

9A **Ardea herodias herodias** Linnaeus
Great Blue Heron

Ardea herodias LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 143 — Hudson Bay.

9B **Ardea herodias repens** Bang & Zappey
"Great White Heron"

Ardea repens BANGS & ZAPPEY, Am. Nat. *39*, 1905, p. 186 — Isle of Pines, Cuba.

Ardea herodias, RIDGWAY, Proc. U.S. Nat. Mus. *7*, 1884, p. 177 (Curaçao); HARTERT 1893, p. 325 (Curaçao): HARTERT 1902, p. 306 (Curaçao); RUTTEN 1931, p. 116 (Aruba, Curaçao, Bonaire, Klein Bonaire); PHELPS & PHELPS 1951, p. 5 (Bonaire).
Ardea herodias adoxa OBERHOLSER, Proc. U.S. Nat. Mus. *43*, 1939, p. 544 — Curaçao; DE JONG 1948, p. 3 (Aruba, Curaçao, Bonaire).
Ardea herodias herodias, BOND 1945, p. 7 (Curaçao); VOOUS 1955, p. 41 (Aruba, Curaçao, Klein Curaçao, Bonaire, Klein Bonaire).
Ardea occidentalis, DE JONG 1948, p. 3 (Curaçao).
Ardea herodias repens, VOOUS 1955, p. 41 (Curaçao, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE, KLEIN BONAIRE (*herodias*). — Non-breeding visitor.
CURAÇAO, BONAIRE, KLEIN BONAIRE (*repens*). — Non-breeding visitor.

CURAÇAO (*herodias*): *Hato*, 11.I.1952 (1 ♀ semi-ad.). BONAIRE (*herodias*): coast of *Palu Lechi*, 27.XI.1951 (1 ♀ imm.).

Taxonomy — Contrary to OBERHOLSER's review of this species (Proc. U.S. Nat. Mus. *43*, 1939, p. 531–559) the number of races currently recognized is very small. Although I have personally examined few study-specimens my field work has led me to the conclusion that the great blue heron is not a breeding bird in the Netherlands Leeward Group. OBERHOLSER's race *adoxa* (type locality: Curaçao), therefore, based on relatively small dimensions of the wing and the bill, is referable to migrants of the northern form *herodias* (*cf.* BOND 1950, p. 8, foot-note 13). The measurements of the collected specimens — none of which is fully adult — are indeed very small, noticeably those of wing, tail, and bill, agreeing in this respect with measurements reported for *herodias*. Our Curaçao specimens, however, do not show the long bill, thought to be characteristic of the Caribbean race *repens*. The evidence of the occurrence of the latter race in the islands of the Netherlands Leeward Group is based on personal field observations in Bonaire of a "great white heron" with a formidable yellow bill and yellow legs. On 9.XI.1951 we observed a

"great white heron" in the salt lagoon of Palu Lechi, Bonaire, in close company with individuals of all other species of American white herons, including *Egretta alba*, *Egretta thula*, *Dichromanassa rufescens* (white colour-type), *Florida caerulea* (white colour-type). A further direct comparison in the field with individuals of the great blue heron repeatedly proved the white bird to be of the same size, though of a slightly more slender appearance. This white heron therefore must have been too small for the Florida form *occidentalis*, which, moreover, is stated to be non-migratory; instead, it must have agreed with published measurements of *repens* (*cf.* HELLMAYR & CONOVER *I* (*2*), 1948, p. 171, foot-note 2).

Iris yellow; bill dusky black, lower mandible largely yellow, becoming greenish towards the base and on the naked lores; legs and feet mainly greenish-black, tibia and underside of toes greenish-yellow (*herodias*).

Measurements — CURAÇAO (*herodias*): ♀, wing 450, bill (exposed culmen) 130, tarsus 158. BONAIRE (*herodias*): ♀, wing 461, bill 125, tarsus 161. — Wing-spread 175 and 170 cm, respectively.

Status — First collected in Curaçao by BENEDICT and NYE in February 1884 (RIDGWAY); more than 50 years later the same specimen became the type of *Ardea herodias adoxa* OBERHOLSER, which is now thought to be synonymous with *herodias*. Since then the occurrence of great blue herons, presumably of the race *herodias*, has been recorded by most of the subsequent ornithologists that visited the islands. All records are unanimous in stating that these herons usually occur solitarily and that they are extremely wild.

"Great white herons", which are the white colour-type of two of the races of this species (*occidentalis*, *repens*), have up to now not been recorded with certainty from the Netherlands Leewards Islands; the statement by DE JONG of their occurrence in Curaçao lacks convincing power.

We observed great blue herons (*herodias*) in all three islands, mostly in solitary specimens, but also in companies of up to 3 individuals. They were also observed fishing along the beach of Klein Curaçao on 26.I.1952 (2 specimens).

Although considered a non-breeding visitor to the Netherlands Leeward Islands the species has been regularly observed during the summer months as well, both by RUTTEN and, more recently, by our friends in Curaçao.

We observed a "great white heron", presumably of the race *repens* (see above) in the saliña Palu Lechi, Bonaire, between 6 and 27.XI.1951. An additional specimen was observed by ANSINGH (verbal communication) in approximately the same period at Rustenburgh, Curaçao.

In the Venezuelan islands this species has been recorded from Los Roques, Margarita, and Los Testigos, most — if not all — of the collected specimens having been referred to the race *repens* (PHELPS & PHELPS 1951, p. 7–8).

Biotope — Found near fresh and salt waters of whatever size, but only in places with a wide view into all directions. Also regularly seen fishing along the shore. Extremely wild and suspicious.

Food — The stomachs of both specimens collected contained exclusively insects, among which were great quantities of water-bugs, some water-beetles, and the nymph of a dragonfly.

Distribution — *Ardea h. herodias* is a breeding bird of the greater part of eastern North America. It winters south through Central America and the West Indies to Colombia and Venezuela.

Ardea h. repens is not only a breeding bird in the Greater Antilles, but in addition in the Roques Islands (PHELPS & PHELPS 1951, p. 7) and probably in other of the Venezuelan islands, whence the race has been reported in the grey, the intermediate, and the white colour-type.

Ardea herodias is the nearctic representative of the European common heron, *Ardea cinerea*. It breeds throughout most of the suitable regions of North and Central America, south to the Galapagos Islands and the Venezuelan islands. In continental South America it is replaced by a different species, *Ardea cocoi*.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

10 **Egretta alba egretta** (Gmelin)

American Egret

Ardea Egretta GMELIN, Syst. Nat. *1*, *2*, 1789, p. 629 — Cayenne (see: BERLEPSCH & HARTERT, Nov. Zool. *9*, 1902, p. 124).
Herodias egretta, RUTTEN 1931, p. 117 (Aruba).
Casmerodius albus, DE JONG 1948, p. 3 (Aruba, Curaçao, Bonaire).
Casmerodius albus egretta, VAN OORDT 1949, p. 324 (Curaçao); PHELPS & PHELPS 1951, p. 6 (Bonaire).
Egretta alba egretta, VOOUS 1955, p. 42 (Aruba, Curaçao, Bonaire).

Native name — Garza blancu.

ARUBA, CURAÇAO, BONAIRE. — Regular visitor; breeding not recorded.

CURAÇAO: *Malpais*, 20.III.1952 (1 ♀).

Taxonomy — Iris and eyelid yellow; bill bright chrome-yellow, tip blackish; naked skin between bill and eye greenish-yellow; legs and feet black, tibio-tarsal and heel joints greenish.

Measurements — CURAÇAO: ♀, wing 357, exposed culmen 105, tarsus 149, — wing-spread 150 cm.

Status and biotope. — Definite records of the occurrence of the egret in the islands are scarce, the first being an observation by RUTTEN of an individual at the Paardenbaai, Aruba, in 1930. VAN OORDT saw several individuals in the saliña Santa Cruz, Curaçao, on 27.II.1948. PHELPS & PHELPS state having seen the egret in Bonaire in XI.1947.

We observed this species in all three islands, where it appeared regularly, though rarely in suitable localities, such as the fresh water pools and mud flats of the Schottegat near Rustenburgh, the saliña Santa Cruz, and the fresh water pools of Malpais in Curaçao. It was most noteworthy that during our whole stay two or three individuals seemed to be permanent inhabitants of the saliña Santa Cruz, where VAN OORDT found them also in 1948. Breeding in this locality cannot be excluded. Additional observations have been made in the following localities: Aruba: mangroves and mud flats near Sabaneta, the mangroves of Bucuti Island, Dakota Airport; Curaçao: Schottegat near Parera; Bonaire: saliña Palu Lechi. — A shy species.

I have not been able to trace any published record from the Venezuelan islands, except Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 15).

Food — The stomach of the collected specimen contained nothing but the remains of insects: one large dragonfly with a wing-span of 94 mm, one small dragonfly, 2 water-bugs, and several small Diptera.

Distribution — *Egretta a. egretta* is a breeding bird throughout all of the warmer temperate, subtropical and tropical regions of America, from the southern United States southwards. It is of a regular occurrence in Colombia and Venezuela, where a certain proportion of the records undoubtedly pertain to wintering individuals from North America.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

11 **Egretta thula thula** (Molina)

Snowy Egret

Ardea thula MOLINA, Sagg. Stor. Nàt. Chile 1782, p. 235 — Chile.
Ardea candidissima, HARTERT 1893, p. 307 (Aruba, Bonaire); HARTERT 1902, p. 306 (Aruba, Bonaire).
Egretta candidissima, RUTTEN 1931, p. 117 (Bonaire).
Egretta thula, DE JONG 1948, p. 3 (Aruba, Curaçao, Bonaire).
Leucophoyx thula thula, PHELPS & PHELPS 1951, p. 6 (Bonaire).
Egretta thula thula, VOOUS 1955, p. 43 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — Garza blancu.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Breeding bird.

CURAÇAO: *Schottegat near Rustenburgh*, 13.X.1951 (1 ♂, 1 ♀). BONAIRE: *Slagbaai*, 8.XI.1951 (1 ♀).

Taxonomy — None of the specimens collected is in its breeding plumage.

Iris yellow; bill black, base of upper mandible and naked lores bright yellow, base of lower mandible light horn; tarsus blackish, posterior side of tarsus greenish-yellow; toes bright yellow.

Measurements — CURAÇAO: ♂, wing 248, bill (exposed culmen) 72, tarsus 98; ♀, wing 244, tarsus 97.5. BONAIRE: ♀, wing 246, bill 71, tarsus 91.

Status — Recorded by HARTERT from Aruba and Bonaire and by RUTTEN from Bonaire. DE JONG was the first to observe this species in Curaçao; he even mentions a flock of 70 individuals at Playa Abau in September 1939! Breeding has never been recorded.

We found this species in all three islands, where it seems to be less common than *Florida caerulea* and decidedly more inclined to congregate in small flocks. In Aruba mixed flocks of herons containing over 20 individuals were regularly observed in the Spaans Lagoen. In Curaçao we saw flocks of up to 24 snowy egrets along the borders of the Schottegat near Parera in October 1951 and April 1952. In Bonaire these egrets were most common at Slagbaai. We did not observe specimens with fully developed nuptial dorsal feathering and crest, nor did we found nests or young.

However, on 1.V.1955 VAN DER WERF (*in litt.*) found a nest at Sint Michiel, Curaçao, containing 4 downy young.

On 30.VIII.1952 the species was observed on Klein Curaçao (ANSINGH *in litt.*).

In the Venezuelan islands apparently only recorded from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 16).

Biotope and habits — The species has been found along salt inland bays, on saliñas, and on mud flats bordering mangroves. Their movements were more elegant and their manner of feeding was more heron-like than those of *Florida caerulea* and were reminiscent of those of *Hydranassa tricolor*, their actions being very rapid and the birds often wading in rather deep water.

Food — Only one stomach has been examined (Slagbaai, Bonaire); it contained a great number of small fish, among which were at least 20 *Cyprinodon dearborni* (identified by Prof. Dr. L. F. DE BEAUFORT).

Reproduction cycle. — The gonads of the collected specimens were very small.

The nest found by VAN DER WERF in Curaçao was located in a small, thorny tree (*Crescentia cujete*) at about 3 m from the ground; it was close to a fresh water pool. On 1.V.1955 it contained 4 downy young of different sizes; on 14.V.1955 only 3 young had survived and had reached almost full-grown size.

Zoogeography — *Egretta t. thula* has a wide distribution in subtropical and tropical America, from the southern United States southward to Argentina and Chile. It is a rare breeding bird in the West Indies, where, however, wintering individuals from more northerly populations regularly appear. The species is rather common along the Caribbean coast of Venezuela and Colombia. The species is probably tropical North American by origin and behaves like the American representative of the Old World lesser egret (*Egretta garzetta*).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

12 **Dichromanassa rufescens colorata** Griscom

Reddish Egret

Dichromanassa rufescens colorata GRISCOM, Am. Mus. Nov. *235*, 1926, p. 9 — Culebra Key, Yucatan Peninsula.

Dichromanassa rufescens, RUTTEN 1931, p. 118 (Curaçao, Bonaire); DE JONG 1948, p. 3 (Curaçao, Bonaire); VOOUS 1955, p. 44 (Aruba, Curaçao, Bonaire).

Dichromanassa rufescens rufescens, PHELPS & PHELPS 1951, p. 6 (Bonaire); BOND Second Suppl. Checklist Birds West Indies, 1952, p. 5 (Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, BONAIRE. — Resident or winter visitor.

BONAIRE: *Saliña Slagbaai*, 8.XI.1951 (1 ♂ ad., 1 ♂ juv.); *Pekelmeer*, 28.XI.1951 (1 ♀ ad., 1 ♀ subad.).

Taxonomy — Our specimens have been compared with one adult male from Padre Island, Texas (Academy of Natural Sciences, Philadelphia), which may be considered to represent topotypical *rufescens*. They appeared to be paler grey above and paler purplish brown, rather than reddish brown on the throat and the neck. In

our adult specimens the coloration of the head and neck almost matches RIDGWAY's "Walnut Brown", which is lighter than in average specimens of *rufescens*. Size is larger than in North American specimens, of which, according to BOND (*in litt.*), the wing-length usually does not exceed 345 mm. — All four specimens are in the fully coloured plumage; white individuals have come to notice only twice, *viz.* on 21.X. 1951 at Piscadera Reef, Curaçao, and on 9.XI.1952 at Palu Lechi, Bonaire.

Pale, long-winged birds of this species have been described from coastal Yucatan by GRISCOM under the name *colorata*. After a re-examination of the material in various American museums and in the PHELPS Collection (Caracas) and after having read my manuscript-notes on this species, BOND (*in litt.*) refers the birds inhabiting the West Indian Islands all to *colorata*, including material from Margarita, Los Roques, Bonaire, Curaçao, Aruba, and the Paraguana Peninsula of Venezuela (see also: BOND, Checkl. Birds West Ind. 4th ed., 1956, p. 11).

Iris whitish or yellowish-white; bill dark horn-brown with a broad base of a much lighter yellowish coloration; lores and naked orbital skin light greenish-yellow; legs and feet blackish-grey.

Measurements — See above! BONAIRE: ♂ ad., wing 358, bill (exposed culmen) 97.5, tarsus 155; ♂ juv., wing 346, bill 105, tarsus 159; ♀ ad., wing 330, bill 94.5, tarsus 138; ♀ subad., wing 313, bill 94.5, tarsus 135.

Status — Previously observed in Curaçao by RUTTEN and DE JONG and in Bonaire by RUTTEN and PHELPS & PHELPS.

We found this species not uncommon in all three islands, though notably abundant in the salt lagoons of Bonaire. Indeed, it was everywhere decidedly more numerous than *Egretta alba* and of about the same abundance as *Ardea herodias*. Individuals in white plumage were scarce (see above).

In the Venezuelan islands only known from Los Roques and Margarita (PHELPS & PHELPS 1951, p. 8), as also from Tortuga (TAMAYO, Mem. Soc. Cienc. Nat. La Salle, Caracas, *15* (40), 1955, p. 21).

Biotope — Most numerous in the salt lagoons of Slagbaai and Pekelmeer, Bonaire, where we often saw 4 or 6 or even more individuals close together. Also observed on the salt mud flats of Santa Cruz, Curaçao, and at Palu Lechi, Bonaire, as well as along the mangroves of Lac, Bonaire. Solitary individuals were regularly seen fishing in the shallow waters of the Paardenbaai, Aruba, and occasionally along the beach of Kralendijk, Bonaire.

Food — Three stomachs examined contained nothing but the remains of small fish of up to 4 cm length, mostly of *Cyprinodon dearborni* (identified by Prof. Dr. L. F. DE BEAUFORT).

Reproduction cycle — The gonads of both adult specimens collected (8.XI and 28.XI.1951) were enlarged, the testes measuring 10½ × 7½ mm, the oviduct being swollen, twisted and strongly vascularized and the ovary being active with yolks of up to 3 mm in diameter. The birds were in breeding plumage, although the elongated dorsal feathering was faded and strongly abraded. We did not observe any sign of breeding activity of this species. Hence, breeding remains uncertain and the individuals of this species visiting the islands may have been migrants from more northerly breeding places.

Distribution — *Dichromanassa r. colorata* is a breeding bird from the Greater Antilles, Bahama Islands and the Yucatan Peninsula, including Cozumel and other islands off the coast. In the south Caribbean islands the species has been recorded

from Aruba, Curaçao, Bonaire, Los Roques, Tortuga and Margarita, but breeding in these islands has never been recorded. The species has been reported from continental South America only casually (accidentally in Venezuela: PHELPS & PHELPS 1951, p. 8; TAMAYO, *l.c.*).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

13 **Hydranassa tricolor ruficollis** (Gosse)

Tri-Coloured or Louisiana Heron

Egretta ruficollis GOSSE, Birds Jamaica, 1847, p. 338 — Jamaica.

Ardea tricolor, HARTERT 1893, p. 307 (Aruba, Bonaire); HARTERT 1902, p. 306 (Aruba, Bonaire).

Hydranassa tricolor ruficollis, CORY 1909, p. 196 (Aruba); RUTTEN 1931, p. 118 (Aruba, Curaçao, Bonaire); PETERS, *1*, 1931, p. 113 (Aruba); HELLMAYR & CONOVER, *1 (2)*, 1948, p. 202 (Aruba, Bonaire); PHELPS & PHELPS 1951, p. 6 (Bonaire); VOOUS 1955, p. 45 (Aruba, Curaçao, Bonaire).

Hydranassa tricolor, DE JONG 1948, p. 3 (Aruba, Curaçao, Bonaire); VAN OORDT 1949, p. 324 (Curaçao).

Native name — unknown.

ARUBA, CURAÇAO, BONAIRE. — Breeding bird.

ARUBA: without locality, 23.VI.1892 (♀ ad., collected by HARTERT; Am. Mus. Nat. Hist. New York); without locality, 25.IV — 8.V.1908 (2 ♂ ad., 2 ♀ ad., collected by FERRY; Chicago Nat. Hist. Mus.); Oranjestad 21–25. VI.1930 and 6.VII.1930 (1 ♂ ad., 1 ad., 1 nestling, collected by PIJPERS, RUTTEN & VERMUNT; Leiden Mus.); *Spaans Lagoen*, 19.XII.1951 (1 ♂ imm.). CURAÇAO: *Groot Santa Marta*, 10.X.1951 (1 ♂ imm.); without locality, 1930 (1 ♂ ad., collected by PIJPERS, RUTTEN & VERMUNT; Leiden Mus.). BONAIRE: *Saliña Slagbaai*, 19.XI. 1951 (1 ♂ imm.); *Saliña Tan*, 20.XI.1951 (1 ♂ ad.); Pekelmeer, 8.VI.1930 (1 ad., collected by PIJPERS, RUTTEN & VERMUNT; Leiden Mus.).

Taxonomy — From the moment that HARTERT (1893, p. 307) identified a specimen from Aruba as *Ardea tricolor*, stating that it was identical with the South American *tricolor*, not with the Mexican subspecies *ruficollis*, some confusion has remained in the literature as to the subspecific identity of specimens originating from the Netherlands Leeward Islands. However, all subsequent ornithologists who have had occasion of examining specimens from these islands have agreed in considering them as belonging to *ruficollis* and not to *tricolor*! The main differences between *ruficollis* and *tricolor* are those of size, *ruficollis* being considerably larger than *tricolor*. After having examined HARTERT's specimen from Aruba, which is an adult female, 23.VI.1892, I am certain that HARTERT was mistaken: wing 243, exposed culmen 92, tarsus 87 mm. For further details on measurements, see below.

Iris light yellow, naked orbital skin yellow; upper mandible olive-grey, tip black, lower mandible dull yellow; legs and feet light grey. — The iris of an individual collected at the nest was vinaceous-red (VAN DER WERF *in litt.*).

Measurements — ARUBA: ♂ ad., wing 253, 258, 259, bill (exposed culmen) 96.5, 97, 102, tarsus 96.5, 101, 109; ♂ imm., wing 250, bill 95, tarsus 99; ♀ ad., wing

241, 241, 243, bill 92, 92, 96, tarsus 84, 87, 95; sex unknown, ad., wing 247, bill 97.5, tarsus 96. CURAÇAO: ♀ ad., wing 262, bill 94, tarsus 104; ♂ imm., wing 250, bill 95, tarsus 95. BONAIRE: ♂ ad., wing 267, bill 101, tarsus 109; ♂ imm., wing 247, bill 102, tarsus 94; sex unknown, ad., wing 261, bill 97, tarsus 103.

The following is a comparison of measurements of adult specimens from the Netherlands Leeward Islands (*ruficollis*) and Surinam (*tricolor*):

Netherlands Leeward Islands

	♂			♀		
wing	253–267	average (6)	260.0	241–247	average (4)	243.0
bill	94–102	,, (6)	97.9	92–97.5	,, (4)	94.4
tarsus	96.5–109	,, (6)	103.7	84–96	,, (4)	90.5

Surinam

	♂			♀		
wing	220–237	average (4)	230.0	207–217	average (2)	212.0
bill	83–88.5	,, (4)	85.5	81– 84	,, (2)	82.5
tarsus	71–86	,, (4)	78.3	69– 70	,, (2)	69.5

Status — In addition to the records by HARTERT and FERRY (CORY *l.c.*) of the occurrence of this species in Aruba and Bonaire, RUTTEN was the first to discover a breeding colony in the Netherlands Leeward Islands in June-July 1930 in the mangroves of the Bucuti Reef of Aruba (at least 50 nests). Three adult specimens and one half-grown nestling preserved in the Leiden Museum have remained as proof of the existence of this heronry. RUTTEN, and after him DE JONG, also report the regular occurrence of this species in Curaçao.

We found this species of heron among the commonest of its tribe in all three islands. It was present in numbers of up to 40 individuals along any stretch of water, often associated with *Florida caerulea* and *Egretta thula*. We had the impression that most of the observed individuals were immatures with much rufous on head and neck and occasionally on the mantle and the upper wing coverts.

After our departure BRONNEBERG, KOELERS, and VAN DER WERF (*in litt.*) discovered a small breeding colony consisting of three nests in the mangroves of Isla Macuacu in the Sint Joris Baai, Curaçao, on 2.VIII.1952. These mangroves are also the regular sleeping places of great numbers of *Fregata magnificens*. The nests were about 2.50 meter above the water. Two of them contained three eggs, in a third one egg and two young were found. Colour-slides of nests and eggs were kindly sent to me for documentation.

In the Venezuelan islands recorded from Los Roques (PHELPS & PHELPS 1951, p. 8) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 16).

Biotope and habits — Salt lagoons, salt pans and any shallow waters; also mangroves and mud flats. The species was particularly numerous in the salt lagoons of Slagbaai, Bonaire, at Lac, Bonaire, the Spaans Lagoen, Aruba, and at the boca of the Sint Joris Baai, Curaçao.

Fishing was carried on by these herons in different ways, but in most of the cases the birds were running with great speed in shallow water, rapidly picking to all sides, giving an impression as if they were very nervous. On other occasions the birds were standing motionless in deep water, looking with great attention for moving prey. Whatever method was employed, we always thought this species more active in

habits than *Florida caerulea* and *Egretta thula*. In addition they seemed to prefer deeper water than those species.

Food — Three stomachs examined contained large quantities (40–50) of small fish of 1–3 cm in length; in a fourth stomach we found both fish and insects (beetles and a large dipteron). Prof. Dr. L. F. DE BEAUFORT kindly identified the fish-remains as belonging to *Cyprinodon dearborni* (the majority) and *Mollienesia vandepolli*.

Reproduction cycle — RUTTEN found a breeding colony on the Bucuti Reef off Oranjestad, Aruba, in June and July 1930. During our stay from September to April we did not observe any sign of a breeding activity of this species. The gonads of the collected specimens were not enlarged. Nests with eggs were found by BRONNEBERG, KOELERS & VAN DER WERF on Isla Macuacu, Curaçao, on 2.VIII.1952.

Eggs — Curaçao (Isla Macuacu): Bluish-green, like all heron's eggs. Measurements of two sets of 3 eggs each taken by VAN DER WERF (mm):

(1) 43.5 × 33.0	(2) 42.7 × 33.3
44.0 × 31.8	44.1 × 33.2
44.7 × 32.9	44.2 × 32.3

Zoogeography — *Hydranassa t. ruficollis* is a breeding bird from the West Indies and adjacent coast regions from the southern United States, through Central America, south to Colombia and western Ecuador. It breeds along the Caribbean coasts of Colombia and Venezuela, in the Netherlands Leeward Islands, and in some of the Venezuelan islands. Other races occur in Trinidad (*rufimentum*) and in the coastal districts of the Guianas and northeastern Brazil (*tricolor*). Way of immigration into Aruba, Curaçao, and Bonaire unknown, but the present range of the species conflicts with the supposition of an origin in South America; the species is probably tropical North American by origin.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

14 **Florida caerulea** (Linnaeus)

Little Blue Heron

Ardea caerulea LINNAEUS, Syst. Nat. ed. 10*I*, 1758, p. 143 — South Carolina.
Florida caerula, CORY 1909, p. 196 (Aruba); RUTTEN 1931, p. 119 (Curaçao); DE JONG 1948, p. 3 (Aruba, Curaçao); HELLMAYR & CONOVER, 1 (2), 1948, p. 191 (Aruba); VOOUS 1955, p. 46 (Aruba, Curaçao, Bonaire).

Native name — Garza azul.

ARUBA, CURAÇAO, BONAIRE. — Breeding not recorded.

CURAÇAO: *Sint Jan Baai*, 19.I.1952 (1 ♀, blue plumage); *Santa Cruz Baai*, 3.II.1952 (1 ♂, blue plumage; 1 ♂, mixed plumage; 1 sex unknown, mixed plumage). BONAIRE: *Sabana*, 29.XI.1951 (1 ♀, white plumage); *Lac*, 17.XI.1951 (1 ♀, white plumage).

Taxonomy — After having examined specimens in the dark blue plumage, originating from Brazil (1), Venezuela (1), Surinam (3), Curaçao (2), and Florida (2) I agree with recent authors that a difference in the intensity of pigmentation between northern (*caerulea*) and southern (*caerulescens*) individuals is hardly apparent. Our specimens in mixed, white-and-blue, plumage show freshly moulted slaty-blue feathers amongst the old, white ones. In addition some of the new inner secondaries

and wing coverts are slaty-blue, irregularly speckled and marmorated with white, whereas some of the greater wing coverts are white with irregular faint markings of blackish. Do these instances of feather replacement indicate that there is an intermediate (2nd year) plumage between the juvenal white plumage and the fully adult slaty-blue plumage?

Iris yellowish-white; bill light bluish-grey, tip broadly black; legs and feet olive-green.

Measurements — Blue plumage — CURAÇAO: ♂, wing 267, bill (exposed culmen) 73, tarsus 94.5; ♀, wing 269, bill 75, tarsus 95.

Mixed plumage — CURAÇAO: ♂, wing 261, bill 71, tarsus 96.5; sex unknown, wing 261, bill 77.5, tarsus 96.

White plumage — BONAIRE: ♀, wing 244, 252, bill 71, 76.5, tarsus 82, 92.

Status — Few published records of this species exist, and none of them refer to Bonaire. In fact there are only 3 pertinent records: (1) one adult collected by FERRY in April/May 1908 in Aruba (CORY *l.c.*); (2) several white birds observed by RUTTEN in 1930 near Rio Canario, Curaçao; (3) several individuals in both blue and white plumages observed by VAN OORDT in February 1948 at Santa Marta Baai and Santa Cruz Baai, Curaçao.

We found this species in many localities in all three islands. We did not get the idea that either one of the white or blue colour-phases was more abundant than the other, but individuals in mixed plumage were decidedly rare. White individuals often occurred in large flocks together with *Egretta thula* and *Hydranassa tricolor*, particularly at the Spaans Lagoen, Aruba, Playa Abau, Curaçao, and Saliña Slagbaai, Bonaire, where mixed flocks of over 40 herons could be observed. Individuals in the blue plumage appeared less social and were usually — though not always — seen solitarily or in pairs. We did not find nests or young.

In the Venezuelan islands recorded from Blanquilla (PHELPS, Jr., 1948, p. 96), Tortuga (PHELPS, Jr., 1945, p. 275) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 15), but not found breeding.

Biotope and habits — Little blue herons have been observed wherever quiet places with fresh or salt water were present. They were usually seen in the same biotope and in company with *Egretta thula* and *Hydranassa tricolor*. More than these latter species they appeared to prefer the muddy edges of lagoons and inland-bays and wet mud flats outside mangroves. In contrast to the other species, feeding was mainly done by walking over the mud flats or wading through shallow water, regularly picking to either side for small prey.

Food — Great quantities of small fiddler-crabs formed the bulk of the contents found in 4 of 5 stomachs examined. In most of these instances over 100 well-preserved specimens were present in one stomach. We also found the larvae of dragonflies (1 ×) and other insects (1 ×), as well as the remains of a small fish (1 ×).

Reproduction cycle — The species is not known to breed in any of the Netherlands Antilles. The gonads of the specimens examined were very small.

Distribution — *Florida caerulea* has a wide range in subtropical and tropical America from the southern United States southwards. It does not seem to show geographical variation. It is partly migratory in the northern parts of its range, whence banded individuals have been found wintering in the West Indies and in northern South America. As a breeding bird it is widely spread throughout the West

Indies, but although fairly regularly recorded from the north coast of Venezuela and Colombia, it has not yet been found nesting in these areas.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

15 **Bubulcus ibis ibis** (Linnaeus)

Cattle Egret

Ardea ibis LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 144 — Egypt.
Ardeola ibis ibis, DRURY, Jr., Auk *70*, 1953, p. 365 (Aruba).

Native name — unknown.

ARUBA. — Casual visitor.

No material.

Status — Once recorded from Aruba by DRURY, Jr., in 1944. DRURY (*in litt.*) informs me that his record refers to the observation of 3 specimens in a "scrub-grown field" on the west coast of the island at the end of March or the beginning of April.

We did not observe this species.

Not recorded from the Venezuelan islands.

Distribution — *Bubulcus i. ibis* is a principally African form, as the whole species is definitely an Old World one. It was, however, recorded in tropical South America (British Guiana) about 1930 and was more numerous in 1937 (BLAKE, Auk *56*, 1939, p. 470). At present it is rather well established as a breeding bird in the savannah belt of Surinam (HAVERSCHMIDT, Auk *64*, 1947, p. 143; Auk *67*, 1950, p. 380) to Venezuela (from 1943 onwards) and Colombia (from 1951 onwards) (see: Auk *61*, 1944, p. 656; Mem. Soc. Cienc. Nat. La Salle, Caracas, *4* (11), 1944, p. 38–41; *ibid.* *15* (40), 1955, p. 19). The species is spreading rapidly to the northward (Massachusetts, 1952: Auk *70*, 1953, p. 364) as well as to the southward (Bolivia, 1953: Journ. f. Orn. *96*, 1955, p. 222) and represents a most instructive example of transoceanic colonization. It has not yet been observed in the Lesser and Greater Antilles.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

16A **Butorides virescens curacensis** Oberholser

Green Heron

Butorides virescens curacensis OBERHOLSER, Proc. U.S. Nat. Mus. *42*, 1912, p. 573 — Sint Patrick, Curaçao.

16B **Butorides virescens virescens** (Linnaeus)

Ardea virescens LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 144 — South Carolina.
Ardea virescens, ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 163 (Curaçao).

Butorides virescens, HARTERT 1893, p. 307 (Aruba), p. 325 (Curaçao), p. 334 (Bonaire); HARTERT 1902, p. 306 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 120 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 3 (Aruba, Curaçao, Bonaire).

Butorides virescens robinsoni, CORY 1909, p. 196 (Aruba).

Butorides virescens curacensis, PETERS *1*, 1931, p. 114 (Aruba, Curaçao, Bonaire); HELLMAYR & CONOVER, *1* (*2*), 1948, p. 183 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 6 (Bonaire); VOOUS 1955, p. 48 (Aruba, Curaçao, Bonaire).

Butorides virescens virescens, VOOUS 1955, p. 48 (Bonaire).

Native name — *Galinja di awa*.

ARUBA, CURAÇAO, BONAIRE (*curacensis*). — Resident; breeding bird
BONAIRE (*virescens*). — Winter visitor.

ARUBA (*curacensis*): Oranjestad, 22.VI.1930 (1 ♀ ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO (*curacensis*): *Rio Canario*, 12.X.1951 (1 ♂ ad.); *Jan Thiel lagoon*, 16.X.1951 (1 ♂ ad., 1 ♀ juv.); *Sint Joris Baai*, 25.X.1951 (1 ♂ ad.); *Groot Piscadera*, 24.X.1951 (1 ♂ ad.), 26.X.1951 (1 ♀ juv.); *Malpais*, 16.I.1952 (1 ♂ ad.); Santa Cruz (1 ♂ ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Santa Cruz*, 3.II.1952 (1 ♀ juv.); *Sint Christoffel*, 27.X. 1951 (1 ♀ juv.). BONAIRE (*curacensis*): *Saliña Palu Lechi*, 9.XI.1951 (1 ♂ ad., 1 ♀ ad.), 24.III.1952 (1 ♀ juv.), 26.III.1952 (1 ♂ ad.); Dos Pos, 27.V.1930 (1 ♂ ad., 1 (♀) ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Salina Tam* 24.XI.1951 (1 ♀ ad.).

BONAIRE (*virescens*): *Saliña Palu Lechi*, 27.XI.1951 (1 ♂ juv.); *Lac*, 17.XI.1951 (1 ♀ juv.).

Taxonomy — Compared with North American specimens of the race *virescens* adult males from the Netherlands Leeward Islands have the colour of the hind neck and particularly the sides of the head more rufous-brown, less vinaceous or purplish-brown. The sides of the breast are also more purely dusky brownish, less tinged with purplish, but individual variation is large in this character. The streaks on the breast are narrow and sharply marked with broad edges of white. Females seem to differ from *virescens* by having the upper parts and the crown a more glossy green, not bluish-green, whereas the striations on the breast are more sharply defined. In the juvenile plumage racial differences in coloration seem to be absent. Measurements, particularly wing-length, are smaller than in North American specimens.

The green herons from Aruba, Curaçao, and Bonaire are generally considered to be racially distinct from the other West Indian breeding populations. Hence, I have tried hard to find the distinctive characters of the South Caribbean form as compared with *maculatus* from the West Indies. Specimens from the following localities have been examined: Cuba [1] (1 ♂ ad., 1 ♀ ad., 1 ♀ imm.), St. Croix [2] (1 ♂ ad.), St. Martin [2] (1 ♀ ad.), Dominica [2] (1 ♀ ad.), St. Vincent [2] (2 ♀ ad., 1 ad.), Barbados [2] (1 ♂ ad., 1 ad.), Grenada [2] (1 ad.), Grand Cayman [2] (1 ♂ ad.). It appeared that in the adult plumage the birds from Aruba, Curaçao, and Bonaire had the head and the sides of the neck a paler purplish-brown, lacking the rich reddish-brown colo-

[1] Leiden Museum.
[2] British Museum (Natural History), London.
[3] Amsterdam Museum.

ration usually present in most, but not all (!) West Indian specimens. In addition South Caribbean birds are at the average smaller. — It is noteworthy that the only adult male from Grand Cayman examined agreed in coloration and measurements (wing 167) with the Curaçao birds rather than with the other West Indian series!

Iris orange-yellow, lighter and more yellowish in females and juveniles; bill black, greater part of lower mandible and naked orbital skin greenish-yellow; legs and feet yellowish-green, posterior side of tarsus and underside of toes bright yellow or orange yellow, much brighter in adults than in juveniles.

Measurements — ARUBA (*curacensis*): ♀ ad., wing 171, tarsus 47. CURAÇAO (*curacensis*): ♂ ad., wing 163, 170.5, 171.5, 172, 172.5, 174, bill (exposed culmen) 58.5, 60, 60, 62, 62, 62, tarsus 48, 49, 50, 50, 51, 52.5; ♂ juv., wing 171, bill 59, tarsus 49; ♀ juv., wing 164, 166, 171.5, 173.5, bill 56,5, 58, 59.5, 62.5, tarsus 46, 49, 50.5, 52. BONAIRE (*curacensis*): ♂ ad., wing 166, 171, bill 60.5, tarsus 51; ♀ ad., wing 160, 163.5, 169.5, bill 60, tarsus 49.5, 51.5; ♀ juv., wing 162.5, bill 56.5, tarsus 48.5.

BONAIRE (*virescens*): ♂ juv., wing 181, bill 58.5, tarsus 52; ♀ juv., wing 184.5, bill 59, tarsus 47.

Summary of measurements of adult specimens from Cuba, St. Croix, St. Martin, Dominica, St. Vincent, Barbados, Grenada (*maculatus*):

wing	♂♀	168 –187	average (12)	177.9
bill	♂♀	56.5– 64	average (12)	58.7

Summary of measurements of adult specimens from Aruba, Curaçao, and Bonaire (*curacensis*):

wing	♂♀	160 –174	average (12)	168.4
bill	♂♀	58.5– 62	average (8)	60.6

Status — All previous observers have recorded the occurrence of this species in all three islands, but exact breeding records have not been published.

We found this small heron common in suitable localities in all three islands.

Several nests with eggs and young have been found by VAN DER WERF (*in litt.*) in mangrove vegetations in Curaçao.

In the Venezuelan islands (*maculatus*) recorded from Los Roques (PHELPS & PHELPS 1951, p. 8) and Blanquilla (PHELPS, Jr., 1948, p. 96).

Biotope — Edges of salt and fresh waters of any size, from small ponds and mangroves to salt lagoons, narrow creeks along the coast, and rocky coral coast. We frequently observed these herons fishing in the daytime, but they were most active at dusk, when we regularly heard their weird calls along the quiet borders of the Schottegat, Curaçao. They were also often seen climbing in bushes and trees.

Reproduction cycle — Enlarged gonads have been found in males collected on 24.X (testes 10.5 × 5 mm), 16.I (13 × 4 mm), and 16.III (11.5 × 4 mm), respectively. A nest with one egg and one young was found in Curaçao on 18.VIII; another nest found in Curaçao on 10.VII contained 3 eggs (VAN DER WERF *in litt.*).

Nest and eggs — All nests recorded from Curaçao were placed rather low in mangroves of *Rhizophora mangle*, but one, found in July 1955, was made in a horizontal crevice of a steep rocky wall. The eggs are uniform bluish-green. Four eggs from Curaçao measure: 36.8 × 28.2, 34.3 × 28.5, 33.2 × 27.7, 32.6 × 28.6, average 34.2 × 28.3 mm (VAN DER WERF).

Food — Aquatic animals of various kinds. In 17 stomachs examined we found small fish (10 × = 59%: *Cyprinodon dearborni, Mollienesia vandepolli*, blenniids, gobiids), insects (7 × = 41%: small beetles, small flies, large red dragonflies, water-bugs), and crustaceans (2 × = 12%: fiddler-crabs, fresh water branchiopods). Two stomachs were empty.

Zoogeography — *Butorides v. curacensis* is known from the islands of Aruba, Curaçao, and Bonaire only. It is slightly distinct from *B. v. maculatus* from the West Indies and Central America.

The species occurs throughout North and Central America south to Panama and northwestern Colombia and through the West Indies to Tobago and the South Caribbean islands of Blanquilla, Roques, Bonaire, Curaçao, and Aruba. It is most noteworthy that in the South American mainland *Butorides virescens* is fully replaced by *Butorides striatus*, a species of different coloration, but of similar appearance and habits. The South American species (*striatus*) has colonized the islands of Tortuga and Margarita, where *virescens* is supposed to be absent, but it is unknown whether both species occur side by side in Trinidad (BELCHER & SMOOKER, Ibis 1934, p. 579–580). Thus, *Butorides virescens curacensis* is a most remarkable North American element in the Netherlands Leeward Islands (see: Zoogeography, p. 43, 45, 47).

Butorides v. virescens is a breeding bird of eastern North America. Wintering individuals of this race are not uncommon in the West Indian islands (BOND) and are also known from northern Colombia and northern Venezuela. The Amsterdam Museum possesses an adult specimen from Surinam belonging to an old collection from about 1852 (nr. 3576, wing 184, exposed culmen 63).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

17 **Nycticorax nycticorax hoactli** (Gmelin)

Black-Crowned Night-Heron

Ardea Hoactli GMELIN, Syst. Nat. *1*, *2*, 1789, p. 630 — Valley of Mexico.
Nycticorax nycticorax, RUTTEN 1931, p. 121 (Curaçao, Bonaire).
Nycticorax nycticorax naevius, DE JONG 1948, p. 4 (Aruba, Curaçao, Bonaire).
Nycticorax nycticorax hoactli, PHELPS & PHELPS 1951, p. 7 (Bonaire); VOOUS 1955, p. 49 (Curaçao, Bonaire).

Native name — Galiña di awa?

CURAÇAO, BONAIRE. — Breeding not recorded.

CURAÇAO: Santa Cruz, 2.X.1954 (1 ♂ ad.; Collection Koelers, Curaçao).

Taxonomy — Iris red; bill black, base of cutting edges and naked loral skin yellow; legs and feet bright yellow.

Measurements — CURAÇAO: ♂ ad., wing 302, bill (measured from forehead) 90; tarsus 83.

Status — The only published records of reliable observations are those by RUTTEN, who states having seen one adult bird at Porto Marie Baai, Curaçao, on 20.IV. 1930 and two adults at Goto, Bonaire, in VI.1930. The statements by DE JONG on the occurrence of this species in Aruba deserve confirmation. Recent verbal communi

cations by persons living in Curaçao should indicate, however, that the species occurs rather regularly in the mangroves of the Saliña Santa Cruz, Curaçao, where an adult specimen was finally collected by KOELERS on 2.X.1954.

We did not observe this night-heron with certainty, although several of the solitary herons which we usually saw at night in the light of our car along the beach of Kralendijk, Bonaire, may have belonged to this species.

In the Venezuelan islands apparently only recorded from Margarita Island (CORY 1909, p. 236).

Distribution — *Nycticorax n. hoactli* occurs throughout the greater part of the Americas. In the West Indies it is a rare breeding bird (BOND). On the north coast of South America it has been recorded from the Goajira Peninsula, Colombia (DE SCHAUENSEE 1948, p. 362), and the Paraguana Peninsula, Venezuela (BARNES & PHELPS, Sr., 1940, p. 171), where it is less common than its relative *Nyctanassa violacea*.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

18 **Nyctanassa violacea bancrofti** Huey

Yellow-Crowned Night-Heron

Nyctanassa violacea bancrofti HUEY, Condor *29*, 1927, p. 167 — Scammon Lagoon, Lower California.

Nyctanassa violacea, RUTTEN 1931, p. 122 (Aruba, Bonaire); DE JONG 1948, p. 4 (Aruba, Curaçao, Bonaire).

Nyctanassa violacea cayennensis, PHELPS & PHELPS 1951, p. 7 (Bonaire).

Nyctanassa violacea bancrofti, VOOUS 1955, p. 50 (Aruba, Curaçao, Bonaire, Klein Bonaire).

Native name — *Krabèchi*.

ARUBA, CURAÇAO, BONAIRE, KLEIN BONAIRE. — Resident.

ARUBA: Bucuti Reef, 25.VI and 6.VII.1930 (2 juv., collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Sint Joris Baai*, 17.X. and 22.X.1951 (1 ♂ ad., 1 ♀ ad.); *Sint Jan Baai*, 13.II.1952 (1 ♀ ad.). BONAIRE: *Onima*, 12.XI.1951 (1 ♂ juv.); Goto, 27.V.1930 (1 ad., 1 ♀ juv., 1 juv., collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — From the short series of specimens available for examination and from critical notes kindly sent to me by Dr. H. FRIEDMANN, who also compared two of my specimens from Curaçao with material present in the United States National Museum, it appeared that the coloration of the upper parts in adult specimens from the United States, Lower California, the West Indies, and northern South America does not show any distinct geographical variation. Instead, there is a considerable individual and geographical variation in body-size and in the length and shape of the bill. North American birds (*violacea*) are largest, but their wing-lengths do not differ materially from those of birds from the West Indies, including Aruba, Curaçao, and Bonaire. Birds collected in northern South America (*cayennensis*), with the exception of the Pacific coast, are considerably smaller. In specimens from the eastern United States belonging to the race *violacea* the bill is on the average slightly

shorter and considerably slenderer than in birds from Lower California, Central America, and the West Indies, which are all treated under the name *bancrofti*. Similarly, in specimens of *cayennensis* from continental South America the bill is shorter and slenderer, contrasting with the condition found in adult and juvenile specimens from Aruba, Curaçao, and Bonaire. In specimens from the last named islands the bill is rather long and very heavy, particularly high at the base, agreeing with specimens of the race *bancrofti* from various localities (kindly examined by Dr. FRIEDMANN in the U.S. National Museum), as well as with the drawing of the bill of the type specimen of *bancrofti* in Condor *29*, 1927, p. 167, fig. 56. Thus, in spite of the fact that specimens from various of the Venezuelan islands have been referred to *cayennensis* (see below) and that a specimen from the Grenadines in the U.S. National Museum is a clear intermediate between *cayennensis* and *bancrofti* (FRIEDMANN *in litt.*), our specimens from Aruba, Curaçao, and Bonaire seem to agree with *bancrofti* rather than with *cayennensis*. With the conclusion that the West Indian populations of this species are referable to *bancrofti* and not to *violacea*, as is stated by HELLMAYR & CONOVER (*1* (*2*), 1948, p. 215) I am in full agreement with WETMORE, who was the first to prove convincingly that the West Indian and Pacific coast groups of this species are identical in appearance (Smiths. Misc. Coll. *106* (1), 1946, p. 17–18).

Iris red or orange-red; bill blackish-brown, base of lower mandible yellow; whole bill blackish in juvenile; legs and feet dark brown, but tibia, posterior side of tarsus and underside of toes bright yellow in adult, greyish in juvenile.

Measurements — ARUBA: juv., wing 280, 288, bill (exposed culmen) 68, 67, depth of bill at base 21, 21.5, tarsus 92, 95. CURAÇAO: ♂, wing 297, bill 67, depth of bill 25, tarsus 88; ♀, wing 283, 301, bill 72, 75, depth of bill 22, 24, tarsus 89, 93.5. BONAIRE: ad., wing 284, bill 77, depth of bill 24, tarsus 92; ♂ juv., wing 285, bill 72, depth of bill 25, tarsus 92; ♀ juv., wing 283, bill 77.5, depth of bill 23.5, tarsus 93; juv., wing 280, bill 73, depth of bill 22, tarsus 94.

Status — First recorded by RUTTEN, who states having observed adult and juvenile birds in 1930 on the Bucuti Reef, Aruba, and at Goto, Bonaire. The only published record of the occurrence of this species in Curaçao is a rather vague statement by DE JONG.

We observed this species in Curaçao and Bonaire, but failed to trace its occurrence in Aruba. In Curaçao it was particularly common at the Sint Joris Baai, Sint Jan, Groot Santa Marta, and Santa Cruz, whereas in Bonaire it was observed at Kralendijk, Boca Onima, Saliña Tam, and in the poor mangroves bordering a salt lagoon on Klein Bonaire. In all these localities both very young individuals and adults were present.

In the Venezuelan islands the species has been recorded from various localities; the collected specimens have been referred to both the races *bancrofti* and *cayennensis*, apparently indicating that here the races meet and perhaps hybridize: Las Aves (*cayennensis*?, HELLMAYR & CONOVER, *1* (*2*), 1948, p. 218), Los Roques (*cayennensis*, PHELPS & PHELPS 1951, p. 8), Blanquilla (*bancrofti*, PHELPS, Jr., 1948, p. 97), Margarita (*cayennensis*, PHELPS, Jr., 1948, p. 97; WETMORE, Smiths. Misc. Coll. *106* (1), 1946, p. 19); Los Testigos (*bancrofti*, PHELPS, Jr., 1948, p. 97).

Biotope — Almost exclusively found in mangrove swamps, where — in the daytime — they were not only resting, but also feeding in well-shaded places. They often occurred in small companies of 3–8 specimens and were also regularly seen fishing in late evening hours along the beach of Kralendijk, Bonaire.

Food — Four stomachs examined contained the remains of a large land-crab (1 ×), large quantities of insects, mainly beetles of medium size (2 ×), and some kind of worm (2 ×). The stomach of a specimen collected early in the morning was empty.

Reproduction cycle — The gonads of one of our female specimens proved to be in breeding condition (22.X.1951, Sint Joris Baai, Curaçao). We have no other indications of breeding activity of this species during the time of our visit. According to verbal information inhabitants of Curaçao seemed to be well acquainted with the nests of this species, which were said to be found exclusively in mangroves.

Zoogeography — *Nyctanassa v. bancrofti* ranges from Lower California and the Pacific coast regions of Mexico south through Central America to the Caribbean coast of Colombia; the range also includes the West Indian islands, as well as Aruba, Curaçao, and Bonaire, and various other islands off the north coast of Venezuela (WETMORE, Smiths. Misc. Coll. *106* (1), 1946, p. 17; BOND 1950, p. 11). On the mainland of Venezuela and in some of the Venezuelan islands it is replaced by another race (*cayennensis*). It is a Caribbean element in the avifauna of Aruba, Curaçao, and Bonaire (see: Zoogeography, p. 44, 45).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

19 **Eudocimus** [1]) **albus** (Linnaeus)

White Ibis

Scolopax alba LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 145 — South Carolina.
Eudocimus albus, VOOUS 1955, p. 50 (Curaçao).

Native name — unknown.

CURAÇAO. — Causal visitor.

No material.

Status — Not previously recorded from the Netherlands Leeward Islands. The only record is based on a photograph in my possession made by Brother M. ARNOLDO (A. N. BROEDERS), Curaçao, of an immature bird caught alive in Curaçao some 30 years ago. It has apparently never seen before or afterwards.

Not recorded from the Venezuelan islands.

Distribution — *Eudocimus albus* is a breeding bird from the Caribbean and Gulf coasts of the United States and Central America, the Greater Antilles, and from scattered localities along the Pacific coast from Lower California down to Peru. It is apparently a rare, casual visitor to the Caribbean coasts of Colombia and Venezuela (DE SCHAUENSEE 1948, p. 367; WETMORE 1939, p. 183, BARNES & PHELPS, Sr., 1940, p. 17). It is primarily a species from tropical Central America and the West Indies.

Protective measures — Not protected by law.

20 **Ajaia ajaja** (Linnaeus)

Roseate Spoonbill

Platalea ajaja LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 140 — São Francisco River, eastern Brazil (see: BERLEPSCH, Nov. Zool. *15*, 1908, p. 301).

[1]) For the use of the generic name *Eudocimus* instead of *Guara*, see: Proc. Biol. Soc. Wash. *64*, 1951, p. 61 and Auk *69*, 1952, p. 309.

Ajaia ajaia, CORY 1909, p. 196 (Aruba); RUTTEN 1931, p. 116 (Aruba); DE JONG 1948, p. 4 (Aruba).
Ajaia ajaja, HELLMAYR & CONOVER, *1* (*2*), 1948, p. 273 (Aruba); VOOUS 1955, p. 51 (Aruba).

Native name — unknown.

ARUBA. — Casual visitor.

No material.

Status — Only known from a female collected by FERRY in Aruba on 26.IV.1908 (CORY *l.c.*; BLAKE *in litt.*).
We did not observe this species.
In the Venezuelan islands only recorded from Margarita (CORY 1909, p. 235).
Distribution — *Ajaia ajaja* is a breeding bird throughout the whole of subtropical and tropical America, from Florida and the Gulf states south through the West Indies and Central America to Argentina and Chile. It is an uncommon breeding bird from the lagoons and mangroves along the north coast of Venezuela (GINES & AVELEDO, Mem. Soc. Cienc. Nat. La Salle, Caracas, *6* (17), 1947, p. 297; MARTIN, *ibidem 9* (24), 1949, p. 194), including the Paraguana Peninsula (BARNES & PHELPS, Sr., 1940, p. 17), and from Colombia (DE SCHAUENSEE 1948, p. 368).
Protective measures — Not protected by law.

21 **Phoenicopterus ruber ruber** Linnaeus Plate I

Red Flamingo

Phoenicopterus ruber LINNAEUS, Syst. Nat. ed. 10, *1*, 1758, p. 139 — West Indies = Bahama Islands (see: BERLEPSCH, Nov. Zool. *15*, 1908, p. 312).
Phoenicopterus sp. inc., HARTERT 1893, p. 307 (Aruba), p. 335 (Bonaire).
Phoenicopterus ruber, HARTERT 1902, p. 306 (Aruba, Bonaire); RUTTEN 1931, p. 122 (Bonaire); HAVERSCHMIDT, Ardea *31*, 1942, p. 146, pl. III-IV (Bonaire); "VOGELVRIEND" 1943, p. 213 (Curaçao); DE JONG 1948, p. 4 (Aruba, Curaçao, Bonaire); VAN OORDT 1949, p. 324 (Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Bonaire).
Phoenicopterus ruber ruber, HARTERT, Vög. Paläarkt. Fauna, 1915, p. 1268 (Bonaire); HELLMAYR & CONOVER, *1* (*2*), 1948, p. 275 (Bonaire); PHELPS & PHELPS 1951, p. 7 (Bonaire), BOND, Second Suppl. Checkl. Birds West Indies, 1952, p. 6 (Bonaire); VOOUS 1955, p. 54 (Aruba, Curaçao, Bonaire).

Native name — *Chogogo* (Togogo in Venezuela).

ARUBA, CURAÇAO, BONAIRE. — Breeding in Bonaire only.

CURAÇAO: Ronde Klip, no date (1 nearly ad.; Collection Ansingh, Curaçao). BONAIRE: *Saliña Grandi, Goto*, 25 and 29.III.1952 (1 ♂ ad., 2 ♀ ad.); without data (2 semi-ad.; Royal Institute for the Tropics, Amsterdam); *Pekelmeer* (Blauwe Pan), XI.1951 (17 old eggs, found washed ashore the salt pans).

Taxonomy — Only the fully adult individuals have the deep vermilion red coloration of the plumage; the immature birds are not unlike specimens of the Old World race *roseus*.

Not only have the feathers an admirable orange-red coloration, but also the subcutanous fat, the fat depositions along the intestines and particularly the connecting tissue below the horn covering of the long, reddish-coloured legs are a deep orange, which I never saw in other bird species. According to an examination by Dr. C. ENGEL of the Central Institute for Food Research (Centraal Instituut voor Voedingsonderzoek), Utrecht, the intestine-fat (deposited in the *mesenterium*) contains some caroteen (169 μg/g), as well as some carotenoids (rhodoxanthine, 916 μg/g); the subcutanous fat, however, does not contain caroteen, but is, instead, rich in carotenoids (rhodoxanthine, 1325 μg/g). It seems likely, that both caroteens and carotenoids are directly derived from the food. See for the establishing of astaxanthin in the feathers of the American flamingo: FOX, Nature *175*, 1955, p. 942–943.

Iris light yellow; bill deep orange, distal half black; legs and feet light cyclamen or rosy-red, darker at the joints; underside of toes tinged yellowish.

Measurements — Total length, from tip of bill to tip of toes, ♂, 175 cm (162–172 cm., according to CHAPMAN, Bull. Am. Mus. Nat. Hist. *21*, 1905, p. 77), ♀, 139 and 141 cm (132–160 cm, according to CHAPMAN, *l.c.*). Wing-spread, ♂, 173 cm. ♀. 154 and 157 cm. Length of neck, from tip of bill to anterior edge of fork bone (*furcula*), ♂, 86 cm, ♀, 63 and 66 cm. Length of legs, from knee joint to sole of the foot, ♂, 70 cm, ♀, 56 and 58 cm.

CURAÇAO: nearly ad., wing 41.5 cm, tarsus 31.5 cm.

BONAIRE: semi-ad., wing 35.5, 30.0 cm, exposed culmen 117, 117 mm, tarsus 26.5, 27.5 cm.

BONAIRE: ♂ ad., wing 43.0 cm, exposed culmen 125 mm, tarsus 35.0 cm; ♀ ad., wing 39.5, 40.0 cm, exposed culmen 113, 115 mm, tarsus 27.0, 29.0 cm.

These measurements agree with those of specimens from the Bahama Islands in the American Museum of Natural History, New York, as given by ZIMMER (*in litt.*):

♂, wing 393, 404, 410 mm, tarsus 271, 310, 321 mm.

♀, wing 346, 374, 389, 395, 408 mm, tarsus 230, 289, 289, 292, 303 mm.

Sex unknown, wing 381, 410 mm, tarsus 292, 300 mm.

Thus, the American red flamingo easily attains the measurements of the largest-sized males of *P. r. roseus*.

The measurements reveal the smallness of the females, particularly as regards the length of the legs (average total length of legs of females is about 80% of that of males; average length of tarsus of females is about 90% of that of males). The length of the neck and the size of the bill are also considerably smaller in females than in males. Immature birds do not seem to attain the full size of that of adults! The proportional differences in size, both between males and females and between adults and immatures, were very conspicuous in the field, particularly when a compact flock of flamingos, with erected necks, were watching an intruder.

Status — It is almost certain that the flamingo rookery in Bonaire dates back to the time that the first Europeans visited the islands in the south Caribbean Sea. According to SWAEN (Ardea *32*, 1943, p. 163–179), who ably summarized the historical records of the flamingos in the Netherlands Antilles, the old traveller and buccaneer WILLIAM DAMPIER saw flamingos in 1681 in "an island lying near the main of America, right against Querisao [= Curaçao], called by Privateers Flamingo

Key, from the multitude of these Fowls that breed there" (p. 165). SWAEN states that WAGENAAR HUMMELINCK does not exclude the possibility of Flamingo Key being another name for Klein Curaçao. The first real statement of the occurrence of flamingos in Bonaire seems to be by G. B. BOSCH, "Reizen in West-Indië, en door een gedeelte van Zuid- en Noord-Amerika", Utrecht, 1836, *2*, p. 299. From that time onward the records of the presence of flamingos in Bonaire gradually accumulated, but continued to be vague and therefore remained unnoticed in the literature outside the Netherlands.

HARTERT, on 12.VI.1892, was the first ornithologist to visit the breeding colony in the Pekelmeer (salt pans), but found only two eggs floating in the water. In 1909 P. A. EUWENS, a Roman Catholic Priest at Rincon, Bonaire, compiled some general data from the literature on flamingos, but also reported the flamingos as breeding birds in the extensive salt lagoons (Pekelmeer) in southern Bonaire; they were also regularly observed in Goto, where, however, they did not breed (De Lev. Nat. *14*, 1909, p. 16–19). Further information on the breeding of the flamingos in Bonaire can be found in a book with splendid photographs by the government surgeon ALFONS GABRIEL ("Tschogogo; aus dem Leben der Flamingos", Stuttgart, 1938), from which can be extracted, that both in the Pekelmeer and in the Goto lagoon breeding colonies must have been present in the years between 1920 and 1930 (see also the photographs by A. FISCHER in Ardea *31*, 1942, pl. III–IV).

RUTTEN in 1930 did not met with flamingos in the Pekelmeer, but found several hundreds of them in Goto. He states, however, that the flamingos were known to breed in the Pekelmeer (Oranje Pan) and not in Goto. He did not observe flamingos in Curaçao and Aruba.

Probably the birds continued breeding in Bonaire rather undisturbed and protected by the government from 1931 onwards, until 1944, when — without any necessity — a Netherlands speedboat and United States aircraft disturbed the breeding places fundamentally by their incessant noise and shooting (WESTERMANN 1946, p. 81 and 1947, p. 210). Consequently the flamingos left Bonaire; some returned in 1945 and 1946 for a short period, but disappeared soon afterwards. In 1947 up to 500 flamingos appeared in the salt lagoons of Goto and Slagbaai (GERHARTS *in litt.*; PHELPS & PHELPS), but VAN OORDT did not see more than 2 of the birds in the Pekelmeer and 13 in Goto when he visited the island in March 1948. At irregular intervals these few flamingos disappeared for some time, but gradually the numbers of returning individuals increased, untill in 1950 breeding again could be established in the Pekelmeer, where the photographer H. WEENER took photographs and moving pictures of the rookery in August. In the summer of 1951 the number of breeding pairs in this locality was estimated at about 1000; splendid photographs of the breeding colony in full activity were made by Messrs. DE CORVER, GERHARTS, and MAYER (Plate I).

In the meantime flamingos had also been reported from the other islands, but there their occurrence remained restricted to the appearance of irregular stragglers. In historical times at least the flamingo does not seem to have bred in Curaçao (N. VAN MEETEREN *in litt.*). Two stray individuals were recorded by M. DE JONG ("VOGELVRIEND") from Santa Cruz and Playa Abau on the south coast of Curaçao in 1941. HARTERT observed a solitary specimen in Aruba in 1892.

We met with flamingos only in Bonaire, where we saw them in three localities, *viz.* Pekelmeer, Saliña Grandi of Goto, and Slagbaai.

On 3.XI.1951, when we visited Goto for the first time, we found some 300 flamingos, of which over 200 specimens were adults, the remaining ones being in the whitish juvenile plumage. Some, however, did not seem to be more than half-grown, greyish-white, and half the size of the adults, or somewhat larger, but all were able to fly. These birds either must have hatched in Goto or must have come from the Pekelmeer, where they were known to have bred, though — judging from their size — the latter supposition seems less likely. During November 1951 this flock remained quite constant in numbers. In the Pekelmeer, however, we counted a group of 100–150 individuals on 13.XI.1951, and nearly 1000 individuals on 28.XI. 1951, in both cases right in the centre of the lagoon and barely approachable. No young in greyish-white plumage were observed there.

In November 1951 we found some hundred or more unbroken flamingo eggs and the remains of several chicks along the western shore of the lagoon, near the Blauwe Pan. These eggs were said to have originated from a brood of April/May of the same year, which had been washed out by heavy rains and storms, and had drifted ashore, where they remained preserved in the salt water and in the ever-present salt incrustation of the bottom. The majority of the eggs proved to be highly incubated, but some were almost fresh, whereas others were perhaps addle. With a minor exception the contents of the eggs were rather well preserved. According to local information the flamingos had started a second brood after the destructive weather conditions had passed, raising their young successfully in July and August. It must have been to this brood in the Pekelmeer, or to a simultaneous brood in Goto, that the young flamingos we observed at Goto in November 1951 belonged.

In March 1952 we still found about 200 flamingos in Goto which had remained there during the winter months. In addition there was a flock of about 20 individuals in nearby Slagbaai. In the Pekelmeer, however, we did not see more than one adult and four immature birds on 26.III.1952. This means, that less than 300 flamingos were present in Bonaire in March 1952, compared with over 1100 in November 1951. This change in numbers agrees with the common opinion of former ornithologists and of the people of Bonaire, that the flamingos leave the island after a long breeding period, not returning before the beginning of the next breeding season.

WAGENAAR HUMMELINCK (*in litt.*) reported that on 11.IV.1955 the flamingos were breeding in the Pekelmeer in four groups, the largest one being estimated at about 250 pairs. A few dozens were nesting without apparent disturbance on the ruins of an old wall in an abandoned salt pan at approximately 200 m from a shed near the coast where, at the time of HUMMELINCK's visit, a party was held with people dancing to blazing wireless music.

As to the occurrence of the flamingo in the other islands we can report having examined a mounted specimen in the possession of Mr. F. H. ANSINGH, surgeon, Rio Canario, Curaçao. This specimen had unfortunately been shot near Ronde Klip, Curaçao, some years ago. I also found the wing quill of a flamingo on Boca Prins, Aruba, on 7.IV.1952. After our return in Holland ANSINGH and VAN DER WERF informed me of a solitary flamingo having stayed on the northern shore of the Schottegat, close to the head-office of the "Curaçaose Petroleum Industrie Maatschappij" (C.P.I.M.), from 12 to 20.V.1952. As the water in which the bird was feeding was greatly polluted with black oil-residue, the bird gradually became stained with a dirty black, particularly on the head.

Biotope — A good description of the breeding and feeding places of the flamingos in Bonaire is given by WAGENAAR HUMMELINCK in SWAEN's paper (Ardea *32*,

1943, p. 175–176). I have borrowed from this paper some of the following details.

The Pekelmeer, breeding place of the flamingos, in the south of Bonaire, is a wide and shallow lagoon, probably never exceeding 2 m in depth and separated from the sea by a low and permeable wall some 100–150 m wide, consisting of coral debris, sand and tuffaceous limestone. The lagoon is usually 4–6 sq. km in extent; its surface, however, varies greatly according to its appearance in severe drought or after heavy rains. It has for the greater part a soft and muddy bottom, and water of a high salinity (over 100 g Cl per liter) and a high temperature (usually over 30° C). The flamingo rookery is situated on a barren mud flat right in the centre of the lagoon, so that the observer can find cover only at some miles distance from the rookery. The water of the Pekelmeer generally has a peculiar reddish coloration, which is caused by the presence of flagellates, probably *Dunaliella*. Not only the millions of brine shrimps (*Artemia salina*) which flourish in these waters, but also the mud flats and the stome walls bordering the salt pans, are eventually stained with this reddish coloration. The presence of this reddish colour brings to mind the problem of the origin of the similar red colours of the feathers and tissues of the flamingos which feed in this water!

Goto, at least an important feeding ground of the flamingos, is an extensive saliña in the northwest of Bonaire, not more than about 25 km from the Pekelmeer. Towards the sea the lagoon (Saliña Grandi) communicates with an inundated pleistocene valley, where the water may reach a depth of over 15 meter. It is separated from the sea, however, by a permeable wall of rough coral stones. In the dry season the Saliña Grandi may be about 3 km² wide. Its bottom consists of a blackish mud, but here there are more places where the rocky or tuffaceous bottom is exposed than there are in the Pekelmeer. The salinity is high (110–120 g Cl per liter), as is the temperature of the water (30°–35° C). Both the brine shrimp (*Artemia salina*) and the larvae and pupariae of the salt fly (*Ephydra*) abound in these almost saturated salt waters.

Reproduction cycle — The gonads of the collected specimens were slightly enlarged, indicating that breeding could be expected within relatively a short time: ♂ (29.III.1952), testes 19 × 10 and 17 × 11 mm; ♀ (25 and 29.III.1952), oviduct swollen and considerably twisted, diameter of follicles up to 6.5 and 7.0 mm.

It is generally considered that the flamingos of Bonaire breed during the summer months, from April to August, depending on the rains of the season, which vary from year to year. According to GABRIEL (*l.c.*) the Bonaire flamingos were building and repairing their nests at the beginning of July, and the first downy chicks appeared in the first week of August. Incubating adults have been recorded by various people in April, as well as in July 1951. During our visit to Bonaire, in November 1951 and March 1952, there was no sign of any breeding activity, unless the growing gonads of the specimens mentioned above be considered as such. The recorded egg-dates in the Bahama Islands are in the same period as in Bonaire, *viz.* between March and July (BENT, Bull. U.S. Nat. Mus. *134*, 1926, p. 6).

Nest and eggs — The nests in the Pekelmeer are the well-known truncated, cone-shaped mud structures, usually covered with a crust of salt and varying between approximately 15 and 30 cm in height and 20–35 cm diameter at the top. The nests were very close together, sometimes connected by low bridges of hardened mud, but in other cases separated by narrow channels of salt water. The nests seem to be used for many years in succession (Plate I).

When we visited Bonaire in November 1951 we did not see anything of breeding

flamingos; instead, we saw their mud nests rising out of the water of the Pekelmeer, between the Witte Pan and the Oranje Pan. By the end of March 1952, when the water level had risen, no nests were visible, so that we assumed that all nests were inundated.

Judging from the photographs by GABRIEL (*l.c.*) of the breeding places in Goto, the nests must have been considerably lower there than in the Pekelmeer, apparently as the result of the lack of a sufficiently thick layer of mud. Many nests seem to have been lower than 10 or 15 cm!

According to local information and the photographs presented to us by various people the nests in the Pekelmeer usually do not contain more than one egg, which, thus, is the full clutch-size. CHAPMAN (*l.c.*, p. 59–61), too, found in the rookery of nearly 2000 nests on Andros Island, Bahama Islands, only one egg per nest, except in two instances.

The eggs are long oval in shape; the shell is chalky-white with broad pori and a rough texture; against the light a yellowish colour shines through.

Measurements (mm):

82.6 × 53.0	84.7 × 53.5	89.9 × 52.5
83.4 × 53.8	84.8 × 50.8	90.5 × 54.6
84.0 × 53.5	85.7 × 52.9	95.0 × 52.0
84.1 × 56.6	85.8 × 54.8	95.7 × 57.9
84.4 × 56.0	86.1 × 52.1	97.4 × 59.1
84.5 × 51.8	88.1 × 55.3	

An additional egg from the April brood measured 88.9 × 55.2.

HARTERT (1893, p. 335) gives the following measurements of 2 eggs: 3.35 × 2.13 and 3.45 × 2.16 inches = 85.1 × 54.1 and 87.6 × 54.9 mm.

Average size of 20 eggs from Bonaire is 87.4 × 54.2.

Average size of 41 eggs from various localities in the Bahama Islands, according to BENT (Bull. U.S. Nat. Mus. *134*, 1926, p. 6) is somewhat larger, *viz.* 91.3 × 55.4 mm.

These average dimensions, particularly those from Bonaire, correspond remarkably well with those of 100 eggs of the Old World form *P. ruber roseus*, as given by STUART BAKER: 88.8 × 54.5 (The Nidification of Birds of the Indian Empire, *4*, 1935, p. 487).

Food — The contents of the gullet and the stomach of the collected specimens (Goto) have been examined by Dr. P. WAGENAAR HUMMELINCK (Utrecht), who found practically nothing but the remains of numerous larvae of the salt fly *Ephydra spec.* The larvae and pupariae of these insects are exceedingly common in the salt water lagoons of all three islands. In the Saliña Grandi of Goto they live firmly "rooted" in the mud or attached to the rocky bottom, locally forming extensive covers, on which the flamingos are apparently "grazing". In addition WAGENAAR HUMMELINCK found the fragments of a few very small fish-scales, and the leg of some insect.

Thus, the main food of the flamingos at Goto appeared to be the larvae of the salt fly *Ephydra*, but we can be sure that the equally abundant brine shrimp *Artemia* also represents an important source of the flamingo's food.

Field observations — Several times we observed flamingos feeding by swimming in rather deep water, not unlike a swan, sometimes with large parts of the neck submerged. Some of the colour pictures taken by K. MAYER (Bonaire) clearly illustrate this manner of feeding.

In the month of April 1955 WAGENAAR HUMMELINCK (*in litt.*) mentions that the

seepages on the inner side of the wall which separates the Pekelmeer from the sea were swarming with *Cyprinodon dearborni*. These localities were therefore much visited by pelicans, various species of terns, and flamingos. It was curious to observe how, in this instance, the customary mowing movements of the flamingos' bills had changed into a more or less clumsy way of pecking. On these feeding grounds the birds showed remarkably little fear for autocars going along the road from Kralendijk to Zuidpunt.

On 13.XI.1951 about 100 to 150 flamingos were sleeping while standing in the middle of the Pekelmeer, the head hidden between the feathers on the shoulders, one leg retracted against the body. It may have been accidental, but we noted that at two opposite places outside the compact flock of sleeping birds one or two individuals were not asleep, but stood with their long necks erected, like the much discussed "sentinels" of the older descriptions!

The normally-heard voice (alarm note) of the flamingo has been well transliterated by CHAPMAN (*l.c.*) as "huh-húh-huh". This call note can be compared with the high-pitched, melodious, but rather penetrating honking of some geese and seemed to have been the origin of the flamingo's local name "chogógo". When alarmed, the gaggling voices of hundreds of flamingos sound like an impressive swan's community song.

Parasites — Miss THERESA CLAY (London) kindly identified the Mallophaga found on our Bonaire specimens as *Trinoton femoratus* Piaget, 1880.

Zoogeography — *Phoenicopterus r. ruber* is originally a breeding bird of all suitable tropical coasts of America, but the number of their breeding places, as well as of their individuals, has been considerably reduced through men's destructive interference. Apart from Bonaire the flamingo breeds in the south Caribbean Sea probably only on one of the Roques Islands (Isla Maria Uespen; PHELPS & PHELPS 1951, p. 9) and perhaps in Orchila (about 200 nests disturbed in 1953; PHELPS, Jr., *in litt.*). Additional exactly known rookeries exist at present in Inagua, Bahama Islands (R. P. ALLEN, Audubon Mag. *53*, 1951, p. 210) and in some lagoons in northwestern Yucatan, Mexico (Audubon Mag. *52*, 1950, p. 256). It seems quite certain, however, that additional colonies have survived in other Bahama Islands (Andros, Abaco), Cuba, Hispaniola, and probably also in the Galapagos Islands. Stray specimens may occur, either solitarily or in small flocks, throughout the West Indian region and along the north coast of South America, from Brazil to Peru. Mr. W. H. PHELPS, Jr., informs me (*in litt.*) that the PHELPS Collection (Caracas) contains specimens from the Venezuelan coast, *viz.* from the east coast of the Paraguana Peninsula (salinas of Adicora) and from the Lagoon of Tacarigua, State of Miranda. The species is a Caribbean element in the avifauna of the Netherlands Antilles.

Protective measures — Protected by law since 1931 (WESTERMANN 1946, p. 82). The flamingo represents a unique attraction to the picturesque island of Bonaire, but it should not be forgotten that the rookery may also very easily be disturbed by the mere presence of men!

22 **Anas discors** Linnaeus

Blue-Winged Teal

Anas discors LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 205 — South Carolina.
"*Querquedula*. L.", SIMONS 1868, p. 153 (Curaçao).

Querquedula discors, VOGELVRIEND 1943, p. 21 (Curaçao); DE JONG 1948, p. 4 (Aruba?, Curaçao).

Anas discors, VOOUS 1953, p. 189 (Curaçao); VOOUS 1955, p. 55 (Aruba, Curaçao, Bonaire).

Native name — *Patu* (not Patu morèkè).

ARUBA, CURAÇAO, BONAIRE. — Winter visitor.

CURAÇAO: *Rio Canario*, 13.XI.1951 (1 ♂ imm.); *Pos Manzanilla*, 30.X.1951 (1 ♀ ad.).

Taxonomy — The plumage of the adult female is fresh, without any noticeable abrasion of feather-tips. The plumage of the first-year male is considerably worn, particularly conspicuous on the tail feathers and the feathers of the under parts.

Iris (♀) dark brown; bill (♀) dark horn-brown, the lower mandible being more yellowish; legs and feet (♀) pale brownish, webs greyish.

Measurements — CURAÇAO: ♂ imm., wing 182.5, bill (exposed culmen) 38.5; ♀ ad., wing 189, bill 38.

Status — After SIMONS's old and rather vague record, DE JONG was the first to mention the occurrence of this species in the islands, but his records, which date from the years after 1940, unfortunately lack convincing evidence.

We observed blue-winged teal in all three islands. Our observations can be summarized as follows: ARUBA: Spaans Lagoen (20.XII.1951, 2 ♂, 3 birds in female dress). CURAÇAO: Schottegat near Rustenburgh (13.X.1951—23.II.1952, several individuals; on 12.I.1952 20 individuals, according to verbal communication by ANSINGH), Pos Manzanilla (30.X.1951, 2 individuals), Pos Grandi (30.X.1951, 1 individual), Malpais (16.I.1952, 1 individual). BONAIRE: flooded low country southeast of Kralendijk (14.XI.1951, 3 individuals; 27 and 28.XI.1951, 6 individuals), Saliña Tam (20.XI.1951, 7 individuals). — During the exceptionally wet winter season of 1954–1955 observed in Curaçao until 26.III.1955 (KOELERS *in litt.*).

Extreme records of arrival and departure in Curaçao: 13.X.1951 (VOOUS) and 26.III.1955 (ANSINGH, KOELERS).

Apparently not yet recorded from the Venezuelan islands.

Biotope — We observed this species in fresh water pools as well as in low-lying country flooded by rains; it was only once found in salt lagoons (Spaans Lagoen, Aruba).

Food — Two stomachs examined contained vegetable matter and the larvae of mosquitoes and other Diptera.

Distribution — *Anas discors* is a breeding bird from North America. It winters south to northern South America, where it is known from Venezuela (WETMORE 1939, p. 183), as well as from Colombia (DE SCHAUENSEE 1948, p. 373). It is the commonest species of duck in the West Indies during the winter months (BOND 1950, p. 18).

Protective measures — Not protected by law. Regularly hunted.

23 **Anas bahamensis bahamensis** Linnaeus

White-Cheeked or Bahama Pintail

Anas bahamensis LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 124 — Bahama Islands.

Dafila bahamensis, RUTTEN 1931, p. 123 (Bonaire); VOGELVRIEND 1943, p. 244 (Curaçao); DE JONG 1943 (Curaçao); DE JONG 1948, p. 4 (Bonaire and the other islands).

Dafila bahamensis bahamensis, HELLMAYR & CONOVER, *1* (*2*), 1948, p. 361 (Curaçao); PHELPS & PHELPS 1951, p. 8 (Bonaire).

Anas bahamensis bahamensis, BOND 1950, p. 19 (Curaçao, Bonaire); VOOUS 1955, p. 56 (Curaçao, Bonaire).

Native name — *Patu di aña* (Curaçao; verbal communication by Mr. N. B. GORSIRA. The meaning of the name is: duck of the year, that is, duck of the yearly cycle, or duck of the rainy season).

CURAÇAO, BONAIRE. — Breeding bird.

BONAIRE: *Saliña Martinus*, 14.XI.1951 (1 ♂); *Playa Frans*, 20.XI.1951 (1 ♀).

Taxonomy — Iris dull reddish (♂), or yellowish-brown (♀); bill dark bluish-grey, base of upper mandible largely red; legs and feet black.

Measurements — BONAIRE: ♂, wing 223, bill (exposed culmen) 42, tarsus 39; ♀, wing 207, bill 41, tarsus 36.5.

Status — First recorded by RUTTEN in May or June 1930 from Goto, Bonaire. Additional pertinent records are very scarce, but a specimen from Sint Patrick, Curaçao, is mentioned by HELLMAYR & CONOVER. In the popular literature, however, several instances occur, which would indicate a more regular occurrence of this and other species of duck, particularly during years of heavy rainfall (GORSIRA, weekly paper Curaçao *1* (51), 1940; JONKERS, Ned. Jager *43*, 1938). According to these sources of information the species should also breed in the islands. — Not definitely recorded from Aruba.

We observed this pintail in Curaçao and Bonaire, where it was among the commonest of ducks. CURAÇAO: Sint Jan Baai (20.I.1952, 2 pairs), Santa Marta lagoon (27.IV.1952, about 40 individuals, VAN DER WERF *in litt.*); BONAIRE: Saliña Palu Lechi (9.XI.1951, 1 specimen), Saliña Martinus (14.XI.1951, 1 specimen), Saliña Slagbaai (19.XI.1951, about 7 individuals), Playa Frans (20.XI.1951, 17 specimens).

The species has been found definitely breeding in Curaçao in 1955, when at least two nests with eggs and two females with downy chicks were observed at Jan Thiel (KOELERS and VAN DER WERF *in litt.*) and one female with downy young at Santa Marta (VAN DER WERF *in litt.*).

Not recorded from the Venezuelan islands, but has occurred in Trinidad (BOND 1950, p. 19).

Biotope — Salt lagoons and saline bays, but also fresh water pools.

Reproduction cycle — In the specimens collected the gonads were not enlarged (♂, testis 7 × 2 mm; ♀, oviduct not swollen, straight, largest follicle in ovary 3 mm). We did not observe anything that suggested breeding activity.

In 1955 one female with 13 chicks and another with 2 chicks were observed in the Jan Thiel lagoon, Curaçao, on 25.IV; in addition a nest with 11 eggs was found in the same locality (VAN DER WERF *in litt.*). On 25.V.1955 probably another nest was reported by KOELERS (*in litt.*), who also found a third nest with 9 eggs early VII.1955. A female followed by at least 6 downy young was observed by VAN DER WERF (*in litt.*) at Santa Marta on 23.X.1955.

Nest and eggs — Nest well-hidden under a dead shrub of *Haematoxylon brasiletto* among high grass and halophytic plants (*Sesuvium portulacastrum*), about 4 meter from the water's edge. Eggs embedded in a thin layer of small feathers and down (KOELERS and VAN DER WERF). Nest-down sooty-brown with conspicuous white basal spots (in collection Amsterdam Mus.). Eggs cream-colour to cream-brown. Measurements of clutch of 11 eggs from Curaçao, according to KOELERS (*in litt.*):

47.8 × 35.5	49.4 × 36.3	51.2 × 36.9
48.5 × 36.1	49.6 × 36.5	51.4 × 36.9
48.9 × 35.8	50.5 × 36.0	51.7 × 36.9
49.1 × 36.2	50.5 × 36.2	

Average 49.9 × 36.3 mm.

Zoogeography — *Anas b. bahamensis* ranges throughout the Bahama Islands and several of the Greater and Lesser Antilles south to the Caribbean coast of Colombia and Venezuela (extremely rare, see: Novedades Cientificas La Salle, Caracas, Ser. Zool. *10*, 1953, p. 10), the coasts of the Guianas and northeastern Brazil. In the more southerly parts of South America and in the Galapagos Islands it is replaced by closely resembling races. It is a South American element in the avifauna of the Netherlands Leeward Islands.

Protective measures — Not protected by law. Regularly hunted when present (see: WESTERMANN 1946, p. 79).

24 **Anas americana** Gmelin

American Widgeon

Anas americana GMELIN, Syst. Nat. *1, 2*, 1789, p. 526 — New York.
Anas americana, VOOUS 1953, p. 189 (Aruba, Curaçao); VOOUS 1955, p. 56 (Aruba, Curaçao).

Native name — *Patu*.

ARUBA, CURAÇAO. — Winter visitor.

CURAÇAO: *Malpais*, 16.I.1952 (1 ♂ ad.).

Taxonomy — The collected specimen is in advanced nuptial plumage. It was fat throughout.

Iris dark brown; bill greyish-blue, nail black, legs and feet light olive-brown.

Measurements — CURAÇAO: ♂, wing 258, exposed culmen 35.

Status — Not previously recorded.

We observed this species in Curaçao twice, *viz.* on 13.X.1951 at Rustenburgh, Rio Canario (♂ and ♀) and on 16.I.1952 at Malpais along the road to Bullen Baai (♂ and ♀). Also observed by VAN OORDT (verbal communication) in Aruba on 23.XII.1951 in the Spaans Lagoen (♂ and ♀).

During the exceptionally wet winter season 1954–55 flocks of over 10 individuals were observed in Curaçao from 17.X until 9.III; a single male, which was probably hit, was present even later, and was subsequently collected on 8.V.1955 in the fresh water pool at Muizenberg (ANSINGH and KOELERS *in litt.*). In 1955 the

species appeared as early as on 19.XI (flock of about 40 birds at Malpais; J. G. DE JONG *in litt.*).

Extreme records of arrival and departure in Curaçao: 13.X.1951 (VOOUS) and 9.V.1955 (ANSINGH, KOELERS).

Not recorded from the Venezuelan islands.

Biotope — Lagoons with either salt water (Rio Canario; Spaans Lagoen) or fresh rain water (Malpais), usually with adjacent soft mud flats. We observed it twice in company with *Anas discors*.

Food — The stomach of the collected specimen contained many green water-plants.

Distribution — *Anas americana* is a breeding bird from northwestern North America. It winters in the southern United States, the West Indies, and Central America, south to northwestern Colombia, where it is a rare winter visitor (DE SCHAUENSEE 1948, p. 373; BORRERO, Lozania *1*, 1952, p. 8). There are no records from Venezuela.

Protective measures — Not protected by law.

25 **Aythya affinis** (Eyton)

Lesser Scaup Duck

Fulica affinis EYTON, Monogr. Anatidae, 1838, p. 157 — North America.
Aythya affinis, VOOUS 1953, p. 189 (Aruba, Curaçao); VOOUS 1955, p. 57 (Aruba, Curaçao).

Native name — *Patu*.

ARUBA, CURAÇAO. — Winter visitor.

CURAÇAO: *Malpais*, 27.XII.1951 (1 ♂).

Taxonomy — The specimen collected is a first-year male in rather advanced breeding plumage. Some of the tail feathers have been renewed, while others are bleached and strongly abraded. The specimen was not fat.

Iris yellow; bill greyish-blue, nail black; legs and feet bluish-grey and black.

Measurements — CURAÇAO: ♂, wing 206, exposed culmen 41.

Status — Not previously recorded.

We observed two pairs of this species on 16.XII.1951 at Spaans Lagoen, Aruba, and collected a solitary male on 27.XII.1951 at Malpais, Curaçao.

In the fall of 1952 the species turned up in Curaçao on 30.X, when an extremely fat juvenile female was collected by ANSINGH (*in litt.*) in the Schottegat near Rio Canario. Also observed in Curaçao in 1954–55 at Rustenburgh (25.XII–5.I) by VAN DER WERF (*in litt.*) and at the fresh water pool of Muizenberg until 8.III.1955 by ANSINGH and KOELERS (*in litt.*).

Extreme records of arrival and departure in Curaçao: 30.X.1952 (ANSINGH) and 8.III.1955 (KOELERS).

Not recorded from the Venezuelan islands.

Biotope — We observed this species in Aruba in the muddy salt lagoons close to the mangroves of Spaans Lagoen. We were much surprised to find a solitary individual in Curaçao in a small patch of low ground inundated by sudden heavy rains, amidst prickly-pear cactus, organpipe cactus, and spiny acacias!

Food — The stomach of the collected specimen contained nothing but the remains of a few small crustaceans, beetle-larvae, and some vegetable matter.

Distribution—*Aythya affinis* is a breeding bird from northern North America. It winters south throughout the West Indies and Central America to Colombia (DE SCHAUENSEE 1948, p. 375) and northwestern Venezuela (2 females examined in the PHELPS Collection, Caracas; Novedades Cientificas La Salle, Caracas, Ser. Zool. *10*, 1953, p. 10).

Protective measures — Not protected by law.

26 **Buteo albicaudatus colonus** Berlepsch

White-Tailed Hawk

Buteo albicaudatus colonus BERLEPSCH, Journ. f. Orn. *40*, 1892, p. 91 — Sint Christoffel, Curaçao.

"*Buteo species*?", PETERS 1892, p. 110 (Curaçao).

Buteo albicaudatus colonus, HARTERT 1893, p. 304 (Aruba), 321 (Curaçao), 332 (Bonaire); HARTERT 1902, p. 304 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 125 (Aruba, Curaçao, Bonaire, Klein Bonaire); PETERS, *1*, 1931, p. 228 (Aruba, Curaçao, Bonaire); VAN OORDT 1949, p. 324 (Curaçao, Bonaire); HELLMAYR & CONOVER, *1* (*4*), 1949, p. 152 (Aruba, Curaçao, Bonaire); FRIEDMANN, *11*, 1950, p. 224 (Curaçao); PHELPS & PHELPS 1951, p. 8 (Bonaire); VOOUS 1955, p. 59 (Aruba, Curaçao, Bonaire, Klein Bonaire).

Buteo albicaudatus, DE JONG 1948, p. 4 (Aruba, Curaçao, Bonaire).

Buteo albonotatus, DE JONG 1948, p. 5 (Curaçao).

Native name — *Falki* (Curaçao), *Gabilan* (Bonaire).

ARUBA, CURAÇAO, BONAIRE, KLEIN BONAIRE. — Resident.

ARUBA: *Sint Nicolaas*, early XII.1951 (1 ♂ imm.). CURAÇAO: *Blauw*, 7.IV.1952 (1 ♂ juv.); Sint Christoffel, 30.VIII.1890 (1 ♀ juv., collected by Ernst Peters; Senckenberg Mus., Frankfurt). BONAIRE: *Piedra Cruz*, 5.XI.1951 (1 ♂ subad.), 29.XI.1951 (1 ♀ juv.), 1.IV.1952 (1 ♀ juv.); *Slagbaai Plantation*, 19.XI.1951 (1 ♂ juv.).

Taxonomy — This species does not seem to show any characters liable to geographic variation other than (1) size, (2) intensity of greyish coloration of the upper parts in adult plumage, and (3) frequency of melanism in the juvenile plumage. Throughout the whole range the population inhabiting Aruba, Curaçao, and Bonaire is smallest in dimensions, birds from more northern and southern regions being considerably larger, particularly those of the race *albicaudatus* from central South America (see below).

All 6 juvenile birds examined, among which is BERLEPSCH's type of *colonus*, are in a melanistic, fuscous-brown stage of plumage, with only a buffish-brown patch on the upper breast. The tail is lighter and greyish, with obsolete cross markings and a terminal band of darker brown.

The male in subadult stage differs from the fully adult plumage, in which the whole of the under parts is white, by having the sides of the head, chin and median throat line slate-grey and in addition by showing narrow cross bars of rufous coloration on the flanks and tibial feathers. Upper parts dull brownish-grey.

Iris brown; bill bluish-grey or greenish-brown with black tip, cere yellowish-green; legs and feet yellow.

Measurements — ARUBA: ♂ imm., wing 385, tail 169, tarsus 86. CURAÇAO: ♂ juv., wing 378, tail 190, tarsus 85; ♀ juv., wing 387, tail 198, tarsus 86. BONAIRE: ♂ subad., wing 368, tail 165, tarsus 83; ♂ juv., wing 362, tail 186, tarsus 85; ♀ juv., wing 385, 387, tail 195, 197, tarsus 84, 88.

The following is a comparison of wing-measurements:

Aruba, Curaçao, Bonaire(*colonus*)	♂ 362–385 average 373.2	♀ 385–387 average 386.3
North Venezuela (*colonus*?) [1]	♂ 408	♀ 411
B.a. hypospodius [2]	♂ 404–430 average 416.4	♀ 423–450 average 438.8
B. a. albicaudatus [3]	♂ 430 and over	♀ 440–475

Status — In spite of the fact that all previous authors agree in stating that this species is rather rare and very locally distributed, all of them — FERRY excepted — mention its occurrence in all three islands, starting with ERNST PETERS, who collected BERLEPSCH's type specimen on 30.VIII.1890 on Christoffel Mountain in Curaçao, and finishing with VAN OORDT in 1948. Most authors report having observed it most commonly in hilly country, particularly around Christoffel Mountain in Curaçao; they all add that it is a wild species and most difficult to obtain. Apart from the specimens now collected, the type specimen (♀ juv., Curaçao) and two birds collected by HARTERT in 1892(♂ juv., Curaçao; ♀ juv., Bonaire)are the only study skins available at present. Adult and juvenile birds differ considerably in colour and colour pattern. The melanistic juveniles — although previously mentioned by several authors — have not been recognized as such by RUTTEN and have been recorded by DE JONG under the erroneous designation *"Buteo albonotatus"*.

Only one certain breeding record has been published, *viz.* by RUTTEN, who found a nest in an organpipe cactus on Klein Bonaire in 1930. Chicks in white downy plumage, apparently originating from the Sint Christoffel region, Curaçao, have been photographed by Brother M. ARNOLDO.

We met with this species in all three islands, but we did not see it in Klein Bonaire. It was the rarest of the resident birds of prey, particularly in Aruba, where we observed it only twice (Plateau of Palu Marca, Ceru Hooiberg). In Curaçao its presence was noticed in at least ten localities, ranging from the Sint Joris Baai in the east to Christoffel Mountain and Savonet in the west. In Bonaire it was local; it was, however, regularly seen near Piedra Cruz and at the plantations of Slagbaai and Brasiel.

In the Venezuelan islands the species apparently only occurs in Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 17).

Biotope — Generally found hunting over cactus deserts and other open vegetation types, but most often seen sailing in favourable air currents along the slopes or near the summits of low mountains or steep mountain ridges, such as Christoffel Mountain and the Escarpment of Jan Kok, Curaçao. Its favourite roosting places were the tops of organpipe cacti or the dead branches of isolated trees.

Food — Two of five stomachs examined were empty; the remaining three

[1]) Tropical north coast, PHELPS *in litt.*
[2]) FRIEDMANN, Bull. U.S. Nat. Mus. *50* (*11*), 1950, p. 234.
[3]) FRIEDMANN, *ibid.* p. 224.

contained nothing but lizards of variable size, though predominantly specimens of *Cnemidophorus* of over 30 cm length. These birds are also known to prey on chicks in poultry yards (Savonet, Curaçao!) and to feed on carrion. Probably the remains of *Columbigallina passerina* found on a boulder near the summit of Christoffel Mountain were also the result of the work of this species. The food was often taken from the ground after initial hovering, which occasionally was sustained for a considerable time.

Reproduction cycle — RUTTEN found a nest with one white egg in an organpipe cactus in May or June 1930. We did not see any sign of the breeding activity of this species other than the presence of a family party consisting of two adult birds and one juvenile on the eastern slopes of Christoffel Mountain on 27.X.1951 and at Sint Jan on 19.I.1952, both in Curaçao.

Zoogeography — *Buteo a. colonus* inhabits — aside from Aruba, Curaçao, and Bonaire — the semi-desert and savannah regions of northern South America, from the Caribbean coast of Colombia and Venezuela eastwards to northeastern Brazil. The species as a whole ranges throughout the subtropical and tropical, semi-arid and arid regions of the Americas, but it is absent in the West Indies proper. It is a South American element in the avifauna of Aruba, Curaçao, and Bonaire.

Protective measures — Not protected by law, but protection is urgent, if not already too late. See also: WESTERMANN 1946, p. 83 and 1947, p. 216.

Haliaetus leucocephalus (Linnaeus)

Bald Eagle

Falco leucocephalus LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 124 — Carolina.
Haliaetus leucocephalus, DE JONG 1948, pl 5 (Curaçao).

DE JONG reports having observed a specimen of this species off the coast of Curaçao in January 1942 and December 1944 (also published under pseudonym VOGELVRIEND in Hou en Trouw 1944, p. 135). These undetailed records do not seem to be very satisfactory and are in need of further confirmation.

27 **Pandion haliaetus carolinensis** (Gmelin)

Osprey

Falco carolinensis GMELIN, Syst. Nat. *1*, *1*, 1788, p. 263 — South Carolina.
"*Falco* (*L.*) *furcatus* — *Gabilan piscado*", SIMONS 1868, p. 154 (Curaçao).
Pandion haliaetus carolinensis, RUTTEN, Ardea *24*, 1935, p. 204 (Curaçao); VAN OORDT 1949, p. 325 (Curaçao, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Curaçao); PHELPS & PHELPS 1951, p. 8 (Bonaire); VOOUS 1953, p. 189 (Netherlands Leeward Group, general); VOOUS 1955, p. 61 (Aruba, Curaçao, Bonaire).
Pandion haliaëtus, VOGELVRIEND, Hou en Trouw 1943, p. 118 (Curaçao); DE JONG 1948, p. 5 (Curaçao).

Native name — *Gabilan piscado(r)*; *Gabilan di laman* (Bonaire).

ARUBA, CURAÇAO, BONAIRE. — Non-breeding visitor and winter resident.

CURAÇAO: Isla, Schottegat, X.1953 (1 ♀ imm.; Collection Ansingh, Curaçao); *Groot Sint Joris*, 17.XI.1951 (1 ♂ imm.). BONAIRE: *Pekelmeer*, 28.XI.1951 (1 ♂ ad.).

Taxonomy — Both male specimens have a faintly developed breast band formed by a small number of arrow-shaped dusky spots; in the immature female only a few dark brown shaft streaks are present on the centre of the breast.

Iris (♂ ad.) brownish-yellow; bill black, cere bluish-grey, legs and feet pale blue.

Measurements — CURAÇAO: ♂ imm., wing 475, tail 195, wing-spread 156 cm; ♀ imm., wing 453. BONAIRE: ♂ ad., wing 477, tail 206, wing-spread 152 cm.

Status — The oldest statement of the occurrence of the *gabilan piscado* in Curaçao is that by SIMONS in 1868. The first pertinent record, however, is that by RUTTEN from a specimen caught along the south coast of Curaçao close to Willemstad in December 1934. Later the records by DE JONG, VAN OORDT, and PHELPS & PHELPS clearly demonstrated that the species is a rather regular and not at all uncommon winter visitor to Curaçao and Bonaire. Published records from Aruba are lacking.

We found it a regularly occurring species, particularly along the leeward side of all three islands.

Extreme dates of arrival and departure in Curaçao: 2.X.1951 (VOOUS) and 30.VII. 1955 (ANSINGH, KOELERS).

In the Venezuelan islands this species is known from Las Aves (PHELPS & PHELPS 1951, p. 19). Tortuga (PHELPS, Jr., 1945, p. 276) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 18).

Biotope and habits — We observed ospreys fishing in coastal seas as well as in inland bays and salt pans. Throughout our stay at least two individuals were regularly observed — often fishing together — in the eastern parts of the Schottegat, Curaçao, sometimes remarkably close to the houses. These birds were not at all shy and have been approached at very close distances (less than 10 meters). Ospreys were particularly numerous on the Pekelmeer (Bonaire) and along the west coast of Aruba, where at least three individuals had their regular perches in the mangroves of the Spaans Lagoen in December 1951. Dead, well-exposed branches of mangrove trees, but also barren coral rocks along the coast were the favourite places for these birds to dry their wing feathers or to crop a prey.

Food — Apparently mainly fish. The crop and stomachs of the collected specimens contained the remains of several large fish, among which were those of the red snapper (*Lutjanus aya*).

Distribution — *Pandion h. carolinensis* is a breeding bird from North America and northern Central America. It winters throughout the West Indies and Central and South America, south to Argentina and Chile. It is a common winter visitor along the Caribbean coast of Colombia and Venezuela.

Protective measures — Not protected by law.

28 **Milvago chimachima cordatus** Bangs & Penard

Carrion Falcon

Milvago chimachima cordata BANGS & PENARD, Bull. Mus. Comp. Zool. *62*, 1918, p. 35 — San Miguel Island, Bay of Panama.

Milvago chimachima cordatus, VOOUS 1955, p. 62 (Curaçao).

Native name — unknown.

CURAÇAO. — Casual visitor.

No material.

Status — Not previously recorded.

We observed this species once, *viz.* on 19.I.1952, when an immature individual was circling high over Julianadorp, Curaçao. The bird, which was of about the size of *Falco peregrinus*, was conspicuous because of the long, slender shape of the body, the long, pointed wings, and the long, fan-shaped tail with many narrow, dark cross bars. In soaring the bird kept the tips of the wings slightly lifted upwards, the whole flight being remarkably elastic, quite unlike that of any other bird of prey in the islands. Adult carrion falcons showing the same characteristics in flight had been previously observed by me in northern Venezuela (Maracay).

Subspecific designation made on geographic reasons only.

Not recorded from the Venezuelan islands.

Distribution — *Milvago c. cordatus* is a resident breeding bird of the tropical zones of northern South America, from Panama and Colombia to Venezuela and British Guiana, south to the Amazon Basin. In Curaçao it is a casual visitor from the South American mainland.

Protective measures — Not protected by law.

29 **Polyborus [1]) cheriway cheriway** (Jacquin)

Caracara

Falco (*Cheriway*) JACQUIN, Beytr. Gesch. Vög. (Vienna), 1784, p. 17, tab. 4. — Aruba.

"*Catharthes* ILLIG. (*Curassavica*) — *wara-wara*", SIMONS 1868, p. 154 (Curaçao).

Pandion Caracara? GRAY, in GRIFFITH, Animal Kingdom described and arranged in conformity with its organization by the Baron CUVIER, *6*, London, 1829, p. 235 (Curaçao).

Polyborus cheriway, PETERS 1892, p. 110 (Curaçao); HARTERT 1893, p. 303 (Aruba), 321 (Curaçao), 332 (Bonaire); HARTERT 1902, p. 303 (Aruba, Curaçao, Bonaire); CORY 1909, p. 198 (Aruba), 210 (Bonaire); RUTTEN 1931, p. 126 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 5 (Aruba, Curaçao).

Polyborus cheriway cheriway, PETERS, *1*, 1931, p. 280 (Aruba); FRIEDMANN, *11*, 1950, p. 607 (Aruba, Curaçao, Bonaire).

Polyborus cheriway audubonii, VAN OORDT 1949, p. 325 (Curaçao, Bonaire).

Caracara plancus cheriway, HELLMAYR & CONOVER, *1* (*4*), 1949, p. 285 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 8 (Bonaire).

Caracara cheriway cheriway, VOOUS 1955, p. 64 (Aruba, Curaçao, Bonaire).

Native name — *Warawara*.

[1]) For the use of the generic name *Polyborus* instead of *Caracara*, see: AMADON, Auk *71*, 1954, p. 203–204.

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: *Kibaima*, 1.IV.1952 (1 ♂ ad.); Fontein, 27.VI.1930 (1 juv.), 1.VII.1930 (1 ♀ ad., both collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Klein Sint Joris*, 25.X.1951 (1 ♂ juv.); *Pos Manzanilla*, 30.X.1951 (1 ♀ juv.); *Noordkant*, 21.III.1952 (1 ♀ subad.); *Malpais*, 22.XII.1951 (1 ♀ juv.), 18.III.1952 (1 ♀ juv.); *Sint Hyronimus*, 24.X.1951 (1 ♂ subad., 1 ♀ juv.); Savonet, 22.XI. 1952 (1 ♂ subad.; Collection Ansingh, Curaçao); *without locality*, 1951–52 (1 ♂ juv., 1 ♀ juv.). BONAIRE: *Punt Vierkant*, 7.XI.1951 (1 ♂ juv.); Goto, 1.VI.1930 (1 ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — The juvenile birds lack the distinct colour pattern of the adults; they are paler brown throughout and irregularly marked below with broad, pale buffish shaft streaks. Three specimens are in a stage of plumage apparently agreeing with that of a subadult as described by DICKEY & VAN ROSSEM (Pub. Field Mus. Nat. Hist. *406*, Zool. Ser. *23*, 1938, p. 136). They are like adults, but show a distinct blackish cross barring on a light buffish ground on the centre of the abdomen, the lower breast, and the median upper wing coverts.

Individuals in the fully adult plumage were extremely scarce in the islands; in fact we did not observe them in Curaçao and Bonaire, though we met with them rather frequently in Aruba. I do not know in what plumage this species starts to breed, but I can mention that the bird in subadult plumage collected in Curaçao on 21.III.1952 had active gonads.

Iris greyish-brown; bill light bluish-grey with whitish tip, cere and orbital skin pale fleshy-white (juveniles) or bright orange (subadults and adults); legs ivory-white or yellowish-white (juveniles), light orange-yellow (subadults) or bright orange-yellow (adult).

Measurements — ARUBA: ♂ ad., tail 193, bill (measured from cere) 32, tarsus 79; ♀ ad., wing 361, tail 196, bill 32.5, tarsus 79; juv., wing 338, tail 191, bill 31, tarsus 79. CURAÇAO: ♂ subad., wing 353, tail 189, bill 33, tarsus 78; ♂ juv., wing 340, 355, tail 195, 201, bill 28.5, 32, tarsus 80, 83; ♀ subad., wing 380, tail 204, bill 33, tarsus 86; ♀ juv., wing 347, 357, 359, 361, 373, tail 190, 194, 198, 201, 205, bill 31.5, 31.5, 32, 32.5, 34.5, tarsus 79, 79, 80, 82, 85. BONAIRE: ad., wing 333, tail 190, bill 32.5, tarsus 81; ♂ juv., wing 335, tail 191, bill 29.5.

Summary of measurements:

wing	♂ 335	–355	average (4) 345.8	♀ 347	–380	average (7) 362.6
tail	♂ 189	–201	average (5) 193.8	♀ 190	–205	average (7) 198.3
bill	♂ 28.5–	33	average (5) 31.0	♀ 31.5–	34.5	average (7) 32.5
tarsus	♂ 78	– 83	average (4) 80.0	♀ 79	– 86	average (7) 81.4

The birds from Aruba, Curaçao, and Bonaire are said to be smaller than individuals from the southern United States, which are separated as *P. c. audubonii* (see: BANGS & NOBLE, Auk *35*, 1918, p. 443; FRIEDMANN, Bull. U.S. Nat. Mus. *50* (*11*), 1950, p. 607).

Status — In the original description by JACQUIN of his *Falco* (*Cheriway*) it is stated that "Diesen prächtigen Adler findet man auf der Insel Aruba, an der Küste von Venezuela, wo ihn die Indianer Cheriway nennen. Die Abbildung stellt ihn dreimal verkleinert vor ... Er hat einige Jahre in dem kaiserl. königl. Thiergarten zu Schönbrunn gelebt". From these remarks it not only appears that as early as 1784

an individual of this species has found its way to the zoological garden of Vienna, but also that this bird came from "the island of Aruba, off the coast of Venezuela", so that Aruba is the undoubted type-locality of the name *cheriway*. At the same time it is the first record of the species from the Netherlands Leeward Islands.

Of the bird described and figured by GRAY in 1829 under the name *Pandion Caracara ?* we read the following remarks: "The figure of the Brazilian Kite, *Pandion Caracara?*, appears to be the *Caracara* of JACQUIN. The specimen was shot at Curaçao, and was drawn by Major HAMILTON SMITH before its death; it appeared to be a male bird. The female is larger, and less elegantly marked." Thus, it is clear that before 1829 another specimen was collected in Curaçao, the drawing of which appeared in GRIFFITH's work mentioned above. It is the first published record of the occurrence of this species in Curaçao.

It was not again recorded from Curaçao until once more in 1892 by ERNST PETERS and a year later by HARTERT; the latter author also mentions for the first time its occurrence in Bonaire.

All subsequent authors have found the species in all three islands, although they indicate it to be rarest in Bonaire, probably as the result of excessive persecution in that island (see: RUTTEN).

We found the species regularly distributed over all three islands; it was least common in Bonaire.

In the Venezuelan islands the species has been recorded from Blanquilla (PHELPS, Jr., 1948, p. 97) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 18).

Biotope and food. — Most frequently observed soaring over acacia and cactus deserts, or perched on top of a large organpipe cactus. Once we saw the remarkable picture of 7 caracaras sitting on top of 7 separate stalks of a single large *Cereus* in the barren desert of southern Aruba. Although they could not be stated to be common, yet these birds were daily to be seen, usually in pairs, or occasionally assembled into flocks of over 10 individuals around the carcasses of dead sheep, goat, or cattle in the midst of the cactus scrub or near a fresh water pool. As a rule they were very wary birds, probably owing to severe persecution. However, they did not seem to avoid human cultivation or farmyards. They were much less specialized in cleaning roadsides and places of human habitation from decaying refuge than they are stated to be in continental South America; but still they were known to assemble in flocks of 20 to 30 individuals around the former slaughter house in Aruba. The birds were very terrestrial in habits and were said to catch domestic fowl by walking nonchalantly across the farmyard and seizing their prey by surprise. I was not able to observe, however, whether they catch the Curaçao hares (*Sylvilagus nigronuchalis*) by running over the ground or by a direct attack from the air. Caracaras were highly suspected of killing newly born lambs and goats. From the many records on the subject I obtained I have no doubt that this occasionally occurs, but in the majority of cases that these birds were observed feeding on dead lambs or goats the animals seemed to have died before the caracaras arrived at their meal.

Eight stomachs examined contained the decaying bits of large dead mammals in 4 instances (50%), large lizards (*Cnemidophorus*) in 3 instances (37.5%), Curaçao hare (*Sylvilagus nigronuchalis*) in 2 instances (25%), once the remains of an unidentified bird (12.5%), and insects in 3 instances (37.5%), but the latter may have been eaten accidentally together with the carrion.

Reproduction cycle — We did not find any indication of the breeding activity of this species other than the growing follicles (up to 4 mm in diameter) in the

ovary of a subadult female collected in Curaçao on 21.III.1952. All other specimens collected proved to have the gonads in an inactive state.

Nest — A nest of this species was shown to us at the base of the spiny vertical stalks of an organpipe cactus (*Cereus repandus*) near the summit of Ceru Grandi, Bonaire, at about 110 m above sea level. The nest was a heavy structure of sticks and branches, some 30 cm in height and approximately 60 cm in diameter. It was well hidden and the breeding birds must have enjoyed a wonderful view over the low country around Kralendijk and the island of Klein Bonaire lying off-shore. — Nests of these birds have occasionally been found on the highest installations of the oil refinery of the C.P.I.M. in Curaçao (VAN DER WERF).

Egg — One egg in the Leiden Museum collected by Dr. EPP in Curaçao in 1879 is broad-ovate, wallnut-brown in coloration, with irregular, fine markings of dark brown; it measures 55.7 × 43.9 mm.

Parasites — Miss THERESA CLAY (London) kindly identified the Mallophaga from our specimens as *Degeeriella sp.* and *Colpocephalum polybori* Rudow, 1869.

Zoogeography — *Polyborus c. cheriway* inhabits northern South America south to northern Peru and the Amazon Valley, including Venezuela and Trinidad, and the Caribbean coast of Colombia and Panama, and the islands Aruba, Curaçao, Bonaire, Blanquilla and Margarita.

The species ranges from the southern United States to the northern half of South America, but it is absent in the Greater and Lesser Antilles excepting Cuba and the Isle of Pines. In the southern half of South America it is replaced by *P. plancus*, which is sometimes treated as conspecific with *cheriway*. Colonization of Aruba, Curaçao, and Bonaire seems to have taken place from the South American continent.

Protective measures — Not protected by law.

30 **Falco peregrinus anatum** Bonaparte

Peregrine Falcon or Duck Hawk

Falco anatum BONAPARTE, Geogr. and Comp. List 1838, p. 4 — Egg Harbor, New Jersey.

Falco peregrinus anatum, VAN OORDT 1949, p. 325 (Curaçao, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Curaçao); PHELPS & PHELPS 1951, p. 10 (Bonaire); VOOUS 1953, p. 189 (Netherlands Leeward Group, general); VOOUS 1955, p. 65 (Aruba, Curaçao, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, BONAIRE. — Winter visitor.

No material.

Status — Previously only known from field records from Curaçao (27.II.1948) and Bonaire (28 and 29.II. 1948) by the party of VAN OORDT in 1948 (VAN OORDT; CROOCKEWIT).

We observed this species rather regularly in all three islands between 27.X.1951 (Sint Christoffel, Curaçao) and 7.IV.1952 (near Oranjestad, Aruba). In most of the cases the birds appeared to be juveniles. Adult birds were observed on 13.XI. 1951 (Bonaire) and 7.IV.1952 (Aruba).

Extreme dates of arrival and departure in Curaçao: 15.IX.1955 and 9.IV.1954 (ANSINGH, KOELERS).

In the Venezuelan islands apparently only recorded from Los Hermanos (PHELPS, Jr., 1948, p. 111).

Biotope — We observed this species hunting over the driest scrub regions and over extensive salt lagoons. It appeared to feed on waders (*Tringa flavipes*, *Himantopus himantopus*) and ducks (*Anas discors*).

Distribution — *Falco p. anatum* is a breeding bird from almost all over North America. It winters throughout the Americas south to Argentina and Chile. It is known as a scarce winter resident in Venezuela and Colombia.

Protective measures — Not protected by law.

31 **Falco columbarius columbarius** Linnaeus

Pigeon Hawk

Falco columbarius LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 90 — South Carolina.
Falco columbarius columbarius, VOOUS 1953, p. 189 (Netherlands Leeward Group, general); VOOUS 1955, p. 66 (Aruba, Curaçao, Bonaire).

Native name — unknown (generally called *Kinikini*, which, however, is the vernacular name of *Falco sparverius*).

ARUBA, CURAÇAO, BONAIRE. — visitor.

CURAÇAO: *Noordkant*, 13.III.1952 (1 (♀)). BONAIRE: *Wanapa*, 17.XI.1951 (1 ♀).

Taxonomy — Both specimens are adult females with very dark upper parts.

Iris dark brown, eyelid yellow; bill bluish-black, cere yellow or greenish-yellow; legs and feet bright yellow.

Measurements — CURAÇAO: ♀, wing 215, tail 126. BONAIRE: ♀, wing 215, tail 129.

Status — Not previously recorded.

We observed the species regularly in all three islands between 27.X.1951 (Sint Christoffel, Curaçao) and 20.III.1952 (Malpais, Curaçao), but it seemed more common in Bonaire than in any of the other islands. Most of the observed individuals were in the greyish-brown female plumage; only once did we observe an adult male (23.XI.1951, Karpata, Bonaire).

In the Venezuelan islands only recorded from Tortuga (PHELPS, Jr., 1945, p. 276).

Biotope — Pigeon hawks have been observed hunting over open cactus deserts and scrub vegetations, as well as over extensive salt lagoons.

Food — One stomach examined (Bonaire) contained the remains of at least 5 small lizards. — We observed this species capturing a specimen of *Columbigallina passerina* and hunting after *Tringa flavipes*. We once found the feathered remains of *Porzana carolina*, which we considered to represent the remnants of a pigeon hawk's meal (Bonaire).

Distribution — *Falco c. columbarius* is a breeding bird from northeastern North America north to the limit of trees. It winters south through the West

Indies and Central America to Ecuador and Peru. It has been recorded as a winter resident in Colombia (DE SCHAUENSEE 1949, p. 411), and it is also known from Venezuela and Trinidad.

Protective measures — Not protected by law.

32 **Falco sparverius brevipennis** (Berlepsch)

Sparrow Hawk

Tinnunculus sparverius brevipennis BERLEPSCH, Journ. f. Orn. *40*, 1892, p. 91 — Curaçao.

"Cymindes Illig. (Cayennensis) — kini, kini", SIMONS 1868, p. 154 (Curaçao).

Falco sparverius, PETERS 1892, p. 111 (Curaçao); RUTTEN 1931, p. 126 (Aruba, Curaçao).

Tinnunculus sparverius brevipennis, ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 164 (Curaçao); HARTERT 1893, p. 303 (Aruba), 321 (Curaçao), 332 (Bonaire); HARTERT 1902, p. 304 (Bonaire).

Falco sparverius brevipennis, CORY 1909, p. 199 (Aruba); PETERS, *1*, 1931, p. 303 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 5 (Aruba, Curaçao); HELLMAYR & CONOVER, *1* (*4*), 1949, p. 332 (Aruba, Curaçao, Bonaire); VAN OORDT 1949, p. 325 (Curaçao); CROOCKEWIT, Ardea *36*, 1949, p. 280 (Curaçao); PHELPS & PHELPS 1951, p. 10 (Bonaire); VOOUS 1955, p. 67 (Aruba, Curaçao).

Cerchneis sparveria brevipennis, CORY, Pub. Field Mus. Nat. Hist. *183*, Orn. Ser., *1* (*9*), 1915, p. 332, 333 (Aruba, Curaçao).

Native name — *Kinikini*.

ARUBA, CURAÇAO; doubtfully in Bonaire. — Resident.

ARUBA: *Boca Bushiribana*, 15.XII.1951 (1 ♂); *Rooi Francees*, 12.XII.1951 (1 ♀); Fontein, 27.VI.1930 (2 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Vader Piet*, 12.XII.1951 (1 ♂), 20.XII.1951 (1 ♀). CURAÇAO: Scherpenheuvel, 10.IX.1936 (1 ♂ juv., 1 ♀ juv., collected by Hummelinck; Leiden Mus.); *Fuik Estate*, 1.IV.1952 (1 ♂); *Klein Sint Joris*, 30.X.1951 (1 ♂); Noordkant, 30.IV.1952 (1 juv., collected by Koelers; Amsterdam Mus.); *Groot Piscadera*, 24.X.1951 (1 ♂), 26.X.1951 (1 ♀), 15.XII.1951 (2 ♂, 1 ♀); *Malpais*, 20.III.1952 (1 ♀); Malpais, 19.IV.1955 (1 ♀, collected by Koelers; Amsterdam Mus.); *Hato*, 28.IX.1951 (1 ♀); *Sint Willebrordus*, 24.X.1951 (1 ♀); *Klein Santa Marta*, 23.I.1952 (1 ♀, 2 eggs); Santa Cruz, 27.IV.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Ceru Kloof*, 18.X.1951 (1 ♀); Savonet, 1.V.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Savonet*, 18.X.1951 (1 ♀); *Grote Knip*, 23.X.1951 (1 ♂); without locality (1 ♂ imm., Jhr. Dr. V. H. van den Bergh; Amsterdam Mus.).

Taxonomy — Compared with large series from Venezuela belonging to the races *ochraceus* and *isabellinus* in the PHELPS Collection (Caracas) our birds fit best with the series of *ochraceus* from northern and northwestern Venezuela. The males are rather intensively coloured both above and below, tending towards vinaceous-brown rather than to cinnamon; dark markings on the mantle and the underside considerably reduced. Reduction of the black spots on the under parts has particu-

larly advanced in the males from Aruba, in which the under parts are practically immaculate! Males with a conspicuous pattern of large, rounded spots on the lower flanks and with dark streaks on the lower breast are considered immatures. Central tail feathers reddish-brown, with a broad, subterminal bar of black and a white margin; shafts blackish. A small rufous crown-patch is present in one male from Aruba and one from Curaçao. It is absent in the remaining male specimens. — The females are also rather dark vinaceous-brown above and heavily streaked below. One single female from Curaçao (19.IV.1955) is exceptional by having pale, whitish under parts and sharp, longitudinal streaks as in Venezuelan specimens of the race *isabellinus*, but it has the short wing (179 mm) characteristic of the insular race *brevipennis*! — Sparrow hawks from Aruba and Curaçao differ considerably from those from the other West Indian islands by the reduction of the black markings on the upper and under parts. From the Venezuelan races *ochraceus* and *margaritensis* they differ by smaller size, particularly that of length of wing.

Iris dark brown, naked orbital skin pale yellow; bill bluish-grey with a black tip, cere yellow or orange-yellow; legs and feet bright yellow, claws black.

Measurements — ARUBA: ♂, wing 170, 170.5, 174.5, 175, average 172.5, tail 117, 117, 121, 122, *crista sterni* 24, 28; ♀, wing 179, 184, tail 122, 122. CURAÇAO: ♂, wing 165, 167.5, 170, 170, 171, 171.5, 173, average 169.7, tail 110, 112.5, 118, 118, 118, 120, 121, 124, *crista sterni* 26, 27, 27.5; ♀, wing 171.5, 173, 173.5, 174, 174.5, 176, 177, 178.5, 179, 179, 180, 181.5, average 176.2, tail 121, 122, 122.5, 123, 124, 124, 125, 126, 126, 127, 127, 129, *crista sterni* 25.5, 27, 28, 29.

Wing-lengths of males from northern Venezuela (*ochraceus*): 181, 183, 189, 189, 190, 191, average 188.8, as against 172.5 in Aruba and 169.7 in Curaçao.

Status — In Aruba this species has been previously collected by HARTERT, FERRY (CORY, *l.c.*), and RUTTEN. In Curaçao it has been collected by ERNST PETERS (BERLEPSCH, *l.c.*), HARTERT, DEARBORN (CORY, *l.c.*), RUTTEN, and HUMMELINCK; in addition it has been observed in that island by SIMONS, ROBINSON, VAN OORDT, and CROOCKEWIT. The specimens collected in Curaçao by PETERS later served as the basis for the description of *Tinnunculus sparverius brevipennis* by BERLEPSCH. Whereas in Aruba and Curaçao the species has been unanimously recorded as being rather abundant, its occurrence in Bonaire has only been recorded by HARTERT ("very rare", 1892) and by PHELPS, father and son ("vimos uno de estos pequenos gravilanes revoloteando encima de las colinas arboladas cerca de Slagbaai", November 1947, PHELPS & PHELPS 1951). Other authors, such as FERRY, RUTTEN, DE JONG, and VAN OORDT specifically state that they did not observe the species in Bonaire. At all events it has never been collected there.

We found it very common in Aruba and Curaçao (Klein Sint Joris!), but failed to trace it in Bonaire. Instead, we regularly observed wintering individuals of *Falco columbarius* in that island. The latter species is often confounded in the field with the sparrow hawk. Hence, the few, rather vague, previous records of the species for Bonaire have become extremely doubtful!

In the Venezuelan islands the species has been doubtfully recorded from Blanquilla (PHELPS, Jr., 1948, p.98) and with certainty from Margarita (*margaritensis*).

Biotope and habits — We observed the sparrow hawk in almost every biotope, but its favourable hunting grounds were barren plains and the semi-deserts with acacia and cactus. In these habitats isolated pieces of rock, low bushes, and the tops of organpipe cacti offered most suitable perching places. The birds occurred in the

driest stone deserts of Aruba, apparently hunting after the few lizards and insects present. They were generally remarkably tame, and rather ubiquitous in the choice of their nesting sites. We never observed these birds hovering, nor did DE JONG ("VOGELVRIEND")! However, KOELERS informed me of having observed a hovering sparrow hawk once in Curaçao (verbal communication).

Food — Apart from the fact that we repeatedly observed these birds seizing small and medium-sized lizards from the ground and noticed the remains of *Columbigallina passerina* and *Coereba flaveola* at a plucking place ascribed to this species at the entrance of a cave at Savonet, Curaçao, we can present the following result of the examination of 18 stomachs. Lizards were present in 16 instances (89%), mainly rather large *Cnemidophorus* (44%; maximum length of tail 17 cm!), but also *Anolis*; insects in 7 instances (39%), mainly consisting of grasshoppers (22%) and beetles (17%); small birds in 3 instances (17%), among which were twice *Zonotrichia capensis*; once a spider (6%).

Reproduction cycle — A nest with 2 fresh eggs was found on 23.I.1952 at Klein Santa Marta, Curaçao. Females with swollen ovaries were collected on 18.X.1951 (Kloof, Curaçao), 26.X.1951 (Groot Piscadera, Curaçao), 12.XII.1951 (Rooi Francees, Aruba). The largest testes of the collected males measured 7 × 5 mm (15.X.1951, Groot Piscadera, Curaçao). — A nest with two downy young was found by VAN DER WERF (*in litt.*) in Curaçao on 6.II.1955.

Nest — One nest was found at about 60 cm depth in a hollow branch of a big tamarind tree about 5 meters from the ground. The eggs were placed on the barren slightly rotten wood. In December 1952 nests were apparently present in natural crevices high up in the steep rocks of Rooi Francees, Aruba. According to local information the species also makes big nests in organpipe cacti (mainly *Cereus repandus*) and occasionally in inaccessible places on the highest installations of the oil refinery in Curaçao. In 1955 a nest was found in a hollow tree (VAN DER WERF).

Eggs — Roundish in shape and pale buff in coloration, with irregular blotches of buffish-brown. Measurements: 32.9 × 28.8 and 33.7 × 27.5 mm.

Parasites — Miss THERESA CLAY (London) kindly identified the Mallophaga from our specimens as *Degeeriella carruthi* Emerson, 1953.

Zoogeography — *Falco s. brevipennis* inhabits Aruba and Curaçao. In northwestern Venezuela and along the Caribbean coast of Colombia it is replaced by a very similar, though decidedly larger race (*ochraceus*), which gradually becomes smaller in northeastern Venezuela and Margarita Island (*margaritensis*). Many other, more different subspecies occur throughout the Americas, from Canada to southern South America. The populations inhabiting Aruba and Curaçao seem to represent the slightly modified direct descendants of the continental South American stock, rather than those of the West Indian stock.

Protective measures — Not protected by law. Protection urgently needed.

33 **Colinus cristatus** (Linnaeus)

Crested Quail

Tetrao cristatus LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 277 — Curaçao (see: BERLEPSCH, Journ. f. Orn. *40*, 1892, p. 100; PETERS, Checkl. Birds of the World *2*, 1934, p. 51; HELLMAYR & CONOVER, Pub. Field Mus. Nat. Hist. *514*, Zool. Ser. *13*, *1* (*1*), 1942, p. 255, foot-note 1).

"Coturnix Briss. (Curasavica) — Coco-i- of patroesi", SIMONS 1868, p. 154 (Curaçao).
"Ortyx species?, Sokle", PETERS 1892, p. 114 (Curaçao).
Eupsychortyx cristatus, BERLEPSCH 1892, p. 98 (Curaçao); OGILVIE-GRANT, Cat. Birds Brit. Mus. *22*, 1893, p. 408 (Aruba, Curaçao); HARTERT 1893, p. 305, 325 (Aruba, Curaçao); ROBINSON, Flying Trip to the Tropics, Cambridge, 1895, p. 164 (Curaçao); HARTERT 1902, p. 306 (Aruba, Curaçao); CORY 1909, p. 198 (Aruba), 204 (Curaçao).
Eupsychortyx cristatus cristatus, TODD, Auk *37*, 1920, p. 216 (Aruba, Curaçao).
Eupsychortix cristatus, RUTTEN 1931, p. 100 (Aruba, Curaçao); DE JONG 1948, p. 5 (Aruba, Curaçao).
Colinus cristatus cristatus, PETERS, *2*, 1934, p. 51 (Aruba, Curaçao); HELLMAYR & CONOVER, *1* (*1*), 1942, p. 258 (Aruba, Curaçao); VOOUS 1955, p. 69 (Aruba, Curaçao).

Native name — *Cocoi, Sokle, Sloke* (Curaçao), *Patrushi* (Aruba).

ARUBA, CURAÇAO. — Resident.

CURAÇAO: Scherpenheuvel, 10.IX.1936 (1 ♀ ad., collected by HUMMELINCK; Leiden Mus.); *Santa Barbara*, 20.X.1951 (1 ♀ ad.); *Klein Sint Joris*, I.IV.1952 (1 ♂ ad.); *Hato*, 13. II.1952 (2 *pulli*), 23.III.1952 (1 ♂ ad.), 14.IV.1952 (1 ♂ juv., 1 ♀ juv.); Hato, 5.VI.1952 (1 ♂ ad., collected by Koelers; Amsterdam Mus.); Porto Marie, 15.IV.1930 (1 ♂ ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Sint Jan*, 13.II.1952 (1 ♀ ad.), 22.III.1952 (1 ♀ ad.), 12.IV.1952 (1 ♂ ad., 1 ♀ ad.).

Taxonomy — Birds of both sexes possess elongated crest feathers, which in females are slightly narrower, though of the same bright buff colour as in males. Males and females can be told apart by the different colour pattern of the head; males having broad, black superciliary and moustachial stripes, which are lacking in females. Ear coverts silvery whitish in males, dusky grey in females.

Iris dark brown; bill black; legs and feet light horn-grey or greyish-brown.

Measurements — CURAÇAO: ♂ ad., wing 98, 100, 101.5, 102, 103, bill (measured from forehead) 14, 14.5, 15.5, 15.5, 16; ♀ ad., wing 100, 100, 103, 103, 105, bill 14, 14, 14.5, 15.5, 16.

Status — Definite published records of the occurrence of this species in Curaçao date back to PETERS and HARTERT. It is quite probable that the specimen upon which LINNAEUS based his description of *Tetrao cristatus* also originated from Curaçao, the latter island being now generally accepted as the type-locality. Indeed, it has been stated to be a common and well-known species in Aruba and Curaçao from the times of HARTERT onwards (CORY, RUTTEN, DE JONG). Well-known local hunters have published interesting particulars of "partridge" shooting in Curaçao, from which once more the local abundance and the reputation of the species as good game appears (JONKERS, Ned. Jager *43*, 1938, p. 571–573 and 581–582; GORSIRA, weekly paper Curaçao *1* (*51*), 1940). — It has always been stated to be absent in Bonaire.

We found it rather common in Curaçao, but very scarce in Aruba! The birds were generally not at all shy and have been collected and observed in a great number of localities throughout Curaçao, including Julianadorp. We saw it only once in

Aruba (Vader Piet). Not observed in Bonaire; the bird known in Bonaire as "patrushi" appeared to be a species of dove (*Leptotila verreauxi*).

In the Venezuelan islands only known from Margarita Island (*C. c. mocquerysi*).

Biotope and habits — The species was found in dense xerophytic scrub and impenetrable *Opuntia* vegetation, but it also appeared regularly in well-shaded plantations and fruit gardens and sometimes among the poultry on farmyards (Klein Sint Joris, Curaçao). The birds assembled in larger flocks at the fields of ripening millet. In case of danger they often sought shelter on thick, horizontal branches of fruit trees, where they also often seemed to stay throughout the night.

The presence of this species was most frequently noticed by the characteristic call of the males, which closely resembles the famous "bob-white" call of the North American species of corresponding name (*Colinus virginianus*). This clear call has been translated in the Papiamento language by the name of the species, which sounds like "cocoi" and "soklé" with its variant "sloké".

Food — In 7 stomachs examined mainly small seeds of various kinds were found. Two stomachs contained the remains of a single insect each, including one cicada. The birds appeared particularly fond of the ripening grains of millet (*Andropogon sorghum*). They are also known to eat from fleshy opuntias (KOELERS).

Reproduction cycle — KOELERS obtained downy chicks of a few days old on 13.II.1952 and rather advanced young on 14.IV.1952 at Hato, Curaçao. Females with swollen gonads were collected on 20.X.1951 at Santa Barbara (follicles of up to 4 mm) and 12.IV.1952 at Sint Jan (follicles of up to 2½ mm) in Curaçao. In addition we observed half-grown young on 21.III.1952 at Noordkant, Curaçao. Although these data cover the greater part of the winter season I agree with local opinion that breeding activity in this species generally starts with the rains. Calling males were also more regularly observed by us in December and January, when relatively the most rain had fallen. ROBINSON, however, records half-grown young in June!

We did not find nests or eggs, but according to DE JONG ("VOGELVRIEND") a complete clutch contains 10–12 olive-coloured eggs.

Male and female have been observed together guarding a family-party.

Zoogeography — *Colinus c. cristatus* inhabits Aruba, Curaçao, and the tropical coast districts of northeastern Colombia, including the Goajira Peninsula (DE SCHAUENSEE 1948, p. 421), and northwestern Venezuela, including the Paraguana Peninsula (BARNES & PHELPS, Sr., 1940, p. 19). Another race (*sonnini*) occurs in the mountain range along the north coast of Venezuela east to Guiana and northeastern Brazil. Still other races live higher up in the mountains of Venezuela and Colombia. The species as a whole ranges throughout tropical Central America, from El Salvador and Guatemala south to northern South America. It seems to be the tropical representative of *Colinus virginianus* from temporate North America and Mexico. It has apparently colonized Aruba and Curaçao from the South American mainland, where at present it is common in desert and cactus vegetation.

Protective measures — Not protected by law. In spite of its small size the species is generally considered valuable game, but relentless hunting without closed season, trapping by natives, and the destruction of suitable habitats (Aruba!) seem to have reduced its numbers considerably. Protective measures in whatever form are urgently needed.

34 **Porzana carolina** (Linnaeus)

Sora Rail

Rallus carolinensis LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 153 — Hudson Bay.
Porzana carolina, RUTTEN, Ardea *24*, 1935 p. 204 (Curaçao); DE JONG 1948, p. 5 (Curaçao); VOOUS 1953, p. 186 (Curaçao, Bonaire); VOOUS 1955, p. 70 (Curaçao, Bonaire).

Native name — unknown.

CURAÇAO, BONAIRE. — Passenger migrant and winter resident.

CURAÇAO: Sint Jan, X.1952 (1 ♂ ad., collected by Koelers; Amsterdam Mus.); *Playa Abau, Grote Knip*, 23.X.1951 (1 ♀ 1st year). BONAIRE: *Kralendijk*, 27.XI. 1951 (1 ♂ 1st year).

Taxonomy — Iris light brown; bill greenish-yellow; legs and feet olive-green. Measurements — CURAÇAO: ♂ ad., wing 117.5, tarsus 36; ♀ imm., wing 107.5, tarsus 33. BONAIRE: ♂ imm., wing 100, tarsus 30.

Status — The only previous record is that by RUTTEN of a bird caught in October 1934 at Blauw, Curaçao.

We observed and collected this species once in Curaçao and once in Bonaire. A third specimen in the Collection ANSINGH (Curaçao) was collected near Rustenburgh, Curaçao, on 10.XI.1951. In addition VAN DER WERF observed it on 18.XI.1951 at Boca Tabla and on 25.XI.1951 at Playa Abau, Curaçao. The species was again regularly observed in October and November 1952 in Curaçao (BRONNEBERG and KOELERS *in litt.*). — During the exceptionally rainy winter season 1954–1955 the species was regularly observed in Curaçao from 6.XI until 8.III (ANSINGH and KOELERS *in litt.*). Also present in the winter of 1955 (26.XII.1955) at the fresh water pool of Muizenberg, Curaçao (at least 20 specimens; ANSINGH and KOELERS *in litt.*).

Extreme dates of arrival and departure in Curaçao: 26.IX.1954 and 8.III.1955 (ANSINGH, KOELERS).

Not recorded from the Venezuelan islands.

Biotope — Edges of minute fresh water pools under thick cover of manchioneel (*Hippomane mancinella*) and other thickets. Once seen in a cactus and acacia desert, which was partly flooded after heavy rains (near Kralendijk, Bonaire), the bird finding shelter in the dense growths of *Opuntia Wentiana*.

Food — Two stomachs examined contained various small seeds and small Diptera.

Distribution — *Porzana carolina* breeds in the greater part of North America. It winters from the southern United States southwards through Central America and the West Indies to northern South America. It is a regular winter resident in Colombia and Venezuela.

Protective measures — Not protected by law.

35 **Porphyrula martinica** (Linnaeus)

Purple Gallinule

Fulica martinica LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 259 — Martinique.
Porphyrula martinica, VOOUS 1955, p. 187 (Curaçao).

Native name — unknown.

CURAÇAO. — Casual visitor.

CURAÇAO: Zapateer, 28.X.1954 (1 ♀ juv.; Collection Ansingh, Curaçao).

Taxonomy — The specimen is in fresh juvenile plumage with bluish-green gloss to the outer edges of the upper wing coverts and primaries.

Iris brown; bill horn-brown with yellow tip, frontal shield dark violet-green; legs and feet greenish-yellow.

Measurements — CURAÇAO: ♀ juv., wing 187, tail 77, bill (from posterior edge of frontal shield) 44, tarsus 63, middle toe (without claw) 61.

Status — Not previously recorded.

We did not observe this species, but through local information we got rather vague records of regular observations of adult birds of the species at Santa Cruz, Curaçao. On 28.X.1954 a juvenile bird was collected at Zapateer, Curaçao, in gardens and scrub which were partly inundated after exceptionally heavy rains (VAN DER WERF *in litt.*). Also observed by ANSINGH and KOELERS (*in litt.*) at the fresh water pool of Muizenberg, Curaçao, on 26.XII.1955.

Not recorded from the Venezuelan islands.

Distribution — *Porphyrula martinica* is widely distributed throughout subtropical and tropical America and is a common bird of saline and fresh water swamps of Venezuela and Colombia. It is rare and rather local in the Greater and Lesser Antilles. — As the birds breeding in the southern United States are migratory and young individuals from any breeding place have been found to show extensive erratic flights after the breeding season, nothing can be stated about the origin of the Curaçao specimen.

Protective measures — Not protected by law.

36 **Fulica caribaea** Ridgway

Caribbean Coot

Fulica caribaea RIDGWAY, Proc. U.S. Nat. Mus. 7, 1884, p. 358 — St. John, Virgin Islands.

Native name — unknown.

CURAÇAO. — Breeding not recorded.

CURAÇAO: Muizenberg, 8.V.1955 (1 ♂ imm.; Collection Ansingh, Curaçao. 1 ♀ imm.; Collection Koelers, Curaçao. 1 ♀ imm., collected by Koelers; Amsterdam Mus.).

Taxonomy — All specimens are in juvenile plumage, showing narrow white edges to the feathers of the under parts, including the chin and the throat. The whole of the plumage is very light greyish throughout. The frontal shield is hardly developed, being the direct continuation of the flat base of the bill and showing a shrunken and longitudinally ridged surface. In the male the frontal shield is considerably larger than in the females. In all specimens the base of the bill was white in life.

According to FRIEDMANN (Bull. U.S. Nat. Mus. *50* (9), 1941, p. 222) *caribaea* differs from *americana* in having the outer web of the outer primary almost wholly white, but in one of the Curaçao specimens (♀, Amsterdam Mus.) only the lateral edge of the outer web is white, except near the tip, which is wholly dark grey. In the other specimens the outer edge of the outer web is broadly white, growing darker towards the tip of the feather. In an adult specimen of *caribaea* from Haiti (on loan from the Acad. Nat. Sc. Philadelphia, by courtesy of Mr. JAMES BOND) the white of the outer web is considerably reduced.

Iris brown; bill, including frontal shield, white, but tip of bill horn-colour; legs and feet green and grey, the frontal side of the tarsus and upperside of the toes being green.

Measurements — CURAÇAO: ♂ imm., wing 193, bill (from frontal shield) 44, tarsus 58; ♀ imm., wing 183, 184, bill 39, 40, tarsus 55, 56.

Status — Not previously definitely recorded (see, however, W. HOLLEMAN, "Mimus, de Chuchubi bekijkt Curaçao", Curaçao, 1952, p. 67).

We did not observe this species, but ANSINGH and KOELERS (*in litt.*) observed 9 birds and collected 3 at the fresh water pool of Muizenberg, Curaçao, on 8.V.1955. In the same locality ANSINGH and KOELERS observed 2 specimens on 7.VI. 1955 and 3 specimens on 1.VII.1955. One specimen was also observed at Malpais, Curaçao, by J. G. DE JONG (*in litt.*) on 23.XI.1955 and by ANSINGH and KOELERS (*in litt.*) on 25.XI.1955. A correlation of these observations with the exceptionally rainy condition of the year 1955 is probably not fictitious.

Not recorded from the Venezuelan islands.

Distribution — *Fulica caribaea* inhabits the Greater and Lesser Antilles, but it is of doubtful occurrence in Trinidad. It has been positively recorded, however, from northern Venezuela (Lagunillas), though not from Colombia. *Fulica caribaea* is the Caribbean representative of *Fulica americana*, which incidentally may be found in the future to be conspecific.

Protective measures — Not protected by law.

37 **Haematopus palliatus palliatus** Temminck ≷ **prattii** Maynard

American Oystercatcher

Haematopus palliatus TEMMINCK, Man. d'Orn. ed. 2 *2*, 1820, p. 532 — South America = Rio de Janeiro, Brazil (*not* Venezuela, as proposed by BRABOURNE & CHUBB, Birds South America, *1*, 1912, p. 37. See: BERLEPSCH, Nov. Zool. *15*, 1908, p. 304 and HELLMAYR & CONOVER, Pub. Field. Mus. Nat. Hist. *616*, Zool. Ser. *13*, *1* (*3*), 1948, p. 19, foot-note). — I examined TEMMINCK's series of 7 paratypes in the Leiden Museum, which originate from (1–2) Algarrobo, Chile, (3–4) Gatajuba, Brazil, (5 and 7) Brazil, (6) South America. These specimens do not seem to represent a homogenous population, but even so Brazil is a far more appropriate type-locality of this species' name than Venezuela, from which country specimens are quite lacking in the series of paratypes. Chilean oystercatchers are now considered to represent a distinguishable subspecies described under the name *H. palliatus pitanay* MURPHY.

Haematopus prattii MAYNARD, App. Cat. West Ind. Birds 1899, p. 34 — Flemming's Cay, Bahama Islands.

Haematopus palliatus, HARTERT 1893, p. 308 (Aruba), 325 (Curaçao); HARTERT 1902, p. 307 (Aruba, Curaçao); CORY 1909, p. 197 (Aruba); RUTTEN 1931, p. 115 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire).

Haematopus ostralegus palliatus, MURPHY, Oceanic Birds South America *2*, 1936, p. 976 (Aruba, Curaçao); HELLMAYR & CONOVER, *1* (*3*), 1948 p. 21 (Aruba); VAN OORDT 1949, p. 325 (Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Bonaire).

Haematopus ostralegus subspec., PHELPS & PHELPS 1951, p. 10 (Bonaire).

Haematopus palliatus palliatus ≲ *prattii*, VOOUS 1955, p. 71 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Shon Piet.*

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Resident; breeding not definitely recorded.

ARUBA: 7.V.1908 (1 ♂, collected by FERRY; Chicago Nat. Hist. Mus.). KLEIN CURAÇAO: 26.I.1952 (1 ♀), 11.IV.1952 (1 ♂, 1 ♀). BONAIRE: 13.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — The specimens from Bonaire and Klein Curaçao closely resemble a female from Great Inagua, Bahama Islands, kindly sent to me by Mr. JAMES BOND as a virtually topotypical reference specimen of the race *prattii*. These birds have the bill slightly rounded and blunted at the tip, much less laterally compressed and, thus, much less razorlike than in the specimens from South America in the series of TEMMINCK's paratypes of *palliatus*. The extension of white in the primaries varies from being wholly reduced (Bonaire) to a situation in which white patches are present on the outer webs of the 7th to 9th primaries, producing the effect of externally visible white wing markings on the primaries 8 and 9. The Bahama bird has slightly more white in the wing, white markings being visible in the closed wing on the outer webs of the primaries 6–10. In TEMMINCK's Brazilian specimens of *palliatus*, however, white markings on the outer webs of the primaries are practically absent.

In the specimen from Aruba the bill is much thinner at the tip, more laterally compressed, less rounded, its shape agreeing more closely with those found in South American specimens of the race *palliatus*. HELLMAYR & CONOVER, who also examined this bird, list it as *H. o. palliatus*, noting, however, that "in shape of bill [it] is somewhat intermediate to *H. o. prattii*" (p. 21, foot-note 1). This bird does not have any white on the outer webs of the primaries.

Hence, although 4 of 5 specimens examined more closely resemble the race *prattii*, differing only in the reduction of white in the primaries, I feel I can best leave the Leeward Islands birds an unnamed population which is intermediate between *prattii* and *palliatus*: the birds from Bonaire and Klein Curaçao being closest to *prattii*, that from Aruba strongly tending towards *palliatus*.

These birds made a heavier and less elegant impression in the field than their European counter parts; their flight was less rapid and their wings appeared less pointed. The difference in appearance was of about the same value as that between a flying mallard (*Anas platyrhynchos*) and a shelduck (*Tadorna tadorna*). The call notes did not seem to differ from those heard in Europe.

Iris bright yellow, eyelid orange-red; bill deep red, lighter at the base; feet pale flesh-colour.

Measurements — ARUBA: ♂, wing 246, bill (exposed culmen) 80.5. KLEIN

CURAÇAO: ♂, wing 259, bill 79; ♀, wing 262, 265, bill 87.5, 89. BONAIRE: ♂, wing 264.5, bill 84.5.

Status — Although HARTERT had recorded the occurrence of this species in Aruba and Curaçao, FERRY was the first to collect a specimen (Aruba, CORY, *l.c.*). Afterwards RUTTEN mentioned having observed oystercatchers during May, June, and July in all three islands; whereas VAN OORDT saw one pair in Bonaire on 28.II. 1948 (see also CROOCKEWIT).

We collected oystercatchers only in Klein Curaçao, but heard their penetrating calls on a few occasions along the coasts of Curaçao and Bonaire, where people were well-acquainted with their regular, though sporadic occurrence. We did not observe them in Aruba.

In the Venezuelan islands this species has been recorded from Las Aves, Los Roques, Blanquilla, Los Hermanos, Margarita, Los Testigos. At least some of the collected specimens have been referred to the race *prattii* (PHELPS, Jr., 1948, p. 98).

Biotope — Rocky coast with great boulders of coral limestone. The birds are shy and the pairs live solitarily.

Food — Three stomachs examined (Klein Curaçao) contained small crabs (2 ×), spines and other fragments of echinids (2 ×), pieces of shells and opercula of molluscs (1 ×), small fish (1 ×).

Reproduction cycle — One female collected from what seemed to be a resident pair at Klein Curaçao on 26.I.1952 had the gonads swollen, the largest egg in the ovary being 3 mm in diameter. Another pair collected in the same island on 11.IV.1952 also had active gonads: testes 12 × 4 mm, largest egg in ovary 4 mm. No other information on the nidification of this species in the Netherlands Leeward Islands is available.

Zoogeography — *Haematopus p. palliatus* has a wide range along the Atlantic and Gulf coast of North, Central, and South America, from Virginia to Yucatan, and from the Caribbean coast of Colombia to southern Brazil; it also occurs along the Pacific coast of Central America and Colombia. In recent years all breeding birds of the West Indies, including the Venezuelan islands mentioned above, have been generally referred to *Haematopus p. prattii*, which was originally considered to be restricted to the Bahama Islands. In view of the fact that oystercatchers breeding on the coasts of Venezuela and Colombia, including both the Paraguana and Goajira Peninsulas, belong to the race *palliatus*, some intermixture of characters is to be expected in any of the South Caribbean islands. Such intermixture has actually been found in the islands of Aruba, Klein Curaçao, and Bonaire, whence specimens have become available.

Although oystercatchers are almost world-wide in their distribution, they form geographically and taxonomically well-defined groups of populations, which — by the absence of evidence of reproductive affinity — can best be treated in nomenclature as separate species. Hence, I follow WETMORE (Smiths. Misc. Coll. *106* (*1*), 1946, p. 32) in using the specific name *palliatus* for the American oystercatcher, instead of *ostralegus*. Thus, *Haematopus palliatus* is the American representative of the Old World species *H. ostralegus*. It is a pan-American, or, in a wider sense, cosmopolitan element in the fauna of Aruba, Curaçao, and Bonaire (see: Zoogeography, p. 44, 45).

Protective measures — Not protected by law.

38 **Arenaria interpres morinella** (Linnaeus)

Ruddy Turnstone

Tringa morinella LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 249 — coast of Georgia.
Strepsilas interpres, HARTERT 1893, p. 307 (Aruba).
Arenaria interpres morinella, CORY 1909, p. 197 (Aruba); RUTTEN 1931, p. 114 (Aruba, Bonaire); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 139 (Aruba); VAN OORDT 1949, p. 326 (Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Bonaire); PHELPS & PHELPS 1951, p. 13 (Bonaire); VOOUS 1953, p. 188 (Netherlands Leeward Group, general); VOOUS 1955, p. 72 (Aruba, Curaçao, Klein Curaçao, Bonaire, Klein Bonaire).
Arenaria interpres, DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire).

Native name - unknown.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE, KLEIN BONAIRE. — Passenger migrant, winter visitor, and non-breeding summer visitor.

ARUBA: Oranjestad, 22.VI.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Westpunt*, 11.XII.1951 (1 ♀). CURAÇAO: *Fuik Baai*, 1.IV.1952 (1 ♂); *Boca Sint Joris*, 25.X.1951 (3 ♂, 2 ♀); *Groot Piscadera*, 24.X.1951 (2 ♂); Sint Nicolaas, 21.II.1948 (1 ♀, collected by Croockewit; Amsterdam Mus.). KLEIN CURAÇAO: 26.I.1952 (1 ♂, 2 ♀), 11.IV.1952 (1 ♂, 1 ♀). BONAIRE: *Saliña Martinus*, 7.XI.1951 (1 ♂); Goto, 27.V.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Pekelmeer*, 13.XI.1951 (1 ♂).

Taxonomy — Compared with European specimens of the race *interpres* the upper parts of the Caribbean birds are in winter plumage paler and greyer, less blackish. Towards the full spring plumage it becomes apparent that the reddish-brown coloration of the upper parts is not only paler (more rufous, less chestnut), but in addition much more extended, particularly in the interscapulary region and on the secundaries and upper wing coverts. Dimensions not appreciably smaller than in European birds.

Iris dark brown; bill black or very dark horn-brown; legs bright orange-red (winter and spring).

Measurements — ARUBA: ♀, wing 143, 154.5, bill (exposed culmen) 23.5, 23.5, tarsus 27, 27. CURAÇAO and KLEIN CURAÇAO: ♂, wing 146.5, 151, 152, 153.5, 154.5, 155, 155, bill 22, 22, 22.5, 22.5, 23, 23, 24, 24, tarsus 26.5, 27, 27, 27.5, 28; ♀, wing 148, 149, 149.5, 152, 152.5, 156, bill 22, 22, 23, 23.5, 25, tarsus 27, 27, 27, 27.5. BONAIRE: ♂, wing 145, 152.5, bill 21.5, 23, tarsus 26, 26.5; ♀, wing 48, bill 23, tarsus 26.5.

Status — First collected in Aruba by HARTERT on 2.VII.1892 and by FERRY (CORY) in April or May 1908. Afterwards observed and collected by RUTTEN in Aruba and Bonaire. Observations from Curaçao remained unpublished until DE JONG'S undetailed records of the occurrence of the species in all three islands. CROOCKEWIT collected the first specimen from Curaçao on 21.II.1948 and, together with VAN OORDT, found it rather plentifully on 28 and 29.II.1948 along the Pekelmeer, Bonaire.

We observed this species regularly between 28.IX.1951 and 11.IV.1952 in all three islands, including Klein Curaçao (26.I and 11.IV.1952) and Klein Bonaire (27.III. 1952). There are several summer records by ANSINGH and KOELERS (*in litt.*).

In the Venezuelan islands recorded from Las Aves and Los Roques (PHELPS & PHELPS 1951, p. 21 and 11), Blanquilla (PHELPS, Jr., 1948, p. 98), Tortuga (PHELPS, Jr., 1945, p. 277), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 21), Los Testigos (PHELPS, Jr., 1945, p. 263).

Biotope — Turnstones were observed by us on the bright sandy beaches of northwestern Aruba and western Klein Curaçao, where they occurred in loose, mixed flocks with *Pluvialis squatarola*, *Charadrius wilsonia*, *Charadrius hiaticula*, and *Calidris alba*. They were particularly common on the south coast of Curaçao, along the shores of the Pekelmeer, Bonaire, and on the sandy beach and along the shell-heaps of *Strombus gigas* at Lac, Bonaire. Flocks of over 25 individuals were also observed in the small harbour of Kralendijk and in the Saliña Martinus behind the reef wall of coral debris between Kralendijk and the airport on Bonaire. On summarizing all records it becomes clear that the species was common along all coasts and all borders of salt lagoons, often seeking shelter for the burning sun under some rotten stump of *Conocarpus* or *Rhizophora*, or standing close together on some isolated piece of rock in shallow salt water.

Food — The contents of 10 stomachs examined were far from being easily identifiable; however, the remains of some bivalve molluscs were found in at least 3 instances (30%), small gastropods in 2 instances (20%; *Cerithium*, immature *Fissurella barbadensis*), small crabs in 4 instances (40%), insects in 4 instances (40%), among which were the pupariae of small Diptera, in addition *Artemia salina* (1 ×) and fish bones.

Distribution — *Arenaria i. morinella* is a breeding bird from arctic North America. It winters along the Atlantic and Pacific coasts of the Americas south to Argentina and Chile. It is a common visitor to the West Indies, but apparently scarce on the Caribbean coasts of Venezuela (FRIEDMANN & SMITH, Proc. U.S. Nat. Mus. *100*, 1950, p. 462) and Colombia (DE SCHAUENSEE 1949, p. 443).

Protective measures — Not protected by law.

39 **Pluvialis squatarola** (Linnaeus)

Grey or Black-Bellied Plover

Tringa squatarola LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 149 — Sweden.
Charadrius squatarola, HARTERT 1893, p. 307 (Aruba); HARTERT 1902, p. 307 (Aruba).
Squatarola squatarola, CORY 1909, p. 197 (Aruba); RUTTEN 1931, p. 111 (Aruba, Curaçao, Bonaire); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 44 (Aruba); DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire); VAN OORDT 1949, p. 325 (Bonaire); PHELPS & PHELPS 1951, p. 11 (Bonaire).
Pluvialis squatarola, VOOUS 1953, p. 188 (Aruba, Bonaire); VOOUS 1955, p. 73 (Aruba, Curaçao, Klein Curaçao, Bonaire, Klein Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE, KLEIN BONAIRE. — Passenger migrant and non-breeding visitor.

ARUBA: Oranjestad, 22.VI.1930 (1 sex unknown, collected by Pijpers, Rutten, & Vermunt; Leiden Mus.); *Pos Chiquitu*, 9.XII.1951 (1 ♀). CURAÇAO: *Groot Sint*

Joris, 22.X.1951 (2 ♀), 9.X.1952 (1 ♀, collected by Koelers; Amsterdam Mus.). KLEIN CURAÇAO: 11.IV.1952 (1 ♂, 1 ♀). BONAIRE: *Lac*, 21.XI.1951 (1 ♂).

Taxonomy — Iris dark brown; bill black; legs and feet bluish-grey.

Measurements — ARUBA: ♀, wing 196, sex unknown, 202.5. CURAÇAO: ♀, wing 186, 199, 200. KLEIN CURAÇAO: ♂, wing 199; ♀, wing 192.5. BONAIRE: ♂, wing 188.

Status — The species was first recorded by HARTERT from a specimen collected in Aruba. Subsequent ornithologists have mentioned the occurrence of this species in all three islands, but particularly in Aruba. It has been observed in winter (Bonaire: 28-29.II.1948, VAN OORDT), as well as in summer (Aruba: 24.VI.1892, HARTERT).

We found it fairly common throughout the duration of our visit in all three islands, including the islands of Klein Curaçao and Klein Bonaire (27.III.1952). The largest number seen together was about 60 at Lac, Bonaire, on 28.III.1952.

Several summer observations have been mentioned by ANSINGH and KOELERS (*in litt.*) from Curaçao: 31.VII, 14.VIII and 24.VIII.1954.

In the Venezuelan islands the species has apparently only been recorded from Los Roques (PHELPS & PHELPS 1951, p. 9).

Biotope — We found this species on quiet sandy beaches, but also on the rough plateaus of coral limestone along the north coast of Curaçao, on the borders of the Schottegat and on dry sand banks and reef walls in the harbour of Oranjestad, Aruba. It was common in halophytic meadows in the northwestern part of Aruba and around Lac, Bonaire.

Food — In 6 stomachs examined we found the remains of small Gastropoda (4 ×) among which was one small *Fissurella* (1 ×), small fiddler-crabs (3 ×) and other small Crustacea (1 ×), small Diptera (2 ×), once a large unidentifiable bivalve mollusc.

Distribution — *Pluvialis squatarola* is a breeding bird from arctic North America and Eurasia. It winters virtually along the coasts of the Americas, south to northern Argentina and Chile. It is fairly common in the West Indies and has been reported from northern Venezuela (southern Goajira Peninsula, PHELPS, Jr., *in litt.*), but so far as I know not from the Caribbean coast of Colombia (DE SCHAUENSEE 1949, p. 437).

Protective measures — Not protected by law.

40 **Pluvialis dominica dominica** (P. L. S. Müller)

American Golden Plover

Charadrius dominicus P. L. S. MÜLLER, Natursyst., Suppl., 1776, p. 116 — Hispaniola. *Pluvialis dominica dominica*, VOOUS 1955, p. 74 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: *Schottegat near Rustenburgh*, 3 and 11.XI.1951 (2 ♀); Ronde Klip, 24.X.1952 (1 ♂, collected by KOELERS; Amsterdam Mus.).

Measurements — ♂, wing 179, bill (measured from forehead) 28.5, tarsus 42; ♀, wing 175, 185, bill 32, 32, tarsus 43, 44.

Status — Not previously recorded.

We observed solitary golden plovers between 13.X.1951 and 26.XII.1951 on some isolated mud flats along the northern shore of the Schottegat near Rustenburgh, Curaçao. The species apparently also turned up in Curaçao in the autumn of the next year, for we received a specimen from Ronde Klip obtained from a flock of about 15 birds on 24.X.1952.

Not recorded from the Venezuelan islands.

Distribution — *Pluvialis d. dominica* is a breeding bird from arctic North America. It winters in southern South America. On migration it is known for example from the Caribbean coast of Colombia (DE SCHAUENSEE 1949, p. 438), from the Sabana de Bogota (BORRERO, Caldasia *3*, 1947, p. 143), and once from north-eastern Venezuela (FRIEDMANN & SMITH, Proc. U.S. Nat. Mus. *100*, 1950 p. 458).

Protective measures — Not protected by law.

41 **Charadrius hiaticula semipalmatus** Bonaparte

Semipalmated Plover

Charadrius semipalmatus BONAPARTE, Journ. Ac. Nat. Sc. Phi. *5* (*1*), 1825, p. 98 — coast of New Jersey.

Aegialitis semipalmata, CORY 1909, p. 197 (Aruba).

Charadrius semipalmatus, RUTTEN 1931, p. 112 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire).

Charadrius hiaticula semipalmatus, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 55 (Aruba), VAN OORDT 1949, p. 325 (Bonaire); PHELPS & PHELPS 1951, p. 11 (Bonaire); VOOUS 1955, p. 75 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Lopi*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Winter visitor and passenger migrant.

ARUBA: Oranjestad, 22.VI.1930 (2 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); plains of *Hudishibana*, 14.XII.1951 (1 ♀); *Saliña Druif*, 9.XII.1951 (1 ♂); *Vader Piet*, 19.XII.1951 (1 ♂). CURAÇAO: *Groot Sint Joris*, 22.X.1951 (1 ♀); *Ronde Klip*, 21.III.1952 (1 ♀); *Boca Grandi, Savonet*, 18.X.1951 (2 ♀); without locality, 27.XI.1930 (1 ♀, collected by Jhr. Dr. V. H. van den Bergh; Leiden Mus.). KLEIN CURAÇAO: 26.I.1952 (3 ♂). BONAIRE: *Saliña Palu Lechi*, 9.XI.1951 (1 ♂); Dos Pos, 27.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Pekelmeer*, 26.III.1952 (1 ♂).

Taxonomy — In their winter plumage these birds resemble *Charadrius h. hiaticula* in first autumn plumage, except for the closed clay-brown breast band and the duller, more greyish-brown coloration throughout.

Iris dark brown, eyelid pale yellow to orange-yellow; bill black, base of lower mandible orange or orange-red; legs and feet orange-yellow, dull yellow in a few specimens.

Measurements — ARUBA: ♂, wing 118, 121, bill (exposed culmen) 18, 18, tarsus 23.5, 25; ♀, wing 116, 117, 127, bill 17.5, 18, 18, tarsus 23.5, 24.5, 25. CURAÇAO and KLEIN CURAÇAO: ♂, wing 121, 124, 126, bill 17, 17.5, 18, tarsus 25, 25, 25.5; ♀,

wing 114, 121, 122.5, 123, 123.5, bill 17, 18, 18, 18.5, 18.5, tarsus 23, 23.5, 23.5, 25, 26. BONAIRE: ♂, wing 114, 120, 128, bill 17.5, 17.5, 17.5, tarsus 24, 24.5, 24.5.

Status — First recorded by CORY from 5 specimens collected by FERRY in Aruba in April-May 1908. The only other pertinent records are those by RUTTEN, who observed small numbers of the species in all three islands (specimens collected by him are from Aruba, 22.VI.1930, and from Bonaire, 27.V.1930) and by VAN OORDT, who noted over 600 birds of the species at the Pekelmeer, Bonaire, on 29.II.1948.

We observed and collected the species in all three islands, including Klein Curaçao. It was nowhere common, but did not appear to be absent during the winter months. The greatest assemblage of the species was seen on 9.XI.1951 at Palu Lechi, Bonaire, where slightly less than 100 birds were present in small flocks of 30-40 individuals. The earliest known record is from 28.IX.1951 (Hato, Curaçao), the latest date is 24.VI.1952 (Schottegat near Rustenburgh, Curaçao, ANSINGH *in litt.*). There are, however, several additional summer records by ANSINGH and KOELERS (*in litt.*).

In the Venezuelan islands recorded from Los Roques (PHELPS & PHELPS 1951, p. 9). Blanquilla (PHELPS, Jr., 1948, p. 98), Tortuga (PHELPS, Jr., 1945, p. 276), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 19), Los Testigos (PHELPS, Jr., 1945, p. 262).

Biotope — The species was found on extensive mud flats, as well as along narrow stony shores, on coral reef walls, and in open, muddy places in mangroves, also in the stone desert of Vader Piet, Aruba, and along the quiet shores of the Schottegat, Curaçao. It appeared to be very fond of those places on the sea shore, where patches of *banana di rif* (*Sesuvium portulacastrum*) grew in closed vegetation.

Food — 10 stomachs examined contained various kinds of insects in 8 instances (80%), molluscs in 3 instances (30%; mainly small lagoon-snails); small crustaceans in 2 instances (20%; *Artemia*); small seeds in one instance (10%). Among the insects we found small beetles (4 ×), the larvae of Diptera (3 ×; *Ephydra, Eristalis*), small flies (3 ×), Hemiptera (1 ×), caterpillars (over 50 specimens in one stomach).

Distribution — *Charadrius h. semipalmatus* is a breeding bird of northern North America, wintering mainly in South America, south to Argentina and Chile. It is a common transient in the West Indies and a well-known winter visitor along the Caribbean coast of Colombia and Venezuela.

Protective measures — Not protected by law.

42 **Charadrius alexandrinus nivosus** (Cassin)

Snowy Plover

Aegialitis nivosa(us) CASSIN, in BAIRD, Rep. Expl. Surv. R. R. Pac. *9*, 1858, p.xlvi and 696 — Presidio, San Francisco Co., California.

Charadrius nivosus tenuirostris, RUTTEN 1931, p. 113 (Bonaire); DE JONG 1948, p. 5 (Curaçao, Bonaire).

Charadrius alexandrinus nivosus, CROOCKEWIT, Ardea *36*, 1949, p. 281 (Bonaire); PHELPS & PHELPS 1951, p. 11 (Bonaire); BOND, Second Suppl. Checkl. Birds West Indies, 1952, p. 9 (Bonaire); VOOUS 1955, p. 76 (Curaçao, Bonaire, Klein Bonaire).

Native name — *Lopi*.

CURAÇAO, BONAIRE, KLEIN BONAIRE. — Breeding visitor.

BONAIRE: *Goto*, 27.V.1930 (1 *pullus*, collected by Pijpers, Rutten & Vermunt; Leiden Mus.), 24.III.1952 (1 ♂, 4 ♀). KLEIN BONAIRE: 14.V.1930 (2 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Our Bonaire specimens are in a rather worn plumage, the extreme paleness of their upper parts being apparently due to wear and bleaching, as is shown by the colour of one or two new feathers appearing on the upper wing of some of the specimens. The bright, sandy-grey colour of the upper parts is perfectly matched by a male from Great Inagua (6.V.1930; swollen testes) collected by JAMES BOND and received for examination from the Academy of Natural Sciences of Philadelphia. None of six Californian specimens from the months of March and May examined (Mus. Vertebr. Zool. Berkeley, Ac. Nat. Sc. Philadelphia) are of a similar light dorsal coloration. These latter, however, do not show a stage of wear even comparable to that in our Caribbean birds. No autumn specimens from the Netherlands Leeward Islands are available, the species apparently leaving the islands during autumn and winter. Two September birds from California and an undated specimen from St. Croix, Virgin Islands, are in fresh plumage and not appreciably distinct from each other, although considerably darker and more brownish-grey than our West Indian birds in worn plumage. Hence, although not without hesitation, I feel I must follow BOND (1950, p. 39) in rejecting a West Indian race, *tenuirostris*, as opposed to a continental form, *nivosus*.

Iris dark brown; bill black, base of lower mandible lighter; legs fleshy-grey, bare portion of tibia and toes pale grey.

Measurements — BONAIRE and KLEIN BONAIRE: ♂, wing 100, 100, 101, bill (exposed culmen) 14, 15, 15, tarsus 24.5, 25, 26; ♀, wing 100.5, 101, 102, 103.5, bill 14, 14.5, 14.5, 15, tarsus 24.5, 24.5, 25, 25.5.

Status — RUTTEN was the first to report the occurrence of this species in the Netherlands Leeward Islands, after having found it breeding at the Pekelmeer and at Goto, Bonaire, in 1930. A downy chick from Goto collected by RUTTEN (27.V. 1930) and additional specimens from Klein Bonaire are now in the Leiden Museum. A picture of a breeding adult at Goto was reproduced in Ardea *20*, 1931, plate II, fig. 2. VAN OORDT (*in litt.*) observed the species in fair numbers at the Pekelmeer, Bonaire, on 28 and 29.II.1948 (see: CROOCKEWIT). — Pertinent published records from Aruba and Curaçao are lacking (see, however, DE JONG).

We found this species in Bonaire only. In spite of our constant efforts from September onwards we did not succeed in tracing the presence of the species until March 24 at Palu Lechi, Bonaire. Nonetheless, during our last visit to Bonaire in the second half of March it was one of the commonest of the smaller shore-birds at Goto and the Pekelmeer.

The species was found breeding along the coast and on islets in the Jan Thiel lagoon, Curaçao, in March 1953 and June 1954. Nests with eggs and downy chicks have been found and photographed by BRONNEBERG and VAN DER WERF (*in litt.*).

The species has not yet been found in Aruba where, however, it is very likely to occur. No records exist from the period between October and January, the latest autumn record being one by ANSINGH and KOELERS (*in litt.*) from 21.IX in Curaçao.

In the Venezuelan islands the species has been recorded from Los Roques

(PHELPS & PHELPS 1951, p. 10) and Margarita Island (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 19).

Biotope — Sandy beaches along salt lagoons (Goto) and saliñas (Pekelmeer, Jan Thiel lagoon). Nests have been found on sand-banks and on the narrow stony walls separating salt pans.

Food — Five stomachs examined contained the remains of small insects, among which were the larvae and the adults of the salt fly (*Ephydra*) and other small Diptera and Coleoptera.

Reproduction cycle — All specimens examined (24.III) showed conspicuously swollen gonads: the birds appeared to have just started breeding. For additional remarks, see under "status".

Zoogeography — *Charadrius a. nivosus* inhabits the coastal and interior arid districts of western North America and the Gulf coast from Alabama to Texas; in addition the Greater Antilles and the southern Bahama Islands. Also probably the Lesser Antilles, south to the Caribbean coast of Venezuela, whence, however, no pertinent breeding records are known. It breeds in Curaçao and Bonaire. The collecting of specimens in Margarita and the Roques Islands might also indicate breeding of the species in these islands (BOND, First Suppl. Checkl. Birds West Indies, 1951, p. 8). The species is not known from Colombia. Although a species with an almost world-wide distribution, *Charadrius alexandrinus* does not breed in Central America, whereas its breeding range in South America seems to be restricted to the Venezuelan coastal islands (including the mainland?) and the littoral of Peru and Chile (*C. a. occidentalis*). Hence, it is a definite West Indian element in the avifauna of Aruba, Curaçao, and Bonaire.

Protective measures — Not protected by law.

43 **Charadrius collaris** Vieillot

Collared Plover

Charadrius collaris VIEILLOT, Nouv. Dict. Hist. Nat. *27*, 1818, p. 136 — Paraguay.
Aegialites collaris, HARTERT 1893, p. 335 (Bonaire); HARTERT 1902, p. 307 (Bonaire).
Charadrius collaris, RUTTEN 1931, p. 113 (Bonaire); PETERS, *2*, 1934, p. 251 (Bonaire); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 67 (Bonaire); DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 11 (Bonaire); VOOUS 1955, p. 77 (Aruba, Curaçao, Bonaire).

Native name — *Lopi*.

ARUBA, CURAÇAO, BONAIRE. — Casual visitor; recorded breeding in Bonaire.

No material.

Status — First recorded by HARTERT, who observed "small flocks" in Bonaire in 1892 and also collected "two young specimens in moult", indicating breeding of this species in Bonaire. It was afterwards observed by RUTTEN in the same island in 1930 and by PHELPS & PHELPS in 1947, but no further specimens were procured, nor do these authors mention anything about breeding.

We observed the species in Curaçao (28.IX.1951,north coast near Hato, about 5 individuals; 18.X.1951, Boca Grandi, Savonet, one solitary individual) and in

Aruba (20.XII.1951, plains of Hudishibana, one individual), but we did not succeed in collecting specimens.

In the Venezuelan islands the species has been recorded from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 20) and Los Testigos (PHELPS, Jr., 1945, p. 262).

Biotope — Twice observed on rocky plateaus of coral limestone along the north coast of Curaçao. In addition we observed a single individual in a mixed flock of *Charadrius hiaticula* and *Calidris alba* in the sparse halophytic vegetation of the sandy plains in northwestern Aruba.

Zoogeography — *Charadrius collaris* is a breeding bird of tropical America, from southern Mexico south to Peru and northern Argentina. It is a resident species in Colombia and Venezuela, but very rare in the Lesser Antilles, whence it is known from Grenada and the Grenadines only (BOND 1950, p. 39). Judging from its virtual absence in the West Indies the species seems South American by origin and consequently a South American element in the avifauna of Aruba, Curaçao, and Bonaire.

Protective measures — Not protected by law.

44 **Charadrius vociferus vociferus** Linnaeus

Killdeer

Charadrius vociferus LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 150 — South Carolina.
Charadrius vociferus vociferus, VOOUS 1955, p. 78 (Aruba, Curaçao, Bonaire).

Native name — *Lopi*.

ARUBA, CURAÇAO, BONAIRE. — Winter visitor.

ARUBA: *Saliña Druif*, 14.XII.1951 (1 ♂). BONAIRE: *Saliña Wayaka*, 8.XI.1951 (1 ♂).

Taxonomy — Both specimens collected had a noteworthy layer of subcutanous fat.

Iris dark brown, eyelid red or orange; bill black; legs and feet light fleshy or fleshy-brown.

Measurements — ARUBA: ♂, wing 165.5, tail 94, bill (exposed culmen) 21, tarsus 37.5. BONAIRE: ♂, wing 162.5, tail 93, bill 21, tarsus 36.

Status — Not previously recorded.

Throughout December, January, and March killdeers were constant, though scarce inhabitants of the northern and eastern shores of the Schottegat, Curaçao. We also observed them at Saliña Druif, Aruba (14.XII.1951), near Kralendijk (4.XI.1951) and at Saliña Wayaka (8.XI.1951), Bonaire. VAN OORDT, who visited Aruba on 23.XII.1951, observed 7 individuals at the Spaans Lagoen (verbal communication).

Not recorded from the Venezuelan islands.

Biotope — We observed killdeers in the shallow waters of saline lagoons and in areas flooded by fresh water.

Distribution — *Charadrius v. vociferus* is a breeding bird from North America. It winters throughout Central America and the West Indies, south to northern South America, whence it is known from Colombia (DE SCHAUENSEE 1949, p. 438) and

from one specimen in northern Venezuela (AVELEDO, Mem. Soc. Cienc. Nat. La Salle, Caracas, 6 (17), 1947, p 301 and p. 312).

Protective measures — Not protected by law.

45A **Charadrius wilsonia cinnamominus** (Ridgway)

Thick-Billed or Wilson's Plover

Pagolla wilsonia cinnamomina RIDGWAY, Bull. U.S. Nat. Mus. *50*, *8*, 1919, p. 113 — Sabanilla, Colombia.

45B **Charadrius wilsonia wilsonia** Ord

Charadrius wilsonia ORD, in WILSON, Am. Orn. *9*, 1814, p. 77, pl. 73, fig. 5 — Cape May, New Jersey.

Aegialitis rufinucha, HARTERT 1893, p. 307 and 335 (Aruba, Bonaire).
Aegialitis wilsonius rufinucha, HARTERT 1902, p. 307 (Aruba, Bonaire).
Ochthodromus wilsonius rufinuchus, CORY 1909, p. 197 (Aruba).
Pagolla wilsonia cinnamomina, RIDGWAY, *8*, 1919, p. 113 (?Aruba, ?Bonaire); HELLMAYR, Pub. Field Mus. Nat. Hist. *255*, Zool. Ser. *12* (*18*), 1929, p. 492 (Aruba, Bonaire); RUTTEN 1931, p. 112 (Aruba, Curaçao, Bonaire).
Charadrius wilsonia cinnamominus, PETERS, *2*, 1934, p. 254 (Aruba, Bonaire); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 75–76 (Aruba, Bonaire); PHELPS & PHELPS 1951, p. 11 (Bonaire), VOOUS 1955, p. 79 (Aruba, Curaçao, Bonaire, Klein Bonaire).
Charadrius wilsonia cinnamomus, DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire).
Charadrius wilsonia wilsonia, VOOUS 1955, p. 79 (Aruba).

Native name — *Lopi*.

ARUBA, CURAÇAO, BONAIRE, KLEIN BONAIRE (*cinnamominus*). — Resident
ARUBA (*wilsonia*). — Winter visitor or migrant.

ARUBA (*cinnamominus*): Oranjestad, 22.VI.1930 (2 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); beach of *Hadikurari*, 7.IV.1952 (2 ♀); *Saliña Druif*, 14.XII.1951 (1 ♂). CURAÇAO (*cinnamominus*): *Spaanse Water*, 25.IX.1951 (1 ♀); *Fuik Baai*, 1.IV.1952 (1 ♂); *Sint Joris Baai*, 22.X.1951 (1 ♂, 1 ♀); 6.V. 1930 (1 (♀), collected by Pijpers, Rutten & Vermunt; Leiden Mus.). BONAIRE (*cinnamominus*): *Saliña Martinus*, 24.III.1952 (2 ♂, 1 ♀); Goto, 27.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); Saliña Slagbaai, V.1930 (1 (♀), collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Lac*, 17.XI.1951 (1 ♂, 1 ♀).
ARUBA (*wilsonia*): beach of *Hadikurari*, 7.IV.1952 (1 ♂).

Taxonomy — Individuals of the resident race *cinnamominus* seem to have a non-breeding plumage, in spite of HELLMAYR & CONOVER's statement to the contrary (*l.c.* p. 75, foot-note 2). In this plumage (♂, 24.III; ♀, 17.XI) both sexes seem to have chest band, lores, subocular and auricular regions dull russet-brownish, without any trace of black on the chest. The crown is greyish-brown and is laterally

and posteriorly only faintly bordered by russet-brown. Some of the specimens examined were moulting from this plumage into the breeding plumage (♂, 14.XII) and *vice versa* (♂, 17.XI). In the breeding plumage (♂, 1.IV) crown, nape, and auricular region are mainly rufous, the lores and the anterior crown patch are black (♂), whereas the rufous-brown patches on the sides of the breast are connected by a black chest patch. Immature birds (♂, 22.X) have the chest band, including the sides of the chest, dull greyish-brown and the ear coverts and the cheeks fawn colour.

The adult male of the migrant race *wilsonia*, which occurred among a flock of the resident form, was conspicuous in the field by the broad black chest band and the more greyish-brown upper parts, which are contiguous with the crown. It was the only specimen in this plumage seen and was therefore collected. In contrast to all other specimens collected the migrant specimen of *wilsonia* possessed some amount of subcutanous fat! The specimen of *wilsonia* collected has been directly compared with specimens of this race from North America.

Iris dark brown, eyelid whitish; bill black; legs and feet flesh-colour.

Measurements: ARUBA (*cinnamominus*): wing 114, bill (measured from forehead) 26.5; ♀, wing 116, 116, 116.5, 124, bill 26, 26.5, 26.5, 27.5. CURAÇAO (*cinnamominus*): ♂, wing 113, 119, bill 25, 26; ♀, wing 118, 119, bill 26, 26, 28. BONAIRE (*cinnamominus*): ♂, wing 115, 117, 122.5, 124.5, bill 25.5, 26, 26.5, 26.5; ♀, wing 116, 119, 120, bill 24, 25, 27.

ARUBA (*wilsonia*): ♂, wing 118, bill 25.

Status — From the time of HARTERT (1892) onwards this species has been regularly recorded as a rather common resident in Aruba and Bonaire. RUTTEN was the first to report it from Curaçao. The same author found a downy chick at Saliña Tam, Bonaire, on 3.VI.1930, which has remained the only direct evidence of the breeding of this species in the Netherlands Leeward Islands.

We found it one of the commonest of the species of plovers in all three islands, including Klein Bonaire (27.III.1952); we did not find nests, but we observed two full-grown young on 30.IX.1951 along the Spaanse Water, Curaçao.

The migratory form *wilsonia*, which we observed and collected at Aruba only once, had not previously been observed in the Netherlands Leeward Islands.

In the Venezuelan islands the race *cinnamominus* is known from Las Aves and Los Roques (PHELPS & PHELPS 1951, p. 10 and 19), and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 20). The race *wilsonia* has been recorded from Los Roques only (MUÑOZ-TEBAR, Mem. Soc. Cienc. Nat. La Salle, Caracas, *10* (27), 1950, p. 189).

Biotope — Although this species has been regularly observed along sandy beaches and mud flats, it seemed to prefer the barren plains of coral limestone and other stony environments close to salt water. We generally found the birds here in isolated pairs, which were not at all shy and in case of danger were more inclined to crouch and find shelter on the ground rather than to fly away.

Food — Remains of small crabs, mostly of small fiddler-crabs, were present in 11 of 13 stomachs examined (92.3%). In addition we found small insects in 3 stomachs (23.1%) and once a small juvenile snail (*Cerithium variabile*). As most of the stomachs contained but very little food-remains, we wondered whether perhaps this species feeds mainly at night.

Reproduction cycle — RUTTEN mentions having found a chick of this

species on 3.VI. We did not see any other sign of breeding activity than one bird of a pair showing injury feigning along the Sint Joris Baai, Curaçao, on 22.X.1951. In addition, females with swollen gonads were collected on 25.IX at the boca of the Spaanse Water, Curaçao (follicles up to 3 mm diameter), on 17.XI at Lac, Bonaire (follicles up to 2 mm diameter), and on 7.IV at the beach of Hadikurari, Aruba (follicles up to 2 mm diameter). Full-grown young were observed on 30.IX at the Spaanse Water, Curaçao. Does this species, then, breed throughout the year?

Zoogeography — *Charadrius w. cinnamominus* is a resident breeding bird of the Caribbean coast of Colombia and Venezuela and of several of the South Caribbean islands. It is a South American element in the avifauna of the Netherlands Leeward Islands.

Charadrius w. wilsonia breeds throughout the West Indies and also along the Atlantic and Gulf coasts of the southeastern United States and Mexico. At least the northern populations are migrants; wintering birds have been recorded along the Caribbean coast of Central America and the Atlantic coast of northern South America, south to Brazil (see: HELLMAYR, Pub. Field. Mus. Nat. Hist. *255*, Zool. Ser. *12* (18), 1929, p. 492).

Protective measures — Not protected by law.

46 **Numenius phaeopus hudsonicus** Latham

Hudsonian Curlew or Whimbrel

Numenius hudsonicus LATHAM, Index Orn. 2, 1790, p. 712 — Hudson Bay.

Phaeopus hudsonicus, RUTTEN 1931, p. 111 (Aruba); VOGELVRIEND 1944, p. 118 (Curaçao); DE JONG 1948, p. 5 (Aruba, Curaçao).

Numenius phaeopus hudsonicus, VAN OORDT 1949, p. 326 (Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Bonaire); PHELPS & PHELPS 1951, p. 12 (Bonaire); VOOUS 1955, p. 80 (Aruba, Curaçao, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

No material.

Status — Recorded by RUTTEN from the beach near Oranjestad, Aruba, in June-July 1930 and by VAN OORDT in the Pekelmeer, Bonaire, on 28.II.1948 (one specimen). The records from Curaçao by DE JONG ("Vogelvriend") have not yet been substantiated.

We observed this species in Bonaire between 6 and 27.XI.1951 and on 24.III.1952, but we did not succeed in collecting specimens. We found, however, a dead individual on 24.III.1952 in Bonaire (length of wing 159 mm). The greatest flock observed consisted of 8 birds.

Observed by VAN OORDT (verbal communication) in northwestern Aruba on 23.XII.1951 and by VAN DER WERF (*in litt.*) at Klein Curaçao on 16.I.1955.

In the Venezuelan islands the species is known from one specimen from Las Aves (CORY 1909, p. 214) and from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 20).

Biotope — Mainly observed in the shallow waters of salt lagoons.

Distribution — *Numenius p. hudsonicus* is a breeding bird from arctic North America. It winters mainly along the Pacific coast of South America south to Chile, and, on the Atlantic side, along the coast of northern Brazil. Specimens are known from the north coast of Venezuela (HELLMAYR & CONOVER, *1* (*3*), 1948, p. 96; FRIEDMANN & SMITH, Proc. U.S. Nat. Mus. *100*, 1950, p. 460), including the Paraguana Peninsula (BARNES & PHELPS, Sr., 1940, p. 19) and also the Caribbean coast of Colombia (DE SCHAUENSEE 1949, p. 440).

Protective measures — Not protected by law.

47 **Tringa flavipes** (Gmelin)

Lesser Yellowlegs

Scolopax flavipes GMELIN, Syst. Nat., *1*, *2*, 1789, p. 659 — New York.

Totanus flavipes, HARTERT 1893, p. 308 (Aruba); HARTERT 1902, p. 307 (Aruba); CORY 1909, p. 197 (Aruba), 209 (Bonaire); DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire).

Neoglottis flavipes, RUTTEN 1931, p. 110 (Aruba, Curaçao, Bonaire).

Tringa flavipes, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 110 (Aruba, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 12 (Bonaire); VOOUS 1955, p. 82 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Snepi*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

CURAÇAO: *Schottegat* near *Rustenburgh*, 13.X.1951 (1 ♂), 14.XI.1951 (1 ♂); *Fuik Baai*, 1.IV.1952 (1 ♀); *Pos Manzanilla*, 30.X.1951 (1 ♂); *Groot Piscadera*, 28.XII.1951 (1 ♀); *Malpais*, 26.IX.1951 (1 ♀), 15.X.1951 (1 ♂, 2 ♀), 12.XI.1951 (2 ♀); *Hato* 11.I.1952 (1 ♀); *Groot Santa Marta*, 10.X.1951 (1 ♂); Santa Cruz, 27.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Playa Abau*, *Grote Knip*, 9.IX.1951 (1 ♀). KLEIN CURAÇAO: 26.I.1952 (1 ♂). BONAIRE: *Saliña Martinus*, 24.III.1952 (*2* ♂); *Saliña Slagbaai*, 8.XI.1951 (1 ♂); *Playa Frans*, 24.XI.1951 (1 ♀).

Taxonomy — Iris dark brown; bill black or brownish-black; legs and feet mostly bright yellow, but varying between a pale straw-yellow and bright orange yellow.

Measurements: — CURAÇAO: ♂, wing 155, 155, 156.5, 157.5, 158.5, 161, bill (exposed culmen) 35, 36.5, 38, 38, tarsus 49, 51.5, 52, 52, 53, 53; ♀, wing 155, 156, 156.5, 157, 157.5, 158.5, 158.5, 159.5, 162.5, bill 34, 36, 36, 37, 38.5, 38.5, 39, 39.5, tarsus 50, 50, 51, 52.5, 53.5, 54, 55. KLEIN CURAÇAO: ♂, wing 158, bill 36, tarsus 51.5. BONAIRE: ♂, wing 153, 160, bill 37, 37, 37.5, tarsus 53, 54, 54, 54; ♀, wing 163, bill 35, tarsus 51.5.

Status — The species was first recorded by HARTERT in 1892 from Aruba and was subsequently collected by FERRY in 1908 in Aruba and Bonaire (CORY). RUTTEN found it not uncommon in all three islands in 1930, while the few other authors mentioned similar experiences.

We found it generally distributed throughout all three islands, including Klein Curaçao. In fact, it was among the most abundant of the species of migratory and wintering waders found in the islands. It usually occurred in small flocks, often mixed with *Tringa melanoleuca*. The largest flock observed was one containing slightly over 100 individuals of this species and a few specimens of *Tringa melanoleuca* (20.XI.1951, Saliña Tam, Bonaire). At least some of these birds seem to stay throughout the summer, for the species was observed in Curaçao on 12.VII and 21.VIII.1952 and on 18, 23, and 31.VII and 6, 14, and 16.VIII.1954 by ANSINGH, KOELERS, and VAN DER WERF (*in litt.*).

In the Venezuelan islands recorded from Las Aves (PHELPS & PHELPS 1951, p. 21), Los Roques (PHELPS & PHELPS 1951, p. 10), TORTUGA (PHELPS, Jr., 1945, p. 276), MARGARITA (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 20), and Los Testigos (PHELPS, Jr., 1945, p. 262).

Biotope — The species occurred along the muddy edges of both fresh and salt water, being present wherever suitable localities were available. It did not seem to show a preference for shallow saliñas extending for miles under the burning sun, as did *Tringa melanoleuca*, but it occurred as well on minute fresh water pools with a narrow fringe of mud under the protective shade of thorny scrub and in wet places or small pools inside or behind the mangroves.

Food — Of 13 stomachs examined, 11 contained insects (85%), 3 crustaceans, including fiddler-crabs (23%), 1 a fresh water snail (*Planorbis*, 8%), and 1 vegetable matter (8%). Among the insects we found small Diptera (38%), the larvae of the salt-fly *Ephydra* (8%), water-bugs (Notonectidae, Corixidae, 23%), and water-beetles (31%).

Gonads — The largest gonads found were the testes of two males collected in Klein Curaçao on 26.I.1952 (4 × 2 mm) and in Bonaire on 24.III.1952 ($4\frac{1}{2} \times 1\frac{1}{2}$ mm) respectively.

Distribution — *Tringa flavipes* is a breeding bird from arctic North America. It winters throughout the West Indies, Central and South America, south to Argentina and Chile. It is common along the Caribbean coasts of Colombia and Venezuela.

Protective measures — Not protected by law. Regular shooting of this species should be prohibited.

48 **Tringa melanoleuca** (Gmelin)

Greater Yellowlegs

Scolopax melanoleuca GMELIN, Syst. Nat. *1*, *2*, 1789, p. 659 — Labrador.

Totanus melanoleucus, HARTERT 1893, p. 334 (Bonaire); HARTERT 1902, p. 307 (Bonaire); CORY 1909, p. 197 (Aruba, Bonaire); DE JONG 1948, p. 6 (Aruba, Curaçao, Bonaire).

Neoglottis melanoleuca, RUTTEN 1931, p. 109 (Aruba, Curaçao, Bonaire).

Tringa melanoleuca, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 114 (Aruba, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Bonaire); PHELPS & PHELPS 1951, p. 12 (Bonaire); VOOUS 1955, p. 83 (Aruba, Curaçao, Bonaire).

Native name — *Snepi*.

ARUBA, CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

CURAÇAO: *Malpais*, 15.X.1951 (1 ♂, 1 ♀). BONAIRE: Pekelmeer, 8.VI.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Pekelmeer*, 13.XI.1951 (1 ♂, 1 ♀).

Taxonomy — The specimens collected in October had a thick layer of subcutanous fat (migrants!), which was absent in specimens collected in November.

Iris dark brown; bill black, or blackish-brown with a greenish-brown base (♀, 13.XI); legs and feet yellow.

Measurements — CURAÇAO: ♂, wing 190, bill (exposed culmen) 54, tarsus 61.5; ♀, wing 195, bill 56, tarsus 59.5. BONAIRE: ♂, wing 186, bill 53, tarsus 61; ♀, wing 186.5, 198.5, bill 55, 61, tarsus 62, 66.

Status — The species has been recorded by all previous ornithologists who have visited the islands, both in the summer months (21.VII.1891, HARTERT) and in the winter (II.1948, VAN OORDT and CROOCKEWIT).

We found it a rather common bird in suitable localities in all three islands, although less common than *Tringa flavipes*. Its numbers increased considerably in March and April, when it eventually out-numbered its smaller relative.

In the Venezuelan islands it has been recorded from Los Aves and Los Roques (PHELPS & PHELPS 1951, p. 21 and 10), Tortuga (PHELPS, Jr., 1945, p. 277), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 20), Los Testigos (PHELPS, Jr. 1945, p. 262).

Biotope — The shores of both fresh and salt waters, such as the flooded cactus deserts around Kralendijk, Bonaire, after heavy rains and the saturated salt waters of the Pekelmeer, Bonaire, as also mud flats bordering mangroves.

Food — Two stomachs examined contained the remains of small insects and one small fresh water fish (*Cyprinodon dearborni*); 2 stomachs were empty.

Distribution — *Tringa melanoleuca* is a breeding bird from northern North America; it winters in the West Indies and throughout tropical Central and South America south to Patagonia. In the non-breeding season it is not uncommon in Colombia and Venezuela.

Protective measures — Not protected by law. Shooting of this and other species of waders, which regularly occurs in the islands, should be prohibited.

49 **Tringa solitaria solitaria** Wilson

Solitary Sandpiper

Tringa solitaria WILSON, Amer. Orn. *7*, 1813, p. 53, pl. 58, fig. 3 — Pennsylvania.
Helodromas solitarius, CORY 1909, p. 204 (Curaçao).
Tringa solitaria solitaria, RUTTEN 1931, p. 110; CONOVER, Auk *61*, 1944, p. 539 (Curaçao); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 120 (Curaçao); VOOUS 1955, p. 84 (Curaçao).
Tringa solitaria, DE JONG 1948, p. 5 (Netherlands Leeward Group, general).

Native name — *Snepi*.

CURAÇAO. — Passenger migrant and winter visitor.

CURAÇAO: *Malpais*, 15.X.1951 (1 ♂ ad.), 18–20.III.1952 (2 ♂, 1st year), 17.X. 1954 (1 ♀; Collection Koelers, Curaçao); Hato, 21.X.1954 (1 ♀; Collection Koelers, Curaçao).

Taxonomy — The specimens collected agree in coloration and dimensions with the smaller southern race *solitaria*, as defined by CONOVER.

Iris brown; bill olive-green with blackish tip; feet olive-green or olive-yellow.

Measurements — CURAÇAO: ♂, wing 126, 130.5, 132, bill (exposed culmen) 27, 28.5, 28.5, tarsus 29.5, 29.5, 29.5; ♀, wing 129.5, 135, bill 28, 30.5, tarsus 32, 33.

Status — Previously only known from a male taken by DEARBORN in Curaçao on 25.III.1908.

We found this species in Curaçao only. It was a not uncommon, though usually solitary inhabitant of Suffisant, Malpais, Hato, Groot Santa Marta, and Grote Knip between 25.IX.1951 and 20.III.1952. From the presence of two or three individuals on 27.XII.1951, 16.I.1952, and 22.I.1952 at Malpais I feel I may safely include the species among the resident winter visitors of the island.

In the spring of 1954 it was observed in Curaçao until 18.IV (ANSINGH, KOELERS), but the extreme dates of arrival and departure in Curaçao are: 18.IX.1955 and 8.V.1955 (ANSINGH, KOELERS).

In the Venezuelan islands recorded only from Los Roques (CORY 1909, p. 216).

Biotope — With one single exception we found this species only along the edges of fresh water.

Food — Three stomachs examined contained nothing but the remains of great quantities of small insects (Coleoptera, Diptera, the larvae of small flies and mosquitoes).

Distribution — *Tringa s. solitaria* is a breeding bird from southern Canada. It migrates through Central America and the West Indies south through Colombia and Venezuela to southern South America.

Protective measures — Not protected by law.

50 **Actitis macularia** (Linnaeus)

Spotted Sandpiper

Tringa macularia LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 249 — Pennsylvania.

Totanus macularius, HARTERT 1893, p. 325 (Curaçao); HARTERT 1902, p. 307 (Curaçao).

Actitis macularia, ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 164 (Curaçao); CORY 1909, p. 197 (Aruba); RUTTEN 1931, p. 110 (Aruba, Curaçao); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 126 (Aruba); DE JONG 1948, p. 5 (Aruba, Curaçao, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Curaçao); PHELPS & PHELPS 1951, p. 12 (Bonaire); VOOUS 1955, p. 85 (Aruba, Curaçao, Bonaire).

Native name — *Snepi*.

ARUBA, CURAÇAO, BONAIRE. — Passenger migrant and winter visitor; probably also non-breeding summer visitor.

CURAÇAO: *Jan Thiel*, 16.X.1951 (2 ♂); *Groot Sint Joris*, 22.X.1951 (2 ♂); *Groot Piscadera*, 15.XII.1951 (1 ♂); *Malpais*, 1.X.1951 (1 ♂), 15.X.1951 (1 ♀); *Sint Jan*, 13.II.1952 (1 ♂); Savonet, 28.IV.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Boca Grandi, Savonet* 18.X.1951 (1 ♀).

Taxonomy — Iris dark brown, eyelid white; bill brownish-black, basal half of lower mandible pale fleshy-horn; legs and feet olive-yellow.

Measurements – CURAÇAO: ♂, wing 99, 100, 101, 101, 102.5, 103, 104, bill (measured from forehead) 26, 27, 27.5, 28, 28, 28, 30, tarsus 23, 24, 24.5, 24.5, 24.5, 25; ♀, wing 105.5, 106.5, bill 28, 29.5, tarsus 24, 25.

Status — First recorded by ROBINSON from a specimen collected in Curaçao in July 1892; it was seen, though not collected, by HARTERT in the same year. The first record from Aruba is by CORY from a specimen taken by FERRY in April or May 1908. Although stated by DE JONG to be regularly occurring in Bonaire too, the first authenticated specimen from that island is a male collected by PHELPS & PHELPS at Lac in November 1947.

We found it very common in all three islands, although usually occurring in solitary individuals or in pairs; groups of three or four birds were exceptional. Throughout the winter months it remained common. We did not meet with specimens in spotted summer plumage, but VAN DER WERF (*in litt.*) observed such individuals in Curaçao on 27.IV and 20.VII.1952. The species has been recorded in Curaçao throughout the summer (ANSINGH and KOELERS *in litt.*).

In the Venezuelan islands recorded from Los Roques (PHELPS & PHELPS 1951, p. 10), Tortuga (PHELPS & PHELPS 1945, p. 277), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 21), and Los Testigos (PHELPS & PHELPS 1945, p. 263).

Biotope — This species occurred along the edges of any fresh or salt water present. In fact, it was one of the most ubiquitous of the species of waders, rarely missing in any aquatic locality. Small fresh water pools seemed to be particularly preferred. We also observed it in thick mangroves, where the birds occasionally were seen running over the horizontal branches of the rhizophores up to 2 meters above the ground. On the barren limestone plateau on the north coast of Curaçao it was the only species of wader present in dry periods.

Food — Eight stomachs examined contained small insects in 7 instances (87%; small Diptera, small beetles, ants, small Hymenoptera, small bug), remains of small fiddler-crabs in 3 instances (37%), small snails in 2 instances (25%), and the seeds of *Nymphaea ampla* in 2 instances (25%; over 250 seeds in the stomach of one bird collected at a fresh water pool at Malpais, Curaçao, 1.X.1951).

Gonads — The largest gonads observed were the testes of a male collected on 13.II.1952 at Sint Jan, Curaçao (3 × 1½ mm).

Parasites — Miss THERESA CLAY (London) kindly identified the Mallophaga from our specimens as *Quadraceps ravus* (Kellog), 1899.

Distribution — *Actitis macularia* is a breeding bird from North America south to the southern United States. It winters throughout the West Indies, Central and South America, south to Argentina and Chile. It is a well-known visitor to Colombia and Venezuela.

Protective measures — Not protected by law.

51 **Catoptrophorus semipalmatus semipalmatus** (Gmelin)

Willet

Scolopax semipalmata GMELIN, Syst. Nat. *1*, *2*, 1789, p. 659 — New York.
Catoptrophorus semipalmatus semipalmatus, VOOUS 1955, p. 86 (Curaçao, Bonaire).

Native name — Snepi.

CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: Santa Cruz, 11.IX.1954 (1 ♀, collected by Koelers; Amsterdam Mus.), 2.X.1954 (1 ♂; Collection Koelers, Curaçao).

Taxonomy — Both specimens are in pale winter dress and were stated to be extremely fat all over the body. They belong to the smaller eastern race *semipalmatus* (see measurements). A male collected by ANSINGH on 12.IX.1952 at Piscadera, Curaçao, has a wing length of 183 mm (ASINGH *in litt.*), which is also sufficient proof of its subspecific identity as *semipalmatus*.

Iris dark brown; bill grey with black tip; legs and feet leaden-grey.

Measurements — CURAÇAO: ♂, wing 192, bill (measured from forehead) 64.5, tarsus 57; ♀, wing 193, bill 62, tarsus 56.

Status and biotope — Not previously recorded.

We observed this species once in Bonaire, *viz.* a solitary individual on 9.XI.1951 in the salt lagoon of Palu Lechi. — ANSINGH succeeded in collecting the first specimen from Curaçao along the reef at Piscadera on 12.IX.1952, after having previously observed an equally solitary individual near Rustenburgh, Rio Canario, Curaçao, on 21, 22, and 24. VIII.1952. Afterwards seen and collected by KOELERS at Santa Cruz, Curaçao, on 11.IX and 2.X.1954. All specimens seen and collected were very wild. The species has been recorded only during autumn migration between 21.VIII and 9.XI.

In the Venezuelan islands recorded from Los Roques (PHELPS & PHELPS 1951, p. 11) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 21).

Distribution — *Catoptrophorus s. semipalmatus* is a breeding bird from eastern temperate North America and from some of the Greater and northern Lesser Antilles (BOND 1950, p. 45). Its occurrence as a winter visitor in the West Indies seems to be rather sporadic, but it is more common along the northern and north-eastern coast of South America, where it is known from Venezuela, but not from Colombia. Records of the species from the Caribbean coast of Colombia seem to be exclusively referable to the larger western race *inornatus* (DE SCHAUENSEE 1949, p. 442).

Protective measures — Not protected by law.

52 **Limnodromus griseus griseus** (Gmelin)

Dowitcher

Scolopax grisea GMELIN, Syst. Nat. *1*, *2*, 1789, p. 658 — Long Island, New York.
Limnodromus griseus, VOOUS 1955, p. 86 (Curaçao).

Native name — Snepi.

CURAÇAO. — Passenger migrant.

CURAÇAO: Rustenburgh, 15.IX.1954 (1 ♀; Collection Koelers, Curaçao); Ceru Fortuna, 28.IX.1954 (1 ♀, collected by Koelers; Amsterdam Mus.).

Taxonomy — The specimens belong to the relatively short-billed, short-legged, and long-winged species of dowitcher, as defined by PITELKA (Zool. Pub. Univ. Cal. *50*, 1950, p. 1–108). Both specimens possessed a thick layer of subcutaneous fat (KOELERS *in litt.*).

Iris dark brown; bill greenish with broad black tip; legs and feet yellowish-green.

Measurements — CURAÇAO: ♀, wing 141, 147, bill (exposed culmen) 53, 57.5, tarsus 32.5, 37.

Status — Not previously recorded.

We observed this species once, on 25.X.1951 at Boca Sint Joris, Curaçao, among a flock of *Arenaria interpres*. — Afterwards, in late September and early October 1953 also observed by VAN DER WERF (*in litt.*) on the Santa Marta lagoon, Curaçao. Specimens were finally collected by KOELERS on 15.IX.1954 at Rustenburgh, Rio Canario, and on 28.IX.1954 on Ceru Fortuna, Curaçao. In 1955 the species was again observed in Curaçao on 20.VIII at Caracas Baai and on 23.VIII at Muizenberg (6 specimens; ANSINGH and KOELERS *in litt.*). The species has been recorded only during the autumn migration between 20.VIII and 25.X.

In the Venezuelan islands only recorded from Los Roques (PHELPS & PHELPS 1951, p. 11).

Distribution — *Limnodromus g. griseus* breeds in eastern Canada. It migrates along the Atlantic coast of North America and throughout the West Indies and South America, south to Brazil and Peru. It seems to be unknown from Colombia, but there is one record from Venezuela (FRIEDMANN & SMITH, Proc. U.S. Nat. Mus. *100*, 1950, p. 462).

Protective measures — Not protected by law.

53 **Capella gallinago delicata** (Ord)

Wilson's Snipe

Scolopax delicata ORD, in reprint, WILSON, Amer. Orn. *9*, 1825, p. ccxviii — Pennsylvania.

Capella gallinago delicata, VOOUS 1955, p. 87 (Curaçao, Bonaire).

Native name — *Snepi*.

CURAÇAO, BONAIRE. — Passenger migrant and winter visitor

CURAÇAO: *Wakau*, 24.X.1951 (1 ♀); *Malpais*, 12.XI.1951 (1 ♀). BONAIRE: *Kralendijk*, 14.XI.1951 (1 ♀).

Taxonomy — Iris dark brown; bill dark horn; legs and feet olive-grey or olive-green.

Measurements — CURAÇAO: ♀, wing 128, 134, bill (exposed culmen) 65, 66. BONAIRE: ♀, wing 133, bill 63.

Status — Not previously recorded, although PETERS (1892, p. 120) mentions the occurrence on migration of a kind of "Bekassine" in Curaçao.

We first observed a solitary specimen of this species on 23.X.1951 at Grote Knip, Curaçao, and collected one at Wakau the next day. On Bonaire we found the snipe in the lowlands flooded after rains around Kralendijk (8 specimens on 14.XI.1951, and one on 27.XI.1951). Also observed on 23.II.1952 at Rio Canario, Curaçao (ANSINGH, verbal communication). — During the exceptionally rainy season 1954–1955 the species stayed throughout the winter months at the fresh water pool of Muizenberg, Curaçao, until 26.III.1955 (ANSINGH, KOELERS *in litt.*).

Extreme dates of arrival and departure in Curaçao: 11.X.1954 and 26.III.1955 (ANSINGH, KOELERS).

Not recorded from the Venezuelan islands.

Biotope — Mainly found in fresh water marshes, even in those of very small size.

Food — The stomachs examined contained the remains of small insects of various kinds, among which were the larvae of Diptera and water beetles.

Distribution — *Capella g. delicata* is a breeding bird from North America. It winters through the West Indies and Central America south to northern South America, where it is known from Colombia, Venezuela, and the Guianas (HELLMAYR & CONOVER, *1*, (*3*), 1948, p. 149).

Protective measures — Not protected by law.

54 **Calidris canutus rufa** (Wilson)

Knot

Tringa rufa WILSON, Amer. Orn. *7*, 1813, p. 43, pl. 57, fig. 5 — New Jersey.
Calidris canutus, VOOUS 1955, p. 88 (Bonaire).

Native name — unknown.

BONAIRE. — Winter visitor.

No material.

Status — Not previously recorded. At present only known from an unpublished field observation by G. J. VAN OORDT, who observed several knots in winter dress on the shores of the Pekelmeer, Bonaire, on 29.II.1948.

Not recorded from the Venezuelan islands.

Distribution — *Calidris c. rufa* is a breeding bird from northeastern arctic Canada. It migrates mainly along the Atlantic coast of America south to Tierra del Fuego. It is unknown from Colombia, but there is one record from the coast of Venezuela (PHELPS & PHELPS, Proc. Biol. Soc. Wash. *67*, 1954, p. 103) and another from Trinidad (HELLMAYR & CONOVER *1* (*3*), 1948, p. 167).

Protective measures — Not protected by law.

55 **Calidris alba** (Pallas)

Sanderling

Tringa alba PALLAS, in VROEG's Catalogue, Adumbr. 1764, p. 7 — coast of North Sea (Holland).

Calidris leucophaea, CORY 1909, p. 197 (Aruba).
Calidris alba, RUTTEN 1931, p. 109 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 6 (Aruba, Curaçao, Bonaire); VOOUS 1955, p. 89 (Aruba, Curaçao, Klein Curaçao, Bonaire).
Crocethia alba, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 173 (Aruba); PHELPS & PHELPS 1951, p. 13 (Bonaire); VOOUS 1953, p. 188 (Aruba, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

ARUBA: *Westpunt*, 20.XII.1951 (1 ♀). BONAIRE: Pekelmeer, 8.VI.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Pekelmeer*, 13 and 28. XI.1951 (2 ♂, 2 ♀); without locality, 13.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Iris dark brown; bill, legs and feet black.
Measurements — ARUBA: ♀, wing 127.5, bill (exposed culmen) 27. BONAIRE ♂, wing 120, 124, 126, bill 24.5, 24.5, 25.5; ♀, wing 124.5, 127, 128, bill 25, 25.5, 26.

Status — Previously recorded only by CORY, who mentions specimens collected and observed by FERRY in Aruba in May-June 1908, and by RUTTEN, who collected specimens in Bonaire on 13.V and 8.VI.1930 and observed others in Aruba and Curaçao.
We found it a not uncommon, though rather local species in all three islands from September onwards; it was also observed at Klein Curaçao (26.I.1952).
In the Venezuelan islands it has been recorded from Los Roques (PHELPS & PHELPS 1951, p. 11) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 21).
Biotope — This species was most frequently found along bright sandy beaches and sun-burnt salt lagoons, where the birds were running along the water's edge, often in white salt foam and in company with *Pluvialis squatarola* and sometimes *Arenaria interpres* and *Charadrius alexandrinus*. In Aruba we observed the species regularly on the beaches of Malmok and Westpunt and once (20.XII.1951) on the dry, grassy plains around the lighthouse, together with *Charadrius hiaticula* and *Charadrius collaris*. In Curaçao we saw it in the Jan Thiel lagoon, and in Bonaire it was present among the mixed flocks of sandpipers always present in the Pekelmeer and at Lac (13.XI.1951–26.III.1952).
Food — The stomachs of four specimens collected along the water's edge showed nothing but large quantities of small, aquatic insects (3 × small Diptera, larvae of *Ephydra*, and small Coleoptera) and *Artemia* (1 ×). The stomach of an additional bird taken on grassy plains in northwestern Aruba contained beetles and large black-and-red grasshoppers.
Distribution — *Calidris alba* is a breeding bird from arctic North America and Eurasia. In the western hemisphere it winters south to Argentina and Chile. It is a common visitor to the West Indies and has been recorded from the north coast of Venezuela and the west coast of Colombia.
Protective measures — Not protected by law.

56 **Calidris pusilla** (Linnaeus)

Semipalmated Sandpiper

Tringa pusilla LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 252 — Hispaniola.
Ereunetes pusillus, CORY 1909, p. 197 (Aruba); RUTTEN 1931, p. 107 (Curaçao, Bonaire); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 176 (Aruba); DE JONG 1948, p. 6 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 13 (Bonaire).
Calidris pusilla, VOOUS 1955, p. 90 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Snepi*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

CURAÇAO: *Jan Thiel*, 16.X.1951 (1 ♂, 1 ♀); *Boca Spaanse Water*, 25.XI.1951 (1 sex unknown); *Veeris*, 5.X.1951 (1 sex unknown); *Malpais*, 26.IX.1951 (2 ♂, 1 ♀), 15.X.1951 (1 ♂); *Groot Santa Marta*, 10.X.1951 (1 ♀); Santa Cruz, 24.IV. 1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Playa Abau, Grote Knip*, 28.IX.1951 (1 ♂). KLEIN CURAÇAO: 26.I.1952 (1 ♂). BONAIRE: *Goto*, 25.III.1952 (1 ♂); *Saliña Slagbaai*, 8.XI.1951 (1 ♂, 1 ♀); Pekelmeer, 8.VI. 1930 (2 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Pekelmeer*, 13.XI.1951 (1 ♂, 2 ♀), 28.XI.1951 (4 ♂, 3 ♀), 26.III.1952 (1 ♂).

Taxonomy — Iris dark brown; bill black; legs and feet black or blackish.

Measurements — CURAÇAO and KLEIN CURAÇAO: ♂, wing 91.5, 94.5, 97, 97.5, 98, 98.5, bill (exposed culmen) 17, 17.5, 17.5, 18, 18, 22, tarsus 21, 21, 21, 21, 21; ♀, wing 93.5, 95.5, 97.5, bill 17.5, 18.5, 20.5, tarsus 21, 21, 21. BONAIRE: ♂, wing 93.5, 93.5, 94.5, 95.5, 95.5, 96.5, 97, bill 17.5, 17.5, 18.5, 19, 19, 19, 19.5, tarsus 20.5, 21, 21, 21, 21.5, 22, 22; ♀, wing 96, 98.5, 99.5, 99.5, 100,100, bill 18, 19.5, 19.5, 20.5, 20.5, 21, tarsus 21.5, 22, 23, 23, 23, 24. — Average measurements, ♂, wing 95.7, bill 18.5, tarsus 21.2; ♀, wing 97.8, bill 19.5, tarsus 22.2.

Status — Previous records are based on 3 specimens collected by FERRY in Aruba in April-May 1908 (CORY), and 2 specimens collected in Curaçao on 24.IV. 1930 and 2 specimens in Bonaire on 8.VI.1930 by RUTTEN.

We found it the most abundant of the species of sandpipers, occurring in all three islands, including Klein Curaçao. It was present in variable numbers from September to April, being most numerous in October and March. Flocks of hundreds of these birds occurred in the Pekelmeer, Bonaire, on 26.III.1952. In Aruba they were particularly common in the saliñas of Druif and Sabaneta.

ANSINGH and KOELERS (*in litt.*) found this species in Curaçao plentifully throughout July, August, and September.

In the Venezuelan islands recorded from Las Aves and Los Roques (PHELPS & PHELPS 1951, p. 11 and 21), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 21) and Los Testigos (PHELPS, Jr., 1945, p. 263).

Biotope and habits — We observed this species both solitarily and in flocks of over hundred individuals along the edges of salt lagoons and on saline mud flats, but on the many smaller salt or fresh waters as well, even on those along the roadsides close to Willemstad, Curaçao (October 1951). They often associated with other species of waders, particularly with *Calidris minutilla* and *C. mauri*, but also with *C.*

alba and *Tringa flavipes*. They were often observed to wade in deeper water than the equally common *C. minutilla*.

Food — 20 stomachs examined contained small insects in 18 instances (90%), among which were mainly the larvae and adults of salt-flies (*Ephydra*; 70%) and other small Diptera; once also small beetles. In addition we found the fragments of small fiddler-crabs in the stomach of an individual shot at the boca of the Spaanse Water, where fiddler-crabs were common along the mangroves. In 5 instances (25%) we identified the small black fruits which at times we found in great numbers washed ashore some of the lagoons, and which we thought to be those of *Ruppia*.

Distribution — *Calidris pusilla* is a breeding bird from northern North America; it winters along the coast of Central and South America south to Chile and Patagonia. It is an abundant passenger migrant in the West Indies and has been regularly recorded from the Caribbean coasts of Colombia and Venezuela.

Protective measures — Not protected by law.

57 **Calidris mauri** (Cabanis)

Western Sandpiper

Ereunetes mauri CABANIS, Journ. f. Orn. *4*, (1856) 1857, p. 419 — South Carolina.
Calidris mauri, VOOUS 1955, p. 91 (Aruba, Curaçao, Bonaire).

Native name — *Snepi*.

ARUBA, CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

CURAÇAO: Sint Michiel, 14.VIII.1954 (1 ♀; Collection Koelers, Curaçao). BONAIRE: *Saliña Martinus*, 24.III.1952 (1 ♀); *Pekelmeer*, 9 and 13.XI.1951 (1 ♂, 1 ♀).

Taxonomy — The specimen from 24.III.1952 has partly changed its greyish winter plumage for the mainly rufous-brown dress of summer.

Iris dark brown; bill, legs and feet black.

Measurements — CURAÇAO: ♀, wing 101.5, bill (measured from forehead) 31.5, tarsus 25.5. BONAIRE: (♂), wing 96, bill 27.5, tarsus 22.5; ♀, wing 98.5, 99, bill 30, 31, tarsus 23, 23.5.

Status — Not previously recorded.

We found this species in all three islands between 28.IX and 13.XI. 1951 and again on 24.III and 27.IV.1952. It was, however, the least common of the three species of "peeps" or small sandpipers (*C. minutilla, C. pusilla, C. mauri*).

Later field observations by ANSINGH and KOELERS (*in litt.*) would indicate that the species may be observed throughout the summer, as there are pertinent records from 29.VI, 31.VII, 14.VIII, 16.VIII, 22.VIII, and 10.IX, all from Curaçao in 1954.

In the Venezuelan islands the species is recorded only from Los Roques (PHELPS & PHELPS 1951, p. 11) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 11).

Biotope and habits — We observed this sandpiper along with the other species of its tribe on salt mud flats and along the shores of salt inland waters, but also near fresh water. It was particularly numerous on 28.IX.1951 in the saliña of

Playa Abau, Curaçao, and on 13.XI.1951 on the shores of the Pekelmeer, Bonaire, but in none of these cases were more than 30 or 40 specimens present. We found them without exception in company with *C. minutilla* and *C.pusilla*; once a mixed flock of these three species and *C. alba* was observed (13.XI.1951, Pekelmeer, Bonaire). They were often found wading in deeper water than *C.minutilla* and *C. pusilla* and more often than those species kept their heads fully submerged when feeding. Their movements appeared more elegant than either of the other species.

Food — Three stomachs examined contained the remains of large quantities of minute insects, among which small Diptera and Coleoptera of 1–4 mm; also one small snail (1½ mm) and the remains of a few small *Artemia*.

Distribution — *Calidris mauri* is a breeding bird from the tundra of arctic North America; it winters along the Gulf and Caribbean coasts and in the West Indies south to northern South America, where it is known as a winter visitor from Colombia and Venezuela.

Protective measures — Not protected by law.

58 **Calidris minutilla** (Vieillot)

Least Sandpiper

Tringa minutilla VIEILLOT, Nouv. Dict. Hist. Nat. *34*, 1819, p. 466 — Nova Scotia.
Tringa minutilla, HARTERT 1893, p. 335 (Bonaire); HARTERT 1902, p. 307 (Bonaire).
Pisobia minutilla, CORY 1909, p. 197 (Aruba); RUTTEN 1931, p. 108 (Bonaire?); DE JONG 1948, p. 6 (Curaçao); PHELPS & PHELPS 1951, p. 13 (Bonaire).
Erolia minutilla, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 184 (Aruba).
Calidris minutilla, VOOUS 1955, p. 92 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — Snepi.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

ARUBA: *Saliña Druif*, 9.XII.1951 (1 ♂, 2 ♀). CURAÇAO: *Jan Thiel lagoon*, 16.X.1951 (2 ♂); *Groot Piscadera*, 24.X.1951 (2 ♂), 26.X.1951 (1 ♀); *Malpais*, 15.X.1951 (1 ♀). KLEIN CURAÇAO: 26.I.1952 (1 ♀), 11.IV.1952 (1 ♀). BONAIRE: *Saliña Martinus*, 24.III.1952 (1 ♂); *Saliña Slagbaai*, 8.XI.1951 (1 sex unknown); *Pekelmeer*, 13.XI.1951 (1 ♀, 2 sex unknown), 28.XI.1951 (7 ♂, 2 ♀, 6 sex unknown).

Taxonomy — Iris dark brown; bill black; legs and feet yellowish-brown, ochraceous, or olive-brown.

Measurements — ARUBA: ♂, wing 92.5, bill (exposed culmen) 19.5, tarsus 20; ♀, wing 88, 88.5, bill 20, tarsus 19, 20. CURAÇAO and KLEIN CURAÇAO: ♂, wing 86.5, 88, 90, 91, bill 17, 18, 18, 19, tarsus 19, 19, 19.5, 19.5; ♀, wing 89.5, 90.5, 90.5, 91, bill 17.5, 18.5, 19, tarsus 19, 19.5, 19.5, 20. BONAIRE: ♂, wing 87, 88.5, 89, 89.5, 89.5, 90, 90.5, 94.5, bill 17, 17.5, 17.5, 18, 18, 18, 19, 19.5, tarsus 18, 18.5, 19, 19.5, 19.5, 19.5, 19.5, 20.5; ♀, wing 94.5, 95.5, bill 19.5, 20. — Average measurements, ♂, wing 89.5, bill 18.0, tarsus 19.2; ♀, wing 91.2, bill 18.9, tarsus 19.5.

Status — The few previous authenticated records of this species refer to one male collected by HARTERT in Bonaire on 23.VII.1892 and to five specimens col-

lected by FERRY (CORY) in Aruba in April-May 1908. It was also observed by PHELPS and PHELPS in November 1947 at the Pekelmeer, Bonaire.

We found it not uncommon in all three islands, including Klein Curacao, although in smaller numbers than *Calidris pusilla*. It was observed between 26.IX. 1951 (Malpais, Curaçao) and 11.IV.1952 (Klein Curaçao), being most numerous along the shores of the Pekelmeer, Bonaire, where flocks of over fifty individuals were present in November 1951. In Aruba it was particularly common in the saliñas of Druif and Sabaneta.

In the Venezuelan islands recorded from Las Aves and Los Roques (PHELPS & PHELPS 1951, p. 11 and 21), Blanquilla (PHELPS, Jr., 1948, p. 99), Tortuga (PHELPS, Jr., 1945, p. 277), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 22), and Los Testigos (PHELPS, Jr., 1945, p. 263).

Biotope and habits — We observed this species in exactly the same biotope as *C. pusilla, viz.* along the sandy shores of salt lagoons and on salt mud flats, but also on small pools of fresh water and, once, in a small meadow with grazing cattle (Malpais, Curaçao). It often occurred in mixed flocks with *C. pusilla* and *C. mauri*. On 28.XI.1951 I obtained from a mixed flock of slightly over 100 sandpipers 12 individuals of the present species, 7 of *pusilla* and 2 of *alba*.

Additional observations by ANSINGH and KOELERS (*in litt.*) have shown that the species is also present in Curaçao during the summer months.

Food — All 27 stomachs examined contained the remains of small insects (100%), among which were mainly the larvae and adults of the salt-fly (*Ephydra*, 74%), also a few other insects and small seeds of what we thought to be *Ruppia* (22%).

Distribution — *Calidris minutilla* is a breeding bird from northern North America, wintering south through Central America and the West Indies to Peru and southern Brazil. It is a common winter resident along the Caribbean coast of Venezuela and Colombia.

Protective measures — Not protected by law.

59 **Calidris fuscicollis** (Vieillot)

White-Rumped Sandpiper

Tringa fuscicollis VIEILLOT, Nouv. Dict. Hist. Nat. *34*, 1819, p. 461 — Paraguay.
Erolia fuscicollis, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 187 (Aruba).
Calidris fuscicollis, VOOUS 1955, p. 92 (Aruba, Curaçao, Bonaire).

Native name — *Snepi*.

ARUBA, CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: Sint Michiel, 16.V.1954 (1 ♂; Collection Koelers, Curaçao).

Taxonomy — Iris dark brown; bill, legs and feet black.

Measurements — CURAÇAO: ♂, wing 125.5, bill (measured from forehead) 28.5, tarsus 24.5.

Status — Listed only by HELLMAYR & CONOVER, from 3 specimens collected by FERRY in Aruba between 22.IV and 7.V.1908 (RAND *in litt.*).

We observed this species twice, *viz.* (1) several birds among a mixed feeding flock

of small sandpipers and other waders at the saliña of Grote Knip, Curaçao (28.IX. 1951); (2) a conspicuously tame single specimen among other waders on the shallow shores of the salt pans of Playa Frans, Bonaire (24.XI.1951). In both cases the birds were conspicuous by their white rump-patch, pale grey coloration, slender appearance, longer legs and larger average size than the ever-present *C. pusilla* and *C. minutilla*.

On 16.V.1954 a flock of about 20 specimens was observed on the saline mud flats of Sint Michiel (Curaçao) by ANSINGH and KOELERS (*in litt.*) and 2 specimens were collected for identification, one of these having been examined by the author and listed above.

In the Venezuelan islands only known from Tortuga (PHELPS, Jr., 1945, p. 277).

Food — The contents of the stomach are recorded by KOELERS as being insects and small snails.

Distribution — *Calidris fuscicollis* is a breeding bird from northern North America. It winters in southern South America. Apart from Tortuga it is also known in Venezuela as a fall transient along the north coast (WETMORE 1939, p. 194), but it has apparently not yet been recorded from Colombia.

Protective measures — Not protected by law.

60 **Calidris melanotos** (Vieillot)

Pectoral Sandpiper

Tringa melanotos VIEILLOT, Nouv. Dict. Hist. Nat. *34*, 1819, p. 462 — Paraguay.
Pisobia maculata, CORY 1909, p. 196 (Aruba); RUTTEN 1931, p. 108 (Aruba).
Calidris melanotos, VOOUS 1955, p. 93 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Snepi*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: *Veeris*, 3.X.1951 (1 ♀); *Malpais*, 15.X.1951 (2 ♀). BONAIRE: *Palu Lechi*, 27.XI.1951 (1 ♂, 1 ♀).

Taxonomy — Iris brown; bill horn-colour or greenish-brown with dark tip; legs and feet pale yellowish-green.

Measurements — CURAÇAO: ♂, wing 131.5, tail 56.5, bill (exposed culmen) 28, tarsus 28; ♀, wing 130.5, 137.5, tail 55, 57.5, bill 25, 30, tarsus 27, 29. BONAIRE: ♂, wing 149.5, tail 61.5, bill 29, tarsus 30; ♀, wing 132, tail 55, tarsus 30.

Status — Previously only known from Aruba, where FERRY took three specimens in April-May 1908 (CORY).

We found solitary specimens of this species at Malpais, Curaçao, between 26.IX and 15.X.1951. A flock of about 5 individuals was present in the saliña of Palu Lechi, Bonaire, on 27.XI.1951. — In the fall of 1952 the species appeared in Curaçao as early as on 21.VIII; in 1955 it was observed from 2.VIII onwards (ANSINGH and KOELERS *in litt.*). On 30.VIII.1952 it was observed at Klein Curaçao (ANSINGH *in litt.*). The species has been recorded only during the autumn migration between 2.VIII and 27.XI.

Not recorded from the Venezuelan islands.

Biotope — Found along the shores of both salt and fresh waters. They seemed to prefer the shore vegetation of fresh water pools, where they associated with other waders, but, when flushed, never mixed up with these.

Food — Four stomachs examined contained various small seeds (2 ×) and insects, among which were the larvae of Diptera (2 ×) and small beetles (2 ×).

Distribution — *Calidris melanotos* is a breeding bird from arctic North America and extreme northeastern Siberia. It winters in the southern half of South America. It is known on migration from Venezuela (HELLMAYR & CONOVER, *1* (*3*), 1948, p. 194) and the Caribbean coast of Colombia (DE SCHAUENSEE 1949, p. 446).

Protective measures — Not protected by law.

61 **Micropalama himantopus** (Bonaparte)

Stilt Sandpiper

Tringa himantopus BONAPARTE, Ann. Lyc. Nat. Hist. New York *2*, 1826, p. 157 — New Jersey.

Micropalama himantopus, VOOUS 1955, p. 94 (Curaçao, Bonaire).

Native name — *Snepi.*

CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

BONAIRE: *Pekelmeer*, 26.III.1952 (2 ♀).

Taxonomy — Both specimens are in pale grey winter plumage in which only very few new, brown feathers appear.

Iris brown; bill black; legs and feet pale olive.

Measurements — BONAIRE: ♀, wing 132, 137, bill (measured from forehead) 45.5, 46, tarsus 40, 40.

Status — Not previously recorded.

We observed this species twice on exactly the same spot along the shores of the Pekelmeer, Bonaire, *viz.* two specimens on 28.XI.1951 and on 26.III.1952. — The species was observed and collected for the first time in Curaçao by ANSINGH (*in litt.*) on 3.X.1952 at the Schottegat near Rustenburgh, Rio Canario (1 ♂). A further specimen was collected on 2.X.1954 at Santa Cruz by KOELERS (*in litt.*).

Extreme dates of arrival and departure: 10.IX.1954 (Curaçao; KOELERS) and 26.III.1952 (Bonaire; VOOUS).

Not recorded from the Venezuelan islands.

Biotope — Observed only along the shore of salt water, where these birds were found to wade in a conspicuously upright attitude in rather deep water, in company with *Tringa flavipes* and various other waders.

Food — The stomachs examined contained great numbers of the larvae of the salt-fly (*Ephydra*), as well as some other unidentifiable animal matter,

Distribution — *Micropalama himantopus* is a breeding bird from northern North America. Outside the breeding time it may be found throughout temperate and tropical America south to Argentina and Chile. Although known from Venezuela (HELLMAYR & CONOVER, *1* (*3*), 1948, p. 204), it has apparently not yet been recorded from Colombia.

Protective measures — Not protected by law.

62 **Himantopus himantopus mexicanus** (P. L. S. Müller) Plate II

American or Black-Necked Stilt

Charadrius mexicanus P. L. S. MÜLLER, Natursyst., Suppl., 1776, p. 117 — Mexico.
Himantopus nigricollis, PETERS 1890, p. 121 (Curaçao).
Himantopus mexicanus, HARTERT 1893, p. 325 (Curaçao), 334 (Bonaire); HARTERT 1902, p. 307 (Curaçao, Bonaire); RIDGWAY, *8*, 1919, p. 444 (Curaçao, Bonaire); RUTTEN 1931, p. 106 (Curaçao, Bonaire).
Himantopus himantopus mexicanus, DE JONG 1948, p. 6 (Curaçao, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Curaçao); PHELPS & PHELPS 1951, p. 13 (Bonaire); VOOUS 1955, p. 95 (Curaçao, Bonaire, Klein Bonaire).

Native name — Snepi hudiu, Snepi di sabana (Curaçao), *caweta di patu, macamba* (Bonaire).

CURAÇAO, BONAIRE, KLEIN BONAIRE. — Breeding bird and winter visitor.

CURAÇAO: *Saliña Santa Cruz*, 18.IV.1952 (1 ♂, 1 ♀); *Grote Knip*, 28.IX.1951 (1 ♂). BONAIRE: *Sabana*, 29.XI.1951 (1 ♀). KLEIN BONAIRE: 14.V.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Iris dark brown; bill black; legs and feet rosy-red.

Measurements — CURAÇAO: ♂, wing 217.5, bill (exposed culmen) 62, 64.5, tarsus 106, 108.5; ♀, wing 209, bill 67.5, tarsus 103. BONAIRE and KLEIN BONAIRE: ♂, tarsus 111; ♀, wing 191.5, 207, bill 59, 64, tarsus 90, 100.

Status — First reported from Curaçao by ERNST PETERS in 1890, shortly afterwards followed by the observations by HARTERT in 1892 in Curaçao and Bonaire. HARTERT observed adult and young birds at Savonet in June and thought that these birds had been breeding in the island. RUTTEN found the species common, particularly in Bonaire, and collected a specimen on Klein Bonaire. It has not yet been recorded from Aruba.

We found this species rather scarce in Curaçao, but is was regularly distributed and locally abundant in Bonaire. It was remarkably common in November in the Saliña Slagbaai, the Saliña Martinus, and the Saliña Tam. In the last named locality a flock of over 100 individuals was observed on 20.XI and 24.XI.1951. We did not observe the species in Aruba. — Throughout June and July 1952 the species was observed in various localities in Curaçao (Rustenburgh, Jan Thiel) by ANSINGH, BRONNEBERG and VAN DER WERF (*in litt.*). The first breeding records are from 1954, when three nests were found in the second half of May on the east coast of the Schottegat on low stony walls separating deserted salt pans (ANSINGH *in litt.*). Nests were also reported in 1955.

In the Venezuelan islands the species has been recorded (not breeding!) from Las Aves (PHELPS & PHELPS 1951, p. 21), Los Roques (HELLMAYR & CONOVER, *1* (*3*), 1948, p. 212; not recorded by PHELPS & PHELPS 1951!), Tortuga (PHELPS, Jr., 1945, p. 278), and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 22).

Biotope — The species was almost exclusively observed in salt lagoons and on the edges of salt pans. On several occasions we saw these birds feeding together with a flock of *Anas discors* among cactus and acacia thickets which were temporarily flooded after heavy rains (Bonaire). It has been found breeding on saline mud flats as well as on fresh water pools.

Food — Five stomachs examined contained insects (60%: small beetles, e.g. Gyrinidae; small flies), small snails (20%: *Potamopyrgus*), minute fish bones (20%), and many small black seeds (60%; presumably *Ruppia*).

Reproduction cycle — The testis of the collected males showed the following dimensions: 2½ × 2 mm (28.IX), 4 × 1½ mm (29.XI), 7½ × 3 mm (18.IV). One female collected on 18.IV.1952 at Santa Cruz from a flock of about 8 individuals had the ovary active, with follicles of up to 3 mm in diameter, and the oviduct swollen and twisted; it may have been a local breeding bird. We did not observe any indications of breeding activity, but nests with highly incubated eggs were found by ANSINGH (*in litt.*) on 26.V.1954; eggs hatched on 10.VI.1954.

Nests and eggs — Nests found by ANSINGH in 1954 were made of small stones, coral debris and shells. They contained 4, 3, and 3 eggs, respectively, and measured (mm):

42 × 31	47 × 32	43 × 32
44 × 32	48 × 31	44 × 32
44 × 33	48 × 32	45 × 32
45 × 33		

After the exceptionally wet winter season 1954–1955 at least seven nests of this species were found and photographs taken in Curaçao by ANSINGH, Brother ARNOLDO, KOELERS, and VAN DER WERF (*in litt.*) (Plate II):

(1) one nest with 4 eggs, 20.III.1955 on mud flats surrounding the fresh water pool at Muizenberg. One addle egg measured 45.6 × 30.5 mm.

(2) 4 young, not yet able to fly, 7.IV.1955 at the fresh water pool at Rustenburgh.

(3) four breeding pairs, 21.IV.1955 at Rustenburgh. One set of eggs measured: 41.5 × 31.2, 41.6 × 32.2, 41.8 × 32.5, 44.0 × 31.5 mm, respectively.

(4) one nest with 4 eggs, 15.V.1955 (still present 25.V) on the small, flat tern island in the Jan Thiel lagoon. Eggs measured 44.6 × 31.6, 45.5 × 32.5, 46.0 × 32.0, 46.7 × 32.7 mm, respectively.

The Curaçao eggs, though of a rather conspicuous creamy or buffish ground-colour, are generally indistinguishable from Old World eggs of this species.

Average of 10 eggs from the breeding season 1954: 45.0 × 32.0 mm.

Average of 9 eggs from the breeding season 1955: 44.2 × 31.9 mm.

Zoogeography — *Himantopus h. mexicanus* is a breeding bird from the southern and western United States southwards throughout Central America and the West Indies to northern South America, where it is well-known along the Caribbean coasts of Colombia and Venezuela. Another race (*melanurus*) occurs in subtropical and temperate parts of South America. The species as a whole has a wide pan-tropical distribution. The race *mexicanus* probably is a Tropical North American distributional element in the Netherlands Leeward Group, but the way of colonization into the islands is at least uncertain.

Protective measures — Not protected by law.

63 **Burhinus bistriatus vocifer** (l'Herminier)

Central American Thick-Knee

Aedicnemus vocifer L'HERMINIER, Mag. Zool. 7, cl. 2, 1837, pl. 84 — State of Monagas, N.E. Venezuela.

Oedicnemus bistriatus, RUTTEN, Ardea *23*, 1934, p. 215 (Curaçao).
Burhinus bistriatus, DE JONG 1948, p. 6, pl. 1, fig. 3 (Curaçao).
Burhinus bistriatus vocifer, VOOUS 1955, p. 95 (Curaçao).

Native name — unknown (not „krabètsj", RUTTEN!).

CURAÇAO. — Casual visitor.

No material.

Status — The only evidence of the occurrence of this species in the Netherlands Leeward Islands is a photograph made by Brother ARNOLDO (A. N. BROEDERS) of an individual caught in the xerophytic scrub near Piscadera Bay, July 1934 (DE JONG *l.c.*). The subspecific indication is made on zoogeographic considerations only, although the conspicuous dark striations on the breast visible on the photograph also point toward the race *vocifer*.

We did not observe this species.

In the Venezuelan islands the species is only known from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 20).

Distribution — *Burhinus b. vocifer* is an inhabitant of the arid tropical zone of northern South America, from northern Colombia and Venezuela to British Guiana and northern Brazil.

The species ranges throughout the arid subtropical and tropical regions of Central and northern South America. In the Greater and Lesser Antilles it is found only on Hispaniola.

Protective measures — Not protected by law.

64 **Stercorarius parasiticus** (Linnaeus)

Arctic Skua

Larus parasiticus LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 136 — Sweden.
Stercorarius parasiticus, VOOUS 1955, p. 96 (Curaçao).

Native name — unknown.

CURAÇAO. — Casual visitor.

CURAÇAO: *Sint Joris Baai*, 3.I.1952 (remains of a dead bird, with head and central tail feathers present).

Taxonomy — Bill slightly elongated, differing from *S. longicauda* in having the gonys relatively and absolutely shorter. The plumage-remains of the specimen showed the characters of the light colour-phase.

Measurements — CURAÇAO: sex unknown, wing, approximately 332, bill (exposed culmen) 30, bill from forehead 36, gonys 7.5.

Status — Not previously recorded.

The fresh remains of a dead specimen washed ashore the Sint Joris Baai and found on 3.I.1952 represent the only evidence of the occurrence of this species in Curaçao.

Not recorded from the Venezuelan islands.

Distribution — *Stercorarius parasiticus* is a breeding bird from arctic and subarctic North America and Eurasia. It winters in the southern oceans. In the Caribbean region it has been recorded from Cuba, Barbados, and the Grenadines (BOND 1945, p. 49), but there are no records from the Caribbean coasts of Venezuela and Colombia.

Protective measures — Not protected by law.

65 **Larus atricilla atricilla** Linnaeus

Laughing Gull

Larus atricilla LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 136 — Bahama Islands.
Larus atricilla, HARTERT 1893, p. 311 (Aruba), 326 (Curaçao), 337 (Bonaire); HARTERT 1902, p. 309 (Aruba, Curaçao, Bonaire); CORY 1909, p. 194 (Aruba); DE JONG 1948, p. 6 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 14 (Bonaire); VOOUS 1955, p. 98 (Aruba, Curaçao, Klein Curaçao, Bonaire).
Croicocephalus atricilla, RIDGWAY, *8*, 1919, p. 637 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 103 (Aruba, Curaçao, Bonaire).

Native name — *Meuchi*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Summer resident and winter visitor. Breeding not recorded.

ARUBA: Paardenbaai, 25.VI.1930 (1 ♀, end of first year, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Paardenbaai*, 18.XII.1951 (1 ♂ ad.), 8.IV.1952 (3 ♂ ad., 1 ♀ ad., 1 ♂ juv.). KLEIN CURAÇAO: 11.IV.1952 (3 ♂ ad., 1 ♀ ad.). BONAIRE: *Kralendijk harbour*, 27.III.1952 (2 ♂ ad.); Saliña Slagbaai, 31.V.1930 (1 juv., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); Pekelmeer, 8.VI.1930 (1 ad., 1 ♂ juv., collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Compared with statements by various authors our specimens show rather small dimensions (CLARK, Proc. Boston Soc. Nat. Hist. *32*, 1905, p. 256; NOBLE, Bull. Mus. Comp. Zool. *60*, 1916, p. 367–368; PARKES, Proc. Biol. Soc. Wash. *65*, 1952, p. 193–195). Hence I follow NOBLE and PARKES in treating the West Indian breeding birds as subspecifically distinct from those from continental North America, without claiming, however, that a borderline between a northern (*megalopterus*) and a southern (*atricilla*) race should exist, the variation probably being of the nature of a regular cline.

Adult specimens in full breeding plumage, showing no signs of a body-moult, were collected by us on 27.III.1952 in Bonaire (2), 8.IV.1952 in Aruba (3), and 11.IV.1952 in Klein Curaçao (4). In addition to these probably local breeding birds there were on 8.IV.1952 in the Paardenbaai of Aruba, among a flock of 30–40 adult gulls with black heads, one bird still in partly adult winter plumage and one in first winter plumage, both of which were collected.

Iris dark brown, eyelid deep red (breeding plumage), or buffish-brown (winter and juvenile plumage); bill very deep dark red, becoming black towards the tip (breeding plumage), blackish-grey (winter plumage), or blackish-brown (juvenile plumage); legs and feet black, with deep reddish tinge (breeding plumage), or blackish (winter and juvenile plumage).

Measurements — ARUBA: ♂ ad., wing 300, 308, 311, 314, tail 112, 113, 116, 123, bill (measured from forehead) 47.5, 48.5, 51, 51, tarsus 47, 47, 47, 49; ♀ ad., wing 290, tail 107, bill 48, tarsus 47.5; ♂ juv., wing 301, tail 112, bill 47, tarsus 47; ♀ juv., wing ± 290, bill 45.5. KLEIN CURAÇAO: ♂ ad., wing 309, 312, 313, tail 115, 118, 119, bill 47, 47.5, 50, tarsus 47, 50, 50; ♀ ad., wing 301, tail 109, bill 47, tarsus 46.5. BONAIRE: ♂ ad., wing 303, 311, tail 117, 117, bill 49.5, 50, tarsus 48 ; unsexed ad, wing 300, bill 47.5; ♂ juv., wing 296, bill 48; unsexed juv., wing 312, bill 46.

Our largest adult specimen is the only bird collected in the winter months (♂, 18.XII.1951, Aruba); it shows the following dimensions: wing 314, tail 123, bill 48.5, tarsus 47. In view of the relatively larger size, this bird might be a wintering specimen from North America. The measurements of the remaining adult males can be summarized as follows:

Aruba, Klein Curaçao, Bonaire (27.III–11.IV.1952): wing 300–313, average (8) 308.4 mm.

The largest North American male mentioned by PARKES (Proc. Biol. Soc. Wash. *65*, 1952, p. 194) has a wing length of 356, whereas the smallest ones range between 321–325 mm.

Status and biotope — First seen (not collected) by HARTERT in June-July 1892 along the coast of all three islands; also seen by FERRY in April-May 1908 in Aruba (CORY). RUTTEN found it in 1930 fairly common along all three islands, but observed and collected more birds in juvenile than in adult plumage.

We observed one juvenile bird on 28.IX.1951 at Playa Abau, Grote Knip, but failed to see any gull until 18.XII.1952, when one bird in adult winter plumage was observed and collected in the Paardenbaai, Aruba. It remained our only specimen for three months, when on 26.III.1952 we observed 4 adults in Kralendijk harbour. From that date onwards the species became rather abundant and was regularly observed along the coasts of all three islands, including Lac in Bonaire and the Annabaai and the Schottegat in Curaçao. On 11.IV.1952 about 300 adult birds were present on Klein Curaçao (KOELERS, VAN DER WERF), but on 1.VI.1952 hardly 20 pairs remained (ANSINGH *in litt.*). The next summer, on 3.VI.1953, about 40 laughing gulls were present at Klein Curaçao, but again no nests were found (KOELERS *in litt.*). Various observers have noted the occurrence of the species in Curaçao throughout the summers of 1952, 1953, and 1954. Birds in first juvenile plumage were observed on 13.VIII.1952 near Hato and throughout July 1953 at Rustenburgh, Rio Canario (ANSINGH and VAN DER WERF *in litt.*). Again, the early date of the observation of a bird in juvenile plumage in Curaçao in 1955 (1.V.1955, Rustenburgh; ANSINGH and KOELERS *in litt.*) strongly suggests breeding in this island.

In the Venezuelan islands the species has been recorded from Los Roques[1]) (PHELPS & PHELPS 1951, p. 12), Blanquilla and Los Hermanos (PHELPS, Jr., 1948, p. 99 and 112), Tortuga (PHELPS, Jr., 1945, p. 278), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 22), and Los Frailes (PHELPS, Jr., 1945, p. 269).

Food and habits — Seven out of eight stomachs examined contained the remains of fish (87.5%). Among these one stomach contained about 50 specimens of *Antennarius* of 12–45 mm length and 1 *Exocoetus* of over 150 mm length (11.IV. 1952, Klein Curaçao). Fragments of *Spirula australis* (shell 2 × ; soft body 1 ×) were

[1]) Breeding recorded in July 1953 (PHELPS & PHELPS, Proc. Biol. Soc. Wash. *68*, 1955, p. 113).

found in 2 instances (8.IV.1952, Paardenbaai, Aruba; 11.IV.1952, Klein Curaçao). In addition there were the remains of small crabs, bivalves, and a noctuid in one instance each. Laughing gulls were often seen following brown pelicans when out fishing, trying to get part of their catch, even when a hazardous landing on the pelican's head or bill turned out to be the only way of reaching the aim. On 21.IV. 1952 I observed a flock of laughing gulls following a large whale in the southern Caribbean Sea between La Guaira and Trinidad.

Reproduction cycle — We did not find nests or eggs, but the specimens collected on 11.IV.1952 at Klein Curaçao showed such advanced stages of gonad development that breeding of the species within the limits of the Netherlands Leeward Islands can hardly be excluded: testis of three males, 12½ × 10, 16 × 8½, and 18 × 10 mm, respectively; largest follicle in the ovary of one female, 4½ mm.

Distribution — *Larus a. atricilla* is a breeding bird throughout the West Indies; it is probably also a breeding bird in the South Caribbean islands. A slightly larger form breeds along the Atlantic and Gulf coasts of North America and Mexico and along the Pacific coasts of southern California and Mexico. It is rare in winter in the West Indies. North American breeding birds winter from South Carolina southwards along the Atlantic and Pacific coasts to Brazil and Peru. The species is known as a winter resident on the Caribbean coasts of Colombia and Venezuela.

Protective measures — Not protected by law.

66 **Sterna hirundo hirundo** Linnaeus Plate III, IVa

Common Tern

Sterna hirundo LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 137.— Sweden.

Sterna hirundo, HARTERT 1893, p. 309 (Aruba, Curaçao, Bonaire), 326 (Curaçao), 337 (Bonaire); HARTERT 1902, p. 309 (Aruba, Curaçao, Bonaire); CORY 1909, p. 194 (Aruba); RIDGWAY, *8*, 1919, p. 493 (Bonaire); RUTTEN 1931, p. 104 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 6 (Aruba, Curaçao, Bonaire).

Sterna hirundo hirundo, HARTERT, Vög. Paläarkt. Fauna, 1921, p. 1702 (Aruba, Bonaire); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 306 (Aruba); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Curaçao); BOND 1950, p. 52 (Bonaire); PHELPS & PHELPS 1951, p. 14 (Bonaire); BOND, Second Suppl. Checkl. Birds West Indies, 1952, p. 10 (Aruba, Bonaire); VOOUS 1955, p. 100 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Meuchi*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Summer visitor (breeding!) and passenger migrant.

ARUBA: *Paardenbaai*, 8.IV.1952 (1 ♂, 1 ♀); Bucuti Reef, 25.VI.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Schottegat*, 20.X.1951 (1 ♀ imm.); *Schottegat near Rustenburgh*, 11.XI.1951 (1 ♂ imm.); Jan Thiel lagoon, 26.VII.1952 (clutch of 2 eggs and one broken egg shell, collected by Bronneberg & van der Werf; Amsterdam Mus.); Isla Macuacu, 2.VIII.1952 (1 ♀, collected by Bronneberg, Koelers & van der Werf; Amsterdam Mus.); without locality, 6.V.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). KLEIN CURAÇAO: 11.IV.1952 (1 ♂, 1 ♀). BONAIRE: Saliña Slagbaa, 31.V.1930 (2 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — I have not succeeded in discovering any constant difference in colour, wing pattern, proportions, or measurements between individuals from the South Caribbean, North America, and western and northern Europe. South Caribbean birds show a tendency towards smaller size.

Iris dark brown; bill red with broad black tip, legs and feet orange red, nails black. The immature specimens had the bill black with the base of the lower mandible tinged with dark red.

Measurements — ARUBA: ♂ ad.; wing 269, tail (longest tail feathers) 129, 148, bill (measured from forehead) 43, 46; ♀ ad., wing 252, tail 141, bill 41. CURAÇAO: ♂ imm., wing 250, bill 38.5; ♀ imm., wing 269, bill 40; ♀ 1st year (2.VIII), wing 242+, tail 147+, bill 37. KLEIN CURAÇAO: ♂ ad., wing 256, tail 151, bill 45; ♀ ad., wing 254.5, tail 152, bill 40.5. BONAIRE: ♂ ad., wing 241, 252, tail 134, 134, bill 44, 44; ♀ ad., wing 266, tail 139, bill 41.

Summary of measurements (mm):

Wing ♂ ad. 241–269 average (4) 254.5 ♀ ad. 252–266 average (3) 257.5.
Bill ♂ ad. 43–46 average (5) 44.4 ♀ ad. 40.5–41 average (3) 40.8

Status — HARTERT was the first to record the occurrence of this species along the coasts of all three islands in June and July 1892 and to record broken egg shells ascribed to the species in unoccupied mud nests of the famous flamingo colony of Bonaire. The same author considered two adult specimens collected by him in the above-mentioned locality (Pekelmeer) as local breeding birds. Owing to the very worn state of these specimens and to the lack of any further positive evidence in favour of the nesting of this species in the American tropics HARTERT's observations have received gradually growing doubt in the international ornithological literature, so that more than fifty years later HELLMAYR & CONOVER (*l.c.*, p. 305) could not state otherwise than that "No certain breeding record exists for any South American locality. Birds observed during the summer months in these countries were probably barren individuals lacking the physiological impulse to migrate." Such statements, however, are not in conformity with the known facts, for not only was an additional male specimen collected by FERRY in April-May 1908 in Aruba (CORY), but a downy young of a few days old was found in the Pekelmeer, Bonaire, on 8.VII. 1930 by RUTTEN; the same author collected 5 adult specimens in Aruba, Curaçao, and Bonaire between 6.V and 25.VI.1930. All specimens mentioned by RUTTEN are now in the Leiden Museum and have been examined by me.

We found small flocks of 5–20 individuals in adult or first year winter plumage as late as 28.X.1951 in the Schottegat, Curaçao. They were very silent birds and therefore difficult to distinguish in the field from *Sterna dougallii*, but two specimens subsequently collected proved our preliminary field identification to be correct. Common terns then remained absent in the islands until by the middle of April they were suddenly seen in solitary specimens or in pairs everywhere along the coast of all three islands. Previously, RUTTEN had also mentioned the arrival of the species in Curaçao by the first week of May There is, however, one winter observation of this species from Curaçao in February 1948 by VAN OORDT and CROOCKEWIT. On 11.IV. 1952 approximately 6 pairs were present on Klein Curaçao among a mixed flock of about 600 terns and laughing gulls. One year later, on 3.VI.1953, some 20 individuals were observed on the same islet by KOELERS (*in litt.*). — After our return in the Netherlands the Amsterdam Museum received two eggs and one broken egg shell collected by BRONNEBERG and VAN DER WERF on 26.VII.1952 at Isla Macuacu in the

Sint Joris Baai, and the skin of one adult specimen collected on 2.VIII.1952 with a colour slide of its nest containing two eggs on an islet in the Jan Thiel lagoon. The species was again found nesting on the last mentioned islet in the summers of 1953 and 1955 together with *Sterna dougallii*, *Sterna albifrons*, and *Charadrius alexandrinus* but all eggs were destroyed by a marauding *Mimus gilvus* (BRONNEBERG and VAN DER WERF *in litt.*). Nests and eggs were also found on small islands in the Spaanse Water in 1952, 1953, and 1955 (ANSINGH, J. G. DE JONG, VAN DER WERF; Plate III, IV).

Thus, actual breeding of this species in the South Caribbean islands has been proved.

Extreme dates of arrival and departure in Curaçao: 8.IV.1952 (Voous) and 26.XI. 1955 (ANSINGH and KOELERS).

In the Venezuelan islands the species has only been recorded as a passenger migrant and winter visitor in Los Roques (PHELPS & PHELPS 1951; p. 12) and Tortuga (PHELPS, Jr., 1945, p. 278).

Biotope — These terns have been observed fishing both at sea and in the wide bays and inlets, as well as in the harbours on the southwest coasts of the islands; also in salt lagoons and in the small fresh water pool near Rustenburgh, Rio Canario. Nests have been found on rocky ground with sparse vegetation on small islands in inland-bays and lagoons.

Food — Four stomachs opened for examination contained only small fish of up to 54 mm in length. Prof. Dr. L. F. DE BEAUFORT kindly identified some of these fishes as *Engraulis sp.* and others as belonging to the Blenniidae. These terns are also known to feed on cyprinodonts (Rustenburgh, Curaçao, ANSINGH and KOELERS).

Parasites — Miss THERESA CLAY (London) kindly identified the Mallophaga from one of our specimens from Curaçao as *Saemundssonia sternae* (L.).

Reproduction cycle — After their arrival in April 1952 these terns started immediately with courtship activity, which was noticed on 10.IV.1952 on the rocky coast of Malmok, Aruba, and on 11.IV.1952 at Klein Curaçao (KOELERS and VAN DER WERF). The testes of males collected in this period measured up to 8 × 4½ mm, whereas in the females the eggs in the ovary had grown to 2½ mm in diameter. Eggs have been found by BRONNEBERG and VAN DER WERF on 26.VII and 21. VIII.1952 and by KOELERS V.1955; downy chicks by RUTTEN on 8.VI.1930. The adult birds were noticed to be very aggressive at their breeding places.

Eggs — Light buffish-grey, with fine markings of dark brown and secundary spots of purplish-grey, the general pattern strongly reminding the egg of *Sterna albifrons*. Ground colour considerably lighter than in the majority of European eggs of this species examined, but particularly in 1954 and 1955 also darker eggs have been found (Plate IV). Among approximately 450 eggs from the Netherlands not more than 2 had the ground colour nearly as light and the spotting as fine as in some of the Caribbean eggs (0.4%); in BENT's presentation of the variation in the common tern's eggs from North America (Bull. U.S. Nat. Mus. *113*, 1921, plate 90, fig. 5–8) the extreme Curaçao type of variation does not occur. — Measurements: 41.4 × 29.7 and 43 × 29.9 mm (Jan Thiel lagoon); 38.4 × 28.4 and 40.7 × 29.8 mm (Macuacu Island; measured by VAN DER WERF).

Zoogeography — *Sterna h. hirundo* is a wide-spread breeding bird in North America, Europe and western Asia. Its nesting in the West Indian region has been almost as frequently stated as it has been rejected (see: BOND *l.c.*, p. 52–53; BOND, First Suppl. Checkl. Birds West Indies, 1951, p. 8). At present its nesting in the South Caribbean islands can be considered as proved. The only other certainly known breeding place of this species in the tropics is on Walker Island off the south

coast of Nigeria. North American breeding birds winter along the coasts of South America south to Argentina and Peru. During the non-breeding season it has also been recorded from Venezuela (specimens in the PHELPS Collection, Caracas) and Colombia (DE SCHAUENSEE 1949, p. 451).

Protective measures — Not protected by law.

67 **Sterna dougallii dougallii** Montagu Plate IVb

Roseate Tern

Sterna dougallii MONTAGU, Orn. Dict. Suppl. 1813 unpaged — Scotland.

Sterna dougalli, HARTERT 1893, p. 310 (Aruba); HARTERT 1902, p. 308 (Aruba); BUREAU, Proc. IV Int. Orn. Congr. London (1905) 1907, p. 343 (Aruba); RUTTEN 1931, p. 105 (Aruba); DE JONG 1948, p. 6 (Aruba).

Sterna dougallii dougallii, HARTERT, Vög. Paläarkt. Fauna, 1916, p. 1707 (Aruba); PETERS, *2*, 1934, p. 334 (Aruba); HELLMAYR & CONOVER, *1 (3)*, 1948, p. 312 (Aruba); BOND 1950, p. 53 (Aruba); VOOUS 1955, p. 101 (Aruba, Curaçao, Bonaire).

Sterna dougallii, JUNGE & VOOUS, Ardea *43*, (1955) 1956, p. 231–233 (Curaçao).

Native name — Meuchi.

ARUBA, CURAÇAO, BONAIRE. — Breeding bird.

CURAÇAO: Jan Thiel lagoon, 29.VII.1954 (1 ♂, collected by Koelers; Amsterdam Mus.), 21.V.1955 (1 egg, collected by Ansingh and Koelers; Amsterdam Mus.).

Taxonomy — Under parts purely white, except for a slight tinge of rosy-red on the breast. The specimen is in a fresh plumage and does not show signs of moult.

Iris dark brown; bill red with broad black tip; legs and feet bright red.

Measurements — CURAÇAO: ♂, wing 232, outer tail feathers 108.5, furcation of tail 36, bill (measured from forehead) 44.5, tarsus 21.5.

Status and reproduction cycle — Previously recorded only by HARTERT, who found a large breeding colony on the reef along the southwest coast of Aruba ("Serro Colorado") in 1892. Full clutch size was recorded as 3. The species had since then never been found on any of the South Caribbean islands. Moreover, the reef where HARTERT found the breeding colony is now uninhabited by birds, as it forms part of the large harbour of Sint Nicolaas.

As we missed the breeding season of terns and other sea-birds during our stay in the Netherlands Antilles, the present status of *Sterna dougallii* in these islands remained as uncertain as before. BOND (1950, p. 53, foot-note 56) is perfectly right in stating that *Sterna dougallii* and *Sterna hirundo* "are rarely seen in the Antillean region during the winter months", for we met with this species only once, *viz.* on 8.XI.1951, when about 5 individuals were fishing in the Saliña Slagbaai. These birds were very silent, uttering only now and then a short, soft call. They were conspicuous by their long, white, less greyish, wings, long tail streamers, and th e

lack of any dusky margin on the bend of the wing, so characteristic of the winter plumage of *Sterna hirundo*.

The species was rediscovered as a breeding bird in the Netherlands Antilles in the summers of 1952, 1953, 1954, and 1955, nests with eggs and young having been found on a small island in the Jan Thiel lagoon, Curaçao, by BRONNEBERG, KOELERS and VAN DER WERF (*in litt.*). In 1955 about 40 breeding pairs were present. (Plate IV). Nests containing 1 and 2 eggs were placed under the protective cover of low salt plants (*Sesuvium portulacastrum*). In 1952 one chick almost able to fly was photographed in colour by VAN DER WERF, under the alarming cries of the parents, but no more young were found. The young bird had a very dusky head and black instead of reddish legs. Black legs in American chicks of *Sterna dougallii* have also been described by JONES (Wilson Bull. *18*, 1906, p. 44). Next year (26.VII.1953) 2 or 3 breeding pairs were observed in the same place from a blind at close range. In the immediate neighbourhood of the nests two or three pairs of *Sterna hirundo*, at least four pairs of *Sterna albifrons* and two pairs of *Charadrius alexandrinus* were found nesting. All these nests were reported to have been subsequently destroyed by a marauding *Mimus gilvus*. In 1954 most of the eggs and young were robbed by egg-raiding men; in 1955 the whole of the colony was destroyed by the middle of June, egg-laying having commenced at the middle of May, but, again, man interfered! Of 25 nests counted on 21.V.1955 only 2 contained 2 eggs, the remaining ones each 1 egg (KOELERS).

The occurrence of this species on Bonaire (breeding?) is proved by its appearance on a colour-slide of the breeding place of *Sterna eurygnatha* at the Pekelmeer, taken by K. MAYER in June 1955.

In the Venezuelan islands recorded only from Los Roques, where it was breeding in 1954 (PHELPS & PHELPS, Proc. Biol. Soc. Wash. *68*, 1955, p. 113).

Eggs — Pale greenish-grey with fine blackish and brownish-black spots and flecks and bluish-grey secondary markings. Lighter and decidedly more finely spotted than eggs of *Sterna hirundo* and more pointed, less conical in shape (Plate IV). Dimensions of 10 eggs (including egg in the Amsterdam Museum) measured in the field by KOELERS on 21.V.1955 are as follows (mm):

39.0 × 29.1	42.8 × 30.0
40.4 × 29.9	43.2 × 28.6
40.9 × 28.4	43.8 × 29.4
41.9 × 31.8	43.9 × 29.5
42.7 × 29.1	44.4 × 29.5

Average of 10 eggs from Curaçao 42.3 × 29.5 mm, as against 41.9 × 28.8 mm of 7 eggs from Massachusetts, U.S.A., in the Amsterdam Museum (Collection NEIJSSEL).

Zoogeography — *Sterna d. dougallii* is a sporadic breeding bird along the temperate and warmer coasts of the North Atlantic Ocean. It is generally distributed throughout the West Indies, but it is rare along the north coast of South America, where I do not know of records from Colombia and Venezuela. It has been recorded on migration or wintering in Trinidad (BELCHER & SMOOKER, Ibis 1935, p. 295), British Guiana (DAVIS, Ibis 1954, p. 446), and on the east coast of Brazil (Bahia). *Sterna dougallii* has an almost world-wide, though extremely sporadic distribution along the temperate and warmer coasts of all continents. It is a West Indian element in the fauna of the Netherlands Leeward Islands.

Protective measures — Not protected by law.

68 **Sterna anaethetus melanoptera** Swainson

Bridled Tern

Sterna melanoptera SWAINSON, Birds West Africa *2*, 1837, p. 249 — coast of West Africa.
Sterna anaestheta, HARTERT 1893, p. 310 (Aruba); HARTERT 1902, p. 309 (Aruba).
Sterna anaetheta recognita, RIDGWAY, *8*, 1919, p. 513 (Aruba); RUTTEN 1931, p. 105 (Aruba).
Sterna anaethetus melanoptera, PETERS, *2*, 1934, p. 337 (Aruba); BOND, 1950, p. 53 (Aruba); VOOUS 1955, p. 102 (Aruba, Klein Curaçao).
Sterna anaethetus recognita, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 314 (Aruba).
Sterna anaethetus, DE JONG, 1948, p. 7 (Aruba).

Native name — unknown.

ARUBA, KLEIN CURAÇAO. — Irregular (non-breeding?) visitor; formerly breeding in Aruba.

KLEIN CURAÇAO: 3.VI.1953 (1 ♀, collected by Koelers; Amsterdam Mus.).

Taxonomy — The specimen has a very light greyish-white hind neck.

Measurements — KLEIN CURAÇAO: ♀, wing 263, bill (measured from forehead) 46, tail 170.5, tarsus 21.

Status — Previously mentioned only by HARTERT, who discovered a breeding colony of this species together with *Sterna dougallii* at the end of June 1892 on the reef wall along the southwest coast of Aruba opposite Ceru Colorado. With the establishment of the big oil-refinery industry in this part of Aruba these terns probably lost their suitable breeding places more than 25 years ago.

We did not find this species in the Netherlands Leeward Islands and adjacent waters, but observed solitary individuals of the species on the north coast of Venezuela some miles east of La Guaira on 21.VI.1952 and, the next day, in the Dragon's Mouth, between the Paria Peninsula and Trinidad. We were also informed that a female specimen with undeveloped gonads was caught on board a tanker between Maracaibo and Curaçao on 8.XII.1952 (ANSINGH *in litt.*).

The species was, however, rediscovered in the Netherlands Leeward Islands by KOELERS, who observed a flock of about 20 individuals at Klein Curaçao on 31.VI. 1953 and succeeded in collecting a specimen, which is now in the Amsterdam Museum. These birds were not at all shy, but did not show signs of breeding activity; the gonads of the collected female were inactive (ANSINGH *in litt.*). A further, juvenile specimen was caught on board a tanker on 5.X.1954 close to Bullenbaai on the south coast of Curaçao (KOELERS *in litt.*).

In the Venezuelan islands only recently recorded as a breeding bird on Los Roques (MUÑOZ-TEBAR, Mem. Soc. Cienc. Nat. La Salle, Caracas, *10* (27), 1950, p. 189–192).

Zoogeography — *Sterna a. melanoptera* is a breeding bird from small cays throughout the whole of the West Indies. Records from the mainland coast of Venezuela and Colombia seem to be extremely scarce. It also occurs along the tropical coast of West Africa. It is a Caribbean element in the avifauna of Aruba, Curaçao, and Bonaire.

Protective measures — Not protected by law.

69 **Sterna fuscata fuscata** Linnaeus

Sooty Tern

Sterna fuscata LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 228 — Hispaniola.
Sterna fuliginosa, CORY 1909, p. 195 (Aruba).
Sterna fuscata fuscata, RUTTEN 1931, p. 105 (Aruba); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 316 (Aruba); VOOUS 1955, p. 103 (Aruba, Klein Curaçao).
Sterna fuscata, DE JONG 1948, p. 7 (Aruba).

Native name — unknown.

ARUBA, CURAÇAO, KLEIN CURAÇAO. — Casual visitor.

No material.

Status — Recorded only from a specimen collected by FERRY in Aruba early May 1908 (CORY).

We did not observe this species, but on 30.VIII.1952 the species was present at Klein Curaçao (ANSINGH *in litt.*) and on 11.VII.1954 one specimen at Jan Thiel, Curaçao, was seen among a flock of *Sterna eurygnatha* (VAN DER WERF *in litt.*).

In the Venezuelan islands the species has been found breeding in Los Hermanos and on the lighthouse rock El Soldado in the Gulf of Paria (PHELPS, Jr., 1948, p. 113). We observed solitary individuals at sea south of the Testigos Islands on 22.IV.1952.

Distribution — *Sterna f. fuscata* is a local breeding bird throughout the West Indies and on the islands in the tropical and subtropical Atlantic Ocean. The species as a whole is pan-tropical in distribution.

Protective measures — Not protected by law.

70 **Sterna albifrons antillarum** (Lesson) Plate V

Least Tern

Sternula antillarum LESSON, Compl. Oeuvr. Buffon *20*, 1847, p. 256 — Guadeloupe.
Sterna antillarum, HARTERT 1893, p. 310 (Aruba, Bonaire), 337 (Bonaire); HARTERT 1902, p. 308 (Aruba, Bonaire); CORY 1909, p. 195 (Aruba); DE JONG 1948, p. 7 (Aruba, Curaçao, Bonaire).
Sternula antillarum antillarum, RIDGWAY, *8*, 1919, p. 523 (Aruba, Bonaire); RUTTEN 1931, p. 105 (Aruba, Bonaire).
Sterna albifrons antillarum, HARTERT, Vög. Paläarkt. Fauna, 1921, p. 1715 (Aruba, Bonaire); HELLMAYR & CONOVER, *1* (*3*), 1948, p. 321 (Aruba, Bonaire); PHELPS & PHELPS 1951, p. 14 (Bonaire); VOOUS 1955, p. 104 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — Meuchi.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Summer visitor (breeding).

ARUBA: near Fontein, 29.VI.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt Leiden Mus.). CURAÇAO: Schottegat near Parera, 12.VII.1952 (1 ♂, collected by Koelers; Amsterdam Mus.). BONAIRE: Slagbaai, 31.V.1930 (1 ♀, 1 sex unknown;

without locality, 13.V.1930 (1 ♀; all collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — These birds have the whole of the upper parts from the hind neck to the tip of the tail feathers a uniform light grey.

Iris dark brown; bill yellow, tip black; legs and feet dark yellow, claws black.

Measurements — ARUBA: ♀, wing 160, tail 73, bill (measured from forehead) 28.5. CURAÇAO: ♂ wing 166, tail 81, bill 32. BONAIRE: ♀, wing 164.5, bill 32, 32.

Status and reproduction cycle — HARTERT found adults and young of this species on a sandy beach of Aruba in July 1892; he also mentions having seen "nearly and quite full-grown young" in Bonaire. After him FERRY collected three specimens in Aruba in April-May 1908 (CORY). In May, June, and early July 1930 this species was described by RUTTEN as a common breeding bird in Aruba and Bonaire. The only pertinent published records from Curaçao are those by DE JONG, who under his pseudonym "Vogelvriend" in addition states having seen the species in the Schottegat, Curaçao, often quite close to the famous bridge over the Annabaai with its busy traffic. — There does not seem to be any record of the species outside the summer months.

We did not observe this species during our stay from September 22, 1951 to April 19, 1952! However, after our return in the Netherlands, we were informed that these terns had appeared in Curaçao in rather large numbers from 1.VI.1952 until at least 30.VIII.1952 (ANSINGH, BRONNEBERG, KOELERS, VAN DER WERF). Some 40 pairs were present at Klein Curaçao on 1.VI.1952, but no nests were found. However, flocks of juvenile birds were observed and photographed by VAN DER WERF at Klein Curaçao on 30.VIII.1952. The next year, on 3.VI.1953, KOELERS found a breeding colony of approximately 100 pairs at Klein Curaçao. All nests found contained one egg. The species was also found breeding in the Jan Thiel lagoon, Curaçao, in 1953, but all nests were destroyed by an egg-robbing *Mimus gilvus*. The birds were again present in 1954 and 1955 (over 70 breeding pairs, KOELERS and VAN DER WERF *in litt.*, Plate V). Breeding colonies have also been found on the north coast of Curaçao (Hato) and on the coast of the Schottegat near Parera.

The species seems to be totally absent in the South Caribbean Sea during the winter, disappearing as soon as the reproduction cycle has been completed.

Extreme dates of arrival and departure in Curaçao: 21.IV.1955 (VAN DER WERF) and 30.VIII.1952 (see above).

In the Venezuelan islands the species has been recorded from Los Roques (1953; PHELPS, Jr., *in litt.*) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 23).

Nest and eggs — The following notes are condensed from letters and photographs by BRONNEBERG and VAN DER WERF.

(1) Breeding colony between Hato and San Pedro, north coast of Curaçao. The breeding habitat is an elevated coastal plain of eroded coral rock. Nests containing eggs and young found on 29.VI and 12.VII.1952. The nests were placed on the rocks and were situated on an average of 7 meters from each other and at approximately 50 meters from the sheer coasts. The birds were very aggressive. On 12.VII.1952 8 nests were found, among a large number of empty nests. Three nests contained 1 egg each, three contained each 2 eggs, one contained a small chick and one 2 slightly larger chicks. No plovers have been found breeding on this coast. The adult terns were observed fishing in the nearby sea, which is known for its rough waters.

Four eggs and the fragment of one eggshell, now in the Amsterdam Museum, were not unlike a number of over 200 eggs of *Sterna a. albifrons* from western Europe with which they were directly compared. They were on an average of a paler cream colour, with the dark markings finer and smaller. In fact, the exact type of coloration of the Curaçao eggs occurred in hardly more than 5% of the series of West European eggs. This type can be found figured in Bull. U.S. Nat. Mus. *113*, 1921, pl. 93, fig. 2. Measurements of eggs from this colony (measured by VAN DER WERF and NEIJSSEL; in mm):

28.7 × 22.4	31.0 × 23.0	32.3 × 23.5
28.5 × 23.5	31.3 × 25.1	32.6 × 23.2
29.5 × 22.7	32.0 × 24.0	33.0 × 23.0
30.0 × 23.5	32.1 × 22.8	34.5 × 23.3
30.5 × 23.2		

(2) Breeding colony at the Schottegat near Parera, Curaçao.

Nests were found on a barren sandy plain which formed part of the project for a new harbour. About 25 pairs were present on 11.VII.1952, but not more than 3 nests with one egg each and several downy young were found. The nests were no more than shallow depressions in the sun-burnt coral sand amidst a mass of broken sea-shells and irregular pieces of coral-rock. Three eggs measured: 30.5 × 27.4, 30.8 × 27.6, and 33.3 × 23.7 mm, respectively.

Additional eggs from Curaçao, from the breeding season of 1953, measure: 30.6 × 23.2, 30.7 × 23.0, 31.2 × 23.2 mm, and from the breeding season of 1955: 30.9 × 23.5 and 29.6 × 23.0 mm.

Average measurements of 21 eggs from Curaçao are 31.1 × 23.7 mm, which is not unlike the average size of West European eggs (32.6 × 23.7 mm of 17 eggs from the Netherlands measured by NEYSSEL).

Clutch-size in 1955 recorded as 1-4, distributed as follows: 6 × 1, 60 × 2, 4 × 3, 1 × 4 (Jan Thiel, Curaçao; VAN DER WERF).

Zoogeography — *Sterna a. antillarum* breeds virtually throughout the West Indian region, north to the east coast of North America and south to the Caribbean coast of Colombia and Venezuela, but it has not yet been recorded from the mainland of Venezuela (PHELPS, Jr., *in litt.*). It is known to winter along the east coast of tropical South America. The species has an almost world-wide distribution. As it does not seem to breed in continental South America, it is a Caribbean element in the fauna of the Netherlands Leeward Islands.

Protective measures — Not protected by law.

71 **Sterna maxima maxima** Boddaert

Royal Tern

Sterna maxima BODDAERT, Tabl. Pl. Enl. 1783, p. 58 — Cayenne.

Sterna maxima, HARTERT 1893, p. 309 (Aruba, Curaçao, Bonaire), 326 (Curaçao); HARTERT 1902, p. 308 (Aruba, Curaçao, Bonaire); CORY 1909, p. 194 (Aruba).

Thalasseus maximus, RIDGWAY, *8*, 1919 p. 469 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 103 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 6 (Aruba, Curaçao, Bonaire).

Thalasseus maximus maximus, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 326 (Aruba); PHELPS & PHELPS 1951, p. 14 (Bonaire).

Sterna maxima maxima, VOOUS 1955, p. 105 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Bubi chiquitu.*

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Breeding bird and winter visitor.

ARUBA: *Paardenbaai*, 18.XII.1951 (1 ♀ ad.). CURAÇAO: *Newport, Fuik Baai*, 26.I.1952 (3 ♂). KLEIN CURAÇAO: 11.IV.1952 (1 ♂). BONAIRE: south of *Kralendijk*, 8.XI.1951 (1 ♀ ad.); Pekelmeer, 8.VI.1930 (2 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Only one of the specimens is in full breeding plumage (11.IV. 1952, Klein Curaçao), the remaining ones having the crown largely white and the wing quills and tail feathers very strongly abraded and partially in the process of being renewed

Iris dark brown; bill orange or orange-red; legs and feet black, underside of toes fleshy-yellow.

Measurements — ARUBA: ♀, wing 300+, bill from forehead 63, exposed culmen 56, tarsus 31. CURAÇAO: ♂, wing 325+, 330+, 350+, longest tail feathers 152, depth of furcation of tail 55, bill from forehead 71, 73, 73, exposed culmen 63, 64.5, 68.5, tarsus 35, 36. KLEIN CURAÇAO: ♂, wing 369, longest tail feathers 193, depth of furcation of tail 104, bill from forehead 71.5, exposed culmen 60, tarsus 31.5. BONAIRE: ♂, wing 342, 360, longest tail feathers 160, 172, depth of furcation of tail 71, 90, bill from forehead 66, 70, exposed culmen 58, 62, tarsus 32.5, 34; ♀, wing 345+, bill from forehead 68.5, exposed culmen 60.5, tarsus 32.

Status — Recorded by all previous observers from all three islands; also recorded during the summer months.

We met with this species along the coasts of all three islands, including the island of Klein Curaçao. It was the only species of tern observed by us during the winter months. We generally observed it singly, or two or three individuals together. We usually found one or two of these birds present in the harbours of Oranjestad (Paardenbaai), Willemstad (Annabaai) and Kralendijk; the largest numbers noticed were flocks of 20–40 birds in the Paardenbaai on 18.XII.1951 and 10.IV.1952, respectively.

Breeding of this species in Curaçao was recorded by VAN DER WERF (*in litt.*), who in 1955 found the species present among the breeding flock of *Sterna eurygnatha* on Tern Island, Jan Thiel lagoon, and subsequently found a set of two eggs on 15.V. 1955 which, in view of their large size, must be ascribed to the present species. The nest was situated on flat ground of coral debris and coralline sand among the nests of *Sterna eurygnatha* and close to the nests of *Sterna dougallii*. The eggs did not differ from those of *eurygnatha* in coloration and pattern. Measurements of one of these eggs: 67.0 × 42.0 mm (VAN DER WERF). Average size of 54 eggs of *Sterna maxima* according to BENT (Bull. U.S. Nat. Mus. *113*, 1921, p. 215) 63.0 × 44.5 mm. The nest was destroyed a few weeks later, together with the whole ternery, through human interference.

Additional breeding of the species in the same year (1955) was recorded by K. MAYER at Bonaire. MAYER took splendid colour-slides of a breeding colony of *Sterna eurygnatha* at the Pekelmeer in June 1955. On these pictures, some of which are now in the possession of Dr. WAGENAAR HUMMELINCK and in that of the author, at

least 5 individuals of *Sterna maxima* appear among those of *Sterna eurygnatha* standing on the wall of coral stones which separates the various salt pans. Eggs of what seem to be a larger size than those of *eurygnatha* appear on the pictures.

In the Venezuelan islands it has been recorded as a winter visitor from Las Aves and Los Roques[1]) (PHELPS & PHELPS 1951, p. 22 and 12), Blanquilla and Los Hermanos (PHELPS, Jr., 1948, p. 99 and 113), and Tortuga (PHELPS, Jr., 1945, p.279).

Food — The stomachs examined contained the remains of large fishes, among which were many flying fish from 10–15 cm in length; also the shell of *Spirula australis* (Newport, Curaçao).

Distribution — *Sterna m. maxima* ranges throughout most of the temperate and warmer waters of North and South America. It is a breeding bird throughout the West Indies, but it is considered mainly a winter visitor to the north coast of Venezuela and Colombia. The species has chiefly an Atlantic distribution, but occurs also in the warmer parts of the Pacific American coasts. It is a West Indian element in the avifauna of the Netherlands Leeward Islands.

Protective measures — Not protected by law.

72 **Sterna sandvicensis eurygnatha** Saunders Plate VI

Cayenne Tern

Sterna eurygnatha SAUNDERS, Proc. Zool. Soc. London 1876, p. 654 — Sa Catharina, southern Brazil.

Sterna eurygnatha, CORY 1909, p. 194 (Aruba); VOOUS 1955, p. 107 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Thalasseus eurygnathus, RIDGWAY, *8*, 1919, p. 475 (Aruba); RUTTEN 1931, p. 95 and 104 (Aruba, Bonaire); DE JONG 1948, p. 6 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 14 (Bonaire).

Thalasseus eurygnatha, PETERS, *2*, 1934, p. 344 (Aruba).

Thalasseus sandvicensis acuflavidus, HELLMAYR & CONOVER, *1* (*3*), 1948, p. 329 (Aruba).

Sterna sandvicensis eurygnatha, JUNGE & VOOUS, Ardea *43* (1955), 1956, p. 226–247 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Bubi chiquitu*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Breeding bird.

ARUBA: Bucuti Reef, 25.VI.1930 (2 ♀, collected by Rutten, Pijpers & Vermunt; Leiden Mus.); without locality, 10.V.1908 (1 ♂, collected by Ferry; Chicago Mus. Nat. Hist.). CURAÇAO: Jan Thiel lagoon, 26.VIII.1952 (broken egg-shells, collected by Bronneberg and Van der Werf; Amsterdam Mus.), 29.VII.1954 (1 ♂; Collection Koelers, Curaçao), 21.V.1955 (1 egg, collected by Ansingh and Koelers; Amsterdam Mus.). KLEIN CURAÇAO: 11.IV.1952 (5 ♂, 1 ♀). BONAIRE: *Lac*, 28.III. 1952 (2 ♂, 2 ♀).

Taxonomy — All specimens collected by me are in a perfectly fresh plumage without any moult and without subcutaneous fat. Those collected at Lac, Bonaire,

[1]) Breeding recorded in June 1954 (PHELPS & PHELPS, Proc. Biol. Soc. Wash. *68*, 1955, p. 114).

have the whole under parts from the chin to the under tail coverts and the outer tail feathers suffused with a beautiful tinge of pale salmon.

Sterna eurygnatha is very close to *Sterna sandvicensis* and to *Sterna elegans*. The relationship of these species have been fully dealt with by JUNGE & VOOUS (*l.c.*). It is of importance to note that the colour of the bill in at least some of the specimens is not yellow, but dusky, or even black with a small yellowish tip. As in addition in the study-skins the colour of the bill gradually grows darker, this may have led HELLMAYR & CONOVER to consider the first Aruban specimen collected by FERRY in 1908 (CORY *l.c.*) as belonging to *sandvicensis*, notwithstanding the fact that it was quite correctly referred to *eurygnatha* in the original report by CORY. The specimen which I kindly received on loan from the Chicago Museum of Natural History proved to be indistinguishable from my series of *eurygnatha*.

Iris dark brown; bill straw-yellow, except in one adult male from Klein Curaçao (reg. nr. 11514) in which the basal half of the lower mandible was orange. See, however, JUNGE & VOOUS. Legs and feet black, but underside of feet and the claws yellow, with the exception of the claw of the middle toe, which was mainly dusky, at least on the upperside.

Measurements — ARUBA: ♂, wing 290, tail 137, furcation of tail 61, bill ± 59, gonies 32, tarsus 26.5, middle toe 18.5; ♀, wing 268 +, 300, bill (measured from forehead) 58, 58, gonies 31, 31, tarsus 26.5, 27.5, middle toe without claw 18, 18.5. CURAÇAO: ♂, wing 285, tail 106 +, bill 63, gonies 31, tarsus 28, middle toe 20. KLEIN CURAÇAO: ♂, wing 293, 296, 297, 302, 307, tail 136, 136, 141, 145, 150, depth of furcation of tail 58, 59, 62, 70, 71, bill 59.5, 64, 64.5, 64.5, 64.5, gonies 30, 30, 32, 32.5, 33.5, tarsus 27, 27, 27, 28, 28, middle toe 18.5, 19, 19, 19, 19; ♀, wing 296, tail 133, furcation of tail 59, bill 62, gonies 28, tarsus 27, middle toe 19. BONAIRE: ♂, wing 290, 291, tail 131, 133, furcation of tail 54, 60.5, bill 57.5, 59, gonies 28.5, 32, tarsus 26.5, 28.5, middle toe 18, 18.5; ♀, wing 290.5, 292, tail 131, 137, furcation of tail 52, 58, bill 59, 64, gonies 29.5, 37.5, tarsus 26, 28.5, middle toe 18, 18.5.

Status and biotope — First collected by FERRY in Aruba on 10.V.1908 (CORY *l.c.*). The species was again collected by RUTTEN in Aruba and observed in Bonaire, whence the same observer reports the occurrence of fully grown juvenile birds in June or July. The rather vague statements by DE JONG on the presence of the species along the coasts of all three islands are the only other published records from the Netherlands Leeward Islands; in addition VAN OORDT observed also a few individuals at Lac, Bonaire, on 28.II.1948 (*in litt.*).

We did not observe this species until 28.III.1952, when a flock of over 20 individuals was resting in the centre of Lac, Bonaire. Afterwards we observed solitary birds flying before the entrance of the Sint Annabaai off Willemstad, Curaçao. On 11.IV. 1952 6 specimens were brought home by KOELERS & VAN DER WERF from a collecting trip to Klein Curaçao, where up to 300 birds of this species were reported, together with an equal number of *Larus atricilla*, *Sterna maxima*, and *Sterna hirundo* combined. The gonads of all specimens collected were in an active state of development.

Later the species was again reported from Klein Curaçao by ANSINGH (*in litt.*) on 30.VIII.1952 and a year later by KOELERS (verbal communication) on 3.VI.1953. The latter observer noticed the presence of about 20 pairs and saw birds in definite copulation.

On 26.VII.1952 BRONNEBERG & VAN DER WERF (*in litt.*) found the broken eggshells of a large species of tern, as well as one dead adult specimen of *Sterna eurygn-*

natha on a flat island in the Jan Thiel lagoon, Curaçao. The eggs closely resemble the eggs of *Sterna sandvicensis sandvicensis* and *Sterna elegans* with which the shells were directly compared in the Zoological Museum, Amsterdam. They were tentatively considered to belong to *eurygnatha* until in 1954 a large breeding colony was found and photos of breeding birds made in the same locality (see below; Plate VI). In 1955 the number of breeding birds was considerably less than the year before, but an additional breeding place was discovered in June of the same year by K. MAYER in the Pekelmeer, Bonaire. Splendid colour-slides were made, some of which remain, as proof of this breeding case, in the possession of Dr. WAGENAAR HUMMELINCK and in that of the author (see: JUNGE & VOOUS *l.c.*).

In the Venezuelan islands the species has been recorded from Los Roques[1]) (PHELPS & PHELPS 1951, p. 12) and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 23).

Reproduction cycle — All specimens collected in the spring had the gonads considerably swollen: testes of 2 males collected on 28.III.1952 (Bonaire): 6 × 4½ and 8 × 4 mm, respectively; testes of 5 males collected on 11.IV.1952 (Klein Curaçao): 7 × 5, 7½ × 4, 7½ × 5, 9 × 7, 14 × 5 mm, respectively; largest follicles in the ovary of females collected on 28.III.1952 (Bonaire): 3½ and 4 mm in diameter, respectively; in 1 female collected on 11.IV.1952 (Klein Curaçao): 3 mm.

Eggshells were found in Curaçao on 26.VII.1952 (see above).

A breeding colony of at least 300 pairs was found in June 1954 on an islet in the Jan Thiel lagoon, Curaçao, by BRONNEBERG and KOELERS (*in litt.*) (Plate VI). By the middle of June the eggs proved heavily incubated. The colony was, however, robbed by local boys.

In 1955 not more than about 20 pairs returned to this breeding place; egg-laying starting from the beginning of May onwards. The colony was fully destroyed by man as early as the second week of June.

All data available seem to indicate that this species mainly comes to visit the islands towards the end of March, or even a full month later, and leaves this region shortly after the breeding season, that is, in August.

Eggs — Very variable, but generally of a creamy white, with black patches and smears and greyish secundary markings. They are indistinguishable in colour and pattern from the great majority of eggs of *Sterna sandvicensis sandvicensis* from the Netherlands and from 6 eggs of *Sterna elegans* from Isla Raza, Gulf of California[2]). Dimensions of 26 eggs from the breeding colony of Jan Thiel, Curaçao, measured in the field by KOELERS on 29.VI.1954, are as follows (mm):

46.7 × 35.5	49.0 × 35.0	51.8 × 37.0
46.7 × 36.9	50.0 × 36.5	52.6 × 34.9
47.8 × 35.3	50.4 × 36.4	52.8 × 35.9
48.3 × 35.0	50.4 × 35.5	53.5 × 36.2
48.4 × 34.7	51.0 × 36.4	53.5 × 37.5
48.5 × 34.9	51.2 × 35.0	53.4 × 36.4
48.7 × 35.3	51.2 × 36.0	55.2 × 35.9
48.9 × 35.5	51.8 × 36.6	56.7 × 38.4
48.9 × 36.2	51.8 × 36.8	

[1]) Breeding recorded in June 1954 (PHELPS & PHELPS, Proc. Biol. Soc. Wash. *68*, 1955, p. 114).

[2]) Received in exchange from the Museum of Vertebrate Zoology, Berkeley, California (Dr. F. A. PITELKA).

Measurements of 2 eggs from the same locality measured in the field by VAN DER WERF on 15.V.1955 are as follows: 49.2 × 34.8 and 53.7 × 34.7 mm, respectively. One egg collected by ANSINGH and KOELERS on 21.V.1955 measures 50.8 × 35.7 mm.

Average of 29 eggs from Curaçao, 50.8 × 35.9 mm.

Food — The contents of 10 stomachs examined showed mainly various species of relatively large fish (90%), among which were specimens of *Sardinella* and fish belonging to the mackerel family (Scombridae) (identification by Prof. Dr. L. F. DE BEAUFORT). The stomachs of 2 specimens collected at Lac contained, in addition to fish, the fragments of the shell and the soft parts of *Spirula australis*.

Field observations — The flight of these terns strongly recalled that of *Sterna sandvicensis sandvicensis*. Hence, they could be distinguished in the field from *Sterna maxima* by their longer and whiter wings and longer and more deeply forked tail. The calls of these terns were harsh and wild and were not greatly unlike those of *Sterna s. sandvicensis*.

Zoogeography — *Sterna sandvicensis eurygnatha* is known to occur only along the Atlantic and Caribbean coasts of South America, from Colombia to Patagonia. It is not known from other parts of the Caribbean Sea. Outside the Netherlands Antilles breeding localities are unknown. See, however, JUNGE & VOOUS (*l.c.*).

Sterna eurygnatha is the South American representative of the North American and palaearctic forms of *Sterna sandvicensis*. On the Pacific coast of Central America (Gulf of California) it is replaced by the closely related *Sterna elegans*.

Protective measures — Protected by law since September 1955. The lack of protection until recently has been a great handicap for this species to settle in the islands. Legal protection of all species of tern, their eggs and their breeding places inclusive, is badly needed, as has also been recommended by WESTERMANN (1946, p. 83).

73 **Phaetusa simplex** (Gmelin)

Large-Billed Tern

Sterna simplex GMELIN, Syst. Nat. *1*, *2*, 1789, p. 606 — Cayenne.
Phaetusa magnirostris, CORY 1909, p. 194 (Aruba).
Phaetusa chloripoda, RUTTEN 1931, p. 106 (Aruba).
Phaetusa simplex, HELLMAYR & CONOVER, *1*, (*3*), 1948, p. 296 (Aruba); DE JONG 1948, p. 7 (Aruba); VOOUS 1955, p. 108 (Aruba).

Native name — unknown.

ARUBA. — Casual visitor.

No material.

Status — Known only from a single male collected in Aruba by FERRY on 12.V. 1908 (CORY).

We did not observe this species.

In the Venezuelan islands known only from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 23).

Distribution — *Phaetusa simplex* is a breeding bird from the fresh waters of tropical South America, including the Caribbean coast of Colombia and Venezuela.

Protective measures — Not protected by law.

74 **Anoüs stolidus stolidus** (Linnaeus)

Noddy Tern

Sterna stolida LINNAEUS, Syst. Nat. ed. 10, *1*, 1758, p. 137 — Atlantic Ocean east of Barbados.
Anoüs stolidus, RUTTEN, Ardea *23*, 1934, p. 214 (Curaçao); VOGELVRIEND 1946, p. 204 (Curaçao); DE JONG 1948, p. 7 (Curaçao)
Anoüs stolidus stolidus, VOOUS 1955, p. 108 (Curaçao).

Native name — unknown.

CURAÇAO. — Casual visitor.

CURAÇAO: South Caribbean Sea between Curaçao and Venezuelan coast, 25.V. 1952 (1 ♀ imm.; Collection Ansingh, Curaçao), 26.XII.1952 (1 ad., collected by Ansingh; Amsterdam Mus.).

Measurements — CURAÇAO: ad., wing 276, tail 149, bill (exposed culmen) 49, bill (measured from forehead) 39; ♀ imm., wing 255+, tail 132, bill (exposed culmen) 40.5, bill (measured from forehead) 49.

Status — First recorded by RUTTEN from a specimen caught in Curaçao on 20.IX.1934 and subsequently photographed and described by Brother M. REALINO. Afterwards VOGELVRIEND (*alias* DE JONG) records having observed noddies each year regularly in October and November resting on the rocky coast near the Waterfort, Willemstad, but whether the birds belonged to this species or to *Anoüs minutus* remains uncertain. The same doubt unfortunately remains as regards the observation by Mrs. A. DE JONG of a noddy tern on the north coast of Curaçao (Noordkant) on 20.IV.1952. An additional adult female of undoubted identity was collected on 17.V.1953 at Bullenbaai, Curaçao (Collection ANSINGH, Curaçao).

We did not observe this species.

In the Venezuelan islands the species has been recorded breeding in Los Roques (PHELPS & PHELPS 1951, p. 12) and Los Hermanos (PHELPS, Jr., 1948, p.113), as well as on the Soldado Rock in the Gulf of Paria (HELLMAYR & CONOVER, *1* (*3*), 1948, p. 333).

Distribution — *Anoüs s. stolidus* is the Atlantic and Caribbean representative of an almost pan-tropical and pan-subtropical species. It is a common breeding bird throughout the West Indies and a breeding bird in some of the Venezuelan islands, but it is apparently unknown from the Caribbean coast of Colombia.

Protective measures — Not protected by law.

75 **Anoüs minutus americanus** (Mathews)

Black Noddy

Megalopterus minutus americanus MATHEWS, Birds Austr. *2* (*4*), 1912, p. 423 — Caribbean Sea, British Honduras.
Anoüs minutus americanus, VOOUS 1955, p. 109 (Bonaire).

Native name — unknown.

BONAIRE. — Casual visitor.

No material.

Status — Not previously recorded.

The only evidence of the occurrence of this species in Bonaire is a colour-slide made by Mr. K. MAYER (Bonaire) and kindly presented to me of a solitary bird caught alive in the mangroves of Lac, Bonaire, in 1952.

In the Venezuelan islands the species has been recorded breeding on the Soldado Rock in the Gulf of Paria (HELLMAYR & CONOVER, *1* (*3*), 1948, p. 336).

Distribution — *Anoüs m. americanus* is known as a breeding bird only from the keys off the coast of British Honduras and from the Gulf of Paria, eastern Venezuela. The species has a world-wide tropical and subtropical distribution.

Protective measures — Not protected by law.

76 **Columba squamosa** Bonnaterre Plate XI (6)

Scaly-Naped Pigeon

Columba squamosa BONNATERRE, Tabl. Encycl. Méth., Orn., *1*, 1792, p. 234 — Guadeloupe.

Columba corensis, HARTERT, Bull. Brit. Orn. Cl. *1*, 1892, p. XII (Bonaire).

Columba portoricensis, HARTERT 1893, p. 332 (Curaçao?, Bonaire); HARTERT 1902, p. 304 (Bonaire); CORY 1909, p. 210 (Bonaire).

Patagoenias squamosa, RIDGWAY, *7*, 1916, p. 313, 314 (Curaçao, Bonaire).

Patagioenas squamosa, RUTTEN 1931, p. 100 (Aruba, Bonaire).

Columba squamosa, PETERS, *3*, 1937, p. 63 (Curaçao, Bonaire); HELLMAYR & CONOVER, *1* (*1*), 1942, p. 433 (Bonaire); DE JONG 1948, p. 7 (Aruba?, Curaçao, Bonaire); BOND 1950, p. 58 (Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 15 (Bonaire), VOOUS 1955, p. 110 (Aruba, Curacao, Bonaire).

Native name — Palomba pretu (Curaçao); Palomba di baranca (Bonaire).

ARUBA, CURAÇAO, BONAIRE. — Resident; probably extinct in Aruba.

CURAÇAO: *Santa Barbara*, 25.IX.1951 (1 ♀ imm.), 7.X.1951 (1 ♀ imm.). BONAIRE: Fontein, 20.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Fontein*, 28.III.1952 (2 ♂); Goto, 1.VI.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — The specimens do not differ in coloration from the only 4 adult specimens from the Greater Antilles (Cuba, Hispaniola) with which I was able to compare them. In two adult males from Bonaire the papillose ring around the eye was clear buffish in life, being in noticeable contrast with the bright red colour observed on individuals seen in Saba. The yellowish colour of the papillose orbital ring in Bonaire specimens has been previously noticed by HARTERT (1893 p. 333). — Immature birds are pale bluish-grey throughout.

Iris light red in adults, light brownish in immatures, eyelid red, naked papillose orbital skin clear buff in adults, yellowish-brown in immatures; bill ivory white in adults, duller and b rowner in immatures, cere red; feet blood red in adults, duller and lighter in one of the immatures.

Measurements — BONAIRE: ♂ ad., wing 195, 209, 210, tail 127, 129, 138, 138. — Wing lengths of males from the Greater Antilles 193–215, from the Lesser Antilles 197–224 (BOND *in litt.*).

Status — All previous authors agree in their statements that this species is locally rather common in Bonaire, particularly along the rocky escarpment and in the fruit gardens of Fontein. Published records from Curaçao are extremely scarce. Since HARTERT's pertinent comments on the species' occurrence on the slopes of the Sint Christoffel in Curaçao, its presence in the island has been mentioned only by shooting experts (JONKERS, Ned. Jager *44*, 1938, p. 51: mountainous region in western Curaçao; GORSIRA, weekly paper Curaçao *1* (*51*), 1940: Santa Barbara, Sint Christoffel). From Aruba there is only one sight record, by RUTTEN at Rooi Prins in 1930.

We observed and collected this species at Pos Bacoval, Santa Barbara, Curaçao, and observed it once on the Sint Christoffel; it must be very scarce in Curaçao. However, in Bonaire it was common at Fontein, though very rare elsewhere in the island (Curuburu). We did not see it in Aruba.

In the Venezuelan islands recorded only from Los Frailes and Los Testigos (PHELPS, Jr., 1945, p. 263, 270).

Biotope — High trees, preferably near steep rocky cliffs, where the nests are placed in natural holes and crevices, often in inaccessible places.

Food — All kinds of vegetable matter (buds, fruits, seeds), which is taken from the tree-tops or from the rocks. In the crop of one of the immature females shot at the drinking pool of Santa Barbara (Pos Bacoval) I found 1254 small, roundish seeds and 8 small snails.

Reproduction cycle — Immature specimens of barely one month old were collected in Curaçao on 25.IX and 7.X.1951. The testes of two adult males shot in Bonaire on 28.III.1952 were slightly swollen (average 10 × 5 mm).

Zoogeography — *Columba squamosa* inhabits the Greater and Lesser Antilles and some of the islands in the South Caribbean Sea. It has never been found on the mainland of South America and thus seems to be a typically West Indian representative in the avifauna of the Netherlands Leeward Islands.

Protective measures — Not protected by law. The species is subject to excessive shooting (Fontein, Bonaire!) and measures should be taken to save it from extirmination.

77 **Columba corensis** Jacquin Plate XI (1)

Bare-Eyed Pigeon

Columba (*corensis*) JACQUIN, Beytr. Gesch. Vög. 1784, p. 31 — Coro, Venezuela (see: HELLMAYR & CONOVER, *1* (*1*), 1942, p. 435, foot-note 1).

"*Columba* (*L.*) *cinerea — Hala blanco*", SIMONS 1868, p. 154 (Curaçao).

"*Ala blanca*", PETERS 1892, p. 112 (Curaçao).

Columba gymnophthalmus, HARTERT, Bull. Brit. Orn. Cl. *1*, 1892, p. XII (Aruba, Curaçao, Bonaire); HARTERT 1902, p. 305 (Aruba, Curaçao, Bonaire).

Columba gymnophthalma, HARTERT 1893, p. 304 (Aruba), 322 (Curaçao), 332 (Bonaire); ROBINSON, Flying Trip to the Tropics, Cambridge, 1895, p. 164 (Curaçao);

CORY 1909, p. 205 (Curaçao), 210 (Bonaire); DE JONG 1948, p. 7 (Aruba, Curaçao, Bonaire).

Crossophthalmus gymnophthalmos, RIDGWAY, 7, 1916, p. 322 (Aruba, Curaçao, Bonaire).

Crossophthalmos gymnophthalmos, RUTTEN 1931, p. 100 (Aruba, Curaçao, Bonaire).

Columba gymnophthalmos, PETERS, 3, 1937, p. 63 (Aruba, Curaçao, Bonaire).

Columba corensis, HELLMAYR & CONOVER, 1 (1), 1942, p. 436 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 15 (Bonaire); VOOUS 1955, p. 112 (Aruba, Curaçao, Bonaire).

Native name — *Ala blanca*.

ARUBA, CURAÇAO, BONAIRE. — Resident.

CURAÇAO: *Santa Barbara*, 7.X.1951 (1 ♀); *Klein Sint Joris*, 25.X.1951 (1 ♂); *Noordkant*, 21.III.1952 (1 ♀); Groot Piscadera, 12.XII.1930 (1 ♂, collected by Jhr. Dr. V. H. van den Bergh; Leiden Mus.); *Groot Piscadera*, 7.IV.1952 (1 ♂); *Malpais*, 22.II.1952 (1 ♀ juv.), 20.III.1952 (1 ♂); Santa Cruz, 26.IV.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Sint Hyronimus*, 24.X. 1951 (2 ♂, 1 ♀); *Savonet*, 14.IV.1952 (1 ♂). BONAIRE: *Fontein*, 22.XI.1951 (1 ♂); Goto, 27.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Males are of a much darker and deeper coloration than females, particularly below. There is, however, in both sexes a considerable variation in the intensity of the vinaceous coloration of upper and under parts. In the males the colour of the upper parts varied between Drab and Hair Brown and the under parts between Pale Purple-Drab and Light Russet-Vinaceous. The under parts in the females agreed with some tinge of Light Cinnamon-Drab. One juvenile bird resembles the females, but is slightly duller and greyer throughout and has dull rufous edges to most of the feathers of the under parts.

I have not examined Venezuelan specimens of this species, but trust upon other authors in considering the birds from Aruba, Curaçao, and Bonaire identical with mainland birds. Besides, there appears to be some influx of individuals from the continent in times of full harvest, when the total number of this species in the islands seems to increase to a considerable extent.

Iris light brown or orange-brown, bare orbital skin bluish-grey or light blue, surrounded by a papillose ring of buffish-brown; bill fleshy-white; legs and feet deep red.

Measurements — CURAÇAO: ♂, wing 193, 197.5, 198, 201, 202, tail 116, 117, 122, 122.5, 123, 125, 128; ♀, wing 193, 193, 194, tail 113, 117, 125, 125. BONAIRE: ♂, wing 197, 203, tail 122, 126.

Status — All authors agree in stating that this species is very common in all three islands, perhaps least common in Aruba and most abundant in Bonaire. It is a shy species, probably because of the fact that it is eagerly hunted practically throughout the year.

We found it common in Curaçao and Bonaire, but failed to trace its presence in Aruba, where, however, it has still been observed in recent years (E. BARTELS, personal communication).

In the Venezuelan islands it is known from Margarita only (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 23).

Biotope and habits — Semi-deserts and thorny scrub vegetation with organpipe cactus and acacia, also fruit gardens and particularly mangroves. These birds were very wild and closely resembled the Old World's *Columba palumbus* in habits, courtship-flight, and call-notes. The call-notes were rather high-pitched, not very musical, and sounded like roo-oo-koo, with the stress on the last syllable. The birds seemed to be exclusively arboreal in habits and have hardly anywhere been observed feeding on the ground. When the fields were covered with ripening millet (*Andropogon sorghum*) great numbers flocked together and apparently caused no little damage to the crop, particularly where small fields were visited. In the crop of one individual shot at Groot Piscadera, Curaçao (7.IV.1952), we counted no less than 1540 fresh grains. Feeding was done mostly by sitting on the ripe ears, as well as on the sheafs in the field. Fallen grains were picked up by other doves (*Zenaidura auriculata*), but apparently never by this species. — In dry periods, when fresh water is scarce, these birds assemble in great flocks around water pools, where they are easily shot in large numbers. Details of pigeon shooting can be found in two articles by Curaçao shooting experts (JONKERS, Ned. Jager *43*, 1938, p. 582–583, 594–596, 607–608, 622–624; GORSIRA, weekly paper Curaçao *1* (*51*), 1940). — Nests have been found in mangroves, tamarinds, manchioneel trees and dividivi (*Caesalpinia coriaria*).

Food — Field observations and the examination of 11 stomachs have indicated that the favourite food of this species consists of the peas of various kinds of leguminous trees, mesh apples (*Achras sapota*), drupes of *Melicocca bijuga*, and ripening millet (*Andropogon sorghum*). In addition we found the remains of various other fruits and seeds.

Reproduction cycle — Nests containing one white egg each were found in Curaçao on 14.I. and 16.I.1952; a nest with one young was found by B. DE JONG on 23.I.1952. In addition individuals with decidedly swollen gonads were collected in Curaçao on 20 and 21.III and on 7 and 14.IV.1952 (testes up to 19 × 16.5 mm; growing eggs in ovary over 3 mm in diameter). Hence the season of reproduction apparently culminated in the months following the rains of the year; in these times and particularly when the weather was wet, courting and cooing were most frequently observed.

All nests seen were very poor platforms of broken twigs, through which the single egg was easily visible from below.

Zoogeography — *Columba corensis* inhabits the arid tropical coast of northern Colombia (including the Goajira Peninsula), northern Venezuela (including the Paraguana Peninsula), Aruba, Curaçao, Bonaire, and Margarita. The actual breeding habitat of this species was discovered by HARTERT in 1892. Until that time the known museum specimens of the species, including TEMMINCK's type of *Columba gymnophthalma* (KNIP, Les Pigeons, 1811, p. 48, pl. XVIII) were of unknown origin, only said to have come from "South America". In contrast to *C. squamosa* this is a true South American species. It is extremely close to *C. picazuro* from eastern Brazil and southern South America, which, although having a bare orbital skin, lacks the papillose circle around the eye.

Protective measures — Not protected by law. Hunting of this splendid game bird should be kept under legal control.

78 **Zenaidura auriculata vinaceo-rufa** (Ridgway) Plate XI (5)

Eared Dove

Zenaida vinaceo-rufa RIDGWAY, Proc. U.S. Nat. Mus. *7*, 1884, p. 176 — Curaçao.
Zenaida vinaceorufa, BERLEPSCH 1892, p. 95 (Curaçao).
Zenaida vinaceo-rufa, HARTERT 1893, p. 304 (Aruba), 324 (Curaçao), 334 (Bonaire); CORY 1909, p. 198 (Aruba), 205 (Curaçao), 210 (Bonaire).
Zenaida ruficauda vinaceo-rufa, HARTERT 1902, p. 305 (Aruba, Curaçao, Bonaire); RIDGWAY, *7*, 1916, p. 371 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 102 (Aruba, Curaçao, Bonaire).
Zenaida auriculata vinaceo-rufa, NAUMBURG, Am. Mus. Nov. *648*, 1933, p. 11 (Aruba, Curaçao, Bonaire).
Zenaidura auriculata vinaceo-rufa, WETMORE, Proc. U.S. Nat. Mus. *87*, 1939, p. 196 (Curaçao); HELLMAYR & CONOVER, *1 (1)*, 1942, p. 493 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 15 (Bonaire); VOOUS 1955, p. 113 (Aruba, Curaçao, Bonaire).
Zenaida ruficauda, DE JONG 1948, p. 7 (Aruba, Curaçao, Bonaire).

Native name — *Blaudeifi, Blaudeifi di aña, Buladeifi.* — RUTTEN has erroneously referred the local name "ala duro" to this species, instead of to *Leptotila verreauxi*.

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: Fontein, 4.VII.1930 (1 ♂ ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Santa Barbara*, 23.I.1952 (1 ♀ juv.); *Groot Piscadera*, 4.X.1951 (1 ♂), 9.X.1951 (1 ♂), 24.X.1951 (1 ♀); *Malpais*, 26.IX.1951 (1 ♂, 1 ♀), 22.II.1952 (1 ♂ juv., 1 ♀ juv.); *Sint Hyronimus*, 24.X.1951 (1 ♂, 1 ♀). BONAIRE: *Spelonk*, 29.XI.1951 (1 sex unknown); *Slagbaai Plantation*, 19.XI.1951 (3 ♂, 1 ♀), 30.XI.1951 (1 ♂); *Pekelmeer*, 26.III.1952 (1 ♂).

Taxonomy — Dr. A. WETMORE, who kindly examined for me a representative number of my specimens from Aruba and Curaçao, informs me (*in litt.*), that these birds are "lighter in color than those adjacent, being paler below, and greyer brown on the upper surface. The character of the lighter chin spot given by HELLMAYR & CONOVER (p. 493) does not hold. Specimens from the Grenadines, Grenada, and Trinidad are closely similar. Skins from Margarita are very slightly darker".

Females are paler throughout and do not have the purplish and grey coloration of the head and neck and have considerably less of the coppery gloss on the sides of the neck.

Juveniles are quite unlike adults, dull greyish-brown all over and barred with irregular, light markings. They are often mistaken for a different species.

Iris brown, eyelid pale yellow, small naked orbital skin greyish-blue; bill and cere black; legs deep red.

Measurements — ARUBA: (♂), wing 143, tail 90. CURAÇAO: ♂, wing 136, 138, 142, 142.5, tail 89, 90, 90, 97; ♀, wing 131, 135, 135, tail 82, 84, 84. BONAIRE: ♂, wing 137, 140, 140.5, 143, 144.5, tail 89, 89, 90, 94, 96; ♀, wing 135, tail 83.

Status — This species has been recorded by all previous authors as a common inhabitant in all three islands.

We found it regularly distributed throughout Curaçao and Bonaire, but it was considerably scarcer in Aruba.

In the Venezuelan islands the species is known from Tortuga and Los Testigos (PHELPS, Jr., 1945, p. 279 and 264), as well as from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 24).

Biotope and habits — We found these birds most frequently in acacia scrub and other semi-desert vegetations with scattered trees of *Caesalpinia coriaria* and *Acacia tortuosa*; also in aloe-fields. They were also common in small trees along roadsides in arid regions, where flocks of up to 10 individuals often assembled in the upper branches. In Aruba they were particularly common in the acacia trees scattered among dense opuntia vegetation on the slopes of Ceru Boonchi. Also, though not regularly, seen in fruit plantations. These birds seemed to feed almost exclusively on the ground, though they were much less terrestrial in habits than *Leptotila verreauxi*. Compared with the latter species *Zenaidura auriculata* proved to be considerably wilder and inhabited quite different types of vegetation; they also assembled in large flocks, which could daily been observed, passing along — what seemed to be — definite routes to their communal sleeping places. In flight they were among the fastest of the birds of the Netherlands Leeward Islands and, thus, an eagerly hunted game. Shooting this species appeared to us a far better sport than that of *Leptotila verreauxi* (see also: JONKERS, Ned. Jager *44*, 1938, p. 52–53, and GORSIRA, weekly paper Curaçao *1* (*51*), 1940). The call is a regular cooing, higher in tone and more rapid in frequency than that of *Leptotila verreauxi*; it was more regularly heard throughout the day than that of the latter species.

Food — Mainly small seeds of various kinds, among which were those of *Jatropha gossypifolia*; also known to eat the seeds of *Argemone mexicana* (JONKERS *l.c.*).

Reproduction cycle — A nest containing two eggs was found by HARTERT in Curaçao in July 1892. We found two nests with each two incubated eggs in Curaçao on 16.I.1952 (Malpais) and 20.I.1952 (Klein Santa Marta). Birds in juvenile plumage were collected on 23.I.1952 at Santa Barbara and on 22.II.1952 at Malpais. Males with swollen gonads were collected in Bonaire on 19.XI and 30.XI.1951 (testes up to 16 × 7 mm), while a female with equally active gonads was taken in Bonaire on 19.XI.1951 (follicle in ovary 5 mm in diameter). These data are sufficient proof of considerable breeding activity of the species during the winter months 1951–1952. The species was again found breeding in the winter of 1953–1954, when KOELERS (*in litt.*) found several nests with 2 eggs each at Hato, Curaçao, on 20.I.1954.

Nest and eggs — Two nests found in Curaçao were conspicuously heavy, cup-shaped structures of small twigs. They were placed among the thorny branches, of *Acacia tortuosa* at 2–2.5 meters above the ground. Nests have also been found in the fork of big organpipe cacti in the cactus scrub of Hato, Curaçao (KOELERS *in litt.*). Eggs glossy white, with a white or yellowish-white transparency, measuring 28.0 × 21.2 and 28.7 × 21.6 (Malpais) and 26.7 × 19.4 and 29.9 × 20.4 mm (Klein Santa Marta), respectively. Three full clutches of 2 eggs from Curaçao have been measured by KOELERS (*in litt.*) as follows: 26.5 × 21.6 and 27.3 × 20.8; 26.5 × 20.8 and 27.5 × 20.8; 29.0 × 21.4 and 27.1 × 21.5 mm, respectively. Finally, 2 eggs found by HARTERT in Curaçao measured 1.23 × 0.86 and 1.1 × 0.84 inches (= 31.2 × 21.8 and 27.9 × 21.3 mm). Average measurements of 12 eggs from Curaçao: 28.0 × 21.0 mm.

Zoogeography — *Zenaidura a. vinaceo-rufa* inhabits the islands of Aruba, Curaçao, and Bonaire. In northern Venezuela the same or a closely resembling form (*stenura*) occurs, but in that area, as in the islands in the southern and eastern

Caribbean Sea, geographical variation seems to be very gradual and of a clinal type. The birds inhabiting the Paraguana Peninsula seem at any rate to be very close to those inhabiting Aruba, Curaçao, and Bonaire (BARNES & PHELPS 1940, p. 21), but those from the Goajira Peninsula are *stenura* (DE SCHAUENSEE 1949, p. 459). The species occurs in more than 10 races throughout South America, from Colombia to southern Argentina and Chile. It is absent in Central America and occurs in the West Indian region only in the extreme southern Lesser Antilles (Grenadines, Grenada; BOND), which proves that it is a South American faunal element in the Netherlands Leeward Islands (see: Zoogeography, p. 47).

Protective measures — Not protected by law. Legal regulation of the shooting of these doves seems desirable.

79 **Columbigallina passerina albivitta** (Bonaparte) Plate X, XI (3, 4)

Ground-Dove

Chamaepelia albivitta BONAPARTE, Consp. Av. *2*, 1854, p. 77 — Cartagena, Colombia.
Columbigallina passerina perpallida HARTERT, Ibis 1893, p. 304 — Curaçao.
"*Columba* (*L*) *passerina* — *Toto-lika*", SIMONS 1868, p. 154 (Curaçao).
Chamaepelia passerina, RIDGWAY, Proc. U.S. Nat. Mus. *7*, 1884, p. 177 (Curaçao).
Peristera passerina, MARTIN, Ber. Reise Niederl. West-Indien, Leiden, 1888, p. 119 (Curaçao).
"*Tortolica* = *Chamaepelia passerina*", PETERS 1892, p. 113 (Curaçao).
Columbigallina passerina, BERLEPSCH 1892, p. 97 (Curaçao); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 164 (Curaçao).
Columbigallina passerina perpallida, HARTERT 1893, p. 304 (Aruba, Curaçao), 325 (Curaçao), 334 (Bonaire); HARTERT 1902, p. 305 (Aruba, Curaçao, Bonaire).
Chaemepelia passerina perpallida, CORY 1909, p. 198 (Aruba), 205 (Curaçao), 210 Bonaire).
Chaemepelia passerina albivitta, TODD, Ann. Carn. Mus. *8*, 1913, p. 555 (Aruba, Curaçao, Bonaire); RIDGWAY, *7*, 1916, p. 409 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 101 (Aruba, Curaçao, Bonaire).
Columbigallina passerina albivitta, PETERS, *3*, 1937, p. 107 (Aruba, Curaçao, Bonaire); HELLMAYR & CONOVER, *1* (*1*), 1942, p. 523 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS, Bol. Soc. Venez. Cienc. Nat. *65–66*, 1946, p. 151 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 7 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 16 (Bonaire); VOOUS 1955, p. 116 (Aruba, Curaçao, Bonaire, Klein Bonaire).
Columbigallina passerina subspec., CROOCKEWIT, Ardea *36*, 1949, p. 280 (Curaçao).

Native name — *Totolica*.

ARUBA, CURAÇAO, BONAIRE, KLEIN BONAIRE. — Resident.

ARUBA: coast near *Boca Budui*, 9.IV.1952 (1 ♀); *Andicuri*, 17.XII.1951 (1 ♂); *Paradera*, 15.XII.1951 (1 ♂); Fontein, 4.VII.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Ceru Pretu* near Sint Nicolaas, 13.XII.1951 (1 ♂, 1 ♀); without locality, 5.XII.1885 (1 ♂, collected by K. Martin; Leiden Mus.). CURAÇAO: *Rio Canario*, 8.X.1951 (1 ♂ juv.); *Santa Barbara*, 25.IX.1951 (2 ♀), 30.XII.1951 (clutch of 2 eggs); *Klein Sint Joris*, 25.X.1951 (1 ♂); *Groot*

Sint Joris, 3.X.1951 (1 ♂); Sint Joris Baai, 22.X.1948 (1 ♂, collected by Croockewit; Amsterdam Mus.); *Ronde Klip*, 29.X.1951 (1 ♀); *Julianadorp*, summer 1951 (1 ♂ juv.), XI.1951 (2 ♀), 8.XII.1951 (1 ♂, 2 ♀), 31.III.1952 (1 ♂); *Groot Piscadera*, 11.X.1951 (1 ♀), 31.X.1951 (1 ♂, 1 ♀), 14.I.1952 (1 ♂, 1 ♀); *Malpais*, 26.IX.1951 (1 ♀), 1.X.1951 (1 ♀), 15.X.1951 (1 ♀), 18.III.1952 (1 ♂, 1 ♀); Porto Marie Baai, 19.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Klein Santa Marta*, 23.I.1952 (clutch of 2 eggs); *Sint Nicolaas*, 3.XII.1951 (1 ♀); Santa Cruz, 27.IV.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt, Leiden Mus.); *Savonet*, 27.X.1951 (1 ♀). BONAIRE: *Jan Tabacu, Guatemala Estate*, 10.XI.1951 (1 ♂, 1 ♀); *Fontein*, 5–6.XI.1951 (1 ♂, 2 ♀); *Goto*, 8.XI.1951 (1 ♂); *Wanapa*, 26.XI.1951 (1 ♀); without locality, 20.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — In spite of a considerable amount of individual variation in the intensity of the colour of the upper and under parts the birds from Aruba, Curaçao and Bonaire as a whole do not seem to be different from those from the continent, though individuals as light as those present in our series from the islands seemed to be absent among the Venezuelan material which I examined in the PHELPS Collection (Caracas). Hence, I agree with TODD and most of the recent authors in considering birds from Aruba, Curaçao, and Bonaire inseparable from those inhabiting the littoral of Venezuela and Colombia. In our males the light greyish head and hind neck are conspicuous; the upper parts vary between a lighter and a darker shade of Drab, whereas the under parts are a pinkish-lilac, which can be described as Pale Vinaceous x Drab or Light Russet Vinaceous x Vinaceous Fawn. The females are extremely light below, the middle of the abdomen being almost white; the upper parts vary between Drab and Hair Brown.

Iris cyclamen or pale vinaceous-red, but rather brownish in individuals in a non-breeding state; eyelid pale yellow; bill horn-brown or blackish-brown, cere and base of the bill orange or orange-yellow; legs and feet pale flesh-colour.

Measurements — ARUBA: ♂, wing 80, 80, 82, 83.5, 84.5, average 82.0, tail 57, 58, 58, 58.5, average 57.9, bill (measured from forehead) 15, 15.5, 15.5, 16.5, average 15.6, tarsus 16, 16.5, 16.5, 17, 17.5, average 16.7; ♀, wing 79.5, 80, 81.5, average 80.3, tail 55.5, 57, 58.5, average 57.0, bill 14, tarsus 15.5, 16, 17, average 16.2. CURAÇAO: ♂, wing 80, 80.5, 81, 82, 82.5, 82.5, 83, 83, 83.5, 85, 86, average 82.6, tail 55, 56, 58, 58, 58, 58, 60, 61, 61.5, 63, average 58.9, bill 14.5, 15, 15, 15, 15.5, 15.5, 15.5, 16, 16, 16, average 15.4, tarsus 16.5, 16.5, 16.5, 17, 17, 17, 17, 17, 17, 17, 17.5, average 16.9; ♀, wing 79.5, 80, 80, 81, 81, 81.5, 81.5, 82, 82, 82, 82.5, 83.5, 83.5, 84, 84.5, 85, 85.5, average 82.3, tail 54.5, 55, 56, 56.5, 57.5, 57.5, 58, 58, 58, 58, 58, 58.5, 59, 59.5, 60, 61, average 57.8, bill 14, 14, 14, 15, 15, 15, 15, 15.5, 15.5, 15.5, 15.5, 16, 16, 16, 16.5, 16.5, average 15.3, tarsus 15, 15.5, 16, 16, 16.5, 16.5, 16.5, 16.5, 16.5, 16.5, 16.5, 17, 17, 18, 18, average 16.5. BONAIRE: ♂, wing 80.5, 83, 83.5, 84, average 82.8, tail 56.5, 56.5, 58, 61, average 58.0, bill 15, 15.5, 15.5, 16, average 15.0, tarsus 15.5, 16.5, 16.5, 17, average 16.4; ♀, wing 80, 82, 83.5, 84, 85, average 82.9, tail 57, 57, 57.5, 59, 59, average 57.9, bill 15, 15.5, 15.5, 15.5, 16, average 15.5, tarsus 15.5, 16, 16, 16.5, average 16.0.

Status — All previous authors agree in considering this species among the most abundant of the species of birds in the Netherlands Leeward Islands.

We found it extremely numerous in all three islands and observed it also in Klein Bonaire (27.III.1952). It was probably the most popular and most abundant of the

species of birds in the islands, although it was hard to tell whether in Aruba this species or *Mimus gilvus* was more numerous; the same applied *mutatis mutandis* to *Coereba flaveola* in Bonaire.

In the Venezuelan islands the species has been recorded from Los Roques, Blanquilla, Los Hermanos, Tortuga, Margarita, Los Frailes, Los Testigos, but not yet from Las Aves (PHELPS & PHELPS 1951, p. 18–23).

Biotope and habits — One can hardly imagine a place in the Netherlands Leeward Islands where this species should not occur. In fact we observed it in every kind of biotope, from the most desolate stony deserts in northeast Aruba to the luxuriant fruit plantations, and wherever there was room for it in the larger towns of Willemstad, Oranjestad, and Sint Nicolaas. Although mainly a terrestrial bird, feeding after the manner of a house-sparrow (*Passer domesticus*), it was regularly observed in trees and shrubs, but only rarely in the top of the highest trees. Notwithstanding its small size it is often shot and eaten; large numbers can easily be killed at a favourite drinking pool (see: GORSIRA, weekly paper Curaçao, I (*51*), 1940). The call is a plaintive, but melodious cooing, sounding like oo-woo-woo, and is often heard in a whole orchestra of voices.

Food — All crops and stomachs examined contained nothing but the remains of seeds and occasionally drupes of various kinds, but mostly of very small size. One bird collected in the evening of 31.X.1951 at Groot Piscadera, Curaçao, had as many as 1068 small seeds in the crop. Most seeds proved to be those of various species of grasses, among which was *Panicum velutinosum*, locally known as "maishi di totolica", which means ground dove's millet. The species is also known to visit the ripening fields of millet (*Andropogon sorghum*), but, as the birds feed on the ground and take the dropped seeds only, they fortunately can never become harmful.

Reproduction cycle — In Curaçao we found nests with eggs or young on the following dates: 28.XI.1951 (1 × 1 egg), 30.XII.1951 (1 × 2 eggs), 2.I.1952 (2 × 2 eggs), 17.I.1952 (2 young), 19.I.1952 (3 × 2 young), 23.I.1952 (3 × 2 eggs, 1 × 1 egg), 18.III.1952 (many eggs and young), 21.III.1952 (2 young); in addition we collected specimens with active gonads from 26.XI onwards. In addition to our own observations VAN DER WERF (*in litt.*) found nests with 2 eggs each on 4.V, 8.VI, and 18.VIII.1952, proving that after the conspicuous breeding activity in the months immediately following the seasonal rains (January to March) the species continued breeding, probably throughout the year. Instances have been recorded that one pair successfully raised two subsequent broods in the same nest (Julianadorp, Curaçao).

Nest — The nests observed varied between a very poor platform of small twigs and fine branches and a rather heavy cup-shaped structure made of the thorny branches of acacia. In some cases coloured ribbon and pieces of iron-wire had been used as nesting material. The nest sites chosen were almost as variable as the biotopes inhabited by these ubiquitous birds. We found several nests on the ground, almost without protective plant cover, or else well-hidden among high grass or low bushes, but the majority of the nests were placed in the thorny branches of *Acacia tortuosa*, from 0.5 meter to about 2.0 meters high; also in mangroves (*Rhizophora mangle*) and in manchioneel trees. The highest placed nest was one situated slightly over 5 meter high in a manchioneel tree (Blauw Baai, Curaçao, VAN DER WERF).

Eggs — Observed full clutch-size 2. Eggs immaculate glossy white. Measurements of 9 eggs from Curaçao (only 4 preserved) (mm):

20.6 × 14.8	21.3 × 16.6	22.3 × 16.5
20.8 × 16.7	21.7 × 16.6	22.4 × 16.4
21.0 × 16.2	21.9 × 16.5	22.8 × 16.5

Average size: 21.64 × 16.31 mm.

Zoogeography — *Columbigallina p. albivitta* inhabits the arid tropical littoral zone of northern Colombia and Venezuela, including the peninsulas of Goajira and Paraguana, and the islands off the coast of Venezuela, from Aruba, Curaçao, and Bonaire in the west to Margarita and Los Testigos in the east. In Tortuga it is replaced by a slightly paler race (*tortugensis*; see: PHELPS & PHELPS, Bol. Soc. Venez. Cienc. Nat. *65–66*, 1946, p. 150–151).

The species has a wide range in subtropical and tropical America and is very prolific and ubiquitous, no less than 18 subspecies having been recognized by recent authors (HELLMAYR & CONOVER, *1* (*1*),1942). Considering the present similarity of the insular and continental populations Aruba, Curaçao, and Bonaire seem to have been colonized directly from South America and not from the West Indies (see: Zoogeography, p. 47).

Protective measures — Protected by law (WESTERMANN 1946, p. 82), but many gun-bearers in the islands do not seem to be acquainted with local legislation.

80 **Leptotila verreauxi verreauxi** (Bonaparte) Plate XI (2)

White-Fronted Dove

Leptoptila verreauxi BONAPARTE, Compt. Rend. Ac. Sc. Paris *40*, 1855, p. 99; Consp. Gen. Av. *2*, 1854 (1857), p. 73 — New Grenada.

Leptoptila verreauxi, HARTERT 1893, p. 305 (Aruba), 324 (Curaçao), 334 (Bonaire).

Leptotila verreauxi insularis, HARTERT 1902, p. 305 (Aruba, Curaçao, Bonaire).

Leptotila verreauxi, CORY 1909, p. 198 (Aruba), 210 (Bonaire); DE JONG 1948, p. 7 (Aruba, Curaçao, Bonaire).

Leptotila verreauxi verreauxi, RIDGWAY, *7*, 1916, p. 448 (Aruba, Curaçao, Bonaire); HELLMAYR & CONOVER, *1* (*1*), 1942, p. 577 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 16 (Bonaire); VOOUS 1955, p. 118 (Aruba, Curaçao, Bonaire).

Leptoptila verreauxi verreauxi, RUTTEN 1931, p. 102 (Aruba, Curaçao, Bonaire).

Native name — *Ala duru, Buladeifi di hoffi, Rukuku* (Aruba, Curaçao); *Jiwiri, Patrushi* (Bonaire). — RUTTEN, and after him others, erroneously referred the name "ala duro" to *Zenaidura auriculata*, which has apparently considerably added to the confusion of the two species of doves among European inhabitants of the islands.

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: *Baranca Cora*, 8.XII.1951 (1 ♂); Fontein, 29.VI.1930 and 4.VII.1930 (2 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Santa Barbara*, 25.IX.1951 (1 ♀); *Groot Piscadera*, 9.X.1951 (1 ♀), 11.X.1951 (1 ♀ imm.), 14.I.1952 (clutch of 2 eggs); *Klein Santa Marta*, 23.I.1952 (1 ♂; clutch of 2 eggs); *Sint Nicolaas*, 3.XII.1951 (1 ♂, 1 ♀); *Sint Hyronimus*, 24.X.1951 (1 ♂); *Savonet*, 27.X.1951 (1 ♂); *Grote Knip*, 23.X.1951 (1 ♀). BONAIRE: *Onima*, 12.XI.1951 (1 ♀); *Dos Pos*, 24.III.1952 (1 ♀); without locality, 19–21.V.1930 (1 ♂, 1 ♀, 1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Compared with three specimens from northern Venezuela the birds from Aruba, Curaçao, and Bonaire tend to be paler greyish-olive, less olive-brown above and lighter below, with more white on the abdomen. In addition the upper mantle and nape are more richly suffused with pinkish-violet, rather than with brownish or buffy. Dr. JOHN T. ZIMMER (American Museum of Natural History) kindly examined for me one male from Aruba and three males from Curaçao and not only noticed the same differences from continental birds of the race *verreauxi* as are mentioned above, but in addition established a slight amount of overlap in individual variation. Thus, although the insular birds are among the palest and particularly the greyest individuals of this species from northern South America, it does not seem to be advisable to provide them with a separate name.

The immature female (11.X.1951, Curaçao) is browner throughout than the adult specimens, particularly on the head and the upper parts. The feathers on the sides of the breast, some of the wing coverts, and the secondaries have very narrow buffish edges, but the bird does not present at all such an unfamiliarly barred appearance as the juvenile of *Zenaidura auriculata*.

Iris pale yellow, naked orbital skin light blue, bill and cere black or horn-black; legs deep red.

Measurements — ARUBA: ♂, wing 135, 135, 137, tail 107, 107, 108.5. CURAÇAO: ♂, wing 137, 137, 137.5, 140.5, 141, 142, tail 99, 102, 105.5, 107, 107.5, 109; ♀, wing 132.5, 137, 140.5, tail 92, 95, 100, 101. BONAIRE: ♂, wing 136.5, tail 104; ♀, wing 130, 132.5, tail 95, 102.

Status — HARTERT, and after him all other subsequent authors, have recorded the occurrence of the species in all three islands. In HARTERT's time it was rare in Aruba and Curaçao, but somewhat commoner in Bonaire. Later authors report a relative abundance of the species in Curaçao and Bonaire, but it does not seem to have been common in Aruba.

We found it a common species in suitable localities in Curaçao and Bonaire; it was very locally distributed in Aruba, though by no means rare.

In the Venezuelan islands known only from Margarita and Los Testigos (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 25).

Biotope and habits — Dense undergrowth of fruit plantations, manchioneel thickets, thorny scrub and all other kinds of well-shaded bush and scrub vegetation, particularly along roadsides and often in dense opuntia vegetation. Feeding took mainly place on the ground, under protective plant cover; we often saw the birds feeding on open, dry places in mangroves. When flushed they usually alighted on a low horizontal branch nearby, where they were very easy to approach. Thus, although a fast flyer, they appeared easy to shoot, and indeed many seemed to fall victim to local hunters. JONKERS (Ned. Jager *44* (5), 1938, p. 51–53, calling it "witbuik" and "ala duro") and after him GORSIRA (weekly paper Curaçao *1* (*51*), 1940) have given interesting details on the shooting of this species in Curaçao. These birds were practically always seen in pairs. They seemed to inhabit small, well-defined feeding and nesting territories. The occurrence of at least one pair of these doves in practically every fruit garden has apparently caused the bird's local name of "buladeifi di hoffi"; its terrestrial habits led to the nick-name of "patrushi" (meaning partridge) in Bonaire, where the true "partridge" (*Colinus cristatus*) is absent. Its deep calling note gave the species the local name of "rukuku" (Curaçao).

Food — Large and small seeds of various kinds, mainly taken from the ground or from low herbs.

Reproduction cycle — Two nests, each containing 2 incubated eggs, were found in Curaçao on 14.I.1952 (Groot Piscadera) and on 23.I.1952 (Klein Santa Marta). In addition an immature bird was collected on 11.X.1951 at Groot Piscadera. A female with active ovary was taken on 25.IX.1951 (Santa Barbara); males with large testes were collected in Curaçao on 3.XII.1951 (11½ × 7 mm) and 23.I. 1952 (13½ × 7 mm) and in Aruba on 8.XII.1951 (12 × 6 mm).

Nest and eggs — Two nests seen in Curaçao were rather large, cup-shaped structures, considerably larger and heavier than the poor platforms usually seen of doves. One nest was placed about 2.5 meters high in a big tamarind tree in a fruit garden, the other was in thick mangroves about 6 meters high. Eggs white, with a slight gloss and a greenish transparency. They measure (mm): 29.3 × 22.0 and 28.6 × 21.4 (Groot Piscadera) and 27.3 × 21.2 and 28.7 × 21.3 (Klein Santa Marta), respectively.

Zoogeography — *Leptotila v. verreauxi* ranges from northwestern Nicaragua southwards to northern Colombia and northern Venezuela, including the islands of Aruba, Curaçao, Bonaire, Margarita, and Los Testigos. The species ranges throughout subtropical and tropical America, but is absent in the West Indies. This indicates not only that the species is South American by origin, but also that it colonized Aruba, Curaçao, and Bonaire from Venezuela.

Protective measures — Not protected by law. The shooting of this species should be legally regulated.

81A **Amazona barbadensis barbadensis** (Gmelin)

Yellow-Winged Parrot

(*Psittacus*) *barbadensis* GMELIN, Syst. Nat. *1*, *1*, 1788, p. 339 — Barbados; *errore* = Aruba (see RIDGWAY, Bull. U.S. Nat. Mus. *50*, 1916, p. 251), or Venezuela see: (Peters, *3*, 1937, p. 220).

81B **Amazona barbadensis rothschildi** (Hartert) Plate XII (1)

Chrysotis rothschildi HARTERT, Bull. Brit. Orn. Cl. *3*, 1892, p. XIII — Bonaire (see: Ibis 1893, pl. IX).

Chrysotis canifrons, LAWRENCE, Ann. New York Ac. Sc. *2*, 1882 (1883), p. 381 (Aruba).

Chrysotis ochroptera, HARTERT, Bull Brit. Orn. Cl. *3*, 1892, p. XIII (Aruba); HARTERT 1893, p. 301 (Aruba); SALVADORI, Ibis 1906, p. 645 (Aruba).

Amazona ochroptera, CORY 1909, p. 199 (Aruba).

Chrysotis ochroptera ochroptera, HARTERT 1902, p. 302 (Aruba).

Amazona barbadensis barbadensis, RIDGWAY, *7*, 1916, p. 252 (Aruba); CORY, *2* (*1*), 1918, p. 87 (Aruba); RUTTEN 1931, p. 129 (Aruba); PETERS, *3*, 1937, p. 220 (Aruba); DE JONG 1948, p. 7 (Aruba); VOOUS 1955, p. 120 (Aruba).

Chrysotis rothschildi, HARTERT 1893, p. 328–330 (Bonaire); SALVADORI, Ibis 1906, p. 645 (Bonaire).

Chrysotis ochroptera rothschildi, HARTERT 1902, p. 303 (Bonaire).
Amazona barbadensis rothschildi, RIDGWAY, 7, 1916, p. 256 (Bonaire); CORY, 2 (1), 1918, p. 87 (Bonaire); RUTTEN 1931, p. 129 (Bonaire); PETERS, 3, 1937 p.220 (Bonaire); DE JONG 1948, p. 7 (Bonaire); CROOCKEWIT, Ardea 36, 1949, p. 281 (Bonaire); PHELPS & PHELPS 1951, p. 17 (Bonaire); VOOUS 1955, p. 120 (Bonaire).

Native name — *Lora*.

ARUBA (*barbadensis*). — Formerly resident; now almost extinct.
BONAIRE (*rothschildi*). — Resident.

ARUBA (*barbadensis*): Fontein, 29.VI.1930 (1 sex unknown, collected by Pijpers Rutten & Vermunt; Leiden Mus.); Ceru Colorado, 30.VI.1892 (2 ♂, collected by Hartert; Am. Mus. Nat. Hist. New York); without locality, 11.V.1908 (1 ♀, collected by Ferry; Chicago Nat. Hist. Mus.); without locality (1 ♀, died in captivity, 16.III.1910; Leiden Mus.).

BONAIRE (*rothschildi*): Fontein, 15 and 17.VII.1892 (1 ♂, 1 ♀, collected by Hartert; Am. Mus. Nat. Hist. New York), 21.V.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.), 1.III.1948 (1 ♀, collected by Croockewit; Amsterdam Mus.); Goto, 1.VI.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Ceru Wecua*, 23 and 24.XI.1951 (3 ♂, 1 ♀); without locality, 21.V. 1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.), without locality (1 ♂, died in Rotterdam Zoo; Leiden Mus.).

Taxonomy — The differences in plumage between the parrots from Aruba and Bonaire are not so striking and constant as was originally stated by HARTERT. Still, specimens from Aruba (*barbadensis*) appeared to be recognizable on the basis of either a wholly yellow head and nape, without greenish malar patch, or a large golden-yellow cubital patch on the bend of the wing. Specimens from Bonaire (*rothschildi*) generally proved to have the yellow of the head considerably restricted, the malar region and the throat being largely glaucous-green; in addition the yellow cubital wing patch was much reduced in size and intermixed with a variable amount of bright red in all specimens examined. Some overlap of characters is demonstrated, however, in two females from Aruba showing a more or less extensive bluish-green malar stripe, as well as in two males from Bonaire which have the whole of the head yellow without any malar stripe. In the latter specimens, nevertheless, the yellow coloration of the head is less extended than in birds from Aruba and the throat is green instead of yellow. Specimens from Aruba examined had the bill considerably heavier and slightly longer than those from Bonaire. Bonaire parrots have the tail on an average longer than Aruba parrots, but in our specimens this difference is less striking than in those mentioned by PHELPS, Jr. (1948, p. 100–101). Two specimens said to originate from the north coast of South America seem to indicate that individuals from these regions are more or less intermediate between *barbadensis* and *rothschildi*, but tending towards *rothschildi*.

Iris orange; bill and cere pale fleshy-yellow; legs and feet blackish.

Measurements — ARUBA (*barbadensis*): ♂, wing 219, 220, tail 119, 124, bill (measured from cere) 31.5, 32.5; ♀, wing 209, tail 120, 125, bill 29; sex unknown, wing 226, tail 136, bill 33.

BONAIRE (*rothschildi*): ♂, wing 213, 214, 215, 219.5, 221, 223, 223, tail 125, 128,

129, 129, 130, 133, 133, bill 29, 30, 30, 30.5, 31, 31, 31.5; ♀, wing 206, 207.5, 208.5, 212, tail 120, 122, 125, 128, bill 26.5, 27, 28.5, 29.

Status — The origin of the type-specimen of GMELIN's (*Psittacus*) *barbadensis* seems to be uncertain. The same applies to LAWRENCE's *Chrysotis canifrons*, which was originally stated to have been a cage-bird from Aruba (see, however, Ibis 1893, p. 566). Both these specimens may as well have come from the north coast of Venezuela. — HARTERT, in 1892, was the first to designate Aruba as the true home of this species of parrot and also discovered its occurrence in Bonaire. Although in Bonaire the parrot is still flourishing and has been observed by all subsequent authors after HARTERT, its numbers in Aruba seems to have been rapidly decreasing in the course of this century, probably as a direct result of the disappearance of suitable localities through the extension of the oil-refinery industry. In 1892 HARTERT found the parrot not rare in wooded and rocky parts of the island, but the birds were wild and not easily to obtain (3 specimens collected). When FERRY visited Aruba in 1908 it was still not uncommon; again its shyness was considered worth mentioning (1 specimen collected; CORY). The first records about its rareness date from1930, when RUTTEN found the parrot at Fontein, near a fresh water well in Rooi Prins, and in the neighbourhood of the Hooiberg (1 specimen collected); its status was described as rather rare. DE JONG in 1943 ("Beurs- en Nieuwberichten", Curaçao) calls the species "rare". In 1948 the whole breeding population was estimated by the same author at only a few pairs!

In spite of our efforts we failed to trace the occurrence of the parrot in Aruba; we only succeeded in collecting some uncheckable information on the last surviving individuals, which were said either to have been caught alive and sold as cage-birds for extraordinary prices, or poisoned some four or five years ago because of their destructive habits in fruit gardens. They seemed to have been last seen in Rooi Francees and in the mountainous region of Baranca Cora sometime between 1944 and 1947 (see also: WESTERMANN 1953, p. 45). Hence, in my book of 1955 I listed the parrot in Aruba as "extinct"! Fortunately, and quite unexpectedly, two specimens of the species were recently observed in Aruba by Mr. B. HARTWELL (Audubon Society) in company of members of the *Natural Sciences Study Group Netherlands Antilles* on 20.XI.1955 (J. G. DE JONG *in litt.*), which would indicate that there is some hope of restoring the parrot as a breeding bird in Aruba!

When we visited Bonaire the parrot was still rather common and well-known by all inhabitants. It was our impression, however, that in this island considerably less than 100 pairs were left.

In the Venezuelan islands the species is known only from Blanquilla (PHELPS Jr., 1948, p. 100).

Biotope and food — Bonaire: We found parrots exclusively in the northern, hilly part of the island, particularly in the well-wooded places and at the rocky escarpments of the estates of Onima, Fontein, Karpata, Brasiel, Slagbaai. They were often found resting in the shade of the crowns of *Acacia*, *Caesalpinia*, and *Bursera* in what seemed to be secondary seasonal forest and cactus vegetation. They often congregated in flocks of 6–10 or even up to 60 or 80 individuals feeding upon the fruits of organpipe cacti (*Cereus*) and those of *Casearia bonairensis* (November). They were also regular visitors of the fruit plantation of Fontein, where they seemed to be particularly fond of the fruits of *Achras sapota* and *Mango mangifera*. Three

stomachs examined contained nothing but the remains of cactus-fruits. HARTERT also mentions the fruits of *Melocactus*, *Cereus*, *Morinda* and *Guava*.

Reproduction cycle — Four specimens collected in November did not show any sign of breeding activity.

Zoogeography — *Amazona b. barbadensis* fortunately still occurs sporadically along the littoral of Venezuela, particularly in the semi-arid regions of the Paraguana Peninsula (J. RACENIS, Doc. Int. Un. Prot. Nat. 3rd Gen. Ass., Caracas, 1952, p. 26); it has been almost extirminated in Aruba.

Amazona b. rothschildi inhabits the islands of Bonaire and Blanquilla.

There are no other subspecies. The species apparently does not occur in Trinidad!

Like all related members of the genus *Amazona* (*Amazona ochrocephala*!) the present species is tropical South American in origin; it is a most noteworthy South American element in the avifauna of the Netherlands Leeward Islands.

Protective measures — The Bonaire parrot has recently obtained the protection of the law (Landsbesluit of August 7, 1952).

82A **Aratinga pertinax arubensis** (Hartert) Plate XII (3)

Caribbean Parroquet

Conurus arubensis HARTERT, Bull. Brit. Orn. Cl. *4*, 1892, p. XVI — Aruba.

82B **Aratinga pertinax pertinax** (Linnaeus) Plate XII (5)

(*Psittacus*) *pertinax* LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 98 — "Indiis"; ed. 12 *1*, 1766, p. 142 — "America" (= Curaçao).

82C **Aratinga pertinax xanthogenius** (Bonaparte) Plate XII (4)

Conurus xanthogenius BONAPARTE, Consp. Gen. Av. *1*, 1850, p. 1 — "Brasilia" (type-specimen without locality!) (= Bonaire; see: HARTERT, Ibis 1893, p. 331 and Nov. Zool. *9*, 1902, p. 302) — Type specimen examined in the Leiden Museum.

Conurus chrysogenys?, MARTIN, Ber. Reise Niederl. West-Indien, Leiden, 1888, p. 141 (Aruba).

Conurus aeruginosus, HARTERT, Bull. Brit. Orn. Cl. *1*, 1892, p. XII (Aruba).

Conurus arubensis, HARTERT 1893, p. 300 (Aruba); SALVADORI, Ibis 1906, p. 456 (Aruba).

Conurus aeruginosus arubensis, HARTERT 1902, p. 301 (Aruba); CORY 1909, p. 199 (Aruba).

Eupsittula arubensis, RIDGWAY, *7*, 1916, p. 167 (Aruba).

Eupsittula pertinax arubensis, CORY, *2* (*1*), 1918, p. 62 (Aruba); RUTTEN 1931, p. 128 (Aruba).

Aratinga pertinax arubensis, PETERS, *3*, 1937, p. 190 (Aruba); DE JONG 1948, p. 7 (Aruba); ZIMMER & PHELPS, Am. Mus. Nov. *1511*, 1951, p. 8 (Aruba); VOOUS 1955, p. 122 (Aruba); MARIEN & KOOPMAN, Am. Mus. Nov. *1712*, 1955, p. 4 (Aruba).

"Psittacus macrourus (minima) — Perkiet", SIMONS 1868, p. 154 (Curaçao).

Conurus pertinax, MARTIN, Ber. Reise Niederl. West-Indien, Leiden, 1888, p. 119 (Curaçao); BERLEPSCH 1892, p. 88 (Curaçao); HARTERT, Bull. Brit. Orn. Cl. *1*, 1892, p. XII (Curaçao); HARTERT 1893, p. 320 (Curaçao); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 164 (Curaçao); HARTERT 1902, p. 301 (Curaçao); CORY 1909, p. 206 (Curaçao).

Eupsittula pertinax pertinax, RIDGWAY, *7*, 1916, p. 164 (Curaçao); CORY, *2* (*1*), 1918, p. 62 (Curaçao); RUTTEN 1931, p. 128 (Curaçao).

Aratinga pertinax pertinax, PETERS, *3*, 1937, p. 190 (Curaçao); DE JONG 1948, p. 7 (Curaçao); ZIMMER & PHELPS, Am. Mus. Nov. *1511*, 1951, p. 8 (Curaçao); VOOUS 1955, p. 122 (Curaçao); MARIEN & KOOPMAN, Am. Mus. Nov. *1712*, 1955, p. 4 (Curaçao).

Conurus xanthogenius, SCHLEGEL, Mus. d'Hist. Nat. Pays-Bas *5*, *Psittaci*, 1864, p. 18 (type of *Conurus xanthogenius* BP., "Amérique méridionale"); SALVADORI, Ibis 1906, p. 457 (Bonaire); HARTERT, Bull. Brit. Orn. Cl. *1*, 1892 p. XII (Bonaire); HARTERT 1893, p. 331 (Bonaire); CORY 1909, p. 211 (Bonaire).

Conurus carolinensis?, MARTIN, Ber. Reise Niederl. West-Indien, Leiden, 1888, p. 141 (Bonaire).

Conurus pertinax xanthogenius, HARTERT 1902, p. 302 (Bonaire).

Eupsittula pertinax xanthogenia, RIDGWAY, *7*, 1916, p. 166 (Bonaire); CORY, *2* (*1*), 1918, p. 62 (Bonaire).

Eupsittula pertinax xanthogenius, RUTTEN 1931, p. 128 (Bonaire).

Aratinga pertinax xanthogenia, PETERS, *3*, 1937, p. 191 (Bonaire); ZIMMER & PHELPS, Am. Mus. Nov. *1511*, 1951, p. 8 (Bonaire); MARIEN & KOOPMAN, Am. Mus. Nov. *1712*, 1955, p. 4 (Bonaire).

Aratinga pertinax xanthogenius, DE JONG 1948, p. 7 (Bonaire); PHELPS & PHELPS 1951, p. 17 (Bonaire); VOOUS 1955, p. 122 (Bonaire).

Native name — *Prikichi* (parkiet).

ARUBA (*arubensis*). — Resident.
CURAÇAO (*pertinax*). — Resident.
BONAIRE, KLEIN BONAIRE (*xanthogenius*). — Resident.

ARUBA (*arubensis*): *Andicuri*, 17.XII.1951 (2 ♂, 1 ♀); *Picaron*, 18.XII.1951 (1 ♀); *Miralamar*, 17.XII.1951 (2 ♀); *Arikok hills*, 19.XII.1951 (1 ♀), 7.IV.1952 (1 ♀), 8.IV.1952 (1 ♂); *Ceru Boonchi*, 10.IV.1952 (1 ♀); *Baranca Cora*, 8.XII.1951 (2 ♀); Fontein, 27–29.VI.1930 (1 ♂, 1 ♀, 2 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Vader Piet*, 19.XII.1951 (1 ♂, 1 ♀).

CURAÇAO (*pertinax*): *Santa Barbara*, 25.IX.1951 (1 ♂), 20.X.1951 (1 ♀); *Groot Sint Joris*, 3.X.1951 (1 ♂, 4 ♀); *Boca Sint Joris*, 1.IV.1952 (1 ♀); Ronde Klip, 2.VI.1952 (1 ♂, collected by Koelers; Amsterdam Mus.); *Groot Piscadera*, 4.X.1951 (2 ♀), 9.X.1951 (2 ♂, 1 ♀), 11.X.1951 (1 ♀); Porto Marie Baai, 15–19.IV. 1930 (2 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Groot Santa Marta*, 28.IX.1951 (1 ♂), 10.X.1951 (2 ♂), 20.I.1952 (clutch of 5 eggs, 1 single egg); Savonet, 25.II.1948 (1 ♂, collected by Croockewit; Amsterdam Mus.); without locality, I.1885 (2 sex unknown, collection C. P. Neervoort van de Poll; Leiden Mus.).

BONAIRE (*xanthogenius*): *Guatemala Estate*, 10.XI.1951 (1 ♂); *Tras Montagne*, 16.XI.1951 (3 ♀); Lagoen, 23.VII.1892 (1 ♂, collected by Hartert; Am. Mus. Nat.

Hist.); *Fontein*, 6.XI.1951 (1 ♂), 15.XI.1951 (1 ♂, 1 ♀); Rincon, 16.VII.1892, collected by Hartert; Am. Mus. Nat. Hist.); *Brasiel*, 20.XI.1951 (1 ♀); *Slagbaai Plantation*, 8.XI.1951 (1 ♂, 1 ♀), 9.XI.1951 (1 ♀), 19.XI.1951 (1 ♀), 30.XI.1951 (1 ♂, 1 ♀); *Wanapa*, 24.XI.1951 (1 ♀), 26.XI.1951 (1 ♂, 1 sex unknown); without locality, 21–22.VII.1892 (2 ♂, collected by Hartert, Am. Mus. Nat. Hist.); 19–21. V.1908 (2 ♂, 3 ♀, collected by Ferry; Chicago Nat. Hist. Mus.); 13.V.1930 (1 ♂' collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

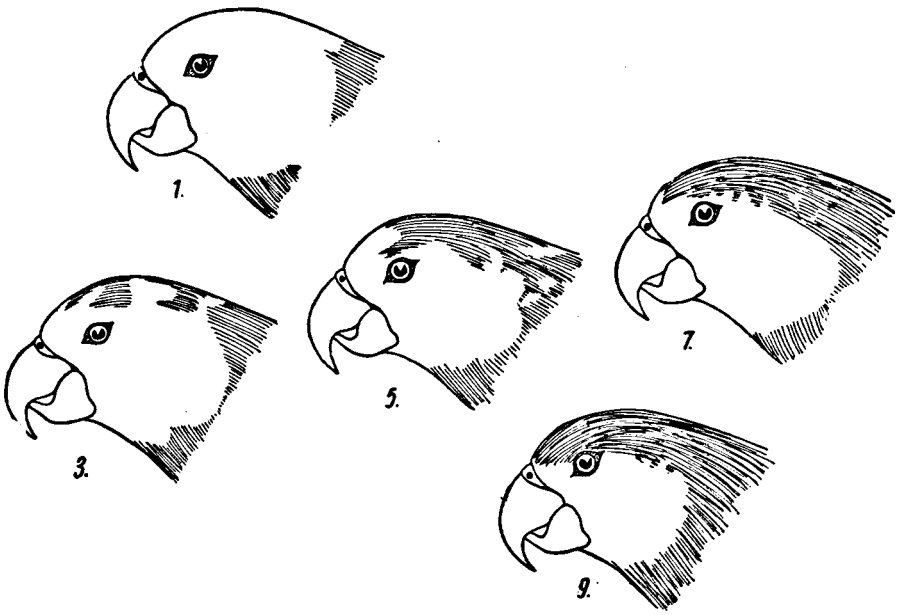


Fig. 1. *Aratinga pertinax*, showing 5 of the 9 main classes of variation in the coloration of the head in the populations from Curaçao and Bonaire, as mentioned in the text and adjoining table. The striped areas are greenish; the white areas are yellow or orange-yellow.

Taxonomy — Individual and geographical variation is striking in the South Caribbean populations of this species and refer mainly to the colour and the colour pattern of the head.

ARUBA (*arubensis*) — Head not conspicuously yellow or orange-buff. Instead, there is on the crown a variable mixture of bright green and dull blue; lores, cheeks and ear coverts are dull olive-brownish. These birds closely resemble a series of 14 skins from the Paraguana Peninsula (*venezuelae*) and 17 skins from Margarita (*margaritensis*) examined in the PHELPS Collection (Caracas), from which they differ only in having the small patch of orange-yellow beneath and behind the eye brighter and well-defined. In 3 of 18 specimens from Aruba examined (17%) the subocular patch was very pale and gradually merged into the dusky colour of the ear coverts;

they were, thus, hardly distinguishable from birds from Venezuela. In striking contrast to the close similarity of the parroquets from Aruba with those from the Venezuelan mainland, none of the Aruba specimens examined showed any resemblance to the parroquets from Curaçao.

CURAÇAO (*pertinax*) — Ear coverts and sides of the head conspicuously orange-yellow, connected by a narrow yellow line over the forehead. Crown bordering the yellow frontal band bluish-green or pale bluish. There is a considerable amount of individual variation in the series of 24 Curaçao specimens examined, particularly as regards the intensity and the extension of the orange-yellow colour of the head. However, none of the specimens showed a tendency towards the racial characteristics of the continental populations, nor to those from Aruba! Instead, the individual variation runs into the direction of the Bonaire parroquets in which the head has still more of the yellow coloration.

BONAIRE (*xanthogenius*) — Head with generally much more and brighter yellow than in Curaçao, particularly on forehead, crown and nape. The extension of this colour is, however, not only very variable, but in addition shows a striking asymmetry. In fact, individual variation is so large that hardly two individuals in our series were alike. The extreme variations are those in which (1) the whole head, including the throat and the hind neck are immaculate bright yellow (8% of individuals examined) and (2) those in which the yellow coloration is restricted to a narrow frontal band, leaving the sides of the head and the ear coverts a dull orange-brown (17% of individuals examined). At least 8 of the series of 28 specimens examined (28.6%) were indistinguishable from the majority of the Curaçao series in having the greater part of the crown green or even bluish-green and the sides of the head a duller, less pure golden-yellow. HARTERT (1902), however, probably was perfectly right in considering the origin of the type specimen of Bonaparte's *Conurus xanthogenius, sine patriae*, which I had the privilege to examine in the Leiden Museum, should be Bonaire. This fine specimen has a wholly orange-yellow head and neck, with only one small greenish feather on the nape; it is almost matched by a male specimen collected by HARTERT in Bonaire on 22.VII.1892 (Am. Mus. Nat. Hist. no. 474443; specimen examined). However, none of the Bonaire parroquets I have collected or seen in the field, nor any of the skins examined from other collections, showed a degree of extension of the yellow colour comparable to that found in the two specimens mentioned. As stated above Bonaire seems to be inhabited at present by variable intermediates between a pure yellow headed type and a type comparable to the average of the conditions found in Curaçao. Bonaire parroquets lacking the excessive yellow coloration of the head are apparently considered by HARTERT (1893, p. 331) as immatures, for he states that juveniles of *pertinax* and *xanthogenius* are indistinguishable. I find, however, that apart from slight differences in the colour of the bill, which is light brownish in juveniles and more blackish-grey in adults, there is no constant difference in the adult and juvenile plumages. Moreover, intermediate specimens not only occur in Bonaire, but have also been found in Curaçao, most noticeably in the male from Ronde Klip, mentioned above.

In order to try to make clear what part of the variation in the parroquets from Curaçao and Bonaire is of a geographical nature and what of a local individual nature, the whole range of variation may be divided into 9 classes, starting (1) with a purely yellow-headed condition and ending with (9) those individuals in which the yellow of the forehead is reduced to a mere indication of an orange-brown tinge on the anterior frontal feathers, leaving the sides of the head and the ear coverts a dull brownish-orange (table 1, fig. 1).

TABLE 1

Showing individual and geographical variation in the coloration of the head in *Aratinga pertinax* from Curaçao and Bonaire (see fig. 1).

variation class	Curaçao		Bonaire	
	number of specimens	%	number of specimens	%
1	0	0	2	7.1
2	0	0	4	14.3
3	0	0	4	14.3
4	1	4.3	8	28.6
5	0	0	2	7.1
6	3	13.0	2	7.1
7	11	47.8	5	17.9
8	4	17.4	1	3.6
9	4	17.4	0	0

Iris yellow or yellowish-white; bill dark grey or dark greyish-brown; legs and feet blackish-brown or dark horn-colour.

Measurements — ARUBA (*arubensis*): ♂, wing 136, 136.5, 141, 142.5, 143; ♀, wing 135, 135, 135.5, 136, 136.5, 137, 138, 138.5, 140, 142, 142. Average wing length of 5 ♂, 139.8, of 11 ♀, 137.8.

CURAÇAO (*pertinax*): ♂, wing 137, 138, 138, 139, 140, 141.5, 142, 142, 145, 147, 147; ♀, wing 133, 136, 136, 136.5, 138, 139, 139, 139, 140, 141, 143. Average wing length of 11 ♂, 141.7, of 11 ♀, 138.2.

BONAIRE (*xanthogenius*): ♂, wing 138, 139, 142.5, 143, 144.5, 145.5, 146, 146.5, 147, 147.5, 149; ♀, wing 139, 140, 141.5, 141.5, 142, 142, 142, 144, 145, 146, 146.5, 146.5, 147.5, 148. Average wing length of 12 ♂, 144.4, of 14 ♀, 143.6.

Status — This species has never been lacking in any list of birds observed or collected by visitors of Aruba, Curaçao, and Bonaire, from the time of SIMONS in 1868 onwards. However, not until 1892 did it become apparent that LINNAEUS' description of *Psittacus pertinax* actually referred to the Curaçao parroquet (BERLEPSCH), indicating that a specimen of this parroquet from the remote island of Curaçao must have found its way to Europe as early as the middle of the 18th century. Indeed, the species of bird mentioned under the name *piriquitos* by IRENE A. WRIGHT (translation by C. F. A. VAN DAM: "Nederlandsche zeevaarders op de, eilanden... aan de kust van Columbia en Venezuela... 1621–1648(9)", 1, Utrecht, 1934 p. 221) to have been captured in Curaçao by a Carib Indian for Dutch colonists in 1635, seems to refer undoubtedly to the present species. The oldest specimens from Curaçao examined by the author are two skins in the Leiden Museum from the collection C. P. NEERVOORT VAN DE POLL, dated January 1885.

Although the type specimen of *Conurus xanthogenius* had been described by BONAPARTE as early as 1850, it was HARTERT who, in 1892, for the first time claimed Bonaire as its place of origin. Up to now the type remains the oldest record of this species from Bonaire.

The description of a "new species" of parroquet from Aruba by HARTERT in 1892 seems to represent the first record of the species from that island and the first introduction of this insular form into scientific literature.

There is nothing in the literature that would indicate that parroquets have been otherwise than abundant in the islands of Aruba, Curaçao, and Bonaire.

We found the parroquets very common in all three islands; we also observed them in Klein Bonaire.

In the Venezuelan islands the species is known from Tortuga (*tortugensis*; CORY 1909, p. 220) and from Margarita and Los Frailes (*margaritensis*; PHELPS, Jr., 1945, p. 270).

Biotope — Parroquets have been found in any kind of biotope where trees were available, from the well-shaded fruit gardens, coconut plantations, and manchioneel thickets to mangroves and lonely wind-blown trees of *Acacia* and *Caesalpinia* in the sun-burnt semi-deserts. In fact, these birds have been found in almost all localities throughout the islands, up to the very top of the Sint Christoffel in Curaçao. They were everywhere most conspicuous with their rich colours and their penetrating call.

Food — Parroquets were extremely common in the fruit gardens at the time of ripening fruits, flocks of a hundred and more of these birds attacking the trees and taking off, when disturbed, with a concert of unmelodious, violent cries. They appeared fond of eating the fruits of *Achras sapota*, *Mangifera indica*, *Melicocca bijuga*, *Anona muricata*. In addition we found the remains of various other kinds of fruits and seeds in the stomachs and crops examined, among which those of organ-pipe cacti, *Caesalpinia*, *Acacia*, and *Prosopis* were most numerous. We also observed parroquets feeding on the fruits of *Malpighia* and once saw them eating the flowers of *Gliricidia sepium*, known for their richness of nectar. Animal remains were never found in the total of 48 stomachs examined.

Reproduction cycle — Females with growing eggs in the ovary and swollen oviducts were collected at various dates between 16.XI.1951 and 7.IV.1952 (9 specimens). Breeding activity was, however, most conspicuous in the months of December and January, that is, during and immediately following the short rains of the season. In contrast to our observations in earlier months parroquets were then seen flying almost exclusively in pairs and not in flocks, although individual pairs were always to be recognized, even in the largest flocks. In addition we found many nests with eggs or young between 19.XII.1951 and 23.I.1952. RUTTEN, on the other hand, described full breeding activity in May 1930 and KOELERS (*in litt.*) found recently fledged young on 18.VIII.1952 and one nest with eggs and one with small young on 12.VIII.1955. From these records it seems clear that a definite breeding season does not exist, the species apparently starts breeding whenever the situation is favourable.

Nest — In all early literature mention is made of nesting holes dug out in big arboreal termitaries, in holes in trees, and in natural crevices and holes in steep limestone walls. We got the impression that the termitaries were by far the most favourite nesting sites. In January 1952 we found most of the arboreal termitaries inhabited by parroquets, independent of whether these were placed in mangroves or in manchioneel, mango, or other fruit trees. The nesting holes, which usually had a more or less rounded entrance of 7–10 cm in diameter, consisted of a narrow, curved tunnel, which we once measured as nearly 50 cm in length, widening into a dome-shaped nesting cave about 25 cm in diameter. One nest in a termitary containing 5 eggs proved on inspection to be devoid of any soft lining, as were the nests found

by us in the decayed trunk of a date palm, but nests found in the holes in a rocky wall (Sint Jan, Curaçao) appeared to be lined with small, green feathers. We also saw nesting holes in a steep, sandy wall of about 5 meters height bordering a road at Ceru Blancu, Aruba, on 20.XII.1951. These nests had been dug out in the soft and stony soil at $3\frac{1}{2}$ — $4\frac{1}{2}$ m from the ground, but were not yet finished by the time we found them. In these cases the entrance of the holes varied between about 8 and 12 cm in diameter. Whenever possible nests were placed in small colonies. The trunk of one date palm contained at least 4 or 5 nests dug out in the decayed wood (Groot Santa Marta, Curaçao).

Eggs — Dull white, of a rough and chalky texture; roundish in shape. One full clutch of 5 eggs was collected on 20.I.1952 at Groot Santa Marta, Curaçao. The eggs were in different stages of incubation, confirming pertinent local statements that parroquets start breeding immediately after the first egg has been laid and in this way give rise to a family of young of various ages and sizes. A nest containing 4 young birds in subsequent stages of development was actually found by KOELERS (*in litt.*) in Curaçao on 12.VIII.1955, the youngest one being about 1 day old, the eldest one about 5 days old, but all of them still had their eyes closed.

Recorded clutch-size in Curaçao: 4–7 (KOELERS).

Measurements of 9 eggs from Curaçao (mm):

25.0 × 21.0	26.1 × 21.9	27.3 × 21.9
25.0 × 21.3	26.6 × 21.0	28.0 × 21.9
25.9 × 22.2	27.0 × 21.9	28.1 × 22.3

Parasites — Miss THERESA CLAY (London) kindly identified the Mallophaga from our specimens as *Psittacomenopon anduzei* (Stafford), 1943, and *Paragoniocotes venezolanus* Stafford, 1943.

Zoogeography — *Aratinga p. arubensis* is only known from Aruba.

Aratinga p. pertinax is only known from Curaçao; it has been introduced into St. Thomas.

Aratinga p. xanthogenius is only known from Bonaire.

While *arubensis* closely resembles the continental race *venezuelae* and the insular race *margaritensis* from the islands of Margarita and Los Frailes, the forms *pertinax* and *xanthogenius*, though resembling each other, are very different from all other forms of the species. Consequently, *arubensis* and *margaritensis* seem to be recent insular offshoots of the continental stock, whereas *pertinax* and *xanthogenius* seem to have attained their characteristics in the course of a considerable time of isolation. Still, the great individual variation and the considerable amount of overlap found in Curaçao and Bonaire seem to point to an inter-insular exchange of genes. Even if only from the fact that parroquets have been found nesting in Curaçao in steep coastal rocks where they could reach their nesting holes only by way of a short flight over the sea, parroquets may well be considered to be able to bridge now and then the sea-gap of slightly over 50 km width which separates Curaçao from Bonaire. However, the remarkable fact remains that no inter-insular flights of parroquets have ever been observed in this region and that no taxonomic overlap whatever is noticeable between the parroquets from Aruba and those from Curaçao in spite of the fact that these latter islands are situated at slightly less than 80 km from each other. Nor is their any recognizable infiltration of continental birds into Curaçao and Bonaire. As moreover 6 specimens from St. Thomas (whence introduced from Curaçao) were all of the dark Curaçao type of coloration, without showing any of the "Bonaire-characters", the mutual overlap of characters in Curaçao and Bonaire

as a result of inter-island exchange of stray individuals becomes somewhat problematical. There exist, of course, the alternatives of independent parallel mutations in both islands and the artificial introduction by means of escaped cage-birds from Curaçao to Bonaire and *vice versa*.

Aratinga pertinax ranges throughout northern South America, from Panama to northeastern Brazil, including the islands of Aruba, Curaçao, Bonaire, Tortuga, Margarita and Los Frailes (see: ZIMMER & PHELPS, Am. Mus. Nov. *1511*, 1951). Throughout this range the populations inhabiting Curaçao and Bonaire are by far the most aberrant, pointing towards a much longer period of insular isolation in these islands than in the other islands. Being virtually absent in the West Indian islands the species must be considered to be of a South American origin (see: Zoogeography, p. 46).

Protective measures — Not protected by law.

83 **Forpus passerinus viridissimus** (Lafresnaye)

South American Parrotlet

Psittacula viridissima LAFRESNAYE, Rev. Zool. 1848, p. 172 — Caracas.
"Psittacus passerinus — Bibitji", SIMONS 1868, p. 154 (Curaçao).
Forpus passerinus, DE JONG 1948, p. 7 (Curaçao).
Forpus passerinus viridissimus VOOUS 1955, p. 123 (Curaçao).

Native name — *Bibitu*.

CURAÇAO. — Breeding not recorded; locally introduced.

CURAÇAO: Malpais, 20.III.1954 (1 ♂, 1 ♀, collected by Ansingh; ♀ in Amsterdam Mus.).

Taxonomy — Compared with specimens from Surinam (*F.p. passerinus*) the Curaçao male is darker green throughout, with the upper side of the wings darker and more strongly tinged with bluish. In the Curaçao female the difference with Surinam specimens is less striking, but the plumage is duller, less brightly yellowish-green and the forehead has less yellow.

Iris dark brown; bill light greyish; legs and feet pale fleshy.

Measurements — CURAÇAO: ♂, wing 86, tail 42.5; ♀, wing 83, tail 42.

Status — Apart from the mere indication by name in SIMONS's work of 1868, the species has been recorded only by DE JONG, who mentions an individual caught in exhausted condition in February 1943 at the Waterfort, Willemstad, on the south coast of Curaçao.

We met with this species only once, *viz.* two individuals on 1.X.1951 at Malpais, Curaçao, in cactus and acacia scrub. In spite of thorough research we did not succeed in seeing it afterwards. Native inhabitants proved to be well acquainted with these birds; they also kept them occasionally as cage-birds, but most of these birds probably came from the mainland and not from the islands. We were furthermore informed that shortly before 1940 some 40 individuals, said to have been introduced from Colombia, were liberated at Klein Piscadera, Curaçao. It is, of course, uncertain, whether all individuals of this species occurring in the island have descended from this Colombian stock or are casual visitors from Venezuela.

In the spring of 1954 small flocks of up to 6 individuals of the species suddenly appeared in Curaçao, where they were observed in various localities between 27.II and 20.III, making themselves conspicuous by their characteristic call notes. After this period the birds disappeared as suddenly as they had turned up. In 1955 the species again appeared in Curaçao from 11.IX onwards (ANSINGH & KOELERS *in litt.*).

Not recorded from the Venezuelan islands.

Food — The crops of the collected specimens contained grass seeds only.

Reproduction cycle — The gonads of the collected specimens were not in an active state of development.

Zoogeography — *Forpus p. viridissimus* inhabits the greater part of Venezuela, where it is very common. In the arid tropical zone of northeastern Colombia it is replaced by a different race (*cyanophanes*). The species occurs in many races throughout most parts of tropical South America, from Colombia to northern Argentina. It is a typical South American element in the avifauna of the Netherlands Leeward Islands.

Protective measures — Not protected by law.

84A **Coccyzus minor minor** (Gmelin)

Mangrove Cuckoo

(*Cuculus*) *minor* GMELIN, Syst. Nat. *1*, *1*, 1788, p. 411 — Cayenne.

84B **Coccyzus minor maynardi** Ridgway

Coccyzus maynardi RIDGWAY, Man. North Am. Birds, 1887, p. 274 — Ten Thousand Islands, Florida.

Coccyzus minor, CORY 1909, p. 199 (Aruba); DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).

Coccyzus minor abbotti, RIDGWAY, *7*, 1916, p. 34 (Aruba).

Coccyzus minor abbotti (?), CORY, 2 (*2*), 1919, p. 337 (Aruba); RUTTEN 1931, p. 132 (Curaçao).

Coccyzus minor maynardi, VOOUS 1953, p. 255 (Curaçao, Bonaire); VOOUS 1955, p. 124 (Curaçao, Bonaire).

Coccyzus minor minor, VOOUS 1953, p. 255 (Aruba); VOOUS 1955, p. 124 (Aruba).

Native name — unknown.

ARUBA (*minor*). — Casual visitor.

CURAÇAO, BONAIRE (*maynardi*). — Passenger migrant and winter visitor.

ARUBA (*minor*): without locality, 22.IV.1908 (1 ♀, collected by Ferry; Chicago Nat. Hist. Mus. nr. 38240).

CURAÇAO (*maynardi*): *Blauw*, 19.I.1952 (1 ♀); Santa Cruz, 21.IV.1930 (1 ♀ collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

BONAIRE (*maynardi?*): *Entrejol*, 25.III.1952 (1 ♀).

Taxonomy — The geographical and individual variation of this species is far from clear. Those specimens (Curaçao) possessing pale grey ear coverts, pale greyish

throat and upper breast, pale buff abdomen, olivaceous-grey upper parts, and brownish-grey head do not show any complication, since they can be directly referred to the migratory race *maynardi*, of which one definite specimen from Nassau Island, Bahamas, was available for direct comparison.

The specimen from Bonaire, although agreeing with *maynardi* in having the ear coverts a dark greyish, is conspicuous in the absence of any grey tinge on throat and breast, which are pale buff, deepening into orange-buff towards the abdomen. The upper parts are a beautiful greyish and the head lighter grey, quite unlike any other of the specimens of this species I was able to examine. In the absence of the knowledge of the sequence of plumages in this species I have provisionally referred here the bird to *maynardi*.

The specimen from Aruba, referred to *abbotti* by RIDGWAY and — with some hesitation — by CORY, was found to agree well with a specimen from Maranhao, Brazil (*minor*), in having lower ear coverts, chin and throat a light buffish, darkening into cinnamon-buff towards the lower under parts. Upper parts browner than in *maynardi*.

Additional specimen examined for comparison: *C. m. nesiotes* (Jamaica, 1 ♂; Am. Mus. Nat. Hist.).

Iris dark brown, eyelid orange-yellow, paler in the Curaçao specimen; bill black, base of lower mandible orange-yellow, paler in the Curaçao specimen; legs and feet dark bluish-grey.

Measurements — ARUBA (*minor*): ♀, wing 133, tail 158, bill (measured from forehead) 32.5, tarsus 30. CURAÇAO (*maynardi*): ♀, wing 133.5, 134.5, tail 147, 155, bill 32, 33, tarsus 29.5, 30.5. BONAIRE (*maynardi?*): ♀, wing 135.5, tail 159, bill 32, tarsus 28.

Status — Previous records pertain to 2 specimens collected in Aruba by FERRY on 22.IV.1908 and 4.V.1908 (CORY), one of these having been examined by the present author and subsequently referred here to *minor*. RUTTEN also collected a specimen (*maynardi*) near the end of April 1930 at Santa Cruz, Curaçao.

We collected one specimen in Curaçao (*maynardi*) and one in Bonaire (probably *maynardi*), but we could obtain little information on their biotope. One of the specimens originated from the xerophytic scrub (Curaçao), the other was caught inside a house (Bonaire). The species has not been otherwise observed by us.

Not recorded from the Venezuelan islands.

Food — The stomachs examined contained (1) large, green locusts, (2) at least 80 large green caterpillars and one large green locust.

Distribution — *Coccyzus m. minor* inhabits northern South America, including Venezuela and Trinidad; records from Colombia pertain to Bogota trade-skins only (DE SCHAUENSEE 1949, p. 491).

Coccyzus m. maynardi is a breeding bird from southern Florida, Cuba, and the Bahama Islands. In the northern parts of this range the species is migratory, wintering mainly in northern South America, where it is known from Venezuela, but apparently not from Colombia.

Protective measures — Not protected by law.

85 **Coccyzus americanus americanus** (Linnaeus)

Yellow-Billed Cuckoo

Cuculus americanus LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 111 — South Carolina.
Coccyzus americanus, CORY 1909, p. 199 (Aruba); RUTTEN, Ardea *24*, 1935, p. 204

(Curaçao); DE JONG 1948, p. 7 (Aruba, Curaçao; also Bonaire); VOOUS 1953, p. 186 (Curaçao); VOOUS 1953, p. 255 (Aruba, Curaçao, Bonaire).

Coccyzus americanus americanus, RUTTEN 1931, p. 132 (Aruba); VOOUS 1955, p. 125 (Aruba, Curaçao, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: *Schottegat Road*, 15.X.1951 (1 ♀), medio XI.1951 (1 ♀); *Jan Thiel*, 16.X.1951 (1 ♂); *Groot Sint Joris*, 22.X.1951 (1 ♂, 1 ♀); *Julianadorp*, 18.X.1951 (1 ♂).

Taxonomy — Iris dark brown, eyelid yellow; bill black, basal half, particularly that of lower mandible bright yellow; legs and feet lead-grey or lead-blue.

Measurements — CURAÇAO: ♂, wing 138, 147, 151, bill (measured from forehead) 30, 30.5; ♀, wing 141, 145.5, 146, bill 28, 29, 31.

Status — Previously known only from one specimen collected by FERRY in Aruba on 22.IV.1908 (CORY) and from specimens collected, but not preserved, on 15.X.1934 at San Mateo and in IX.1940 on the Sint Christoffel, Curaçao (DE JONG). Pertinent published records from Bonaire do not exist.

We observed this species only in Curaçao and Bonaire. By the second half of October and early November it was not uncommon and was observed regularly all over Curaçao. The first specimen appeared on 15.X.1951 (Malpais), the latest record was one by VAN DER WERF on 25.XI.1951 (verbal communication). It was only observed in solitary individuals, most of them were extremely weak and exhausted.

In the Venezuelan islands apparently known only from Los Testigos (PHELPS, Jr., 1945, p. 265).

Biotope — Open, xerophytic scrub and mangroves.

Food — Five of six stomachs examined contained various kinds of medium-sized and large insects (beetles, cicadas, caterpillars); in two stomachs we found the remains of a medium-sized lizard; one stomach was empty.

Distribution — *Coccyzus a. americanus* is a breeding bird from eastern North America, the Greater Antilles and the Bahama Islands. It migrates through Central America and the West Indies and winters in northern South America, whence it is known as a regular passenger migrant and winter resident throughout Colombia and Venezuela.

Protective measures — Not protected by law.

86 **Crotophaga sulcirostris sulicrostris** Swainson

Groove-Billed Ani

Crotophaga sulcirostris SWAINSON, Philos. Mag., new ser. *1*, 1827, p. 440 — Temascaltepec, Mexico.

Crotophaga sulcirostris, HARTERT, Bull. Brit. Orn. Cl. *1*, 1892, p. XII (Curaçao); HARTERT 1893, p. 320 (Curaçao); HARTERT 1902, p. 303 (Curaçao); CORY 1909, p. 206 (Curaçao); RIDGWAY, *7*, 1916, p. 95 (Curaçao); RUTTEN 1931, p. 132 (Curaçao, Bonaire); DE JONG 1948, p. 7 (Curaçao, Bonaire); VAN OORDT

1949, p. 326 (Curaçao, Bonaire); Voous 1953, p. 254 (Aruba, Curaçao, Bonaire). *Crotophaga sulcirostris sulcirostris*, Peters, *4*, 1940, p. 58 (Curaçao); Phelps & Phelps 1951, p. 18 (Bonaire); Voous 1955, p. 127 (Aruba, Curaçao, Bonaire).

Native name — *Chuchubi pretu*, Chuchubi hudiu.

Aruba, Curaçao, Bonaire. — Resident.

Aruba: *Dakota*, 19.XII.1951 (1 ♀). Curaçao: *Klein Sint Joris*, 25.X.1951 (1 ♂); *Groot Sint Joris*, 3.X.1951 (1 ♂); *Groot Piscadera*, 24.X.1951 (1 ♂); *Malpais*, 26.IX.1951 (2 ♀), 15.X.1951 (1 ♀); *Hato* 29.I.1951 (1 ♂ juv.); *Groot Santa Marta*, 10.X.1951 (1 ♀); Santa Cruz, 27.IV.1930 (2 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Sint Patrick*, 10.XI.1951 (1 ♀); *Grote Knip*, 23.X.1951 (2 ♂, 1 ♀). Bonaire: Kralendijk, 28.XI.1951 (1 ♀), 29.XI.1951 (1 ♀); *Guatemala Estate*, 10.X.1951 (2 ♂); *Onima*, 12.XI.1951 (1 ♂); *Fontein*, 15.XI. 1951 (1 ♂).

Taxonomy — No differences found after comparison with 10 specimens from Mexico, El Salvador, Honduras, Nicaragua, and Costa Rica.

Iris very dark brown; bill, legs and feet black.

Measurements — Aruba: ♀, wing 122.5, tail 163, bill (exposed culmen) 25, maximum height of bill 16.7. Curaçao: ♂, wing 124, 125, 126, 129 133.5, tail 168, 169, 174, bill 25, 26, 27, 28, 28.5, maximum height of bill 17.0, 17.7, 17.8, 17.8; ♀ wing 120, 125, 128, 129.5, 132.5, 133.5, tail 166, 167, 170, 170, 170, bill 25, 25.5, 25.5, 26, 26, 27, maximum height of bill 16.3, 16.4, 16.4, 16.5, 16.9, 18.3. Bonaire: ♂, wing 125, 130, 130.5, 133, tail 160, 162, 163, 179, bill 25, 26, 26, 28.5, maximum height of bill 16.2, 16.5, 17.6, 19.2; ♀, wing 122.5, 125, tail 160, 162, bill 24, 25, maximum height of bill 15.9, 17.0.

Status — Hartert was the first to find this species in Curaçao in 1892; by that time it was apparently very scarce in the island. The species was again collected in Curaçao by Dearborn in March 1908 (Cory). Rutten not only found it rather common in Curaçao, but in addition recorded for the first time its occurrence in Bonaire in 1930. This author furthermore made the important statement that the species had been unknown to the inhabitants of the island until two or three year before. Published records from Aruba apparently do not exist.

We found the species rather common in Curaçao and Bonaire and in addition observed and collected it in Aruba. In the latter island, however, it seemed to be very locally distributed and rather rare; observations were made in the gardens of Oranjestad, around the Strand Hotel, at Ajo, and at Santa Cruz. According to verbal information from Brother Antoon (Congregation La Salle, Aruba) the species must have been present in Aruba at least from 1941 onwards. — The species was almost without exception seen in flocks of 6 to 20 individuals.

Not recorded from the Venezuelan islands.

Biotope — The species has been found in every kind of dense scrub, from the driest acacia and cactus desert to the relatively luxuriant vegetation of fruit gardens and plantations. Wherever cattle or sheep were grazing these birds rarely failed to be present. From a flock of about 10–15 individuals that fed among the small herd of cattle at Malpais, Curaçao, at least two of the birds collected had large balls of hardened dung at their toes.

Food — There were perhaps no other species of birds found in Aruba, Curaçao, and Bonaire that proved to have such extraordinarily large quantities of food in their stomachs. In contrast to this situation the birds themselves often appeared rather poor; fat deposits, either beneath the skin or around the viscera, were found in but 2 of 18 specimens internally examined, that is in no more than 11%. Some of the birds were exceptionally thin even.

The contents of 18 stomachs examined proved to be at least as variable in animal components as they were large in quantities. The birds proved to be mainly carnivorous in habits (100% of stomachs examined), plant remains occurred in one stomach only (4 large seeds; 5.6%). Insects were present in 17 instances (94.4%), big spiders in 5 instances (27.8%), various species of lizards in 6 instances (33.3%; mainly *Anolis lineatus* of up to 20 cm in length). The insect diet consisted principally of large and small beetles (61.1%), large grasshoppers (33.3%), wasps (22.2%), cockroaches (16.7%), large cicadas (16.7%), caterpillars (11.1%), flies (11.1%), large bugs (5.6%), ants (5.6%). — It was not at all an exception to find in one stomach, for example, over 10 large spiders, 1 green grasshopper, 1 medium-sized beetle, and 1 cockroach, or — another example — over 55 beetles of 5 mm each, several wasps, several caterpillars, and many other insect remains. Lizards were usually too large to be swollen at once: after they had swallowed this prey, the lizard's tail would be hanging out of the half-opened bill, while the birds themselves in some cases were too well-fed to be able to fly away.

Reproduction cycle — In none of the specimens collected were the gonads appreciably swollen. However, I examined one nest — shown to me by BRONNEBERG — at Koraal Specht, Curaçao, on 18.I.1952. This nest, which contained 6 naked, black young, was a rough and rather bulky structure of sticks, lined with the fresh leaves of *Cassearia tremula* in which it was built. The nest was placed against the main trunk at about 3 meters height in dense, thorny scrub. At least three agitated adult birds were seen close to the nest. The beginning of another nest, which was never finished, was found on 14.I.1952 in acacia-scrub at Julianadorp, Curaçao; two adult birds were observed carrying a fresh, green leaf to the nest. — In the same period, on 29.I.1952, a recently fledged young in short, black, downy plumage, was collected at Hato; it formed part of a mixed flock of adult and juvenile birds.

VAN DER WERF (verbal communication) reports a nest with 4 naked young found in Curaçao on 19.XI.1955 in a thorny acacia. Only two adult birds were alarming.

Zoogeography — *Crotophaga s. sulcirostris* ranges from the southern United States southwards through Mexico and Central America to northwestern South America, where it occurs south to Peru and east to Venezuela, Trinidad, and Guiana. A slightly distinct subspecies inhabits the west coast of Mexico and Lower California (*pallidula*). The species does not occur in the West Indies, where it is apparently replaced by a slightly bigger species, *Crotophaga ani*. Like *C. ani*, *C. sulcirostris* seems originally to have had a South American distribution, but *sulcirostris* shows a decidedly stronger preference for arid regions than *ani*. Although both species are common in the Caribbean coast region of Venezuela and Colombia, it is *sulcirostris* only which inhabits the Paraguana Peninsula and which has colonized the outlying islands of Aruba, Curaçao, and Bonaire. Apparently Curaçao was the first of the islands to be colonized. Colonization must have happened in rather recent time, for the older people in Curaçao told me they could recall the days of their youth when anis had not yet been seen in the island. Bonaire and Aruba have been reached subsequently.

Protective measures — Not protected by law, but protection of this highly beneficial species is recommended by WESTERMANN (1946, p. 83), with whom I agree.

87 **Guira guira** (Gmelin)

Guira Cuckoo

Cuculus guira GMELIN, Syst. Nat. *1*, *1*, 1788, p. 414 — Brazil.
Guira guira, VOOUS 1955, p. 188 (Curaçao).

Native name — unknown.

CURAÇAO. — Casual visitor.

CURAÇAO: Caracas Baai, 12.VI.1954 (1 ♂; Collection Ansingh, Curaçao).

Taxonomy — The bird is in a very fine plumage and does not show any sign of captivity. With the exception of the central pair all tail feathers have been renewed; the old central tail feathers are not particularly abraded.

Iris orange-brown; bill orange; legs and feet dark grey.

Measurements — CURAÇAO: ♂, wing 185, tail 235, bill (measured from forehead) 30, tarsus 42.

Status — Not previously recorded.

Once, on 12.VI.1954, a dead specimen was picked up at Caracas Baai (ANSINGH *in litt.*).

Not recorded from the Venezuelan islands.

Distribution — *Guira guira* has a wide range in the savannah regions of central and southeastern South America, from Argentina to northeastern Brazil (mouth of Amazon River), but it is unknown from any locality north of the Amazon. Its occurrence in Curçao is therefore unexpected.

Protective measures — Not protected by law.

88 **Tyto alba bargei** (Hartert)

Barn Owl

Strix flammea bargei HARTERT, Bull. Brit. Orn. Cl. *3*, 1892, p. XIII — Fort Nassau, Curaçao.
"Palabrúa", PETERS 1892, p. 111 (Curaçao).
Strix flammea bargei, HARTERT 1893, p. 322 (Curaçao); HARTERT 1902, p. 304 (Curaçao).
Tyto alba bargei, HARTERT, Vög. Paläarkt. Fauna 1913, p. 1039 (Curaçao); HARTERT, Nov. Zool. *35*, 1929, p. 101 (Curaçao); VOOUS 1955, p. 128 (Curaçao, Bonaire).
Tyto bargei, RIDGWAY, *6*, 1914, p. 611 (Curaçao); CORY, *2* (*1*), 1918, p. 49 (Curaçao); RUTTEN 1931, p. 127 (Curaçao); DE JONG 1948, p. 8 (Curaçao).

Native name — *Palabrua*.

CURAÇAO, (BONAIRE). — Resident.

CURAÇAO: Mahaai, 21.I.1952 (1 ♂, Collection Ansingh, Curaçao); *Hato*, 12.XI. 1951 (1 ♂); *Sint Jan*, 2.IV.1951 (1 ♀); Klein Santa Marta, 16.XII.1948 (1 sex unknown, collected by Wagenaar Hummelinck; Amsterdam Mus.); *Savonet*, 18.X.1951 (1 ♂); Grote Knip, 21.I.1952 (1 sex unknown, not preserved); without locality, IX.1951 (1 ♀), (1 ♂, Leiden Mus.), (1 sex unknown, collected by Jhr. Dr. V. H. van den Bergh; Amsterdam Mus.).

Taxonomy — Males are almost pure white below with a variable amount of dark spotting; females have a buffish tinge of variable intensity and with more pronounced dark spots than in males. The upper parts are vermiculated with a rather dark greyish. In relation to the small body-size the legs and the feet are remarkably large and strong.

A female from Grenada, representing the Lesser Antillean race *insularis*, proved to be much darker above and below, with a deeper rufous on the facial disk. In general this specimen was much more intensively pigmented than any of the specimens from Curaçao examined, although of a comparable size.

Iris very dark brown; bill whitish; legs and feet light grey.

Measurements — CURAÇAO: ♂, wing 247, 248, 249, 257; ♀, wing 252, 259; sex unknown, wing 254, 260, 262.

Status and biotope — The type-specimen of this Curaçao race of barn owl, received by HARTERT in 1892 from Mr. HARRY BARGE, Governor of the Netherlands West Indies, long remained the only proof of the occurrence of the species in the Netherlands Antilles. Afterwards the museums of Leiden and Amsterdam received stray specimens from Curaçao, but neither FERRY, nor RUTTEN succeeded in finding a trace of the species. It was not until 1943 that DE JONG ("Beurs- en Nieuwsberichten", Curaçao) recorded it as being by no means as rare as had been supposed.

We found it fairly common throughout Curaçao and well-known by the inhabitants as "the white owl from Hato". It is, however, rarely seen, except in grottoes, which seem to provide its favourite daily sleeping places, but casually also in houses and old buildings. In spite of our efforts we did not find any owl in Bonaire, but we found one white breast feather of an owl — undoubtedly of the present species — in the grottoes of Spelonk on 29.XI.1951, where local people were acquainted with the sporadic occurrence of a "white owl". Trustworthy records from Aruba are lacking.

The species is unknown from the Venezuelan islands.

Food — The contents of the stomach of the specimen collected in the grotto of Savonet and a small number of pellets collected in the same place revealed the following particulars: skull remains of at least 5 small and medium-sized Muridae, 1 skull of *Columbigallina passerina*, 3 skulls of *Tiaris bicolor*, 1 skull of *Zonotrichia capensis*, the remains of at least 2 lizards, and various small and large insects. All animals recorded in this list are abundant in the surrounding xerophytic scrub and must have represented an easy prey.

Reproduction cycle — None of the specimens collected had the gonads enlarged; hence nothing is known about the reproduction cycle of this species.

Zoogeography — *Tyto a. bargei* is known only from Curaçao; barn owls from Bonaire probably belong to the same small race. In Venezuela and Colombia it is replaced by considerably larger forms, the wing-lengths of which easily amount to over 320 mm (against 254 mm on the average in Curaçao). A small form similar to that in Curaçao inhabits the Lesser Antilles (*insularis*). Hence, *Tyto alba* seems to

represent a West Indian, rather than a South American element in the avifauna of the Netherlands Leeward Islands. The species as a whole is quite cosmopolitan in distribution, and occurs both in North and South America and generally throughout the West Indies.

Protective measures — Not protected by law. Positive protective measures are badly needed and have been recommended by WESTERMANN (1946, p. 83), with whom I agree.

89 **Speotyto cunicularia arubensis** Cory

Burrowing Owl

Speotyto cunicularia arubensis CORY, Pub. Field Mus. Nat. Hist. *182*, Orn. Ser. *1* (*8*), 1915, p. 299 — Aruba.

Speotyto cunicularia arubensis, CORY 1918, p. 41 (Aruba); RUTTEN 1931, p. 127 (Aruba); BARNES & PHELPS 1940, p. 23 (Aruba); DE JONG 1948, p. 8 (Aruba); VOOUS 1955, p. 129 (Aruba).

Native name — *Chogó*.

ARUBA. — Resident.

ARUBA: *Dakota Airport*, 14.XII.1951 (1 ♂); *Westpunt*, 12.XII.1951 (1 ♂, 1 ♀).

Taxonomy — This is a pale-breasted form of burrowing owl with a generally light buffish coloration and reduced barring on the under parts. — Compared with 5 specimens from the Paraguana Peninsula and 11 from Margarita in the PHELPS Collection (Caracas) the Aruba specimens were slightly paler above, particularly on the mantle and the head, not darker as stated in the original description (CORY 1915). Other distinguishing characters of the Aruba birds were the reduced barring of the under parts, the reduction of black markings on the outer tail feathers to no more than two or three broad shaft streaks (instead of four or five cross bars in specimens from Paraguana and Margarita), and less heavily bristled tarsus; in addition slightly larger dimensions (see also: BARNES & PHELPS, *l.c.*).

Iris yellow; bill light horn; legs and feet ochraceous-horn.

Measurements — ARUBA: ♂, wing 157, 166, tail 63, 65, tarsus 48, 48; ♀, wing 165, tail 63.5, tarsus 48. — The average wing-measurements of 5 specimens according to CORY are: ♂, 159, ♀, 163.

Paraguana Peninsula (*brachyptera*): wing ♂, 156, 159; ♀, 148, 152.5, 156 (PHELPS Collection).

Margarita (*brachyptera*): wing ♂, 147, 149, 149, 152, 152, 152.5, 156, 157; ♀, 149, 150, 150 (PHELPS Collection).

Status — This species was discovered by FERRY in Aruba in April-May 1908; his 5 specimens subsequently formed the basis for the description of the race *arubensis* by CORY in 1915. Up to now FERRY remained the only collector or ornithologist to have noticed the presence of this owl in Aruba.

We found it a rather scarce inhabitant of Aruba, where, however, the native people recognized it under a special name, indicating that the species is less scarce than is generally accepted. A male and a female, apparently forming a pair, were

collected at Westpunt (12.XII.1951), where they had been observed in the same place four days previously. A further specimen was shot at dusk at the edge of the Dakota Airport, where the species was said to nest regularly (14.XII.1951). Calling owls had been heard at various occasions during the night near the Strand Hotel close to the airport and probably must be referred to this species.

In the Venezuelan islands the species occurs in Margarita only.

Biotope — A slightly undulating stone desert, here and there interspersed with small groups of opuntias and organpipe cacti. The birds apparently found a day-shelter in some narrow crevice between the larger stones.

Food — Two stomachs examined contained many remains of medium-sized and large beetles; in addition other insects and the remains of a lizard (1 ×).

Reproduction cycle — None of the birds collected were in breeding condition. Rather, the male and female collected on 12.XII seemed to have just finished breeding (testis measuring 8 × 6 and 6 × 4 mm, respectively; largest egg in ovary 2 mm in diameter, oviduct thin, though strongly twisted).

Zoogeography — *Speotyto c. arubensis* is confined to the island of Aruba. Closely related forms inhabit the Paraguana Peninsula of Venezuela (*brachyptera*) and the arid tropical Caribbean coast of Colombia (*tolimae*). The species seems to have reached Aruba directly from South America. The species as a whole has an extensive range throughout all arid regions of America, from the southern United States south to southern South America.

Protective measures — Not protected by law. Protection of this rare and unique insular form is badly needed; too many individuals seem to fall a victim to local shooters.

90 **Caprimulgus cayennensis insularis** (Richmond)

Cayenne Nighthawk

Stenopsis cayennensis insularis Richmond, Proc. Biol. Soc. Wash. *15*, 1902, p. 159 — Curaçao.

Stenopsis cayennensis, Berlepsch 1892, p. 87 (Curaçao); Hartert 1893, p. 319 (Curaçao), 328 (Bonaire); Hartert, Das Tierreich *1*, 1897, p. 35 (Curaçao); Hartert 1902, p. 303 (Curaçao, Bonaire); Rutten 1931, p. 130 (Bonaire).

Stenopsis cayennensis insularis, Ridgway, *6*, 1914, p. 501 (Curaçao, Bonaire).

Thermochalis cayennensis insularis, Cory, *2* (*1*), 1918, p. 130 (Curaçao, Bonaire); de Jong 1948, p. 8 (Curaçao, Bonaire).

Caprimulgus cayennensis insularis, Peters, *4*, 1940, p. 201 (Curaçao, Bonaire); Barnes & Phelps 1940, p. 9 (Curaçao, Bonaire); Phelps & Phelps 1951, p. 18 (Bonaire); Voous 1955, p. 131 (Aruba, Curaçao, Bonaire).

Native name — *Para carpinté*; *Tapa camina* (Bonaire).

Aruba, Curaçao, Bonaire. — Resident.

Aruba: eastern slopes of *Arikok*, 18.XII.1951 (1 ♂); *Ceru Boonchi*, 10.IV.1952 (1 ♂). Curaçao: Rustenburgh, 30.I.1952 (1 sex unknown; Collection Ansingh, Curaçao); Brakke Put, 17.VII.1952 (1 (♂) juv.; Collection Ansingh Curaçao); *Santa Barbara*, 20.X.1951 (1 ♂); Groot Sint Joris, 29.VII.1952 (1 ♀, collected by Koelers; Amsterdam Mus.); *Bullenbaai*, 2.X.1951 (1 ♂).

Taxonomy — Examination of specimens in the PHELPS Collection (Caracas) showed that males from Aruba and Curaçao are generally paler above and below than Venezuelan birds. In addition the cross bars on the flanks are somewhat reduced and the white on the abdomen is somewhat extended. Of 16 males originating from various localities in continental Venezuela (*cayennensis*) only 2 were barely separable from Leeward Islands' birds as regards coloration of the upper parts. — I have not had an occasion to make direct comparisons with females. — One male in juvenile plumage has the barred under parts characteristic of the female plumage. It seems that the barred tail feathers of the juvenile plumage are retained for a considerable time. — Insular birds tend to have smaller measurements than continental ones.

Iris dark brown; bill horn-brown; legs and feet fleshy-horn.

Measurements — ARUBA: ♂, wing 138.5, tail 123, tarsus 16, 17. CURAÇAO: ♂, wing 141.5, 142.5, tail 114, tarsus 16, 18; ♀, wing 136, tail 96, tarsus 17.5.

Wing of 16 males from Venezuela: 139–152, average 144.2 (PHELPS Collection, Caracas).

Status — First recorded by BERLEPSCH from a specimen collected by ERNST PETERS in Curaçao in 1890. Afterwards mentioned from Curaçao by HARTERT, RICHMOND (from a specimen collected June 1900 by Capt. WIRT ROBINSON), and DE JONG. All these authors state that the species is rather rare. Published records from Bonaire exist from HARTERT and RUTTEN; the latter author found the species in the scrub vegetation near Saliña Tam. Not previously recorded from Aruba.

We found this species locally distributed throughout all three islands. It was remarkably scarce in Aruba and Bonaire, but fairly common in Curaçao, where we often observed the birds by night on the roads when they were conspicuous for their large, fluorescent red eyes (Julianadorp!).

In the Venezuelan islands known only from Margarita (*cayennensis*; see also: BARNES & PHELPS 1940, p. 24).

Biotope — Throughout the day these nighthawks were found sleeping on the ground under thick cover of thorned scrub and cacti, particularly *Opuntia wentiana*. They did not start hunting before almost complete darkness. Before that time their silhouettes were rarely seen against the evening sky. Once we saw one hunting in dark twilight along the edge of the fruit plantation of Klein Piscadera, Curaçao.

Food — The stomachs of all collected specimens contained large quantities of insects, particularly beetles of over 10 mm length.

Reproduction cycle — Enlarged gonads were found in specimens collected on 2.X (♂, testis 8½ × 5½ and 6½ × 5 mm) and on 29.VII (♀, largest egg in ovary 4 mm). Breeding, therefore, does not seem to be restricted to a certain season, but to be extended throughout the year.

A nest containing 2 incubated eggs was found by B. DE JONG and VAN DER WERF (*in litt.*) on 16.VIII.1953 at Groot Santa Marta, Curaçao. The two eggs were laid on a small, open space of coral debris under a small shrub of *Conocarpus*. The eggs were oval-shaped, buffish brown, with small markings and veins of blackish. Measurements about 23 × 18 and 24 × 17 mm, respectively.

Zoogeography — *Caprimulgus c. insularis* is probably restricted to the islands of Aruba, Curaçao, and Bonaire.

In Venezuela and Colombia the species is represented by slightly different races, from which the populations from Aruba, Curaçao, and Bonaire have apparently been

directly derived. Although virtually absent in the West Indies the species has been recently rediscovered on Martinique (PINCHON & BON SAINT-COME, Ois. Rev. Fr. Orn. *22*, 1952, p. 115–117 and BOND, Second Suppl. Checkl. Birds West Indies, 1952, p. 14).

Protective measures — Protected by law.

91A **Chordeiles minor gundlachii** Lawrence

Nighthawk

Chordeiles gundlachii LAWRENCE, Ann. Lyc. Nat. Hist. New York *6*, 1856, p. 165 — Cuba.

91B **Chordeiles minor minor** (Forster)

Caprimulgus minor J. R. FORSTER, Cat. Anim. Am., 1771, p. 13 — South Carolina.

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO (*gundlachii*): Malpais, 19.IV.1955 (1 ♂ ad.; Collection Ansingh, Curaçao); Westpunt, 17.IX.1955 (1 ♂ ad.; Collection Koelers, Curaçao).
CURAÇAO (*minor*): Malpais, 22.X.1955 (1 ♂ imm.; Collection Koelers, Curaçao).

Taxonomy — The specimens have been directly compared with two specimens of the race *minor*, 2 of *chapmani* (Florida, Alabama) [1], 3 of *aserriensis* (Texas 2, Mississippi 1) [2], and 5 of *gundlachii* (Cuba, dark colour-phase) [2]. One of the specimens referred to *gundlachii* has been verified by Prof. Dr. A. H. MILLER and Mr. R. K. SELANDER of the Museum of Vertebrate Zoology, Berkeley (Cal.), who also first recognized the specimen as belonging to *gundlachii*. These birds are conspicuous for their pale ochraceous coloration throughout and the extension of the light buffish coloration on the under parts, including the under tail coverts. The dark bars on the under parts are rather narrow, slightly narrower than the light interspaces, and very regular in appearance. On the upper parts the mantle and back show a considerable reduction of the black undertone, but the crown is rather dark brown with large, rounded buffish spots. These specimens are considerably smaller than continental North American birds. Wing-tip [3] small, 27 and 28 mm, respectively.

The specimen referred to *minor* is in its first autumn plumage (see: SELANDER, Condor *56*, 1954, p. 58, fig. 1). It is much larger than the specimens of *gundlachii*. Wing-tip large, 33 mm.

Measurements — CURAÇAO (*gundlachii*): ♂ ad., wing 177, 182, tail 93, 96. — Measurements of 5 males from Cuba for comparison: 169, 171, 174, 175, 180, tail 91.5, 91.5, 92, 92, 93 (Leiden Museum).

CURAÇAO (*minor*): ♂ imm., wing 202, tail ± 114.

[1] U.S. National Museum (courtesy of Dr. H. FRIEDMANN).
[2] Leiden Museum (courtesy of Dr. G. C. A. JUNGE).
[3] Distance of tip of longest primary to tip of 4th primary.

Status — Not previously recorded.

We did not observe this species.

First recorded by ANSINGH and KOELERS from the specimens collected and referred to above. In addition small flocks of 2–8 specimens were regularly observed in October 1955 in various parts of Curaçao (Willemstad, Julianadorp, Rio Canario), flying in the characteristic manner in bright daylight as well as at dusk (ANSINGH, KOELERS, J. G. DE JONG, VAN DER WERF *in litt.*). During this exceptionally strong autumn migration of 1955 the species was recorded from 17.IX–14.XII.

Not recorded from the Venezuelan islands.

State of gonads — In all specimens collected the gonads are small. Only the spring-specimen shows a considerable layer of subcutaneous fat.

Distribution — *Chordeiles m. gundlachii* is a breeding bird from the Bahama Islands and the Greater Antilles, where it is a summer resident. Its winter range is unknown, but is supposed to be somewhere in South America (BOND 1950, p. 81). In this connection the presence of specimens of this race in Curaçao in spring as well as in autumn is suggestive.

Chordeiles m. minor is a breeding bird in eastern and northern North America. It winters in the greater part of South America including Colombia and Venezuela; it is a regular passenger migrant throughout the West Indies.

Protective measures — Not protected by law.

92 **Florisuga mellivora mellivora** (Linnaeus)

White-Necked Jacobin

Trochilus mellivorus LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 121 — Surinam.

Florisuga mellivora, CORY 1909, p. 200 (Aruba); RIDGWAY, *5*, 1911, p. 578 (Aruba); RUTTEN 1931, p. 130 (Aruba); DE JONG 1948, p. 8 (Aruba).

Florisuga mellivora mellivora, CORY, *2* (*1*), 1918, p. 170 (Aruba); PETERS, *5*, 1945, p. 22 (Aruba); VOOUS 1955, p. 132 (Aruba).

Native name — unknown.

ARUBA. — Causual visitor.

No material.

Status — Only once recorded, *viz.* an immature ♂ collected by FERRY in Aruba April-May 1908 (CORY).

We did not observe this species.

Not recorded from the Venezuelan islands.

Distribution — *Florisuga m. mellivora* inhabits tropical America, from southern Mexico through Central America to the northern half of South America, south to Peru and southern Brazil. It is abundant throughout the whole of Venezuela. In the south Caribbean area the species is known only from Trinidad (*mellivora*) and Tobago (*tobagensis*); accidental records are known from Aruba (once!) and Cariacou (once!).

Protective measures — Not protected by law.

93 **Chlorostilbon mellisugus caribaeus** Lawrence

Emerald Hummingbird

Chlorostilbon caribaeus LAWRENCE, Ann. Lyc. New York *10*, 1874, p. 13 — Curaçao.
Ornismya prasina, MARTIN, Ber. Reise Niederl. West-Indien, Leiden, 1888, p. 119 (Curaçao).
Chlorostilbon atala, SALVIN, Cat. Birds Brit. Mus. *16*, 1892, p. 55 (Curaçao); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 165 (Curaçao).
Chlorostilbon caribaeus, PETERS 1892, p. 119 (Curaçao); BERLEPSCH 1892, p. 87 (Curaçao); HARTERT 1893, p. 299 (Aruba), 319 (Curaçao), 328 (Bonaire); HARTERT, Das Tierreich *9*, 1900, p. 77 (Aruba, Curaçao, Bonaire); HARTERT 1902, p. 301 (Aruba, Curaçao, Bonaire); CORY 1909, p. 200 (Aruba), 206 (Curaçao), 212 (Bonaire); RIDGWAY, *5*, 1911, p. 560 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 131 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).
Chlorostilbon caribaeus caribaeus, CORY, *2* (*1*), 1918, p. 204 (Aruba, Curaçao, Bonaire).
Chlorostilbon canivetii caribaeus, PETERS, *5*, 1945, p. 39 (Aruba, Curaçao, Bonaire).
Chlorostilbon mellisugus caribaeus, ZIMMER, Am. Mus. Nov. *1474*, 1950, p. 11 (Aruba, Curaçao, Bonaire); VOOUS 1955, p. 133 (Aruba, Curaçao, Bonaire).
Chlorostilbon mellisuga caribaeus, PHELPS & PHELPS 1951, p. 19 (Bonaire).

Native name — *Blenchi*, Blenchi Gewoon, *Blenchi berde* (♂); *Blenchi*, Blenchi hudiu (♀).

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: Eagle Factory, 12.XII.1936 (1 ♂, collected by Wagenaar Hummelinck; Leiden Mus.); *Rooi Francees*, 12.XII.1951 (1 ♀); *Arikok hills*, 10.XII.1951 (2 ♂), 8.IV.1952 (1 ♂, 1 (♀) juv.); Fontein, 29.VI.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Steenrijk*, 2.X.1951 (1 ♀); *Klein Sint Joris*, 30.X.1951 (1 ♂); *Groot Sint Joris*, 17.X.1951 (1 ♀); *Julianadorp*, early III.1952 (1 ♂); *Groot Piscadera*, 11.X.1951 (1 ♂), 24.X.1951 (1 ♀); *Malpais*, 15.X.1951 (1 ♂); *Hato*, 6.X.1951 (1 ♀); Porto Marie Baai, 19.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Groot Santa Marta*, 10.X.1951 (3 ♂, 1 ♀); Savonet, 28.IV.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Savonet*, 18.X.1951 (1 ♂), 27.X.1951 (1 ♂, 1 ♀); without locality, 1922 (2 ♂, collected by C. J. van der Horst; Amsterdam Mus.); (1 ♂, Leiden Mus.). BONAIRE: *Spelonk*, 29.XI.1951 (1 ♀); *Onima* 12.XI.1951 (1 ♂); Fontein, 20–21.V.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Fontein*, 15.XI.1951 (1 ♀); *Dos Pos*, 24.XI.1951 (2 ♂, 1 ♀); *Karpata* 23.XI.1951 (4 ♂, 1 ♀).

Taxonomy — I did not find any differences between specimens from Aruba, Curaçao, and Bonaire. — Males are bright glistening green all over, including the throat. A few of them have bright coppery-red edges to the feathers of the crown and the mantle; these are supposed to be in a freshly moulted stage. Tail conspicuously forked and deep steel-blue in coloration. Females have the tail much less deeply forked and the tail feathers are a duller bluish-black than in the males. The central pair of tail feathers is bluish-green with a narrow, more or less distinct terminal bar of steel-blue; the outer two or three pairs have greyish-white tips of variable width.

Iris dark brown; bill, legs and feet black.

Measurements — ARUA: ♂, wing 44.5, 45.5, 45.5, 46.5, 48, average 46.0, tail, 27, 28, furcation of tail 6, 7, bill (measured from forehead) 20, 20.5, 20.5; ♀, wing 45, 46.5, 46.5, tail 27, 28.5, furcation of tail 1.5, 3, bill 21, 22.5. CURAÇAO: ♂, wing 44.5, 44.5, 44.5, 45, 45.5, 46.5, 46.5, 47, 47.5, 47.5, average 45.9, tail 25, 26, 26, 26.5, 27, 27, 27.5, 27.5, 28, average 26.7, furcation of tail 4.5, 6, 6, 6, 6, 7, 7, 7.5, 7.5, average 6.4, bill 18, 18, 18.5, 18.5, 19.5, 20, 20, 20, 20, 20.5, average 19.3; ♀, wing 45.5,45.5, 46.5, 46.5, 46.5, 46.5, average 46.2, tail 25, 25.5, 25.5, 25.5, 26, 26.5, average 25.7, furcation of tail 1.5, 1.5, 2, 2, 2.5, 4, average 2.3, bill 19, 20, 20, 20.5, 21.5, 22, average 20.5. BONAIRE: ♂, wing 45, 45.5, 45.5, 45.5, 46, 46, 47, average 45.8, tail 26, 27, 27, 29, 30, average 27.8, furcation of tail 6.5, 7, 7.5, 7.5, 7.5, average 7.2, bill 18.5, 19, 19, 19.5, 19.5, 19.5, 20, 20.5, average 19.4; ♀, wing 46, 46, 46.5, 46.5, 48, average 46.6, tail 26.5, 27, 27.5, furcation of tail 1, 2, 3, bill 19, 19.5, 20, 20, 20, average 19.8.

Status — First recorded from Curaçao by LAWRENCE, who states having received 3 specimens from Mr. T. BLAND, who, in his turn, obtained them from Mr. HENRY H. RAVEN, apparently shortly before 1874. HARTERT was the first to discover the species in Aruba and Bonaire in 1892. Afterwards it has been recorded by all subsequent observers from all three islands. It has been generally stated to be rather abundant and the commonest of the two species of hummingbird found in the Netherlands Leeward Islands.

We found it in Aruba, Curaçao, and Bonaire, where it was abundant. We had the impression, however, that in some of the remote valleys of Aruba, particularly in the Arikok hills, and locally in Bonaire (Kralendijk), this species was outnumbered by its larger relative, *Chrysolampis mosquitus*.

In the Venezuelan islands known only from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 29).

Biotope and food — We found this species on flowering trees and shrubs in gardens and fruit plantations, in acacia deserts, in mangroves, as well as in the seasonal forest near the summit of Christoffel Mountain in Curaçao. Nests have been found by us in Curaçao in the gardens of Willemstad and Emmastad, as well as in acacia-scrub. These birds have been observed feeding in particularly large numbers on the sweetly smelling flowers of *Tamarindus indica* (Dos Pos, Bonaire!), *Beureria succulenta*, *Acacia tortuosa* and other leguminous trees. We also observed them on the flowers of *Cordia sebestena*, *Hibiscus rosa-sinensis*, *Albizzia lebbeck*, *Poinciana regia*, *Leonotis nepetaefolia*, *Bougainvillea spectabilis*, and *Opuntia wentiana*, as well as on epiphytic bromeliads. Without exception all 17 stomachs examined contained the remains of minute insects ($\frac{1}{2}$ mm in length or smaller), usually in remarkably great quantities, indicating that nectar and insects represent equally important items in the diet of this hummingbird. We also observed these birds alighting on the calices of the big flowers of *Ipomoea incarnata*, making a hole in the flower with their needle-pointed bill and apparently subsequently extracting nectar (and insects) without giving the flower the profit of being cross-fertilized.

Habits — The sharp call of this species was quite unlike the highly-pitched notes produced by *Chrysolampis mosquitus*. Evidently it was only from the males of the present species that we heard a pleasant, twittering song. These hummingbirds were certainly not less pugnacious than *Chrysolampis mosquitus* and individuals being involved in a heavy fight was a common phenomenon among the blossoms of flowering trees. In inter-specific fights, however, the present species was far inferior to the much larger *Chrysolampis mosquitus*. Therefore, in flowering trees of tama-

rinds, for example, they invariably occurred among the thinner and less exposed branches, particularly in the lower canopy of the trees, leaving the top and the more exposed parts to the other species!

Reproduction cycle — Nests with eggs have been found in Curaçao at the following dates: 15.X.1951, 29.XII.1951, 20.III.1952; a nest with two young was shown to us on 4.IV.1952. According to local information the species breeds throughout the year.

The following data are based on the observation of a nest in one of the gardens of Suffisant, Curaçao (KOELERS *in litt.*):

First egg laid, 14.X.1951.
Second egg laid, 15.X.1951.
Both eggs hatched, 28.X.1951.
Young fledged, 15.XI.1951.

In this case the incubation period was 13 days and the nestling period 18 days.

Nests were made particularly from the silken cotton of some plants such as *Calotropis procera* and *Cryptostegia grandiflora*. They have been found at between 1.00 and 2.50 meters height in *Bougainvillea*, *Hibiscus*, *Acacia tortuosa*, *Nerium oleander*, and *Hippomane mancinella*. One nest measured had an outer diameter of 32 mm and an inner diameter of 25 mm.

The eggs are white, without gloss, and long-oval in shape. Two eggs from Curaçao measure: 11.3 × 7.6 and 11.4 × 7.8 mm.

Zoogeography — *Chlorostilbon m. caribaeus* inhabits Aruba, Curaçao, Bonaire, Margarita, and Trinidad, as well as the north coast of Venezuela from the Paraguana Peninsula to the Orinoco Valley. In other parts of northern South America, including the Goajira Peninsula and the whole of the Caribbean coast region of Colombia, it is replaced by closely resembling forms. The species, which was recently ably monographed by ZIMMER (*l.c.*), ranges from western and central Mexico through Central America to northern South America, south to the Guianas, Bolivia, and Peru, but it does not occur in the Amazon Valley of Brazil, nor in the West Indies proper, where other representatives of the genus *Chlorostilbon* are found. The species is a South American element in the avifauna of the Netherlands Leeward Islands.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

94 **Chrysolampis mosquitus** (Linnaeus)

Ruby-Topaz Hummingbird

Trochilus Mosquitus LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 120 — "Indies"; *errore* = Surinam (see BERLEPSCH & HARTERT, Nov. Zool. *9*, 1902, p. 87).

Chrysolampis mosquitus, MARTIN, Ber. Reise Niederl. West-Indien, Leiden, 1888, p. 119 (Curaçao); PETERS 1892, p. 119 (Curaçao), BERLEPSCH 1892, p. 86 (Curaçao); HARTERT 1893, p. 299 (Aruba), 319 (Curaçao), 328 (Bonaire); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 164 (Curaçao); HARTERT, Das Tierreich *9*, 1900, p. 101 (Aruba, Curaçao, Bonaire); HARTERT 1902, p. 301 (Aruba, Curaçao, Bonaire); CORY 1909, p. 200 (Aruba), 206 (Curaçao), 212 (Bonaire); RIDGWAY, *5*, 1911, p. 666, 667 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 131 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 19 (Bonaire); VOOUS 1955, p. 135 (Aruba, Curaçao, Bonaire).

Chrysolampis elatus, CORY, *2* (*1*), 1918, p. 225 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).

Native name — *Blenchi tornasol, Tornasol* (♂); *Blenchi, Blenchi hudiu* (♀).

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: *Arikok hills*, 10.XII.1951 (1 ♂), 18.XII.1951 (1 ♀), 8.IV.1952 (1 ♂); *Ceru Kleine Jamanota*, 13.XII.1951 (1 ♀); *Baranca Cora*, 8.XII.1951 (2 ♂); Fontein, 29.VI.1930 (2 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Parera*, 22.X.1951 (1 ♂, 1 ♀); *Santa Barbara*, 7.X.1951 (1 ♀); *Groot Sint Joris*, 17.X.1951 (1 ♀); *Groot Santa Marta*, 28.IX.1951 (1 ♂), 10.X.1951 (3 ♂); *Savonet*, 18.X.1951 (5 ♂, 1 ♀), 27.X.1951 (1 ♂). BONAIRE: *Kralendijk*, 12.XI.1951 (1 ♂ juv.), 23–27.XI.1951 (2 ♂, 5 ♀, 3 ♂ juv.); *Guatemala Estate*, 10.XI.1951 (1 ♂); *Rincon*, 10.XI.1951 (1 ♂), 12.XI.1951 (1 ♀); Dos Pos, 31.V. 1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Dos Pos*, 24.XI.1951 (1 ♂, 1 ♀); Goto, 27.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — The great majority of the adult males are in the purplish-red colour-type in which the crown and the throat are a glistening dark purplish-red rather than orange-red; only two males from Curaçao show the orange-red coloration (87%). Males in juvenile dress closely resemble adult females, but have a differently coloured tail and rusty-red edges to the feathers of the rump and the lower back. The tail feathers are steel-blue, in some of the specimens with an additional greenish gloss on the lateral edges of the central pair and with whitish tips, except in the two central feathers. The metallic body-feathers of the adult plumage first appear on the centre of the throat.

Iris very dark brown; bill, legs, and feet black.

Measurements — ARUBA: ♂ ad., wing 56.5, 57, 57.5, 57.5, 59.5, tail 34, 35, 36, 36.5, bill (measured from forehead) 19, 19, 19, 20, 20.5; ♀ ad., wing 55, 55.5, tail 31, bill 23. CURAÇAO: ♂ ad., wing 53, 54.5, 54.5, 54.5, 56.5, 57, 57.5, 58, 58.5, 59, 59, tail 34, 34, 34, 34, 34, 34.5, 35, 36, 36.5, bill 18.5, 20, 20, 20.5, 20.5, 21, 21, 21.5, 21.5, 22; ♀ ad., wing 54, 55.5, 56.5, 58.5, tail 32, 32, 32, 32.5, bill 21.5, 22.5, 22.5, 24. BONAIRE: ♂ ad., wing 55, 56, 56, 58, 58.5, 59.5, tail 32, 33, 33, 33.5, 35, bill 18.5, 19, 20, 20, 20.5, 22; ♀ ad., wing 54, 54.5, 55, 55, 56.5, 57, tail 30, 31, 31.5, 32, 32.5, 32.5, bill 19.5, 20, 20, 22, 22, 22.5, 23, 23.5.

Status — First recorded from Curaçao by MARTIN in 1884. HARTERT was the first to observe it in Aruba and Bonaire in 1892. All subsequent authors have mentioned the species from all three islands, stating that it is rather abundant, although less common than *Chlorostilbon mellisugus*.

We found it common in all three islands, but it seemed less numerous than *Chlorostilbon mellisugus*. However, in some localities it was more abundant than the latter species (Arikok region in Aruba; Kralendijk in Bonaire). Its numbers seem to be subject to great fluctuations, which was not only apparent to us, but also well-known by local bird-observers. At a given time it appeared to be almost absent in Curaçao, only to be extremely numerous a short time afterwards. The same phenomenon was noticed by Dr. ERNST SCHAEFER in the Maracay district in northern Venezuela (verbal communication). It is, then, not impossible that this species wanders irregularly, disappearing for some time from a given place and turning up in large

numbers in another. In this connection it seems worth while recording an observation on 17.XI.1951 of a solitary individual of the species flying straight into the sea at Lac, Bonaire, and disappearing out of sight in a southeasterly direction.

In the Venezuelan islands the species has been recorded from Blanquilla (PHELPS, Jr., 1948, p. 102), Tortuga (PHELPS, Jr., 1945, p. 280), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 29), and Los Testigos (PHELPS, Jr., 1945, p. 265).

Biotope and food — This species was found in all kinds of biotope, including mangroves, but it was much less common in gardens near houses than *Chlorostilbon mellisugus* and we did not observe it in the seasonal forest on the upper slopes and on the summit of Christoffel Mountain in Curaçao, where *Chlorostilbon mellisugus* did occur.

It was most frequently observed feeding on the flowers of the various kinds of *Aloë* and *Agave* growing along roadsides; it was also common in flowering trees of *Tamarindus indica* and *Poinciana regia*, but we did not observe it feeding on the yellow flowers of *Opuntia wentiana*. The other shrubs and trees upon which we found the species feeding were: *Cordia sebestena, Cordia alba, Beureria succulenta, Crescentia cujete, Albizzia lebbeck, Acacia tortuosa, Prosopis juliflora, Haematoxylon brazilletto, Caesalpinia coriaria*, and other flowering leguminous trees.

All 28 stomachs examined contained the remains of minute insects, which, in addition to nectar, seemed to constitute an important part of the food of this species. On 29.X.1951 we observed a female hovering less than 10 cm over the ground and constantly picking in the wet mud, where large numbers of small *Diptera* were assembled after one or two tropical showers (near Ronde Klip, Curaçao).

Habits — The thin, high-pitched notes of this species seemed very characteristic and were quite different from the more aggressive call notes of *Chlorostilbon mellisugus*. We never heard this species singing. Like all hummingbirds it was very pugnacious: not rarely, fighting individuals dropped down and continued fighting on the ground, where they could be picked up rather easily. These fights involved both males and females. The birds were also often observed chasing *Chlorostilbon mellisugus* and *Coereba flaveola*; even birds of prey were attacked and successfully driven away (*Falco sparverius, Polyborus cheriway*).

Reproduction cycle — Two nests with eggs were found in Curaçao on 20.I. 1952. On 5.XI.1951 I observed a female building a not-yet-finished nest (Bonaire), while on 10.XI.1951 a male with active gonads (testis 5.5 × 5 mm) was collected (Bonaire).

One nest contained 2 eggs, another 1 egg. Nest building, defense of nest-territory, incubation, and feeding of the young seemed to be done by the female only.

Nests have been found at about 2.00 meters height in an almost leafless shrub of *Acacia tortuosa* growing along the border of a sun-burnt salt pan, and at about 2.50 meters height in a *Conocarpus* growing in the same locality (Groot Santa Marta, Curaçao). Another nest was observed at over 10 meters height in the top of a big mango tree at Fontein, Bonaire.

Two nests examined were finely woven, cup-shaped structures of the buffish-white cotton which forms the basis of the inflorescence of *Melocactus*; in the outer lining these nests also contained several of the small, red flowers of this cactus, as well as small pieces of lichen. Outer diameter of one of these nests 31 mm, inner diameter 15 mm.

Eggs white, without gloss, broad-oval in shape. Two eggs from Curaçao measure 11.8 × 8.7 and 12.0 × 8.7 mm, respectively.

Zoogeography — *Chrysolampis mosquitus* inhabits northern South America from Colombia to the Guianas and central Brazil. It also occurs in several of the outlying islands on the north coast of Venezuela, as also in Trinidad. It is one of the commonest and most conspicuous of the species of hummingbirds occurring in the tropical lowlands of northern South America. It is a definite South American species in origin and a South American element in the avifauna of Aruba, Curaçao, and Bonaire. Geographical variation in this species is not recorded.

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

95 **Ceryle alcyon alcyon** (Linnaeus) Plate XII (2)
Belted Kingfisher

Alcedo alcyon LINNAEUS, Syst. Nat. ed. 10 I, 1758, p. 115 — South Carolina.
Ceryle alcyon, RUTTEN 1931, p. 129 (Curaçao); VOOUS 1953, p. 188 (Curaçao).
Megaceryle alcyon, DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).
Ceryle alcyon alcyon, VAN OORDT 1949, p. 326 (Curaçao, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 281 (Curaçao); PHELPS & PHELPS 1951, p. 19 (Bonaire); VOOUS 1955, p. 139 (Curaçao, Bonaire).

Native name — unknown.

CURAÇAO, BONAIRE. — Winter visitor.

CURAÇAO: *Jan Thiel lagoon*, 16.X.1951 (1 ♂ imm.).

Taxonomy — The grey feathers of the chest are largely intermixed with rufous, as are the feathers of the flanks, indicating the bird's immaturity.

Iris dark brown; bill black, base of lower mandible flesh-colour, tip of bill whitish; legs flesh-colour, upper side of toes blackish.

Measurements — CURAÇAO: ♂ imm., wing 160, tail 89, bill (measured from nostril) 42.

Status — First recorded from Curaçao by RUTTEN on 20.IV.1930 at Porto Marie Baai. Afterwards observed by VAN OORDT in Curaçao and Bonaire in February 1948. There are no pertinent published records from Aruba, although DE JONG states that this species is a regular visitor to all three islands.

We found it a fairly common bird in Curaçao and Bonaire in suitable localities between 16.X.1951 and 2.IV.1952; we did not see it in Aruba. It was observed in solitary individuals only.

Extreme dates of arrival and departure in Curaçao: 11.IX and 20.IV (ANSINGH, KOELERS), with an exceptional observation on 25.VII.1954 (VAN DER WERF *in litt.*).

In the Venezuelan islands the species has been recorded from Blanquilla (PHELPS, Jr., 1948, p. 102), Tortuga (PHELPS, Jr., 1945, p. 280), Margarita (LOWE, Ibis 1907, p. 550), and Los Testigos (PHELPS, Jr., 1945, p. 266).

Biotope — We found this species along the shores of the shallow lagoons (Palu Lechi, Bonaire), perched on mangrove-trees and cacti bordering large inland-bays (Schottegat, Fuik Baai, Sint Joris Baai, Sint Jan Baai, Curaçao), as well as on the rocky sea coast. We observed it fishing in the smooth and clear waters of the south coast of Curaçao, but also right in the rough surf at the north coast of the island

(Boca Grandi, Savonet!). It seemed to us as if each of the larger bays had its own specimen of kingfisher, which apparently remained solitary during the whole winter.

Food — One stomach examined contained the chopped remains of a large, greenish crab.

Field observations — A shy, though very aggressive species. Twice we observed it in heavy pursuit of a passing *Falco columbarius*.

Distribution — *Ceryle a. alcyon* is a breeding bird from the greater part of eastern North America. It is an abundant winter visitor throughout the West Indies, wintering south to northern South America, where it is known from the Caribbean coast of Colombia (DE SCHAUENSEE 1949, p. 596), the north coast of Venezuela (BARNES & PHELPS 1940, p. 24), Trinidad, and the Guianas.

Protective measures — Not protected by law.

96 **Sphyrapicus varius varius** (Linnaeus)

Yellow-Bellied Sapsucker

Picus varius LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 176 — South Carolina.
Sphyrapicus varius varius, VOOUS 1955, p. 140 (Aruba).

Native name — unknown.

ARUBA. — Casual winter visitor.

ARUBA: Sabaneta, 9.XI.1950 (1 ♂), collected by Lt. E. G. Oehlers; mounted specimen in Mr. Oehlers's possession).

Measurements — ARUBA: (♂), wing 121.

Status — Not previously recorded.

Known only from the specimen mentioned above, which I examined. It was caught by hand in a very poor condition, probably as a result of exhaustion from over-sea migration flight.

Not recorded from the Venezuelan islands.

Distribution — *Sphyrapicus v. varius* is a breeding bird throughout the greater parts of eastern North America. It winters in the Bahama Islands, the Greater Antilles, and in Central America south to western Panama. It does not seem to have ever been collected on the South American mainland. See: HOWELL, Auk *70*, 1953, p. 118–126.

Protective measures — Not protected by law.

97 **Muscivora tyrannus tyrannus** (Linnaeus) Plate XIII (1)

Fork-Tailed Flycatcher

Muscicapa tyrannus LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 325 — Surinam.
Muscivora tyrannus tyrannus, VOOUS 1953, p. 189 (Curaçao); VOOUS 1955, p. 140 (Curaçao).

Native name — unknown.

CURAÇAO. — Summer visitor.

CURAÇAO: *Malpais*, 1.X.1951 (1 ♂ juv.), 8.X.1951 (1 (♂) ad.); Malpais, 25.VIII. 1955 (1 ♂ juv.; Collection Ansingh, Curaçao).

Taxonomy — In the adult specimen the inner webs of the three outer primaries are sharply emarginated, agreeing with the figure referring to *M.t.tyrannus* in ZIMMER, Am. Mus. Nov. *962*, 1937, p. 9. The specimen has moreover been compared with a large series, representing various races, present in the PHELPS Collection (Caracas) and with two additional males from Argentina (*tyrannus*) in the Leiden Museum. The upper parts are dark grey, growing darker on the back and the rump and becoming almost black on the upper tail coverts. — In the juvenile birds the yellow crown spot is lacking. The wing feathers are brown and strongly abraded, particularly in the 1955 specimen. The outer primaries are not emarginated at their tips. In the 1955 specimen the upper parts are as dark greyish as in the adult specimen, but in the 1951 juvenile the upper side is a very light grey, with an additional indication of a whitish collar around the hind neck, which are all characters of the race *monachus* from northern Venezuela. It is quite possible that this specimen actually belongs to the Venezuelan populations. — All specimens are in a state of rather heavy moult (particularly the tail), though most of the small feathers have been renewed. In the 1955 specimen there is a conspicuous brown crown patch formed by the much faded and abraded feathers left of the juvenile plumage.

Iris dark brown; bill, legs and feet black.

Measurements — CURAÇAO: ♂ ad., wing 106, bill (measured from forehead) 20; ♂ juv., wing 97, bill 20.

Status — Not previously recorded.

We observed a flock of 10–15 specimens between 26.IX. and 15.X.1951 at Malpais, Curaçao. Also observed and collected in Curaçao (Malpais) in 1955 between 21.VIII and 22.X (ANSINGH and KOELERS *in litt.*).

In the Venezuelan islands the species has been recorded from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 31) and Los Testigos (early October, PHELPS, Jr., 1945, p. 266). All these records apparently pertain to the race *tyrannus*.

Biotope — Only observed in the high scrub vegetation bordering fresh water pools and creeks, where the birds were feeding in mixed flocks with *Tyrannus melancholicus* and *Tyrannus dominicensis*.

These flycatchers were very wild and were usually seen perched on exposed branches of the highest trees and shrubs, preferably above water (see: Zoogeography, p. 39). Also recorded from the telephone-wires along the Bullen Baai road, Curaçao (ANSINGH).

Food — The stomachs examined contained nothing but the remains of insects.

Distribution — *Muscivora t. tyrannus* is a breeding bird from temperate South America (Argentina, Paraguay), wintering north to northern South America as far as Trinidad, Tobago, Grenada and even to Cuba and eastern North America (ZIMMER, Am. Mus. Nov. *962*, 1937, p. 3; BOND 1950, p. 98). It is a not uncommon summer resident in Venezuela, whence it has been recorded as late as 13.X (ZIMMER, *l.c.*, p. 3). The records in Colombia fall between 20.III and 23.X (DE SCHAUENSEE 1950, p. 813).

Protective measures — Not protected by law.

Muscivora forficata (Gmelin)

Scissor-Tailed Flycatcher

Muscicapa forficata GMELIN, Syst. Nat. *1*, *2*, 1789, p. 931 — Mexico.
Muscivora forficata, VOOUS 1953, p. 186 (Curaçao).

In the absence of any collected material I am now in doubt as to the correctness of my field observation of this species at Malpais, Curaçao, as mentioned in an earlier paper (VOOUS). As there are no other records the species should therefore not be included in the present list.

98 **Tyrannus melancholicus chloronotus** Berlepsch Plate XIII (5)

Tropical Kingbird

Tyrannus chloronotus BERLEPSCH, Ornis *14*, 1907, p. 474 — Temax, Yucatan.
"Tyrannus species", PETERS 1892, p. 118, nr. 31 (Curaçao).
Tyrannus melancholicus satrapa, CORY 1909, p. 200 (Aruba), 207 (Curaçao).
Tyrannus melancholicus despotes, CORY & HELLMAYR, *5*, 1927, p. 108 (Aruba, Curaçao); DE JONG 1948, p. 8 (Curaçao).
Tyrannus melancholicus despotus, RUTTEN 1931, p. 134 (Aruba, Curaçao).
Tyrannus melancholicus chloronotus, VOOUS 1955, p. 142 (Aruba, Curaçao, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, BONAIRE. — Resident (?). — Breeding not definitely recorded.

CURAÇAO: *Malpais*, 1.X.1951 (1 ♂), 15.X.1951 (2 ♂, 2 ♀), 12.XI.1951 (1 ♂); *Hato*, 29.I.1952 (1 sex unknown). BONAIRE: *Onima*, 12.XI.1951 (1 ♂).

Taxonomy — In spite of the fact that most of the specimens are in a worn plumage it is clear that the Antillean birds are among the palest of individuals of this species with which they have been compared (Honduras 2, El Salvador 5, Nicaragua 1, Costa Rica 6, Panama 1, Cauca, eastern Colombia 1, Merida, Venezuela 1, British Guiana 3, Surinam 20, Quito, Peru 1, Santa Catharina, Brazil 5) [1]. The upper parts are olive-grey, rather than pale olive-green; the head light grey, hardly contrasting with the mantle; the under parts are light sulphur-yellow with a very pale greyish-olive chest band growing whitish on the throat and chin. In all these characters they are more or less in agreement with conditions found in specimens from Central America, Colombia and Venezuela, but I must trust ZIMMER, who ably reviewed this species (Am. Mus. Nov. *962*, 1937, p. 19–21), in accepting a good deal of irregularly distributed individual variation in that large area. Central American birds are a slightly purer green above and have a more conspicuous greyish head than the birds from Curaçao and Bonaire. In the literature Antillean individuals have usually been referred to the more easterly race *despotes*. However, individuals from Surinam and British Guiana belonging to the latter race are considerably darker olive-green above, in some instances even tending to brownish-olive, contrasting with the head, which is rather dark grey; on the under parts those birds

[1]) Including the specimens collected by Mr. H. W. E. CROOCKEWIT in Central America in 1952–1953.

have a distinct olivaceous chest band separating the deep yellow of the abdomen from the dark grey of the throat and the chin.

I have tried to make the same complicated calculations proposed by MEISE (Festschr. Stresemann, Heidelberg, 1949, p. 68–71) to attain a key for separating sedentary and migratory individuals of this species on a basis of details of the shape and length of the wing, but unfortunately failed to reach definite results. Still I am inclined to consider our Antillean specimens as mainly sedentary, or, at best, irregular visitors from the nearby South American continent. — After this was written ANSINGH and KOELERS (*in litt.*) informed me of now having observed this species in Curaçao in all months of the year.

Iris dark brown; bill black; legs and feet brownish-black.

Measurements — CURAÇAO ♂, wing 107, 107.5, 111.5, 112, tail 86.5, 87.5, 88, 92, bill (measured from forehead) 24, 24, 25, 26.5; ♀, wing 106, 112, tail 80, 85, bill 24, 27. BONAIRE: ♂, wing 109, tail 91, bill 26.5.

Status — The two females collected by FERRY (CORY) in Aruba on 1.V.1908 and in Curaçao on 1.III.1908 remained for a long time the only evidence of the occurrence of this species in the Netherlands Leeward Islands, but the species was apparently observed in Curaçao as early as 1890 by ERNST PETERS. DE JONG is the only subsequent author to mention its occurrence in Curaçao from personal observations.

We met with this species in Curaçao and Bonaire, but failed to find it in Aruba. In Curaçao it was by no means rare, although locally distributed, but owing to its sharp call and conspicuous habits it was hardly to be overlooked. In Bonaire we found it only once, *viz.* in the mangroves of Onima on 12.XI.1951.

In the Venezuelan islands the species has been recorded from Margarita; it is also known from Trinidad and Tobago (*T.m. chloronotus*; see: ZIMMER, Am. Mus. Nov. *962*, 1937, p. 19).

Biotope and habits — The species seemed to occur in the same biotope as *Tyrannus dominicensis*, with which it often assembled in loose flocks. It was, however, decidedly superior to that species, both in activity and pugnacity (see: Zoogeography, p. 39). It occurred in cactus desert and scrub and in mangroves and was once observed in the gardens of Julianadorp, Curaçao (28.X.1951), where it kept to the tops of high tamarind trees.

Food — Like *Tyrannus dominicensis* this species often hunted after insects, flying high in the air like big swallows. Large and medium-sized insects dominated in 6 out of 7 stomachs examined (85.7%); among these were beetles, flies, and large wasps. In addition 4 stomachs (57.2%) contained the remains of large orange fruits and other vegetable matter.

Field observations — Although very wild, the presence of this species was easily noticed by its sharp call sounding like "tseerrr, tseerrr".

Reproduction cycle — Nothing is known about the breeding activity of this species; the gonads of none of the collected specimens were enlarged.

Zoogeography — *Tyrannus m. chloronotus* occurs in the greater part of Venezuela, including Trinidad and Tobago, the Caribbean coast of Colombia and most of Central America (ZIMMER, Am. Mus. Nov. *962*, 1937, p. 19). The species ranges throughout subtropical and tropical America, from southern Texas to northern Argentina, but not in the West Indies proper, excepting Grenada. It is, therefore, a South American member of the avifauna of Aruba, Curaçao, and Bonaire.

Protective measures — Not protected by law. Legal protection has been proposed by WESTERMANN (1946, p. 83).

99 **Tyrannus dominicensis dominicensis** (Gmelin) Plate XIII (6)

Grey Kingbird

Lanius dominicensis GMELIN, Syst. Nat. *1*, *1*, 1788, p. 302 — Hispaniola.
"Pipiripi Pitangus sp." PETERS 1892, p. 117 (Curaçao).
Tyrannus dominicensis, BERLEPSCH 1892, p. 86 (Curaçao); HARTERT 1893, p. 298 (Aruba, Curaçao, Bonaire); HARTERT 1902, p. 301 (Aruba, Curaçao, Bonaire); CORY 1909, p. 200 (Aruba), 207 (Curaçao), 212 (Bonaire); DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).
Tyrannus dominicensis dominicensis, HELLMAYR, *5*, 1927, p. 111 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 134 (Aruba, Curaçao, Bonaire); BOND 1950, p. 96 (Aruba, Curaçao, Bonaire); VOOUS 1955, p. 142 (Aruba, Curaçao, Bonaire, Klein Bonaire).
Tyrannus dominicensis tenax, BRODKORB, Auk *67*, 1950, p. 344 (Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 19 (Bonaire).
Tyrannus dominicensis fugax, BRODKORB, Auk *67*, 1950, p. 337 (Aruba).

Native name — Cabez grandi; probably also *Bati calbas* (Curaçao).

ARUBA, CURAÇAO, BONAIRE, KLEIN BONAIRE. — Resident; recently disappeared from Aruba (?). — Also passenger migrant and winter visitor.

CURAÇAO: *Jan Thiel*, 16.X.1951 (1 ♂ ad.); *Santa Barbara*, 23.I.1952 (1 ♀ juv.); *Klein Sint Joris*, 30.X.1951 (1 ♂ ad.); *Groot Sint Joris*, 17.X.1951 (1 ♂ juv., 1 ♀ juv.); *Malpais*, 8.X.1951 (1 ♀ juv.), 15.X.1951 (2 ♀ juv.), 27.XII.1951 (1 ♀ ad.), 16.I. 1952 (1 ♂ ad.); *Sint Jan*, 19.I.1952 (1 ♂ ad., 1 ♀ ad.). BONAIRE: *Kralendijk*, 14.XI. 1951 (1 ♂ ad.); main road *Kralendijk-Rincon*, 10.XI.1951 (1 ♀), 12.XI.1951 (1 ♂ ad., 2 ♀ ad.); *Onima*, 12.XI.1951 (1 ♀ ad.); *Fontein*, 15.XI.1951 (1 (♀) ad.); Dos Pos, 31.V.1930 (1 ♀ ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); Goto, 1.VI.1930 (1 ♀ ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Goto*, 19.XI.1951 (2 ♂ ad.); without locality, 13.V.1930 (1 ♂ ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Among the specimens collected are 3 certain breeding birds, *viz.* a breeding pair (male and female) collected at their nest with three eggs (Sint Jan, Curaçao, 19.I.1952) and one female with an egg in the oviduct (Onima, Bonaire, 12.XI.1951). The male is in a perfectly fresh plumage without any trace of moult; the females show an almost completed renewal of the small body feathers, wing quills, and tail feathers. Measurements of these three breeding birds are as follows:

♂, wing 118, tail 98.5, tail/wing ratio 83.5%, bill (measured from forehead) 30.5.

♀, wing 113, 115, tail 88, 95, tail/wing ratio 77.9, 82.6%, bill 29, 31.

These measurements not only show that individual variation in the tail/wing ratio is large, but also that South Caribbean individuals are not smaller than specimens from the centre of the area of the race *dominicensis*, of which I can give the following measurements for comparison (Cuba, Sint Martin, Sint Eustatius):

♂ ad. wing 116–121, average (5) 118.1
tail 88–102, average (5) 94.6
tail/wing ratio 75.2–85.2, average (5) 80.1%
bill 29–31, average (5) 29.7

♀ ad. wing 111.5, 114.5
tail 82, 95
tail/wing ratio 71.6, 85.2%
bill 29, 31

Therefore, I cannot agree with BRODKORB in recognizing a South Caribbean race *tenax*, described from Margarita Island, on a basis of shorter wing, longer bill, and larger tail/wing and bill/wing ratios.

I had, it is true, the impression that the present series averages darker and duskier grey above and that the ear coverts were less intensively black than in adult birds from Sint Martin and Sint Eustatius, but this difference did not provide a clue for distinguishing unlabelled individual specimens on a morphological basis. Therefore, I regret that I also cannot accept the identification by BRODKORB of a specimen from Aruba as belonging to a supposed migratory northern race (*fugax*).

Two immature specimens in perfectly fresh plumage and collected from a mixed flock of tyrant-flycatchers (*T. dominicensis*, *T. melancholicus*, *Muscivora tyrannus*) are conspicuous for their pale and purely grey coloration and for the absence of any conspicuous moult or wear. They might be considered to be migrants from more northerly populations, although dimensions and proportion of wing and tail do not give any evidence to this effect (Malpais, Curaçao, 15.X.1951). The measurements of these two immature individuals are as follows:

♀ imm., wing 114.5, 115, tail 88, 90.5, tail/wing ratio 76.9, 78.7, bill 29.5, 33.

It is noteworthy that the body-weight of these immature specimens proved to be considerably larger than those of our other specimens, *viz* 43 and 46 grams, respectively, against 31–38 grams in 8 other males and 32–39.5 grams in 6 other females!

As no satisfactory morphological racial characters seem to be known I have treated here all specimens collected in Aruba, Curaçao, and Bonaire — whether they were resident or may have been migrants — under one subspecific name (*tyrannus*).

Iris dark brown; bill, legs and feet black.

Measurements — CURAÇAO: ♂ ad., wing 113, 113.5, 114, 118, tail 93, 93, 98.5, tail/wing ratio 81.6, 81.9, 83.5%, bill (measured from forehead) 30, 30, 30.5, 32; ♀ ad., wing 88, tail 77.9, tail/wing ratio 77.9%, bill 27.5, 31; ♀ imm., wing 106, 109, 114.5, 115, tail 84.5, 84.5, 88, 90.5, tail/wing ratio 76.9, 77.5, 78.7, 82.0%, bill 28, 29.5, 29.5, 33. BONAIRE: ♂ ad., wing 112, 113, 114, 114, 115, 116.5, tail 92, 92, 92, 92, 94, 95, tail/wing ratio 80.0, 80.7, 80.7, 81.4, 81.5, 83.8%, bill 28.5, 30, 30.5, 31, 32; ♀ ad., wing 111, 111.5, 112.5, 113.5, 115, 118, tail 88.5, 90, 91, 91.5, 95, tail/wing ratio 76.3, 79.4, 80.9, 82.4, 82.6%, bill 27, 28, 28.5, 29, 29, 29.5, 31.

Status — Recorded by all previous observers from at least one of the islands, but particulars on the species' abundance vary considerably. HARTERT found it very rare in Aruba in 1892 (only one pair seen), though common in the other islands. FERRY records it as common in Aruba and Bonaire in 1908, and in the same year DEARBORN succeeded in collecting as many as 7 specimens in Curaçao during an eight day's stay (CORY). Finally, RUTTEN found it common in Bonaire in 1930, but merely mentions its occurrence in the other islands. Breeding has not yet been definitely recorded in spite of BOND's (1945, 1950) and DE JONG's (1948) statements to that effect.

We found this species rather common in Curaçao, but definitely commoner in Bonaire; we failed to see it in Aruba. It occurred also in Klein Bonaire (27.III.1952). — Nests with eggs were found at Sint Jan, Curaçao (19.I.1952) and juvenile birds were collected at Groot Sint Joris (17.X.1951). During the winter months the number

of these birds appeared to have been increased by migratory birds from the north. Such passing or wintering birds seemed to prefer congregating in loose flocks, often together with *Tyrannus melancholicus* and *Muscivora tyrannus*.

In the Venezuelan islands recorded from Las Aves and Los Roques (PHELPS, Jr., 1951, p. 22 and 13), Blanquilla (PHELPS, Jr., 1948, p. 103), Tortuga (PHELPS, Jr., 1945, p. 280), Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 32).

Biotope — Xerophytic scrub with scattered acacias, the edges of mangroves, and dense vegetations of organpipe cacti surrounding fresh water pools or bordering roadsides; also cultivated lands, but owing to the species', wildness only rarely seen close to human habitations. Often seen perched on top of organpipe cacti, or on exposed branches of isolated acacia trees and — particularly in Bonaire — on the telephone-wires along roadsides (see: Zoogeography, p. 39).

Food — Of 21 stomachs examined 19 contained insects (91%), 1 a small lizard (5%), and 5 vegetable matter (24%). Large insects predominated (52%). The stomach contents can be classified as follows: beetles (9 ×), big cicadas (4 ×), wasps (3 × ; 25 wasps' heads present in one stomach!), grasshoppers (2 ×), unidentifaible Hymenoptera (2 ×), caterpillars (2 ×). The vegetable matter mainly consisted of big seeds and berries, among which were *Malpighia* (Bonaire, 12.XI.1951).

These birds have been observed catching insects on the wing high in the air after the manner of swallows.

Reproduction cycle — One nest with three nearly fresh eggs and one nest with three eggs containing almost fully developed young were found at Sint Jan, Curaçao, on 19.I.1952. In one of these nests from which I collected both the eggs and the parents, again a fresh egg of this species was found half a year later (VAN DER WERF *in litt.*). Nesting was also recorded in the mangroves of the Spaanse Water, Curaçao, on 13.VII.1952 (BRONNEBERG *in litt.*). Adult birds feeding their young on the telephone-wire along the Bullen Baai road, Curaçao, were observed by VAN DER WERF (*in litt.*) on 29.X.1951. A family party from which I collected two juvenile birds was observed by us on 17.X.1951. Apart from the breeding pair specimens with enlarged gonads were collected by us on 12.XI.1951 in Bonaire (♀ with egg in oviduct) and on 16.I.1952 in Curaçao (♂, testis 10.5 × 5.5 mm).— From these various sources it appears that the species breeds virtually throughout the year.

Nest and eggs — Two nests found were open, rather roughly built, cup-shaped structures of small twigs. The first nest was made at about 2 meters height in an isolated tree of *Acacia tortuosa* on the edge of a salt lagoon. The other nest was placed at about 1.50 meters above the sea water in a mangrove tree (*Rhizophora mangle*) on the south coast of the island.

The eggs are creamy buff with irregular small spots of reddish-brown; larger secundary markings of chestnut-brown and purplish-grey form a ring at the broader pole. Both clutches found contained 3 eggs. Measurements: (first clutch) 23.3 × 17.1 24.0 × 17.3, 24.0 × 17.5; (second clutch) 24.0 × 17.5, 24.5 × 17.6, one broken. Average dimensions: 24.0 × 17.4 mm.

Zoogeography — *Tyrannus d. dominicensis* is a breeding bird in the greater part of the West Indies, including the Bahama Islands, the extreme southeastern United States ("*fugax*"), the islands in the South Caribbean Sea, and possibly in continental northern South America (Venezuela, Colombia), where, at all events, the species is a winter visitor from September 15 – May 7 (DE SCHAUENSEE 1950, p. 816). In most of the Lesser Antilles it is replaced by the subspecies *vorax*. *Tyrannus dominicensis* seems to be one of the autochthonous species of the West Indies which

has extended its range into adjacent coastal countries. It is a typically West Indian element in the avifauna of Aruba, Curaçao, and Bonaire.

Protective measures — Not protected by law. Protective measures have been proposed by WESTERMANN (1946, p. 83).

100 **Myiarchus tyrannulus brevipennis** Hartert Plate XIII (2)

Brown-Crested Flycatcher

Myiarchus brevipennis HARTERT, Bull. Brit. Orn. Cl. *3*, 1892, p. XII (Aruba, Curaçao, Bonaire).

Myiarchus brevipennis, HARTERT 1893, p. 298 (Aruba, Curaçao, Bonaire); HARTERT 1902, p. 300 (Aruba, Curaçao, Bonaire); RIDGWAY, *4*, 1907, p. 620 (Aruba, Curaçao, Bonaire).

Myiarchus tyrannulus brevipennis, CORY 1909, p. 200 (Aruba, Curaçao, Bonaire); HELLMAYR, *5*, 1927, p. 163 (Aruba, Curaçao, Bonaire); BARNES & PHELPS, Sr., 1940, p. 9 (Aruba, Curaçao, Bonaire); PHELPS, Jr., 1948, p. 105 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 20 (Bonaire); VOOUS 1955,p. 145 (Aruba, Curaçao, Bonaire).

Myiarchus tyrannulus, RUTTEN 1931, p. 134 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).

Native name — *Pimpiri*; also *Chonchorogai* (Bonaire).

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: *Arikok hills*, 18.XII.1951 (1 ♂); *Ceru Boonchi*, 10.IV.1952 (1 ♂). CURAÇAO: Scherpenheuvel, 10.IX.1936 (1 sex unknown, collected by Wagenaar Hummelinck; Leiden Mus.); *Groot Sint Joris*, 17.X.1951 (1 ♂, 1 ♀), 22.X.1951 (1 ♂); *Noordkant*, 23.III.1953 (1 ♀, collected by Croockewit; Amsterdam Mus.); *Malpais*, 26.IX.1951 (2 ♂, 1 juv.), 1.X.1951 (1 ♂), 8.X.1951 (4 ♀), 15.X.1951 (1 ♀), 12.XI.1951 (1 ♂), 27.XII.1951 (1 ♀), 18.III.1952 (1 ♂, 1 sex unknown); Porto Marie Baai, 19.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt, Leiden Mus.); *Groot Santa Marta*, 10.X.1951 (1 ♂); *Sint Nicolaas*, 3.XII.1951 (1 ♂); Santa Cruz, 27.IV.1930 (1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Savonet*, 18.X.1951 (1 ♂, 1 sex unknown), 27.X.1951 (1 sex unknown); *Grote Knip*, 23.X.1951 (1 ♂, 1 ♀); *without locality*, spring 1952 (1 ♂). BONAIRE: Fontein, 21.V.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Fontein* 5.XI.1951 (1 ♂); *Dos Pos*, 8.XI.1951 (1 ♀); *Karpata*, 22–23.XI.1951 (1 ♂, 1 ♀); without locality, 13.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Specimens from Aruba, Curaçao, and Bonaire proved to be no paler above or below than those from Venezuela. Instead, in fresh plumage, the upper parts are slightly darker olive-grey, less olive-brown than in the birds from Venezuela. The feathers of the head form a kind of occipital crest, which is dark brownish, and contrasts with the dark olive coloration of the mantle. As in addition the differences in size between island birds and specimens from northern Venezuela are only apparent when taken on the average, the insular form *brevipennis* is at its best poorly characterized against the continental form *tyrannulus*. — In hardly

any other bird inhabiting Aruba, Curaçao or Bonaire did the process of fading, sun-bleaching, and wear of the plumage appear to result in a stage comparable to that found in this species: the body of individuals in worn plumage are barely covered by the short and abraded feathers, giving these birds, even in the field, an extremely poor appearance.

Iris light or dark brown; bill blackish-brown, base of lower mandible lighter, more or less light horn or flesh-colour; legs blackish-brown. — In Venezuelan birds the bill has not been recorded otherwise than wholly blackish.

Measurements — ARUBA: ♂, wing 96, 91.5, tail 87, bill (measured from forehead) 26, 26, tarsus 21.5, 23. CURAÇAO: ♂, wing 88, 90, 91, 91.5, 91.5, 91.5, 92, 92.5, 92.5, 93, 93, 94, tail 80, 82, 82, 83, 83, 83.5, 84, 84.5, 85, 86, 87, bill 23.5, 24, 25, 25, 25.5, 25.5, 26, 26, 26, 26, 26, 26.5, average 25.4, tarsus 22, 22, 22, 22, 23, 23, 23.5, 23.5, 24, 25, average 23.0; ♀, wing 85.5, 85.5, 86, 88, 88.5, 90, 94, tail 79, 79.5, 80, 80, 81, 83.5, 85.5, bill 23.5, 24, 24.5, 25.5, 26, 26.5, 27.5, average 25.4, tarsus 22, 22, 23, 23, 23, 23.5, 23.5, average 22.9. BONAIRE: ♂, wing 91.5, 92.5, 96.5, tail 85, 85, 90, bill 23.5, 24.5, 26, average 24.7, tarsus 22, 22.5, 24, average 23.0; ♀, wing 84.5, 89, 96.5, tail 80, 80.5, 87, bill 24, 25, 27, average 25.3, tarsus 22, 23, 23, average 22.7.

The following is a comparison of the measurements of wing and tail (see also: PHELPS, Jr., 1948, p. 104–105).

WING

Curaçao	♂ 88 –94 average (12) 91.7	♀ 85.5–94 average (7) 88.2
Bonaire	♂ 91.5–96.5 average (3) 93.5	♀ 84.5–96.5 average (3) 90.0
North Venezuela [1])	♂ 88 –99.5 average (16) 93.8	♀ 87.5–95 average (6) 90.3

TAIL

Curaçao	♂ 80–87 average (11) 83.6	♀ 79–85.5 average (7) 81.2
Bonaire	♂ 85–90 average (3) 86.7	♀ 80–87 average (3) 82.5
North Venezuela [1])	♂ 80–96 average (16) 88.0	♀ 79–85 average (6) 81.3

Status — From the time of HARTERT's discovery of this species in the Netherlands Leeward Islands in 1892, it has been recorded by all subsequent observers as common in all three islands.

We found it equally common in Curaçao and Bonaire, but it was very scarce in Aruba, where we only met with it in two or three pairs in the valleys in the Arikok hills and on Ceru Boonchi.

In the Venezuelan islands the species has been recorded from Los Roques (*brevipennis*: PHELPS & PHELPS 1951, p. 13), Blanquilla (*blanquillae*: PHELPS, Jr., 1948, p. 103), Tortuga (*tyrannulus*: PHELPS, Jr., 1945, p. 281), Margarita (*tyrannulus*: YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 32), Los Frailes and Los Testigos (*tyrannulus*: PHELPS, Jr., 1945, p. 270 and 266).

Biotope and habits — The species apparently preferred thorny scrub with open spaces of bare ground, as also impenetrable cactus scrub. It was a characteristic bird in the flattened tree-tops of *Caesalpinia coriaria*, growing in the aloe-fields of Bonaire. It was also observed in mangroves. Its habits were those of the typical flycatchers, darting after flying insects from some regularly occupied exposed perching site. In contrast to the two species of kingbird (*Tyrannus melancholicus*, *T.*

[1]) Mainly from measurements taken by Dr. J. T. ZIMMER (*in litt.*) in the American Museum of Natural History, New York.

dominicensis) it was hardly ever seen sitting in the tops of trees, but, instead, chose a more hidden, dead branch, where it was less conspicuous. In these positions it remained motionless in an upright attitude, often for a considerable time. In interspecific struggles, which were often observed, it was decidedly inferior to the species of *Tyrannus*, but superior to *Sublegatus* and *Elaenia* (see: Zoogeography, p. 39).

Food — Of 29 stomachs examined 24 (82.8%) contained the remains of insects; vegetable matter was present in no more than 6 (20.7%) instances. In most of the cases large or medium-sized insects had been eaten, among which were particularly numerous: beetles (13 ×), grasshoppers (5 ×), cicadas (3 ×), big potter-wasps (3 ×). The remaining insects can be classified as follows: small Diptera (5 ×), small Hymenoptera (2 ×, among which one ant), small Heteroptera (3 ×), small Coleoptera (2 ×); once I counted at least 22 Geometrid caterpillars in one stomach. — The vegetable matter consisted of berries (3 ×) and seeds (2 ×), also big peas of some *Capparis*.

Reproduction cycle — We did not collect specimens with noticeably enlarged gonads, although in two females the ovary appeared to be in an active state (8.X, 23.X). However, we got two not yet full-grown juveniles (26.IX, 23.X). These data indicate that at least some reproduction had taken place in September and October. In December and January we had the impression that many birds of this species were breeding, but we did not collect breeding specimens, nor did we see any nest. VAN DER WERF (*in litt.*) found nest-building individuals of this species in Curaçao on 20.VII.1952 and a nest containing 3 fresh eggs on 25.VIII.1952 (Malpais).

Nest and eggs — VAN DER WERF (*in litt.*) reports the nest as being a mass of fine material, including grass-stems, woollen threads, and the feathers of *Aratinga pertinax*, *Polyborus cheriway*, and *Icterus icterus*. It was placed at the entrance of the nesting cavity of *Aratinga pertinax* in an arboreal termitary. Eggs, broad-oval, cream-colour, with fine streaks and spots of violet-brown and secundary spots of sepia. Three eggs measured 22.8 × 16.8, 23.3 × 16.9, and 23.4 × 16.6 mm, respectively.

Zoogeography — *Myiarchus t. brevipennis* is an insular race, inhabiting Aruba, Curaçao, Bonaire, and Los Roques. In other Venezuelan islands it is replaced by a special form (*blanquillae*), or by the race *tyrannulus*, which also inhabits continental Venezuela and Colombia. Other races of this species occur from the southern United States southwards through Central America to northern Argentina, Paraguay, Bolivia, and Peru. In the West Indies it is only found in the chain of Lesser Antilles north to St. Kitts. The species is a typically South American member of the avifauna of Aruba, Curaçao, and Bonaire (see: Zoogeography, p. 39, and VOOUS 1955, p. 414).

Protective measures — Not protected by law; legal protection is recommended by WESTERMANN (1946, p. 83), with whom I agree.

101 **Sublegatus modestus pallens** Zimmer Plate XIII (4)

Smooth Flycatcher

Sublegatus glaber pallens ZIMMER, Am. Mus. Nov. *1109*, 1941, p. 6 — Savonet, Curaçao.

Sublegatus glaber, BERLEPSCH 1892, p. 84 (Curaçao); HARTERT 1893, p. 298 (Aruba) 318 (Curaçao), 328 (Bonaire); HARTERT 1902, p. 300 (Aruba, Curaçao, Bonaire);

RIDGWAY, *4*, 1907, p. 422 (Aruba, Curaçao, Bonaire); CORY 1909, p. 200 (Aruba), 207 (Curaçao), 212 (Bonaire).

Sublegatus modestus glaber, HELLMAYR, *5*, 1927, p. 448, 449 (Aruba, Curaçao, Bonaire); RUTTEN 1931, p. 135 (Aruba, Curaçao, Bonaire).

Sublegatus glaber pallens, ZIMMER, Am. Mus. Nov. *1109*, 1941, p. 6 (Aruba, Curaçao, Bonaire).

Sublegatus modestus, DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).

Sublegatus arenarum pallens, PHELPS & PHELPS 1951, p. 20 (Bonaire).

Sublegatus modestus pallens, VOOUS 1955, p. 146 (Aruba, Curaçao, Bonaire).

Native name — *Para bobo* (Curaçao).

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: *Arikok hills*, 17–18.XII.1951 (1 ♂, 1 sex unknown), 7.IV.1952 (1 ♂, 1 ♀); *Ceru Boonchi*, 10.IV.1952 (1♀). CURAÇAO: *Groot Sint Joris*, 17.X.1951 (1 ♂, 1 ♀); *Santa Catharina*, 2.I.1952 (1 ♂); *Malpais*, 1.X.1951 (1 ♀), 8.X.1951 (1 ♂), 15.X. 1951 (1 sex unknown), 15.XI.1951 (1 ♂); Sint Willebrordus, 23.II.1948 (1 ♂, collected by Croockewit; Amsterdam Mus.); *Groot Santa Marta*, 10.X.1951 (1 ♂); *Sint Nicolaas*, 3.XII.1951 (2 ♂); *Sint Hyronimus*, 24.X.1951 (1 ♂). BONAIRE: *Kralendijk*, 27–28.XI.1951 (3 ♀); *Pos Amor*, 10 and 16.XI.1951 (1 ♂, 1 sex unknown); *Piedra Cruz*, 12.I.1951 (1 sex unknown); Fontein, 20.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Fontein*, 28.III.1952 (1 ♀); *Karpata*, 23.XI.1951 (1 ♂); Goto, 1.VI.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Brasiel*, 23.XI.1951 (1 ♀); *Wanapa*, 24–26.XI. 1951 (1 ♂, 1 ♀); *Lac*, 17.XI.1951 (1 ♀); without locality, 15.V.1930 (1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Our series has been compared with 2 specimens in fresh plumage from Barcelona, northern Venezuela (PHELPS Collection, Caracas), belonging to the race *glaber*, and with 4 specimens from Barranquilla and Bonda, northern Colombia (Am. Mus. Nat. Hist., New York), belonging to the paler race *atrirostris*. It appeared that the island birds are palest above, olive-grey rather than olive-brown. They are only slightly paler than the Colombian birds, though of a different colour shade. Head slightly darker, contrasting with the rest of the upper parts, brownish in continental birds, but greyish in insular specimens. The sulphur-yellow coloration of the abdomen in insular birds varies considerably according to the state of wear and bleaching. The darker extremes (Curaçao, Bonaire) are matched by the Venezuelan specimens, whereas on the other hand the lightest yellow present in the series can hardly be distinguished from the pale yellow of the Colombian birds, the latter specimens tending to be still lighter. However, birds from Aruba, Curaçao, and Bonaire differ from those from Colombia in the clear whitish-grey coloration of the breast, which is sharply bordered against the yellow of the abdomen; in Colombian birds the throat and the upper breast are a light dusky greyish, which gradually merges into the yellow of the abdomen. Finally, the bill in island birds is smaller and narrower and therefore has a less stubby appearance than that in continental birds. — There is no difference between the specimens from Curaçao and Bonaire, but some of my specimens from Aruba are clearly intermediate between birds from Curaçao and Colombia (Arikok hills, 7.VI.1952, coll. nrs. 1105, 1106)!

Iris dark brown; bill black or blackish-brown; legs blackish-brown.

Measurements — ARUBA: ♂, wing 69.5, 71.5, tail 63.5, 65.5, bill (measured

from forehead) 12, 14; ♀, wing 67.5, 68.5, tail 63.5, 63.5, bill 13, 13.5. CURAÇAO: ♂, wing 68.5, 70, 70.5, 71, 73, 73, 75, tail 64.5, 65, 66, 66, 66, 66.5, 66.5, 70, 71, bill 12, 12.5, 12.5, 13, 13.5, 13.5, 13.5, 13.5, 13.5; ♀, wing 67.5, 71.5, tail 66.5, 67, bill 12, 12.5. BONAIRE: ♂, wing 72.5, 72.5, 74, tail 65, 67, 68, bill 12.5, 13, 13; ♀, wing 66, 66.5, 67, 69.5, 70, 71, 72.5, 73, tail 61.5, 62.5, 63.5, 66, 66.5, 66.5, 68, bill 12, 12, 12, 12.5, 13, 13, 13, 14.

Status — Starting with the records by BERLEPSCH (coll. ERNST PETERS, Curaçao, 1890) and HARTERT all authors agree in considering this species a fairly common resident in all three islands. One male collected by HARTERT in Curaçao on 15.VI. 1892 later on (1941) served as the type-specimen of ZIMMER's Curaçao race, *Sublegatus glaber pallens*.

We found it a common species in Curaçao and particularly in Bonaire; it was, however, scarce in Aruba, where we found it restricted to the valleys in the Arikok hills.

In the Venezuelan islands the species has been reported from Los Roques (PHELPS & PHELPS 1951, p. 13), Tortuga (PHELPS, Jr., 1945, p. 281), and Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 33).

Biotope and habits — These birds were almost restricted to dense, thorny scrub, preferably with *Acacia tortuosa*. They have also been observed on the edges of fruit gardens. They had quiet habits, making them very inconspicuous as they moved through the lower branches of the scrub and among the cacti (see: Zoogeography, p. 40). We frequently observed them on the ground, chasing after small insects, which later on proved to be mainly small ants. The call-note, which was not often heard, was a friendly and distinct pee-wee. The song was a high-pitched, thin rattle, sounding like pee-weereereeree.

Food — All 30 stomachs examined contained the remains of insects (100%); only 2 stomachs showed additional fruits (7%), among which were those of *Casearia* (Aruba). The majority of the insect-food consisted of great quantities of reddish-brown ants (70%) and small, blackish beetles (63%); in addition we found small flies (7%), small caterpillars (10%), mosquitoes (3%), and a cicada (3%); also a small spider (3%).

Reproduction cycle — Increased activity and frequent song indicated that this species was breeding in December and January, but no nests were found, nor did we collect specimens with decidedly enlarged gonads.

Zoogeography — *Sublegatus m. pallens* inhabits Aruba, Curaçao, Bonaire, Los Roques and Tortuga. In continental Venezuela, including the Paraguana Peninsula, along the Caribbean coast of Colombia, as well as in Margarita and Trinidad, it is replaced by closely resembling forms. The species is the only representative of the genus which ranges throughout the whole of tropical South America north to northern Colombia; an isolated form inhabits southwestern Costa Rica. The species' absence in the West Indian islands clearly indicates its South American origin.

Protective measures — Not protected by law. All species of tyrant-flycatchers, however, should be protected (see: WESTERMANN 1946, p. 83).

102 **Elaenia chiriquensis albivertex** Pelzeln

White-Crowned Elaenia

Elainea albivertex PELZELN, Orn. Bras. *2*, 1868, p. 107, 177 — Ypanema, São Paulo, Brazil.

Elaenia chiriquensis albivertex, Voous 1955, p. 147 (Bonaire).

Native name — unknown.

Bonaire. — Probably casual visitor.

Bonaire: *Fontein*, 6.XI.1951 (1 ♂).

Taxonomy — The specimen was identified by Dr. J. T. Zimmer (New York), to whom I am greatly indebted for his kind assistance. The specimen is in a fresh plumage and did not show any sign of moult of body feathers.

Iris dark brown; bill dark horn-colour, lower mandible lighter; legs and feet dark horn-colour.

Measurements — Bonaire: ♂, wing 71, tail 56.5, bill (measured from forehead) 14, tarsus 17.

Status — Not previously recorded.

We observed and collected this species once in the fruit plantation of Fontein, Bonaire, on 6.XI.1951.

Not recorded from the Venezuelan islands.

Food — The stomach contained vegetable matter (fruits) only.

Gonads — The testes were very small, measuring 1 × 1 mm.

Distribution — *Elaenia c. albivertex* is a breeding bird throughout the greater part of tropical South America, including the island of Trinidad. It is common along the north coast of Venezuela. Additional races occur in northwestern Ecuador and southwestern Colombia, in Panama and southwestern Costa Rica, but the species is absent in the West Indies. The single specimen known from Bonaire probably is a straggler from the South American continent, unless it belongs to a species hitherto overlooked in the islands.

Protective measures — Not protected by law.

103 **Elaenia martinica riisii** Sclater Plate XIII (3)

Caribbean Elaenia

Elainea riisii Sclater, Proc. Zool. Soc. London *28*, 1860, p. 314 — St. Thomas.

Elainea martinica, Berlepsch 1892, p. 85 (Curaçao).

Elainea martinica riisii, Hartert 1893, p. 318 (Curaçao); Hartert 1902, p. 300 (Curaçao).

Elaenia martinica riisii, Cory 1909, p. 200 (Aruba), 207 (Curaçao), 213 (Bonaire); Peters, Occ. Pap. Boston Soc. Nat. Hist. *5*, 1926, p. 199 (Aruba, Curaçao, Bonaire); Hellmayr, *5*, 1927, p. 409 (Aruba, Curaçao, Bonaire); Rutten 1931, p. 135 (Aruba, Curaçao, Bonaire); de Jong 1948, p. 8 (Aruba, Curaçao, Bonaire); Bond 1950, p. 104 (Aruba, Curaçao, Bonaire); Phelps & Phelps 1951, p. 20 (Bonaire); Voous 1955, p. 147 (Aruba, Curaçao, Bonaire).

Native name — *Para bobo* (incidentally called *Chonchorogai* in Bonaire).

Aruba, Curaçao, Bonaire. — Resident (still occurring in Aruba?).

Aruba: Fontein, 29.VI.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt;

Leiden Mus.). CURAÇAO: *Santa Barbara*, 7.X.1951 (1 ♂); *Klein Sint Joris*, 1.IV. 1952 (1 ♂); *Noordkant*, 21.III.1952 (1 ♂ juv.); *Malpais*, 26.IX.1951 (1 ♂, 1 ♀), 1.X.1951 (1 sex unknown); *Groot Santa Marta*, 20.I.1952 (1 ♂); summit of *Sint Christoffel*, 27.X.1951 (2 ♂, 1 ♀); *Grote Knip*, 23.X.1951 (1 ♂, 1 ♀). BONAIRE: *Kralendijk*, 27.XI.1951 (1 ♂); Fontein, 21.V.1930 (1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); Goto, 1.VI.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Brasiel*, 20.XI.1951 (1 ♀); *Slagbaai Plantation*, 8.XI.1951 (1 ♀); *Wanapa*, 26.XI.1951 (1 ♀).

Taxonomy — The specimens closely resemble a series of birds from St. Martin (4), St. Thomas (3), St. John (1), and Vieques Island (1) with which they have been compared. When seen in a series, the South Caribbean birds tend to be more uniform greyish on the under parts with hardly any tinge of olive on the flanks or yellowish on the abdomen or the under wing coverts; the upper parts are also very pale greyish. These minor differences from topotypical material of the race *riisii* probably result from different stages of bleaching and wear, for it seems that South Caribbean birds are subjected to a maximum amount to influences of sun, heat, and wind! Neither in measurements, nor in the extension of the white edges to the greater and median wing coverts or in the extension of the light tips to the tail feathers have differences with *riisii* been found.

Iris dark brown; bill dark horn, greater part of lower mandible light fleshy-brown; legs and feet dark brown or blackish.

Measurements — ARUBA: ♀, wing 74, tail 64, bill (measured from forehead) 13. CURAÇAO: ♂, wing 78.5, 79.5, 80, 80, 80.5, tail 65, 66.5, 68, 69, 70, 71, bill 14, 14, 14.5, 15, 15.5, 16, 16; ♀, wing 72, 73+, 74+, tail 63, 64+, 65, bill 13.5, 15.5. BONAIRE: ♂, wing 76+, 77+, 79, tail 68.5, 71, 71.5, bill 13.5, 14.5, 14.5, 15; ♀, bill 14, 14, 14.5.

The following is a comparison of wing measurements.

Aruba (1 ♀)	74		
Curaçao (6 ♂, 3 ♀)	72	–80.5	average 78.5
Bonaire (1 ♂, 1 sex unknown)	79	–80.5	average 79.7
St. Martin (3 ♂, 1 ♀)	72.5–75		average 73.6
Virgin Islands (1 ♂, 1 ♀, 2 sex unknown)	73	–80	average 78.0

Status — First recorded by BERLEPSCH and HARTERT from specimens collected in Curaçao. It was first collected in Aruba and Bonaire by FERRY in 1908 (CORY). Subsequent visitors have recorded the occurrence of the species in all three islands; it proved to be commonest in Bonaire (RUTTEN).

We found this species in Curaçao and Bonaire, but failed to trace its occurrence in Aruba. If still existing in the latter island, it must be extremely rare. Although regularly distributed throughout Curaçao and Bonaire, it was decidedly commoner in Bonaire.

Not recorded from the Venezuelan islands.

Biotope and habits — We found it a quiet and very inconspicuous bird in thorny acacia and cactus scrub, *Croton* vegetation, and manchioneel thickets, as well as in the scattered shade-trees of *Caesalpinia*, *Acacia*, *Prosopis*, and *Beureria* in the aloe-fields of Bonaire. It was a very tame species, usually found in pairs and keeping to the thickest foliage or xerophytic bush. It was by far the least agressive of the species of tyrant-flycatchers occurring in the islands and of least conspicuous habits (see: Zoogeography, p. 40). It often moved through the branches in a hori-

zontal attitude, keeping its feathers loose and fluffy. In Curaçao it was perhaps nowhere more abundant than in the seasonal forest vegetation with *Acanthocereus tetragonus*, bromeliads, and vines of the genus *Cissus* on the summit of Christoffel Mountain; it was once collected along the edge of mangrove (Santa Barbara). — Its call, which was much less frequently heard than in the islands of St. Martin, Saba, and St. Eustatius sounded like wee-wee-weew, wee-weew; its song was a melodious rattle, like peeweereereeree.

Food — Juicy fruits, berries, blossoms, and other vegetable matter occurred in 15 of 16 stomachs examined (94%); in some instances the whole alimentary tract was stained by the violet colour of some kind of fruit. Large seeds which had passed the stomach were usually present in several parts of the intestines. In addition, small insects have been found in 4 stomachs (25%), among which were small beetles, small flies, small caterpillars, and, once, a honey-bee.

Reproduction cycle — We did not found nests or eggs, but we collected a bird in a not yet fully grown juvenile plumage in Curaçao on 21.III.1951. — None of the collected females showed active gonads, but in some of the collected males the testes were enlarged, indicating breeding activity: Curaçao: 7.X.1951 (testis 9 × 6½ mm), 20.I.1952 (testis 8½ × 5½ mm). The smallest testis found (3 × 3 mm) was that from a male collected in Bonaire on 27.XI.1951. Breeding activity, therefore does not seem to be restricted to any special period of the year.

Zoogeography — *Elaenia m. riisii* inhabits Aruba, Curaçao, and Bonaire, in addition the outer chain of the northern Lesser Antilles, from Barbuda and Antigua in the south to the Virgin Islands and the islands east of Puerto Rico in the north-west. The present distribution of the whole species is Caribbean, not South American, comprising the Lesser Antilles, Bonaire, Curaçao, Aruba, as well as the islands Old Providence and St. Andrews off the coast of Yucatan. In Venezuela and Colombia it is replaced by another species, *Elaenia flavogaster*, which is almost the geographical representative of *E. martinica* (see, however: BOND 1948, p. 222-223). The occurrence in the South Caribbean islands of *E. martinica*, instead of the continental *E. flavogaster*, in addition to the discontinuous range of the race *riisii*, makes this species a most interesting element of the avifauna of Aruba, Curaçao, and Bonaire which, for the present, cannot otherwise be indicated than as "Caribbean". For map, see: VOOUS 1955, p. 413.

Protective measures — Not protected by law, but protection has been recommended by WESTERMANN (1946, p. 86), with whom I fully agree.

104 **Progne subis** (Linnaeus)

Purple Martin

Hirundo subis LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 192 — Hudson Bay.
Progne subis, VOOUS 1953, p. 187 (Curaçao).
Progne subis subis, VOOUS 1955, p. 149 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

No material.

Status — Not previously recorded.

We observed this species only in Curaçao in September and October 1951: 25.IX.1951, Brakke Put (solitary male with uniform dark upper and under parts), 8 and 15.X.1951, Malpais (single individual with light under parts (female plumage) close to a mixed flock of swallows).

There is furthermore a record of a solitary individual in female plumage observed on 31.X.1954 at Santa Marta, Curaçao (VAN DER WERF *in litt.*).

Apparently unknown from the Venezuelan islands.

Distribution — *Progne s. subis* is a breeding bird from the greater part of North America, wintering in tropical Brazil. The birds observed in Curaçao might well have been individuals of this race, as might also have been an apparently migrating flock of about 100 purple martins which I observed on 21.IX.1951 over the harbour of La Guaira, Venezuela. It is the only race of purple martin known to have occurred either as a passenger migrant or a winter visitor in Venezuela and Colombia.

Protective measures — Not protected by law.

105 **Progne chalybea chalybea** (Gmelin)

Grey-Breasted Martin

Hirundo chalybea GMELIN, Syst. Nat. *1, 2*, 1789, p. 1026 — Cayenne.

Native name — unknown.

CURAÇAO. — Passenger migrant or irregular visitor.

CURAÇAO: Muizenberg, 26.V.1955 (1 ♂; Collection Koelers, Curaçao); Malpais, 8.IX.1955 (1 ♀ imm.; Collection Ansingh, Curaçao), 6.X.1955 (1 ♂, 1 ♀; Collection Koelers, Curaçao).

Taxonomy — Apart from the immature specimen of 8.IX.1955, which has fuscous-brown under tail coverts with broad white margins, all specimens are decidedly lighter grey on chin and throat than a series of 5 specimens from Surinam. The Surinam specimens are also a little smaller than the specimens from Curaçao. In view of the apparently irregular local (or individual?) variation in body-size throughout the South American range of the species, I have tentatively referred all Curaçao specimens to the race *chalybea*. However, future collecting and observing will have to take into consideration the possibility of the presence of wintering individuals from populations breeding in southern South America (*domestica*), which are said to be larger and paler underneath than those from northern South America and Central America (*chalybea*). — See also: ZIMMER (Am. Mus. Nov. *1723*, 1955, p. 2), who goes so far as to treat all specimens with wing lengths over 134 mm and tail lengths over 70 mm as *domestica*. According to ZIMMER's classification all Curaçao specimens, with the probable exception of the immature female of 8.IX. 1955, should be migrants of *domestica* from southern South America.

Measurements — CURAÇAO: ♂, wing 139, 147.5, tail 68, 70, depth of furcation of tail 19, 19; ♀, wing 145, tail 65, furcation of tail 16; ♀ imm., wing 131, tail 75, furcation of tail 22.

Wing length of 3 males from Surinam: 131, 133, 136 (Leiden Museum).

Status — Not previously recorded.

We did not observe this species.

In Curaçao recorded from a specimen collected on 26.V.1955 (KOELERS), as well as from the observation of a flock of 35–50 specimens at Malpais from 6–13.X.1955 by ANSINGH and KOELERS (3 collected specimens examined).

In the Venezuelan islands only recorded from Margarita Island (YEPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 33).

State of gonads — In all specimens the gonads were said to have been of minute size, the largest testis measuring 3 × 2 mm (26.V.1955).

Distribution — *Progne c. chalybea* is a breeding bird from Mexico and Central America south to northern South America, where it gradually merges into the larger form *domestica* which ranges south to northern Argentina. It is an abundant breeding bird in Colombia and Venezuela. It is absent in the West Indian islands (BOND).

Protective measures — Not protected by law.

106 **Petrochelidon pyrrhonota pyrrhonota** (Vieillot)

Cliff Swallow

Hirundo pyrrhonota VIEILLOT, Nouv. Dict. Hist. Nat., nouv. éd. *14*, 1817, p. 519 — Paraguay.
Petrochelidon pyrrhonota, VOOUS 1953, p. 187 (Curaçao, Bonaire).
Petrochelidon pyrrhonota pyrrhonota, VOOUS 1955, p. 150 (Curaçao, Bonaire).

CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: *Grote Knip*, 23.X.1951 (1 ♀, 1st year).

Taxonomy — The collected specimen did not show any sign of body-moult.
Iris dark brown; bill, legs and feet light horn-colour.
Measurements — CURAÇAO: ♀, wing 107.

Status — Not previously recorded.

We observed this species regularly between 9.X and 30.XI.1951 in Curaçao and Bonaire. Although by far not so abundant as *Hirundo rustica* a few Cliff Swallows (up to 10 or 15 individuals) were usually present in any large flock of swallows observed. They were particularly numerous on 27.X.1951 at the summit of Christoffel Mountain, Curaçao, as well as in November 1951 above Kralendijk, Bonaire. By the end of November the numbers had decreased considerably.

In the autumn of 1954 the species appeared in Curaçao on 21.IX (KOELERS *in litt.*).

Apparently not yet observed in the Venezuelan islands.

Food — One stomach examined contained the remains of many small insects, particularly small beetles of various kinds, but also some flies.

Distribution — *Petrochelidon p. pyrrhonota* is a breeding bird from North America. It winters in South America south to Argentina. It migrates chiefly through Central America; hence, it is a not uncommon passenger migrant in Colombia (DE SCHAUENSEE 1951, p. 880), but it has been observed only a few times in Venezuela (PHELPS & PHELPS 1950, p. 217).

Protective measures — Not protected by law.

107 **Riparia riparia riparia** (Linnaeus)

Bank Swallow

Hirundo riparia LINNAEUS, Syst. Nat. ed. 10 *r*, 1758, p. 192 — Sweden.
Riparia riparia, VOOUS 1953, p. 187 (Curaçao, Bonaire).
Riparia riparia riparia, VOOUS 1955, p. 151 (Curaçao, Bonaire).

Native name — Sauchi.

CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: *Groot Piscadera*, 4.X.1951 (1 ♀).

Taxonomy — The collected specimen did not show any sign of body-moult. Iris dark brown; bill black; legs and feet dark horn-colour.
Measurements — CURAÇAO: ♀, wing 100, furcation of tail 7.

Status — Not previously recorded.
We observed this species only twice, *viz.* a single specimen among a flock of *Hirundo rustica* on 4.X.1951 at Groot Piscadera, Curaçao, and one or more individuals among *Hirundo rustica* and *Petrochelidon pyrrhonota* on 3.XI.1951 at Goto, Bonaire.
In the autumn of 1952 the species appeared in Curaçao on 17.IX. (Bullen Baai, ♂, collected by ANSINGH); in 1954 it was present on 13.IX (KOELERS *in litt.*).
Only once observed during spring passage, *viz.* on 28.IV.1955 at Malpais, Curaçao (ANSINGH *in litt.*).
Apparently not yet recorded from the Venezuelan islands.
Distribution — *Riparia r. riparia* is a breeding bird from North America, Europe, and temperate Asia. North American individuals winter in tropical South America. It apparently migrates chiefly through Central America; hence, it is a rather common winter resident in at least parts of Colombia (DE SCHAUENSEE 1951, p. 880), but a rare transient in western Venezuela (PHELPS & PHELPS 1950, p. 220), though it was observed in December 1951 in northern Venezuela along the shores of Lake Valencia (SCHAEFER *in litt.*). Rather recently it has also been recorded as a regular passage migrant in British Guiana (DAVIS, Ibis *96*, 1954, p. 446).
Protective measures — Not protected by law.

108 **Hirundo rustica erythrogaster** Boddaert

Barn Swallow

Hirundo erythrogaster BODDAERT, Tabl. Pl. Enl. 1783, p. 45 — Cayenne.
Hirundo erythrogastra, PETERS 1892, p. 117 (Curaçao); HARTERT 1893, p. 317 (Curaçao); CORY 1909, p. 208 (Curaçao); RUTTEN 1931, p. 136 (Curaçao, Bonaire).
Hirundo rustica erythrogastra, HARTERT 1902, p. 300 (Curaçao).
Hirundo erythrogaster, DE JONG 1948, p. 8 (Aruba, Curaçao, Bonaire).
Hirundo rustica erythrogaster, PHELPS & PHELPS 1950, p. 220 (Curaçao); PHELPS & PHELPS 1951, p. 21 (Bonaire); VOOUS 1953, p. 187 (Aruba, Curaçao); VOOUS 1955, p. 152 (Aruba, Curaçao, Klein Curaçao, Bonaire).

Native name — *Sauchi*.

ARUBA, CURAÇAO, KLEIN CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

CURAÇAO: *Willemstad*, 26.IX.1951 (1 ♀ ad.); *Groot Piscadera*, 4.X.1951 (1 ♂ imm.); *Grote Knip*, 23.X.1951 (1 ♀ imm.).

Taxonomy — Iris dark brown; bill, legs and feet black.

Measurements — CURAÇAO: ♂ imm., wing 114.5; ♀ ad., wing 118; ♀ imm., wing 115.

Status — Various authors have recorded the presence of this species in Curaçao in different seasons. ERNST PETERS records large flocks above the harbour in August and September. HARTERT saw a few over the houses of Willemstad in June-July 1892. RUTTEN observed it as late as early May 1930 in Curaçao and Bonaire. PHELPS & PHELPS saw it in November 1947 in Bonaire. There is no pertinent record from Aruba, but DE JONG — apparently quite correctly — mentions its occurrence in this island as well.

We found this species in all three islands, but never in flocks of over 50 individuals. In September and October the birds were common all over Curaçao; they remained rather common during November in Bonaire, but in December they were scarce in Aruba. Still, a few solitary individuals remained throughout the winter over the Rifwater in Curaçao. They were very much less common in the spring of 1952 than in the autumn of 1951. Up to now I know of the following extreme dates of arrival and departure in Aruba, Curaçao, and Bonaire:

11.VIII.1952, a single individual at Hato, Curaçao (VAN DER WERF *in litt.*).

21.V.1952, a single female at Rustenburgh, Curaçao (collection ANSINGH, Curaçao). Follicles of this specimen up to 4 mm.

There is in addition a record by HARTERT of individuals seen in June-July 1892 in Curaçao.

In 1954 the species appeared in Curaçao on 18.VIII (KOELERS *in litt.*) and in 1955 on 21.VIII (VAN DER WERF, verbal communication).

Observed at Klein Curaçao by ANSINGH (*in litt.*) on 30.VIII.1952.

In the Venezuelan islands the species has been recorded from Las Aves (PHELPS & PHELPS 1951, p. 22), Los Roques (PHELPS & PHELPS 1950, p. 220), Tortuga, Margarita (YÉPEZ, BENEDETTI & PHELPS, SR., 1940, p. 33), and Los Testigos.

Biotope and habits — This species appeared all over the islands, irrespective of the kind of biotope. They were, however, most numerous on the leeward side of the islands, hunting insects along the edge of the mangroves and over the harbours. They often occurred in mixed flocks with *Petrochelidon pyrrhonota*, *Riparia riparia*, and probably other species of swallows. Such mixed flocks were noteworthily conspicuous at Kralendijk, Bonaire, during November 1951 and around the summit of Christoffel Mountain, Curaçao, on 27.X.1951. They have been observed resting on dead branches of small acacias.

Food — Two stomachs examined contained large quantities of small insects, mainly beetles up to 3 mm in length (including Curculionidae).

Distribution — *Hirundo r. erythrogaster* is a widespread breeding bird in North America. It winters from Central America south to Argentina and Chile; during the winter half of the year it is common in Colombia and Venezuela.

Protective measures — Not protected by law.

109 **Mimus gilvus rostratus** Ridgway Plate VII, VIIIa

Southern Mockingbird

Mimus gilvus rostratus Ridgway, Proc. U.S. Nat. Mus. *7*, 1884, p. 173 — Curaçao.
"Orpheus (Americanus) — Choe-choe-bi", Simons 1868, p. 154 (Curaçao).
Mimus gilvus rostratus, Berlepsch 1892, p. 74 (Curaçao); Peters 1892, p. 115 (Curaçao); Hartert 1893, p. 294 (Aruba), 311 (Curaçao), 327 (Bonaire); Robinson, Flying trip to the tropics, Cambridge, 1895, p. 165 (Curaçao); Hartert 1902, p. 296 (Aruba, Curaçao, Bonaire); Ridgway, *4*, 1907, p. 236 (Curaçao); Cory 1909, p. 202 (Aruba), 208 (Curaçao), 213 (Bonaire); Rutten 1931, p. 136 (Aruba, Curaçao, Bonaire); Hellmayr, *7*, 1934, p. 316 (Aruba, Curaçao, Bonaire); Croockewit, Ardea *36*, 1949, p. 280 (Curaçao); Phelps & Phelps 1951, p. 21 (Bonaire), Voous 1955, p. 154 (Aruba, Curaçao, Bonaire, Klein Bonaire).
Mimus gilvus, de Jong 1948, p. 8 (Aruba, Curaçao, Bonaire); Voous 1953, p. 254 (Aruba, Curaçao, Bonaire).

Native name — *Chuchubi*.

Aruba, Curaçao, Bonaire, Klein Bonaire. — Resident.

Aruba: *Mahuma*, 12.XII.1951 (1 ♂); *Arikok hills*, 10.XII.1951 (2 ♂, 1 ♀), 8.IV.1952 (1 ♂); *Ceru Boonchi*, 10.IV.1952 (1 ♂); *Ceru Kleine Jamanota*, 13.XII. 1951 (1 ♀); Fontein, 29.VI.1930 (1 ♀, 1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). Curaçao: Scherpenheuvel, 10.XI.1936 (1 juv., collected by Wagenaar Hummelinck; Leiden Mus.); *Santa Barbara*, 25.IX.1951 (2 ♂); *Fuik Baai*, 1.IV.1952 (1 ♂ juv., 1 ♀); *Groot Sint Joris*, 3.X.1951 (1 ♂, 4 ♀), 17.X.1951 (1 ♂); *Santa Catharina*, 2.I.1952 (1 ♀); *Julianadorp*. 6.I.1952 (2 eggs from a clutch of 3), 15.III.1952 (1 ♀ juv.); *Groot Piscadera*, 11.X.1951 (2 ♂, 1 sex unknown), 31.X.1951 (1 ♀), 14.I.1952 (2 ♀); *Malpais*, 8.X.1951 (1 ♀); Sint Willebrordus, 23.II.1948 (1 ♂, collected by Croockewit; Amsterdam Mus.); Porto Marie Baai, 19.IV.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Groot Santa Marta*, 28.IX.1951 (1 ♂); Savonet, 1.V.1930 (1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). Bonaire: *Kralendijk*, 28. XI.1951 (1 ♀); *Pos Amor*, 10.XI.1951 (1 ♂); *Fontein*, 5–6.XI.1951 (3 ♂), 22.XI. 1951 (1 ♀), 28.III.1952 (1 ♂ juv.); *Slagbaai Plantation*, 8.XI.1951 (1 ♀).

Taxonomy — In fresh plumage the upper parts are a beautiful pale grey, varying between a lighter and a darker shade of Mouse Gray. The under parts are clear whitish, but a light greyish suffusion, which is suggestive of a chest band, is perceptible in most of the specimens. The wings have broad white or greyish-white edges to the feathers, which are particularly conspicuous on the greater and median upper wing coverts and on the innermost secondaries. The extension of the white tips to the tail feathers varies considerably, but in view of the fact that the tail in museum-skins of this species seems to be frequently incomplete, this variation is easily over-estimated. I have measured the greatest length of the white tip to the feathers of the central pair but one and found the following measurements (only freshly moulted tails measured) (mm):

Aruba	— ♂ 22, 23, 24, 24, 27	♀ 23, 25	average 24.0 mm
Curaçao	— ♂ 14, 17, 20	♀ 19, 20, 21	average 18.5 mm
Bonaire	— ♂ 22	♀ 22, 24	average 22.7 mm

Thus, the tips of the tail feathers are narrowest in Curaçao birds; the broad white feather edgings being most conspicuous in birds from Aruba, even in the field!

The bill of this species varies considerably, both as regards its length and its shape; the extremes being (see: VOOUS 1955, p. 411):

(a) relatively short, but rather strong: Aruba (2 ♀), Curaçao (5 ♂, 4 ♀), Bonaire (2 ♂, 1 ♀)

(b) more elongated, but generally slender and less strong: Aruba (2 ♂), Curaçao (1 ♂, 3 ♀), Bonaire (2 ♂, 2 ♀)

(c) long and very strong, sharply decurved, suggesting a thrasher's bill: Aruba (3 ♂), Curaçao (1 ♂).

Moult and wear — These birds appeared subject to considerable fading, sun-bleaching, and wear, which not only changed the general coloration of the birds from a light greyish to a dull buffish-brown (Drab), but in addition caused a considerable shortening of the wings and the tail. The long, fan-shaped tail, which in the living bird is in constant action, proved to be most seriously affected; in some of the specimens (♂, 11.X.1951, Curaçao) the barbs of the central tail feathers are totally abraded, leaving only a bare, serrated shaft (Plate VII)! In the most strongly worn individuals from Curaçao the lengths of the tail were reduced to 91 (♂), 92 (♂), and 97 (♀) mm, respectively, which is only slightly over 81% of the average normal tail-length of males and 91% of females. Specimens in freshly moulted plumage were collected between 28.XI.1951 and 14.I.1952; whereas the extremely worn plumages are from various dates between 3.X. and 9.XI.1951.

Iris light brown or buffish-brown, lighter in birds in breeding condition; bill black; legs and feet dark brown or blackish-brown.

Measurements — ARUBA: ♂ wing 113, 114, 116.5, 118, 119, tail 114, 117, 119, 119, 126, bill (measured from forehead) 27, 28, 28.5, 29, 29.5, tarsus 34.5, 35.5, 36, 36; ♀, wing 106.5, 110, 115, tail 110, 119, 122, bill 26, 26.5, 28.5, tarsus 34, 35, 35.5. CURAÇAO: ♂, wing 105, 108.5, 108.5, 109, 113, 114, tail 110, 111, 111, 116, bill 24, 25, 25, 27, 27, 27.5, 28, 30, tarsus 32, 34.5, 34.5, 35, 35, 36; ♀, wing 103, 103.5, 105, 105, 106, 106, 107.5, 108, tail 106.5, 110, 112, 112, 112, bill 24.5, 24.5, 24.5, 26, 26, 26, 26, 26, 26.5, tarsus 33.5, 34, 34, 34, 34.5, 34.5, 35, 35, 35.5, 37. BONAIRE: ♂, wing 104, 105.5, 107.5, 109, 111, 113, tail 109, 112, 120, bill 24.5, 25.5, 26, 26, 27, tarsus 32, 32.5, 32.5, 34, 35, 35.5; ♀, wing 102, 103.5, 104, tail 105, 113.5, bill 27, 27, 27, tarsus 33.5, 34, 34.

Birds from Aruba tend to be larger than those from Curaçao and Bonaire! The large size and the heavy appearance of Aruba birds appeared conspicuous in the field.

Status — All previous authors have stated that this species is one of the most abundant of birds in all three islands. HARTERT reports that in 1892 it was less common in Aruba than in Curaçao, a situation which — fifty years later — we found quite the reverse.

We found this species very common in all three islands, including Klein Bonaire (27.III.1952). It was thought to be the most numerous of the bird-species in Aruba.

In the Venezuelan islands it has been recorded from Orchila, Blanquilla, and Tortuga (*rostratus*), as well as from Margarita, Los Frailes, and Los Testigos (*melanopterus*; PHELPS & PHELPS 1950, p. 238).

Biotope and habits — This species was present in every kind of habitat where trees or low shrubs were present; we did not find it, however, in mangroves. Together

with *Columbigallina passerina* it was the first species of bird to appear in those desolate places in Aruba where lonely acacias or *Caesalpinia* withstood the drought at the edges of the stony deserts. It was common in every kind of xerophytic bush and it was remarkably abundant in small gardens and near human habitations (Plate VIII), as well as along roadsides and in fruit plantations. One pair of these birds banded by KOELERS in his garden at Suffisant, Curaçao, appeared strictly sedentary throughout the year and defended their small territory not only against intruders of the same kind but also against individuals of *Icterus icterus* and *Icterus nigrogularis*. Its pleasant song, its intelligent and vivid manners, as well as its tameness, probably have made this species the most popular of all birds in the Netherlands Leeward Islands, notwithstanding the fact that it appeared to be fond of all kinds of fruit, causing locally not less damage than did *Icterus icterus*. In its feeding habits the species was arboreal rather than terrestrial.

Song very varied and melodious and exceedingly strong. Imitations of other species' song were only rarely heard by us, but we heard it consciously imitate the call-notes of *Icterus icterus* and *Falco sparverius*. — A popular account of the life habits of this species has been given by W. HOLLEMAN ("Mimus, de Chuchubi, bekijkt Curaçao", Curaçao, 1952).

Food — The contents of 33 stomachs examined showed vegetable matter in 26 instances (81%) and animal matter in 20 instances (61%). — The vegetable matter mainly consisted of the remains of various kinds of fruits, among which were many meshapples (*Achras sapota*) and mangos (*Mangifera indica*), but we also observed this species feeding on the fruits of *Anona muricata, Melicocca bijuga, Phoenix dactylifera, Tamarindus indica,* and upon the husks of *Caesalpinia coriaria* and *Capparis spec.* In addition the birds have been observed feeding on the fruits of *Cereus* and *Opuntia, Carica papaya* and on ripening *Andropogon sorghum*. — The animal matter consisted of insects in 20 instances (64%), among which were many beetles (32%), caterpillars (10%), ants (10%), wasps (6%), a flie (3%); also a spider (3%) and small land-snails (10%, including *Brachypodella* and *Tudora*). — The data clearly show the omnivorous diet of this species. The species is also known to eat small lizards and it has been reported to rob the eggs of other birds (KOELERS and VAN DER WERF *in litt.*).

Reproduction cycle — We observed newly fledged young on 15 and 23.X. 1951 and on 1.IV.1952 and found nests with eggs on 6 and 19.I.1952. Females with large follicles in the ovary have been collected on 14.I.1952 and birds in juvenile plumage on 15 and 28.III and 1.IV.1952. Nests have furthermore been found in August and July. We can therefore be sure to state that this species nests throughout the whole year.

Nest and eggs — Nest and eggs are very thrush-like. The nest is placed in trees, shrubs and cacti and is a rather large, open, cup-shaped structure made of twigs and lined with plant fibres and stems. — Eggs blunt-ovate, light greenish, clouded with irregular, reddish-brown primary markings and violet-grey secondary spots. Two nests in Curaçao (Julianadorp, 16 and 19.I.1952) contained a full clutch of 3 eggs each. The measurements of these eggs are as follows: (1) 18.3 × 26.4, 18.3 × 26.9, 18.4 × 26.4, (2) 18.8 × 25.7, 18.9 × 26.5, 19.1 × 27.7; average of 6 eggs 18.6 × 26.6 mm.

Zoogeography — *Mimus g. rostratus* inhabits Aruba, Curaçao, Bonaire, Orchila, Blanquilla, and Tortuga. Another race (*melanopterus*) occurs in other Venezuelan islands, as well as along the north coast of South America, from British

Guiana and extreme northern Brazil in the east to northern Colombia in the west. In Venezuela it is common in the arid tropical coastal zone, including the Paraguana Peninsula (BARNES & PHELPS 1940, p. 28); it also occurs in the Goajira Peninsula of Colombia (DE SCHAUENSEE 1951, p. 909). *Mimus gilvus* is the southern representative of *Mimus polyglottos* from North America and the Greater Antilles; it ranges southwards from southern Mexico and Yucatan to northern South America and also occurs in the Lesser Antilles north to Nevis. The species seems to have colonized Aruba, Curaçao, and Bonaire from South America (see: Zoogeography, p. 46, and VOOUS 1955, p. 414).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

110 **Margarops fuscatus bonairensis** Phelps & Phelps

Pearly-Eyed Thrasher

Margarops fuscatus bonairensis PHELPS & PHELPS, Proc. Biol. Soc. Wash. *61*, 1948, p. 171 — Fontein, Bonaire.

Margarops fuscatus, HARTERT, Bull. Brit. Orn. Cl. *1*, 1892, p. xii (Bonaire); HARTERT 1893, p. 327 (Bonaire); HARTERT 1902, p. 297 (Bonaire); DE JONG 1948, p. 8 (Bonaire); VOOUS 1953, p. 253 (Bonaire).

Margarops fuscatus fuscatus, RUTTEN 1931, p. 136 (Bonaire).

Margarops fuscatus subspec., HELLMAYR, *7*, 1934, p. 342, foot note 2 (Bonaire).

Margarops fuscatus bonairensis, PHELPS & PHELPS 1951, p. 21 (Bonaire); VOOUS 1955, p. 157 (Bonaire).

Native name — *Palabrua*.

BONAIRE. — Resident.

BONAIRE: *Tras Montagne*, 27.XI.1951 (1 ♂); Fontein, 19-21.V.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Fontein*, 5.XI.1951 (3 ♂), 6.XI.1951 (1 ♂, 1 ♀), 15.XI.1951 (1 ♀, 1 ♀ imm.), 22.XI.1951 (1 ♂), 28.III. 1952 (1 ♂ juv.).

Taxonomy — Slightly different from a series of 12 adult specimens from St. Martin, Saba, and St. Eustatius (*fuscatus*). Bonaire birds are slightly paler throughout, particularly underneath, where the dark markings are smaller and less extensive. The upper parts are slightly lighter, more olivaceous, less greyish-brown, particularly on the head. There is, however, a slight overlap in individual variation, some of the Bonaire birds being almost indistinguishable from specimens from Sint Martin.

Iris yellowish-white (also in the juvenile specimen); bill light horn or fleshy-horn, the base of the lower mandible being sometimes lighter; legs and feet light horn colour or fleshy-horn.

Measurements — BONAIRE: ♂, wing 136, 138, 139, 139.5, 140, 140, 141, tail 110, 111, 112, 112, 113, 114, 115, bill (measured from forehead) 32.5, 32.5, 33, 33, 34, 34, 34, tarsus 35.5, 36.5, 36.5, 37, 37, 37.5; ♀, wing 134, 143, tail 102, 110, 116, bill 33, 34, 34, tarsus 36, 38, 38.

The following is a comparison of average dimensions of the races *bonairensis* and *fuscatus*.

M.f. bonairensis (Bonaire)			*M./. fuscatus* (St. Martin, Saba, St. Eust.)		
wing	♂ 139.1	♀ 138.5	wing	♂ 140.4	♀ 137.2
tail	♂ 112.4	♀ 109.3	tail	♂ 116.6	♀ 111.0
bill	♂ 33.3	♀ 33.7	bill	♂ 32.4	♀ 33.2
tarsus	♂ 36.7	♀ 37.3	tarsus	♂ 37.8	♀ 38.2

Status — First recorded by HARTERT in 1892 from Fontein, Bonaire. Subsequent visitors (RUTTEN, PHELPS & PHELPS, VAN OORDT) also found these birds exclusively at Fontein Plantation and nowhere else in the island. RUTTEN is the only person to have observed it in addition in the vicinity of Dos Pos.

We did not observe these thrashers outside the plantation of Fontein, but we were presented with an adult male caught at Tras Montagne, which is not far away from Fontein.

There is some possibility that the species also occurs in Aruba.

In the Venezuelan islands the species apparently has occurred only in La Horquilla of the Hermanos Group (PHELPS, Jr., 1948, p. 114), where, however, according to PHELPS, Jr. (verbal communication), it has recently been found to be extinct.

Biotope — This species seems to be practically restricted to the fruit plantation of Fontein, where it is rather abundant. It is strictly arboreal, living a secret and hidden life among the dense foliage of sapodillas (*Achras sapota*), mangos (*Mangifera indica*), kenepas (*Melicocca bijuga*), and soursops (*Annona muricata*).

Food — In 8 out of 9 stomachs examined we found the remains of several kinds of fruits (89%), among which the following species could be identified: *Achras sapota* (2 ×), *Mangifera indica* (1 ×), *Melicocca bijuga* (2 ×). Animal matter was present in 6 instances (67%), among which were lizards (4 × : *Anolis bonairensis*, also one gekko), wasps (once at least 21 long-legged specimens), ants (2 ×). Also known to feed upon dates and papayas (HARTERT 1893, p. 327) and even said to eat mice!

Reproduction cycle — We observed an adult specimen feeding a fully-fledged young on 5.XI.1951 and again observed and collected specimens in juvenile plumage on 28.III.1952. None of the collected specimens, however, had the gonads notably enlarged, the largest size of the testes being 5 × 4 mm (27.XI.1951). Perhaps the fruit plantation is not the breeding habitat of the species.

Field observations — The habits of these birds in Bonaire apparently did not differ from those in the islands of the Windward Group otherwise than that Bonaire birds were much less noisy and called much less frequently. It was very noteworthy that whenever these birds met with individuals of *Mimus gilvus* — though not when they met with individuals of the same species — a persistent fight would follow.

Zoogeography — *Margarops f. bonairensis* is known only from Bonaire and the Hermanos Islands (PHELPS & PHELPS 1950, p. 239; see, however: BOND, First Suppl. Checkl. Birds West Indies, 1951, p. 14 and Second Suppl. idem 1952, p. 17). The species occurs throughout the Lesser Antilles, from Sa. Lucia in the south to the Virgin Islands, Puerto Rico (rare!) and the Bahama Islands in the north. It is absent from the mainland of South America. It is an unmistakable Caribbean element in the avifauna of Aruba, Curaçao, and Bonaire. Colonization apparently took place by accident across the sea from the northeast. For map, see: VOOUS 1955, p. 412.

Protective measures — Not protected by law, but protection is highly recommended in view of the extremely isolated occurrence of the species in the South Caribbean area.

111 **Hylocichla mustelina** (Gmelin)

Wood-Thrush

Turdus mustelinus GMELIN, Syst. Nat. *1*, *2*, 1789, p. 817 — New York.
Hylocichla mustelina, VOOUS 1953, p. 187 (Curaçao); VOOUS 1955, p. 158 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant or winter visitor.

CURAÇAO: *Klein Sint Joris*, 30.X.1951 (1 ♂).

Taxonomy — The collected specimen did not show any sign of body-moult and possessed a thick layer of subcutaneous fat.
Iris dark brown, eyelid white; bill horn-brown, base of lower mandible flesh-colour; legs and feet flesh-colour.
Measurements — CURAÇAO: ♂, wing 107, tail 71, bill (measured from forehead) 20, tarsus 31.

Status — Not previously recorded.
We observed and collected this species once, *viz.* on 30.X.1951 in a small wood exclusively of manchioneel trees (*Hippomane mancinella*) at Klein Sint Joris, Curaçao. It was a shy, solitary individual which was feeding among the thick layer of dead leaves covering the ground below the trees.
Not recorded from the Venezuelan islands.
Distribution — *Hylocichla mustelina* is a breeding bird of temperate eastern North America, wintering mainly in Central America south to Panama. The species is rare in the West Indies and there are no records of it from the mainland of South America.
Protective measures — Not protected by law.

112 **Hylocichla ustulata swainsoni** (Tschudi)

Olive-Backed Thrush

Turdus swainsoni TSCHUDI, Fauna Peruana, Aves, 1845, p. 28 — Saskatchewan.
Hylocichla ustulata, VOOUS 1953, p. 187 (Curaçao).
Hylocichla ustulata swainsoni, VOOUS 1955, p. 159 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: *Grote Knip*, 23.X.1951 (1 ♂).

Taxonomy — Upper parts rather dark olive-grey. A conspicuous light buffy eye-ring.
Iris dark brown; bill, legs, and feet blackish-brown.
Measurements — CURAÇAO: ♂, wing 106, tail 74.

Status — Not previously recorded.

We observed this species only once, *viz.* on 23.X.1951, when a solitary specimen was collected on the damp ground in a manchioneel-thicket (*Hippomane mancinella*) close to the bay of Grote Knip, Curaçao.

Not recorded from the Venezuelan islands

Food — The stomach of the collected specimen contained the remains of fruits and other vegetable matter, as also a few beetles and large Diptera.

Distribution — *Hylocichla u. swainsoni* is a breeding bird from northern and temperate North America. It winters in tropical South America south to Argentina. Although known as a winter resident in Colombia (DE SCHAUENSEE 1951, p. 921), it has been observed only few times in Venezuela (PHELPS & PHELPS 1950, p. 248). Thought to migrate chiefly through Central America.

Protective measures — Not protected by law.

113 **Hylocichla fuscescens fuscescens** (Stephens)

Veery

Turdus fuscescens STEPHENS, in SHAW, Gen. Zool. *10*, *1*, 1817, p. 182 — Pennsylvania.
Hylocichla fuscescens fuscencens, VOOUS 1955, p. 188 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: Rio Canario, 14.X.1954 (1 ♂; Collection Ansingh, Curaçao).

Taxonomy — The specimen has been compared with a number of specimens from various parts of the eastern United States. The colour of its upper parts is among the most intensively rusty-brown present in the whole series.

Measurements — CURAÇAO: ♂, wing 101, tail 71, bill (measured from forehead) 18, tarsus 31.

Status — Not previously recorded.

Once, on 14.X.1954, a dead specimen was picked up in Curaçao at Rio Canario (ANSINGH *in litt.*).

Not recorded from the Venezuelan islands.

Distribution — *Hylocichla f.fuscescens* is a breeding bird from the eastern United States and southeastern Canada. It winters in northern South America, where it has also been reported from Colombia and Venezuela. On migration, it is of very rare occurrence in the West Indies, its main migration route going through Central America (see: HELLMAYR, *7*, 1934, p. 460).

Protective measures — Not protected by law.

114 **Vireo olivaceus olivaceus** (Linnaeus)

Red-Eyed Vireo

Muscicapa olivacea LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 327 — South Carolina (see: ZIMMER, Am. Mus. Nov. *1127*, 1941, p. 1).
Vireo olivaceus, VOOUS 1953, p. 187 (Curaçao).
Vireo olivaceus olivaceus, VOOUS 1955, p. 159 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: *Santa Barba. a*, 7.X.1951 (1 ♂).

Taxonomy — The collected specimen did not show any sign of body-moult; its plumage is perfectly fresh.

Iris reddish-brown; bill dark horn; legs and feet lead-grey.

Measurements — CURAÇAO: ♂, wing 82, tail 52, bill from forehead 17.5.

Status — Not previously recorded.

We observed and collected this species once on 7.X.1951 at Santa Barbara in the vegetation surrounding the fresh water pool Pos Bacoval (solitary individual).

Not recorded from the Venezuelan islands.

Food — The stomach of the collected specimen contained nothing but the remains of some big fruits.

Distribution — *Vireo o. olivaceus* is a breeding bird from eastern and central North America. It winters in northern South America, where it has been recorded from the greater part of Colombia (DE SCHAUENSEE 1951, p. 931) and Venezuela (PHELPS & PHELPS 1950, p. 258). Migration is considered to take place mainly through Central America.

Protective measures — Not protected by law.

115A **Vireo altiloquus bonairensis** Phelps & Phelps

Black-Whiskered Vireo

Vireo altiloquus bonairensis PHELPS & PHELPS, Proc. Biol. Soc. Washington *61*, 1948, p. 173 — Fontein, Bonaire.

115B **Vireo altiloquus barbatulus** (Cabanis)

Phyllomanes barbatulus CABANIS, Journ. f. Orn. *3*, 1855, p. 467 — Cuba.

Vireosylva chivi agilis, CORY 1909, p. 213 (Bonaire); RUTTEN 1931, p. 137 (Bonaire).
Vireo altiloquus barbatulus, HELLMAYR, *8*, 1935, p. 150 (Bonaire); VOOUS 1955, p. 161 (Bonaire).
Vireo virescens vividior, BARNES & PHELPS 1940, p. 9 (Bonaire).
Vireosylva chivi, DE JONG 1948, p. 8 (Bonaire).
Vireo altiloquus bonairensis, PHELPS & PHELPS 1951, p. 23 (Bonaire); VOOUS 1955, p. 161 (Aruba, Curaçao, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, BONAIRE (*bonairensis*). — Resident.
BONAIRE (*barbatulus*). — Passenger migrant.

ARUBA (*bonairensis*): slopes of *Baranca Cora*, 8.XII.1951 (1 ♂). CURAÇAO (*bonairensis*): *Groot Sint Joris*, 17.X.1951 (1 ♀); *Groot Piscadera*, 23.XI.1951 (1 ♂); Malpais, 10.X.1954 (1 ♀; Collection Ansingh, Curaçao); *Groot Santa Marta*, 20.I.1952 (1 ♂, 1 ♀). BONAIRE (*bonairensis*): Fontein, 27.XI.1947

(1 ♂, collected by Phelps & Phelps; Phelps Collection, Caracas); *Fontein*, 5.XI.1951 (1 ♂); without locality, 19.I.1909 (1 ♀, collected by Ferry; Chicago Nat. History Museum).

BONAIRE (*barbatulus*): *Fontein*, 5.XI.1951 (1 ♀).

Taxonomy — The collected specimens have been directly compared with the co-type of *Vireo altiloquus bonairensis* in the PHELPS Collection (Caracas) and with specimens of various other races of this species and those of *Vireo chivi* from the mainland of Venezuela. The examination showed that the island specimens possess a rather dark, grey crown without buffish tinge, very slightly developed dark malar stripes, which are almost absent in specimens with advanced feather abrasion, and rather pure greenish upper parts, which grow paler and greyer in worn plumage. The abdomen is pure white and contrasts with the sulphur-yellow colour of the under tail coverts. The specimen collected by FERRY on Bonaire in 1909, originally by CORY referred to *Vireosylva chivi agilis* and until recently to *Vireo altiloquus barbatulus* according to HELLMAYR, has also been examined by me and compared with the fresh material from which it proved indistinguishable. It has therefore to be referred to the resident race *bonairensis*.

A single specimen collected in Bonaire (nr. 11008) is strikingly distinct from *bonairensis* in having (1) a more greyish-olive crown, bordered laterally by not more than obsolete dusky lines, (2) buffish instead of pale greyish sides of the head, (3) buffish superciliaries, (4) duller, more greyish-green upper parts, (5) duller and less pure white under parts and (6) darker flanks. The specimen, which was compared with birds from Cuba (*barbatulus*), Jamaica (*altiloquus*), Saba (*altiloquus*), St. Eustatius (*barbadensis*), and southern Venezuela (*barbatulus*) seems to belong to *barbatulus*. Dr. WILLIAM PHELPS, who also kindly examined the specimen, agreed with this identification.

Iris reddish-brown; bill blackish-grey, base of lower mandible slightly lighter greyish; legs and feet blue-grey.

Measurements — ARUBA (*bonairensis*): ♂, wing 74+, tail 52, bill (measured from forehead) 19. CURAÇAO (*bonairensis*): ♂, wing 75.5; 78, tail 53, 59, bill 18.5; ♀, wing 72.5, 73.5, 75+, 75.5, tail 51, 52, 52.5, 53.5, bill 18, 19, 19, 20. BONAIRE (*bonairensis*): ♂, wing 76+, tail 58.5, bill 20.5; ♀, wing 74, tail 54.5, bill 18.5.

BONAIRE (*barbatulus*): ♀, wing 76, tail 50, bill 19.

Status — The female collected by FERRY in Bonaire on 19.I.1909 (CORY) long remained the only specimen known from the islands. Not until PHELPS, father and son, collected two specimens near Fontein, Bonaire, on 27.XI.1947, which subsequently became type and co-type of *Vireo altiloquus bonairensis*, did it become apparent that a resident form of vireo inhabited the island. Neither HARTERT, nor RUTTEN or DE JONG observed this species, which, thus, remained known from Bonaire only.

We found the black-whiskered vireo in all three islands, where it was among the rarest of the species of land birds. It was locally common near the summit of Christoffel Mountain (27.X.1951) and at Groot Santa Marta (20.I.1952) on Curaçao. It was a remarkable coincidence that the only known specimen of the migrant race *barbatulus* was found in close company with an individual of the resident form *bonairensis*, both of which were collected from the same mango tree with two successive shots at Fontein, Bonaire, on 5.XI.1951.

In the Venezuelan islands the species seems to have been recorded from

Margarita only (*bonairensis*; PHELPS & PHELPS, Proc. Biol. Soc. Wash. *65*, 1952, p. 97).

Biotope — We observed this species in a variety of biotopes, ranging from the xerophytic acacia and cactus scrub on the Baranca Cora to mangroves bordering the Spaans Lagoen, Aruba, the thickets of *Tournefortia* in the valleys of the sand dunes near Boca Prins, Aruba, and the shady fruit gardens with big fruit trees at Fontein, Bonaire. Also among the epiphytic bromelias and beard-mosses in the seasonal forest near the summit of the Chrisfoffel Mountain in Curaçao and in the forest of manchioneel and wayaka at Groot Santa Marta, Curaçao.

Food — Six stomachs examined contained both the remains of small and medium-sized insects (4×, green weevils, caterpillars, beetles) and orange fruits (2×).

Reproduction cycle — Particularly the male collected on 20.I.1952 at Groot Santa Marta, Curaçao, had the gonads considerably enlarged (testis 6×5 mm). We did not observe other indications of breeding activity, but in February 1952 BRONNEBERG collected a specimen in Curaçao which was feeding a fledgling; this specimen, unfortunately, became lost.

Zoogeography — *Vireo a. bonairensis* is confined to the islands of Aruba, Curaçao, Bonaire, and probably also Margarita.

Vireo a. barbatulus is a breeding bird from southern Florida, Cuba, and the Bahama Islands. It is stated to winter in the western Amazon Basin and is known from Venezuela (rare: PHELPS & PHELPS 1950, p. 260) and Colombia (regular transient: DE SCHAUENSEE 1951, p. 932).

Vireo altiloquus is the Caribbean representative of the red-eyed vireo (*Vireo clivaceus*) from North and Central America and of *Vireo chivi* from the mainland of South America. It is a Caribbean element in the avifauna of Aruba, Curaçao, and Bonaire, being replaced in Venezuela and Colombia by *Vireo chivi* (see: TODD, Auk *48*, 1931, p. 407–412).

Protective measures — Not protected by law.

116A **Coereba flaveola uropygialis** Berlepsch

Bananaquit

Coereba uropygialis BERLEPSCH, Journ. f. Orn. *40*, 1892, p. 77 — Curaçao.

116B **Coereba flaveola bonairensis** Voous

Coereba flaveola bonairensis VOOUS, Stud. Faun. Cur. Caribb. Isl. *6* (26), 1955, p. 83 — Slagbaai Plantation, Bonaire.

"Certhia Illig. (flaveola) — Geelborsi", SIMONS 1868, p. 154 (Curaçao).

Certhiola martinica, MARTIN, Ber. Reise Niederl. West-Indien, Leiden, 1888, p. 119 (Curaçao).

"Certhiola species, Barica geel", PETERS 1892, p. 116 (Curaçao).

Certhiola uropygialis, HARTERT 1893, p. 295, 312, 313 (Aruba, Curaçao, Bonaire).

Coereba uropygialis, ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 165 (Curaçao); RIDGWAY, *2*, 1902, p. 420 (Curaçao); CORY 1909, p. 202 (Aruba), 208 (Curaçao), 213 (Bonaire); RUTTEN 1931, p. 140 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 9 (Aruba, Curaçao, Bonaire).

Coereba flaveola uropygialis, HARTERT 1902, p. 297 (Aruba, Curaçao, Bonaire); HELLMAYR, *8*, 1935, p. 301 (Aruba, Curaçao, Bonaire); BARNES & PHELPS, Sr., 1940, p. 9 (Aruba, Curaçao, Bonaire); CROOCKEWIT, Ardea *36*, 1949, p. 280 (Curaçao); PHELPS & PHELPS 1951, p. 23 (Bonaire); VOOUS 1955, p. 163 (Aruba, Curaçao).

Coereba flaveola bonairensis, VOOUS 1955, p. 163 (Bonaire, Klein Bonaire).

Native name — *Barica heel* (= barica geel; Aruba, Curaçao); *Chibichibi, Bachi pretu* (Bonaire); *Suikerdiefje*.

ARUBA, CURAÇAO (*uropygialis*). — Resident.
BONAIRE, KLEIN BONAIRE (*bonairensis*). — Resident.

ARUBA (*uropygialis*): *Rooi Francees*, 12.XII.1951 (1 ♀, 1 sex unknown); *Spaans Lagoen*, 16.XII.1951 (1 ♂); *Arikok hills*, 17.XII.1951 (1 ♂), 8.IV.1952 (1 ♂); *Boca Prins*, 12.XII.1951 (1 ♂); Fontein, 27 and 29.VI.1930 (1 ♂, 1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO (*uropygialis*): *Willemstad*, 13.X.1951 (1 ♀); *Steenrijk*, 2.X.1951 (1 ♀ juv.); *Santa Barbara*, 25.IX.1951 (1 ♂, 1 ♂ imm., 1 ♀, 1 sex unknown); *Klein Sint Joris*, 1.IV.1952 (1 ♂); *Julianadorp*, 29.XII.1951 (2 eggs from a clutch of 3); *Groot Piscadera*, 4.X.1951 (1 ♂), 9.X.1951 (2 ♀), 31.X.1951 (1 ♂), 14.I.1952 (2 ♂); *Malpais*, 26.IX.1951 (1 ♂, 1 sex unknown), 1.X.1951 (1 ♂); Porto Marie, 15 and 19.IV.1930 (1 ♂, 1 ♂ subad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Groot Santa Marta*, 10.X.1951 (1 ♂); *Klein Santa Marta*, 23.I.1952 (set of 2 eggs); *Savonet*, 27.X.1951 (1 ♂); *Boca Grandi, Savonet*, 18.X.1951 (1 sex unknown; summit of *Sint Christoffel*, 27.X.1951 (1 ♂, 1 semi-ad., 1 imm.).

BONAIRE (*bonairensis*): *Kralendijk*, 29.XI.1951 (1 ♀ juv.); *Jan Tabacu, Guatemala Estate* 10.XI.1951 (1 ♂ ad., 1 ♂ juv.); *Onima*, 12.XI.1951 (1 ad.); Fontein 20–21.V.1930 (1 ♀, 1 ad., collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Fontein*, 15.XI.1951 (2 ♂); *Dos Pos*, 8.XI.1951 (1 ad.), 9.XI.1951 (1 ♂ imm.); *Karpata*, 23.XI.1951 (1 ♀); *Slagbaai Plantation*, 9.XI.1951 (1 ♂, *type* of *C.f. bonairensis*); *Wanapa*, 3.XI.1951 (1 ♂, 1 ♀). KLEIN BONAIRE: 27.III.1952 (2 ♂, 1 ♀).

Taxonomy — The bananaquits from Curaçao represent a well-marked race which is readily distinguished from nearby continental races by the black of chin and throat being uniform with the ear coverts and the remaining black parts of the head. Birds from the mainland of South America have the chin and throat light grey, sharply contrasting with the black lores and ear coverts; in addition these birds do not have the brightly coloured and swollen fleshy edges to the mouth which are so characteristic of Caribbean populations. A white wing-spot, formed by the white base of the primaries, is usually present, but varies considerably in size; it is on an average least developed in birds from Bonaire. Curaçao specimens have a small white patch of variable extent between the black of the throat and the yellow of the breast. In some of the Aruba specimens this white patch is slightly enlarged, leaving, however, the chin and the upper throat black. The white patch is still larger and definitely triangular in shape in Bonaire birds; in fact, practically the whole of the throat is white, leaving only a small patch of black on the chin. This character was of frequent occurrence in the series examined, only one specimen (7.2%) being indistinguishable from Curaçao birds. This kind of geographical variation had been

previously noticed by HELLMAYR, who, however, stated having seen exceptions to the rule, and, thus, did not pay further attention to it.

I have not closely examined birds from the Venezuelan islands, but those which I incidentally saw in the PHELPS Collection (Caracas) confirmed the generally accepted resemblance of these birds with the continental race *luteola* rather than with the Bonaire and Curaçao races.

It was, however, necessary to compare the races *bonairensis* and *uropygialis* with *martinica* from Santa Lucia and Martinique. Although the latter birds proved to have much white on the throat and, thus, exhibited a particular resemblance with *bonairensis*, *martinica* proved to have the white throat patch narrower, more linear, less triangular in shape; furthermore, the white throat line was laterally sharply bordered with sooty-black, not with greyish as in *bonairensis*. *Martinica* differed also in having darker, slightly more greenish-yellow under parts, darker and more olive flanks and a smaller and darker olive rump patch (3 specimens from Martinique and from Santa Lucia examined).

Iris dark brown; bill black, corner of mouth swollen, fleshy, and reddish in coloration; legs and feet dark brown or greyish-brown.

Measurements—ARUBA (*uropygialis*): ♂, wing 57.5, 62.5, 62.5, 62.5, tail 36, 37.5, 42, 43, 44, bill (measured from forehead) 15, 16, 16, 16.5, 16.5; ♀, wing 56.5, tail 37.5, bill 15.5. CURAÇAO (*uropygialis*): ♂, wing 56, 58.5, 61, 61.5, 61.5, 62, 62.5, 62.5, 63, 65, 65, tail 36, 39, 40, 40, 41, 41, 42, 42.5, 43, 43.5, 44.5, 47, bill 15, 15.5, 15.5, 16, 16, 16, 16.5, 16.5, 16.5, 17, 17, 17; ♀, wing 57.5, 57.5, 58.5, 62.5, tail 36, 37, 38, 43.5, bill 15.5, 16, 16, 16, 16.

BONAIRE and KLEIN BONAIRE (*bonairensis*): ♂, wing 58, 63.5, 63.5, 64.5, 65, 65, 66, tail 40, 44, 44, 45, 45, 45, 46, bill 15, 16, 16, 16.5, 17, 17, 18; ♀, wing 57.5, 59, 59, 60, tail 40.5, 41, 43, 43, bill 15, 15, 15.5, 16.

Status — All previous observers agree in stating that this is one of the most abundant of all species of birds in the islands, particularly in Curaçao and Bonaire.

We found it extremely common in all kinds of habitat in Curaçao and Bonaire, including Klein Bonaire, but it was noticeably scarcer in Aruba. We had the impression that in Bonaire it was the most numerous species of bird.

In the Venezuelan islands various races of this species are known to occur in Los Roques, Los Hermanos, Tortuga, Margarita, Los Frailes, Los Testigos; it is unknown from Las Aves, Orchila, and Blanquilla (PHELPS & PHELPS 1950, p. 273–276).

Biotope — Bananaquits have been met with throughout all parts of Curaçao and Bonaire, from the driest and most thorny xerophytic bush to fruit gardens and farm yards and the summit of Christoffel Mountain. They often entered the houses for an inspection of the walls, lamps, pictures, and — if present — the curtains in search for insects, or else made serious attacks at the sugar bowl or the fruit plate for a sweet meal. Nests have been found in all these localities, even on and in the houses. — The noticeable scarcity of the species in Aruba seems to be the result of both the poverty of the natural vegetation in the island and the destruction of small birds by local boys. In the quiet and larger gardens of Oranjestad and in the less visited valleys in the hills in the south of the island the species appeared more abundant.

Food — Of 28 stomachs examined 26 (92.9%) contained large quantities of minute insects, particularly small beetles (32.2%) and small caterpillars (28.6%).

Vegetable matter was present in 13 instances (64.4%), but these remains did not prove to be identifiable. Our field observations showed, however, that bananaquits were fond of juicy fruits like those of *Mangifera indica*, *Annona muricata*, and *Malpighia*. Numbers of these birds were usually seen feeding on the blossoms of flowering trees, particularly of tamarinds, from which they seemed to attract both the nectar and the pollen, and many minute insects.

Reproduction cycle — Nests were found throughout the whole duration of our stay in the Netherlands Antilles. Moreover, we collected specimens with swollen gonads as well as birds in first juvenile plumage during the whole of our stay. There was, however, a distinct optimum of breeding activity in December and January, shortly after the seasonal rains. It was well known among the inhabitants of the islands that what was supposed to be the same pair sometimes would breed throughout the whole year with hardly any interruption, often demolishing the old nest to get material for the construction of a new one in almost the same place.

Nest — The nests usually resembled large oval sacks with the entrance at the side; they were roughly made from plant fibres and lined with all kinds of suitable material like rough wool, woollen threads, chicken feathers, and slips of paper. Nests have been found in various situations in houses (kitchens, living rooms, roofs), in cactus-scrub, in fruit trees, and in mangroves at heights of over 5 or 6 meters at the end of small branches of high trees as well as close to the ground within hand's reach

Eggs — Only in two instances could the full clutch-size be established (2–3, Curaçao). The eggs are greyish-white, irregularly spotted and blotched with various shades of rusty brown. Measurements of one set of two eggs: 16.4 × 12.1 and 16.7 × 12.6 mm. Measurements of 2 eggs from a clutch of three: 16.6 × 12.4 and 17.0 × 12.4 mm. Average 16.7 × 12.4 mm (Curaçao).

Zoogeography — *Coereba f. uropygialis* inhabits Aruba and Curaçao.

Coereba f. bonairensis inhabits Bonaire and Klein Bonaire.

These insular races resemble the Lesser Antillean birds more closely than the races inhabiting continental South America and the Venezuelan islands. Although the species is of a definite South American origin and is most prolific in the West Indies, the populations at present inhabiting Aruba, Curaçao, and Bonaire do not seem to be the direct offshoots of the present continental stock as are the bananaquits from Tortuga Island (*jerryi*). Instead, they belong to the West Indian group of subspecies (including *martinica*), which all must have deviated from a much older continental South American stock which has since altered somewhat in appearance and developed into the present race *luteola* (see: Zoogeography, p. 46).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

117 **Mniotilta varia** (Linnaeus)

Black-and-White Warbler

Motacilla varia LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 333 — Hispaniola.

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: Malpais, 16.X.1955 (1 ♀; Collection Ansingh, Curaçao).

Measurements — CURAÇAO: ♀, wing 72, tail 48, tarsus 18.

Status — Not previously recorded.

We did not observe this species.

Only recorded from Curaçao by ANSINGH from the specimen collected at Malpais on 16.X.1955, which was seen among a flock of *Dendroica petechia* migrants?), and from a specimen collected by KOELERS (*in litt.*) in the same locality on 17.XI. 1955.

Not recorded from the Venezuelan islands.

Distribution — *Mniotilta varia* is a breeding bird from eastern North America. It winters in Central America, northern South America and the West Indian islands; it is a common winter visitor in Colombia and Venezuela.

Protective measures — Not protected by law.

118 **Protonotaria citrea** (Boddaert)

Prothonotary Warbler

Motacilla citrea BODDAERT, Tabl. Pl. Enl., 1783, p. 44 — Louisiana.

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: Rio Canario, 22.VIII.1955 (1 ♂; Collection Ansingh, Curaçao); Malpais, 6.XI.1955 (1 ♂; Collection Koelers, Curaçao).

Taxonomy — The specimen collected on 22.VIII.1955 seems to have the primaries fully grown; nevertheless, the wing tip and, consequently, the whole wing length are remarkably short.

Iris dark brown; bill dark grey, lighter on lower mandible; legs and feet bluish-grey.

Measurements — CURAÇAO: ♂, wing 67.5, 74; tail 44, 46, tarsus 18, 20.

Status — Not previously recorded.

We did not observe this species.

Only recorded from Curaçao by ANSINGH and KOELERS from the collected specimens listed above. One of the specimens was collected in acacia-bush flooded by heavy rains.

Not recorded from the Venezuelan islands.

Distribution — *Protonotaria citrea* is a breeding bird from eastern North America. It winters in southern Central America to Colombia and extreme western Venezuela (PHELPS & PHELPS 1950, p. 279). It is a very rare passenger migrant in the West Indian islands (BOND 1950, p. 133).

Protective measures — Not protected by law.

Vermivora peregrina (Wilson)

Tennessee Warbler

Sylvia peregrina WILSON, Am. Orn. 3, 1811, p. 83, pl. 25, fig. 2 — Cumberland River, Tennessee.

Passenger migrant.

Caribbean Sea, between CURAÇAO and north coast of Venezuela, 17.XI.1954 (1 ♂; Collection Ansingh, Curaçao).

Taxonomy — Although in autumn plumage, the specimen has the feathers of the crown and nape almost devoid of their green edgings, the grey colour contrasting with the pure green of the mantle and the back.

Measurements — ♂, wing 68, tail 45, bill (exposed culmen) 14, tarsus 17.

Status — Not recorded from the Netherlands Leeward Islands.

Once a single male specimen was caught alive in exhausted state on board an oil tanker between Venezuela and Curaçao (17.XI.1954). Definite records from the islands are lacking.

Not recorded from the Venezuelan islands.

Distribution — *Vermivora peregrina* is a breeding bird from the coniferous forests of eastern North America. It winters in Central America and northern South America (Colombia, Venezuela), but it is a rather rare passenger migrant in the West Indies.

119 **Dendroica petchia rufopileata** Ridgway

Yellow Warbler

Dendroica rufopileata RIDGWAY, Proc. U.S. Nat. Mus. *7*, 1884, p. 173 — Curaçao.
"*Parus. L. (luteslus) — Pagara di misa*", SIMONS 1868, p. 154 (Curaçao).
Dendroica rufopileata, BERLEPSCH 1892, p. 76 (Curaçao); PETERS 1892, p. 116 (Curaçao); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 165 (Curaçao).
Dendroeca rufopileata, HARTERT 1893, p. 295 (Aruba), 311 (Curaçao), 327 (Bonaire).
Dendroica petechia rufopileata, HARTERT 1902, p. 297 (Aruba, Curaçao, Bonaire); PETERS, Proc. Biol. Soc. Wash. *40*, 1927, p. 39 (Aruba, Curaçao, Bonaire); HELLMAYR, *8*, 1935, p. 378 (Aruba, Curaçao, Bonaire); PHELPS, Sr., & GILLIARD, Am. Mus. Nov. *1153*, 1941, p. 11 (Aruba, Curaçao, Bonaire); ZIMMER & PHELPS, Sr., Am. Mus. Nov. *1270*, 1944, p. 15 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 24 (Bonaire); VOOUS 1955, p. 165 (Aruba, Curaçao, Bonaire, Klein Bonaire).
Dendroica ruficapilla rufopileata, RIDGWAY, *2*, 1902, p. 525 (Curaçao); CORY 1909, p. 202 (Aruba), 208 (Curaçao), 213 (Bonaire); RUTTEN 1931, p. 137 (Aruba, Curaçao, Bonaire).
Dendroica petechia ruficapilla, DE JONG 1948, p. 9 (Aruba, Curaçao, Bonaire).

Native name — *Para di misa*. The name "heel" (local pronounciation for "geel" = yellow) attributed by RUTTEN to this species, does not seem to exist as a vernacular bird's name.

ARUBA, CURAÇAO, BONAIRE, KLEIN BONAIRE. — Resident.

ARUBA: *Spaans Lagoen*, 10.IV.1952 (1 juv.); *Arikok hills*, 10.XII.1951 (1 ♂), 7.IV.1952 (1 ♂), 8.IV.1952 (1 ♂, 2 ♂ juv., 2 ♀ juv.); *Ceru Kleine Jamanota*, 13.XII.1951 (1 ♂); *Boca Prins*, 12.XII.1951 (1 ♂); Fontein, 4.VII.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Santa Barbara*, 25.IX.1951 (1 ♂); 7.X.1951 (1 ♂, 1 ad.); *Klein Sint Joris*, 1.IV.1952 (1♀); *Groot Sint Joris*, 3.X.1951 (1 ♀), 10.X.1951 (1 ♀), 22.X.1951 (1 ad.); *Santa Catharina*, 2.I.1952 (1 ♀); *Malpais*, 1.X.1951 (1 ♀), 15.X.1951 (1 ♂, 3 ♀), 12.XI.1951 (1 ♀), 27.XII.1951 (1 ad.), 18.III.1952 (1 ♀), 20.III.1952 (1 ♂);

Porto Marie Baai, 19.IV.1930 (2 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Groot Santa Marta*, 28.IX.1951 (1 ad.), 10.X.1951 (3 ♂, 1 ♂ semi-ad., 1 ♂ juv., 2 ad.); *Savonet*, 18.X.1951 (1 ♀, 1 ad.), *Sint Christoffel*, 27.X.1951 (1 ♂); *Grote Knip*, 23.X.1951 (1 ♀). BONAIRE: *Kralendijk*, 29.XI.1951 (1 ad., orange aberration!); *Palu Lechi*, 9.XI.1951 (1 ♀); *Guatemala Estate*, 10.XI. 1951 (1 ad.); *Pos Amor*, 10.XI.1951 (1 ♂); *Fontein*, 15.XI.1951 (1 ad.); *Rincon*, 22.XI.1951 (1 ♂, 1 ad.); *Slagbaai Plantation*, 19.XI.1951 (1 ♀); *Wanapa*, 3.XI. 1951 (1 ♂); *Lac*, 17.XI.1951 (1 ad., 2 ♀); *Pekelmeer*, 13.XI.1951 (2 ♂); without locality, 20–21.V.1930 (3 (♀), collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — After comparison of 18 adult males from Aruba (4), Curaçao (10), and Bonaire (4) with 3 males from Barbados (British Museum, Natural History) I agree with HELLMAYR (1935, p. 377, foot note 1) that birds from Aruba, Curaçao, and Bonaire resemble each other closely, differing from those from Barbados (*petechia*) in having the crown patch a lighter chestnut-brown and more restricted, not extending posteriorly onto the neck; the upper parts are perhaps a slightly lighter green; bill slightly smaller.

The males from Aruba, Curaçao, and Bonaire show some individual variation in the development of the longitudinal brown streaks on the under parts: in most of the specimens these are confined to the breast and the flanks; in a few others they are extended over the whole of the abdomen, leaving chin and throat unstreaked, except in two males from Aruba in which there are faint brown streaks on the throat (as in the race *cienagae* from the coast regions of the states of Carabobo and Aragua, northern Venezuela). One unsexed specimen from Bonaire (nr. 11641, Kralendijk, 29.XI.1951) has a strong wash of golden orange over the whole of its plumage; it is a unique and very conspicuous bird. Two additional males (nrs. 11649 and 11650, Pekelmeer, 13.XI.1951) and one female (nr. 11637, Slagbaai Plantation, 19.XI.1951) from the same island show a partial wash of deep orange on the breast, the sides of the head, and the mantle, as well as along the edges of the wing feathers. No such indication of over-pigmentation has been observed in males from the other islands. One aberrant specimen from Los Roques in the PHELPS Collection (Caracas) seems to be similar to the fully orange specimen from Bonaire (PHELPS *in litt.*).

The females from Aruba, Curaçao, and Bonaire do not generally possess the brown cap present in the males, although a slightly perceptible golden wash can be observed in most of our specimens. They are paler below, without, or with a few faintly developed, brown streaks. They can be — and in fact have been — very easily mistaken in the field for wintering or passing individuals of the North American race (*aestiva*).

Three females from Curaçao (nr. 11631, 15.X.1951; nr. 11630, 12.XI.1951; nr. 11634, 1.IV.1952) show a perfect male plumage with chestnut crown patch and boldly streaked under parts; two of them proved to have active female gonads! In addition there are other females showing various intermediate stages of masculine plumage characters, starting with one with stray chestnut feathers among the greenish feathers of the crown (nr. 11626, Malpais, 18.III.1952) and culminating in a female from Bonaire with fairly well streaked under parts and pale brownish crown patch (nr. 11632, Slagbaai Plantation, 19.XI.1951).

Juvenile males closely resemble females, but there is also an immature type of plumage in which pale greyish-white predominates on head and under parts. These

birds resemble individuals of the North American race *aestiva* in corresponding juvenile plumage and are very misleading in the field. We found them in Aruba only (8 and 10.IV.1952), whence also an adult female in this rare pale greyish colour phase is known (collection RUTTEN, Leiden Mus.). The broad yellow margins along the inner webs of the tail feathers reaching the shaft near the base of the feathers are, however, diagnostic of this species.

The specimens of the resident race *rufopileata* differ in all plumages from North American migrants of the race *aestiva* in having a shorter wing tip (9.5–12.5 mm = 19.1% of wing-length in 27 specimens) and shorter bill.

Iris dark brown; bill black or bluish-black, basal half of lower mandible light horn; legs and feet yellowish-brown.

Measurements — ARUBA: ♂, wing 56.5, 57.5, 58.5, 59.5, 61, average 58.6, tail 44, 47.5, 47.5, average 46.3, bill (measured from forehead) 14, 14, 14, 14.5, 14.5, average 14.2; ♀, wing 56.5, tail 47, bill 14. CURAÇAO: ♂, wing 57, 58, 58.5, 59, 60, 60.5, 60.5, 60.5, 61.5, 62, average 59.8, tail 47.5, 47.5, 48, 48.5, 48.5, 48.5, 49, average 48.2, bill 13.5, 14, 14, 14, 14, 14, 14, 14.5, 14.5, 14.5, 14.5, average 14.1; ♀, wing 53.5, 54, 55.5, 56.5, 57, 57, 59, 59.5, 60.5, average 56.6, tail 42, 42.5, 44, 44.5, 46, 46, 46, 47, 48, 48, average 45.4, bill 13.5, 13.5, 14, 14, 14, 14, 14, 14, 14.5, 15, average 14.1. BONAIRE: ♂, wing 59.5, 59.5, 60, 60.5, 61, average 60.1, tail 45, 47, 48, 49.5, 50, average 47.9, bill 13.5, 14, 14, average 13.8; ♀, wing 56, 56.5, 56.5, 56.5, 57.5, 59.5, 60, 60, average 57.8, tail 45.5, 46.5, 46.5, 47, 47.5, 48, 49, average 49.1, bill 13.5, 14, 14.5, 14.5, 14.5, average 14.2.

Aruba, Curaçao, Bonaire (*rufopileata*)			Barbados (*petechia*)		
♂ wing	56.5–62	average (20) 59.6	♂ wing	58, 59.5, 63	average 60.2
tail	44 –50	average (15) 47.7	tail	46, 46, 48.5	average 46.8
bill	13.5–14.5	average (19) 14.1	bill	15, 15.5, 15.5	average 15.3

Status — First recorded from Curaçao from a specimen collected by BENEDICT and NYE in Februari 1884. This specimen served as the type specimen of RIDGWAY's *Dendroica rufopileata* in 1884. HARTERT was the first to record the species from Aruba and Bonaire in 1892. All authors agree in describing this species as very numerous in Curaçao and Bonaire, but somewhat scarcer in Aruba.

We had the same experience and found it rather abundant in Curaçao and Bonaire, and notably scarcer in Aruba. We also observed it in Klein Bonaire (27.III.1952).

In the Venezuelan islands the species has been recorded from Las Aves (*obscura*), Los Roques (*obscura*), Orchilla (*rufopileata*), Blanquilla (*rufopileata*), Tortuga (*aurifrons*), Margarita (*rufopileata*), Los Testigos (*rufopileata*).

Biotope — We found this species wherever trees and shrubs were present, from acacia and cactus scrub to luxuriant fruit plantations, mangroves, and manchioneel bushes (*Hippomane mancinella*). It was, however, much less abundant than *Coereba flaveola*, and less familiar in habits than this species. Still, it outnumbered any other small passerine bird, including *Coereba flaveola*, in mangroves and shaded manchioneel-bush. It was also rather abundant in the bushes of *Tournefortia* at Boca Prins, Aruba, and in the poor *Conocarpus* vegetation along the borders of the Pekelmeer, Bonaire.

Food — All 42 stomachs examined contained the remains of minute insects (100%); in addition small spiders (5%) and a few small seeds (2%). Most of the insects eaten proved to be small beetles (at least 48%), but we also found small caterpillars (15%), ants (12%), Diptera (10%), and larvae of small beetles (5%).

Reproduction cycle — We obtained nests with eggs ascribed to this species in Bonaire in November and received a colour slide of a nest with eggs from Curaçao from 18.VIII.1952 (VAN DER WERF). In addition we have males with active gonads collected between 25.IX and 13.XI.1951 (testes up to 7 × 5 mm) and females with growing follicles in the ovary from 12.XI.1951, 2.I.1952, and 1.IV.1952. Besides, we collected individuals in fresh juvenile plumage between 8 and 10.IV.1952. When I finally add that persistently singing males were observed by us during the whole of our stay in the islands from September 1951 until April 1952, one may feel quite sure in considering that in these islands the species, does not follow any particular breeding season, but can be found breeding throughout the year. We had the impression, however, that there was a culmination of breeding activity from November till January.

Nest and eggs — The nests were deep, cup-shaped structures, found in mangroves or placed in the upright fork of some acacia between one and two meters above the ground. They were made from fine twigs, the spines of opuntias and other cacti, woollen threads, and small feathers, and neatly lined with feathers and woollen threads.

Clutch-size recorded was 3, 3, 2, respectively.

Eggs broad-ovate, buffish-white, with irregular, mainly secundary markings of brown, violet-brown, and black, forming a collar near the broad pole, the opposite pole generally remaining unmarked.

Dimensions: CURAÇAO: 16.8 × 12.6, 16.9 × 12.8 mm (VAN DER WERF); BONAIRE (1) 16.1 × 12.4, 16.1 × 12.4, one broken; (2) 16.1 × 12.0, 16.2 × 12.0, 16.3 × 12.2 mm. Average 16.3 × 12.3 mm.

Zoogeography — *Dendroica p. rufopileata* occurs in the islands of Aruba, Curaçao, Bonaire, Orchila, Blanquilla, Margarita, and Los Testigos. A closely resembling form inhabits Las Aves and Los Roques (*obscura*) and a further one Tortuga and the neighbouring coast of northern Venezuela in the states of Anzoategui and Sucre (*aurifrons*). All these forms, together with the race *cienagae* from the coastal regions of the states Carabobo and Aragua just south of the Aves Islands and Bonaire, resemble each other closely and form various taxonomic connecting links with the race *petechia* from Barbados. — Other races, representing a different subgroup of this widely distributed species, occur along the coastal fringes of the Paraguana and the Goajira Peninsulas and along the Pacific coast regions of Colombia and Ecuador to northern Peru. The species has furthermore a wide distribution throughout the West Indies, Central and North America. From the subspecies-group *petechia sensu stricto* HELLMAYR has recognized no less than 16 West Indian insular races. Judged from its present range this group probably has had a tropical North American origin; the occurrence of the species in Aruba, Curaçao, and Bonaire, therefore, indicates a colonization from the Caribbean region rather than from South America (see: Zoogeography, p. 46).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

120 **Dendroica fusca** (P. L. S. Müller)

Blackburnian Warbler

Motacilla fusca P. L. S. MÜLLER, Natursyst., Suppl., 1776, p. 175 — French Guiana

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: Malpais, 4.IX.1955 (1 ♂; Collection Koelers, Curaçao).

Taxonomy — The specimen is in winter plumage with bright yellow throat and sharp, dark striations on the flanks.

Iris dark brown; bill dark brown with the base of the lower mandible and the cutting edges lighter; legs and feet dark horn-colour.

Measurements — CURAÇAO: ♂, wing 68, tail 46, tarsus 20.

Status — Not previously recorded.

We did not observe this species.

Once collected by KOELERS in a mixed flock of *Dendroica petechia* (migrants?) and one *Setophaga ruticilla* (4.IX.1955).

Not recorded from the Venezuelan islands.

Distribution — *Dendroica fusca* is a breeding bird from eastern North America. It winters in southern Central America and northern South America, including the subtropical zones of Colombia and Venezuela. It is a rare passenger migrant in the West Indian islands (BOND 1950, p. 141).

Protective measures — Not protected by law.

121 **Dendroica castanea** (Wilson)

Bay-Breasted Warbler

Sylvia castanea WILSON, Am. Orn. *2*, 1810, p. 97, pl. 14, fig. 4 — Pennsylvania.
Dendroica castanea, VOOUS 1953, p. 187 (Curaçao); VOOUS 1955, p. 166 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

No material.

Status — Not previously recorded.

We observed this species once in Curaçao, *viz.* at Julianadorp, on 28.X.1951, when one adult specimen occurred in a flock of *Dendroica striata* which was moving in thorny acacia-bush. The "buffish-salmon" coloration of the flanks of the individual, which was observed at very close range, was extremely conspicuous.

In the Venezuelan islands the species has been observed once on Tortuga Island in November (PHELPS, Jr., 1945, p. 282).

Distribution — *Dendroica castanea* is a breeding bird from the coniferous forests of northern North America. It winters throughout Panama and Colombia (DE SCHAUENSEE 1951, p. 969), as well as in the tropical zone of western Venezuela (PHELPS & PHELPS 1950, p. 283). It is rare on passage in the West Indies (BOND).

Protective measures — Not protected by law.

122 **Dendroica striata** (Forster)

Blackpoll Warbler

Muscicapa striata FORSTER, Phil. Trans. *62* (29), 1772, p. 406, 428 — Fort Severn, west coast Hudson Bay.

Dendroica striata, VOOUS 1953, p. 185 ((Aruba), Curaçao, Bonaire); VOOUS 1955, p. 167 ((Aruba), Curaçao, Bonaire).

Native name — *Para bobo*(?).

(ARUBA), CURAÇAO, BONAIRE. — Fall transient.

CURAÇAO: *Willemstad*, ultimo X.1951 (1 ♂, 1 sex unknown); *Klein Sint Joris*, 30.X.1951 (2 sex unknown); *Groot Sint Joris*, 17.X.1951 (1 ♀, 1 sex unknown); *Julianadorp*, 28.X.1951 (1 ♂ ad.); *Groot Piscadera*, 31.X.1951 (1 ♂, 1 sex unknown); *Malpais*, 1.X.1951 (1 ♂ ad.), 15.X.1951 (1 ♂, 4 sex unknown); Malpais, 16.X. 1955 (1 ♂; Collection Koelers Curaçao); *Hato*, 6.X.1951 (2 sex unknown); *Sint Patrick*, 10.XI.1951 (1 ♀ ad.); summit of *Sint Christoffel*, 27.X.1951 (1 ♂).

Taxonomy — In some of the adult males the under parts are still largely suffused with white feathers of the past breeding plumage.

Iris dark brown; bill dark horn-brown, the lower mandible lighter, usually yellowish or yellowish-brown; legs horn-brown or yellowish-brown, the feet often paler ochraceous.

Measurements — CURAÇAO: ♂, wing 72.5, 73, 76, 76, 78, 79, 79, bill (measured from forehead) 14, 14, 14, 14, 14.5, 15; ♀, wing 72 73.5, 74.5, 79.5, bill 14, 14, 14, 15; sex unknown, wing 71.5, 72.5, 72.5, 74.5, 74.5, 75, 75.5, 77.5, 79.5, 79.5, bill 13, 13, 13.5, 14, 14, 14.5.

Status — Not previously recorded.

We observed and collected this species in Curaçao between 1.X and 31.X.1951 and in addition got a specimen from the island collected by J. G. DE JONG on 10.XI.1951. In Bonaire we did not collect it, but observed solitary specimens on 2 and 5.XI.1951. The species was notably common between 20 and 30.X.1951, when hundreds of individuals must have been present in Curaçao, the birds, which appeared extremely exhausted, occurring in any locality, including Willemstad-town and the main roads of the island with their busy traffic. More than a few individuals entered rooms and kitchens, where they were easily caught. We did not visit Aruba in October and November, but Brother ANTOON (Oranjestad) informed us that large numbers of a small species of greenish warbler, which may have been this species, occurred in the gardens of Oranjestad in October and early November. — In the autumn of 1952 the species turned up in considerably smaller numbers than in the previous year, but stray individuals were observed by BRONNEBERG and VAN DER WERF (*in litt.*). Extreme dates of passage in the autumn in Curaçao: II.IX.1955 and 20.XI.1955 (ANSINGH, KOELERS). — Not yet recorded on its spring migration.

Not recorded from the Venezuelan islands, but during the optimum of migration in Curaçao, on 15.X.1951, a specimen of this species was caught alive on board the whaler "Willem Barendsz" at 12° 12′ N, 67° 00′ W, which is just to the north of the westernmost of the Roques Islands (specimen in the Leiden Museum).

Biotope — In the days of strongest passage in Curaçao this species occurred practically everywhere in the island (see above), but in general it was most frequently observed in acacia-bush and other flowering leguminous trees. It was less common in fruit plantations and it has also been observed in mangroves and in the seasonal forest near the summit of Christoffel Mountain (27.X.1951).

Food — All 20 stomachs examined contained minute insects (100%), among which were mainly small beetles (50%) and small caterpillars (32%; up to 14 mm in

length), but also Diptera (21%), the larvae of beetles (11%), and Hymenoptera (5%); once a small snail of 4 mm length. Vegetable matter was present in not more than 2 instances (11%) and included small seeds.

Distribution — *Dendroica striata* is a breeding bird from the northernmost forest zone of North America north to the limit of trees. It migrates chiefly through the West Indies and winters in the tropical rain forest of northern South America, whence it is also known from Venezuela and Colombia.

Protective measures — Not protected by law.

123 **Seiurus aurocapillus aurocapillus** (Linnaeus)

Oven-Bird

Motacilla aurocapilla LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 234 — off the coast of Hispaniola.

Seiurus aurocapillus, VOOUS 1955, p. 169 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant or winter resident.

CURAÇAO: Malpais, 6.XI.1955 (1 ♂; Collection Ansingh, Curaçao).

Measurements — CURAÇAO: ♂, wing 78, tail 53, tarsus 23.

Status — Not previously recorded.

We observed this species only once, *viz.* on 3.XII.1951, when a shy, solitary specimen was present in the shade of the undergrowth of an old fruit plantation at Sint Nicolaas, Curaçao.

During the autumn migration 1955 the species was observed by ANSINGH and KOELERS (*in litt.*) in the flooded acacia-scrub of Malpais, Curaçao; one specimen was collected on 6 and one on 11.XI.1955 (one of these birds having been referred to above).

Apparently not yet recorded from the Venezuelan islands.

Distribution — *Seiurus aurocapillus* is a breeding bird from eastern North America. It winters in the West Indies and Central America south to northwestern South America, where it is known from one individual taken on the Caribbean coast of Colombia (DE SCHAUENSEE 1951, p. 970) and one on the Paraguana Peninsula in northwestern Venezuela (BARNES & PHELPS, Sr., 1940, p. 30).

Protective measures — Not protected by law.

124A **Seiurus noveboracensis noveboracensis** (Gmelin)

Northern Water-Thrush

Motacilla noveboracensis GMELIN, Syst. Nat. *1*, *2*, 1789, p. 958 — New York.

124B **Seiurus noveboracensis notabilis** (Ridgway)

Seiurus naevius notabilis RIDGWAY, Proc. U.S. Nat. Mus. *3*, 1880, p. 12 — Black Hills, Wyoming.

124C **Seiurus noveboracensis limnaeus** McCabe & Miller

Seiurus noveboracensis limnaeus McCABE & MILLER, Condor *35*, 1933, p. 196 — Indian Point Lake, Cariboo Distr., British Columbia.
Seiurus noveboracensis notabilis, PHELPS & PHELPS 1951, p. 24 (Bonaire).
Seiurus noveboracensis, VOOUS 1953, p. 188 (Curaçao); VOOUS 1955, p. 170 (Aruba, Curaçao, Bonaire).

Native name — unknown.

ARUBA, CURAÇAO, BONAIRE. — Passenger migrant and winter visitor.

CURAÇAO: *Santa Barbara*, 25.IX.1951 (1 ♀); *Klein Sint Joris*, 30.X.1951 (1 ♂); *Groot Sint Joris*, 3.X.1951 (1 ♀); *Santa Catharina*, 2.I.1952 (1 sex unknown); *Malpais*, 26.IX.1951 (1 ♀), 1.X.1951 (1 ♂), 12.XI.1951 (1 sex unknown), 20.III. 1952 (1 ♂); *Groot Santa Marta*, 28.IX.1951 (1 ♂); *Sint Hyronimus*, 24.X.1951 (1 ♀, 1 sex unknown); *Grote Knip*, 23.X.1951 (2 ♀).

Taxonomy — The specimens collected differ widely in the coloration of the upper and under parts and may therefore belong to various subspecies. According to one of the latest reviews of this species (McCABE & MILLER) it is, however, impossible to denote a subspecific name to every individual of the species, (1) because the geographic variation in the species' North American breeding range is mainly of what is now called a clinal nature, and (2) because the colour of the upper parts and to a certain extent also that of the under parts discolours during the non-breeding season. In our series we can therefore only identify those specimens representing the extreme types of the range of variation. We had for comparison 6 specimens of *noveboracensis* from the states of Virginia, New York, Massachusetts, Michigan and Illinois, and 2 specimens of *notabilis* from Georgia, the latter kindly sent by Dr. H. FRIEDMANN (Washington) as reference specimens of *notabilis*. We have accordingly arranged our specimens from Curaçao into the following groups:

(a) Specimens with pale olive-brownish upper parts and a variable amount of yellow below, falling well within the limits of variation of the small series of *noveboracensis* mentioned above. They have been referred to *S.n.noveboracensis* (5 specimens).

Santa Barbara, 25.IX.1951, ♀, wing 73, tail 50, bill (measured from forehead) 16.5.
Malpais, 26.IX.1951, ♀, wing 75, tail 51, bill 16.
Grote Knip, 23.X.1951, ♀, wing 75, tail 52, bill 15.
Sint Hyronimus, 24.X.1951, sex unknown, wing 76, tail 51, bill 15.5.
Malpais, 12.XI.1951, sex unknown, wing 78.5, tail 51.5, bill 16.

(b) Specimens with dark olive-grey upper parts, lacking the brownish tinge of the previous group, but showing a similar variation of the yellow coloration below. They fully agree with the reference specimens of *notabilis* mentioned above and are accordingly here referred to *S.n.notabilis* (3 specimens).

Groot Santa Marta, 28.IX.1951, ♂, wing 73, tail 50.5, bill 15.
Sint Hyronimus, 24.X.1951, ♀, wing 72.5, tail 47, bill 16.
Malpais, 20.III.1952, ♂, wing 80.5, tail 56, bill 16.

(c) Two specimens were conspicuous in having very dark, olive-sooty coloration of the upper parts; under parts pale yellow. They agree remarkably well with the description of *limnaeus* and are therefore tentatively referred here to *S.n. limnaeus* (2 specimens).

Malpais, 1.X.1951, ♂, wing 73, tail 50.5, bill 16.

Grote Knip, 23.X.1951, ♀, wing 78.5, tail 52.5, bill 16.5.

(d) Three specimens were conspicuous in the series for the paleness of the brownish grey upper parts and the pale, yellowish under parts. Although McCABE & MILLER state that individuals of *notabilis* in worn plumage are very pale I do not feel secure in referring these birds to any of the above mentioned races (3 specimens).

Groot Sint Joris, 3.X.1951, ♀, wing 75, tail 50.5, bill 16.5.

Klein Sint Joris, 30.X.1951, ♂, wing 78.5.

Santa Catharina, 2.I.1952, sex unknown, wing 75.5, tail 51, bill 16.

Iris dark brown; bill dark brown, lower mandible lighter horn-colour; legs and feet horn-colour.

Status — Previously only known from one specimen (*notabilis*) collected by PHELPS & PHELPS in November 1947 at Goto, Bonaire.

We found this species regularly distributed in all three islands between 23.IX.1951 (Santa Barbara, Curaçao) and 10.IV.1952 (Spaans Lagoen, Aruba). It was particularly common by the end of September and at the beginning of October, when up to 6 individuals together were seen at the edge of the small fresh water pool Bacoval, Santa Barbara, Curaçao. In contrast, during the winter months only solitary individuals have been noticed. In Bonaire we observed it throughout the whole month of November, but not in March-April.

Extreme dates of arrival and departure recorded by ANSINGH and KOELERS (*in litt.*) in Curaçao in 1953 and 1954: 11.IX–24.IV.

In the Venezuelan islands recorded from Las Aves (*notabilis*), Los Roques (*noveboracensis* and *notabilis*), Tortuga (*notabilis*), and Los Testigos (*noveboracensis*) (see: PHELPS, Jr., 1945, p. 282 and PHELPS & PHELPS 1950, p. 284–285).

Biotope and habits — We observed this species mainly along fresh water pools, which varied in size between the large fresh water reservoirs at Malpais, Curaçao, and the smallest wells or minute streams of less than 20 cm width for the artificial irrigation of the fruit plantations of Santa Catharina and Groot Sint Joris, Curaçao. We also met with them in well-shaded bushes of manchioneel (*Hippomane mancinella*), where they kept to the moist bottom amongst the fallen leaves and in the mangroves of the Spaans Lagoen (Aruba), Sint Joris Baai (Curaçao), and Lac (Bonaire), as well as in various other localities. The birds were largely terrestrial in habits, ascending to the lowest branches of protective shrubs in the case of danger only. In September and October they appeared very tame, but in the course of the winter months they grew more and more wild and towards March and April were hard to approach.

Food — In 100% of 13 stomachs examined small insects were found: small beetles (77%), small Diptera (31%), larvae of Diptera (23%), caterpillars (8%). Small snails were present in 5 stomachs (38%): immature Subulinids (2 ×), *Potamopyrgus* (1 ×), *Planorbis* (1 ×). Small black seeds in 4 stomachs (31%). Once a small spider (8%).

Distribution — *Seiurus noveboracensis* is a breeding bird from temperate and

northern North America north to the tree line. The race *noveboracensis* inhabits the eastern, *limnaeus* the central, and *notabilis* the western and northwestern portions of the range. The species is a common winter bird throughout Central America, the West Indies, and northern South America, where it is also known from Colombia and Venezuela (mainly the race *notabilis*!). SCHAEFER (*in litt.*) observed it at Rancho Grande north of Maracay, Venezuela, between early October and early May.

Protective measures — Not protected by law.

125 **Oporornis agilis** (Wilson)

Connecticut Warbler

Sylvia agilis WILSON, Am. Orn. *5*, 1812, p. 64, pl. 39, fig. 4 — Connecticut.
Oporornis agilis, VOOUS 1953, p. 187 (Curaçao); VOOUS 1955, p. 171 (Curaçao, Klein Curaçao).

Native name — unknown.

CURAÇAO, KLEIN CURAÇAO. — Passenger migrant.

CURAÇAO: *Julianadorp*, 15.X.1951 (1 ♂ 1st year); Malpais, 9–10.X.1954 (1 ♂ ad., 1 ♀; Collection Koelers, Curaçao). KLEIN CURAÇAO: 15.X.1950 (1 ♀; Collection Ansingh, Curaçao).

Taxonomy — All specimens have a conspicuous, closed eye-ring of a buffish-white colour. They were inexceptionally fat.

Iris dark brown; bill horn-brown, base of lower mandible flesh-colour; legs and feet flesh-colour or pale horn-colour.

Measurements — CURAÇAO: ♂ ad., wing 75.5, tail 52.5, tarsus 25; ♂ 1st year, wing 69.5, tail 49.5, tarsus 22; ♀, wing 72.5, tail 52, tarsus 22.

Status and biotope — Not previously recorded.

The specimens mentioned above represent the only evidence of the occurrence of this species in Curaçao and Klein Curaçao. They were all extremely tame and moved along the ground rather inconspicuously, preferably under protective cover of shrubs and bushes.

Not recorded from the Venezuelan islands.

Food — One stomach examined (Julianadorp, 15.X.1951) contained the remains of a great number of various small insects, as well as some vegetable matter.

Distribution — *Oporornis agilis* is a breeding bird from the coniferous forests of North America. It winters mainly in northwestern Brazil. On migration it has been found on the Bahama Islands, but it "has not yet been reported from any of the Antilles nor from Central America" (BOND 1950, p. 148). Likewise, the species has only rarely been recorded in Colombia and Venezuela (DE SCHAUENSEE 1951, p. 971; PHELPS & PHELPS 1950, p. 286; Mem. Soc. Cienc. Nat. La Salle, Caracas, *13* (35), 1953, p. 192).

Protective measures — Not protected by law.

126 **Oporornis philadelphia** (Wilson)

Mourning Warbler

Sylvia philadelphia WILSON, Am. Orn. *2*, 1810, p. 101, pl. 14, fig. 6 — near Philadelphia, Pennsylvania.

Oporornis philadelphia, VOOUS 1953, p. 187 (Curaçao); VOOUS 1955, p. 171 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

No material.

Status — Not previously recorded.

We observed a solitary specimen at very close range at Parera, Curaçao, on 1.XI. 1951; it was in those days of the autumn migration that North American passenger migrants of various species were teaming everywhere in Curaçao, most of them in an exhausted condition.

Not recorded from the Venezuelan islands.

Distribution — *Oporornis philadelphia* is a breeding bird from eastern North America. It winters mainly in southern Central America and northwestern South America, whence it is known as a winter resident in Colombia (DE SCHAUENSEE 1951, p. 971) and in western Venezuela (PHELPS & PHELPS 1950, p. 286). It is a very rare passenger migrant in the West Indies. It is very likely, however, that the specimen from Curaçao, which made a rather exhausted impression, had travelled across the Caribbean Sea, rather than over Central America.

Protective measures — Not protected by law.

127 **Setophaga ruticilla ruticilla** (Linnaeus)

American Redstart

Motacilla ruticilla LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 186 — Virginia.
Setophaga ruticilla, DE JONG 1948, p. 9 (Curaçao); VOOUS 1953, p. 186 (Curaçao), VOOUS 1955, p. 173 (Curaçao, Bonaire).

Native name — unknown.

CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: *Klein Sint Joris*, 30.X.1951 (1 ♂ imm., 1 ♀ ad.); *Groot Sint Joris*, 3.X.1951 (1 ♀); *Malpais*, 15.X.1951 (1 ♂ imm., 1 ♀); *Sint Christoffel*, 27.X.1951 (1 ♀); *Grote Knip*, 23.X.1951 (1 ♂ ad., 2 ♀). BONAIRE: *Karpata*, 23.XI.1951 (1 ♂ imm.).

Taxonomy — Upper parts of females light olive-grey, with paler greyish or greyish-brown head. The series has been compared with several females of the race *ruticilla* from the eastern United States and with one female of the race *tricolora* (*fide* Wetmore) from Haiti (19.IV.1931). See revision of this species by WETMORE (Journ. Wash. Ac. Sci. *39*, 1949, p. 137–139).

Two immature males and one adult male are also tentatively referred to *ruticilla*.

Iris dark brown; bill black in adult male, blackish-brown with the base of the lower mandible slightly lighter in females and immature males; legs and feet black in adult male, blackish-brown in females and immature males.

Measurements — CURAÇAO: ♂ ad., wing 66.5; ♂ imm., wing 62, 64; ♀, wing 61, 61, 61, 63.5, 64, 64.5. BONAIRE: ♂ imm., wing 63.5.

Status — Previously recorded only by DE JONG from one specimen shot from a small flock of these birds at the slopes of the Sint Christoffel, Curaçao, on 3.X.1941.

We found it not at all scarce in Curaçao between 30.IX and 30.X.1951 and observed it once in Bonaire on 23.XI.1951, and again in Curaçao on 18.IV.1952. There is even a record from Curaçao from as late as 4.V.1952 (VAN DER WERF *in litt.*). Females and immature males far outnumbered adult males. Only twice did we observe a solitary adult male in black-and-orange plumage, *viz.* on 23.X.1951 and on 18.IV. 1952, both times in Curaçao. — We did not observe this species in Aruba.

Extreme dates of arrival and departure recorded by ANSINGH and KOELERS (*in litt.*) in Curaçao in 1953 and 1954: 29.VIII–24.IV.

In the Venezuelan islands recorded only from Margarita (YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 36).

Biotope — We observed this species in open acacia-bush and in fruit plantations, preferably in the close vicinity of fresh water pools and wells, where the birds were probably attracted by the large numbers of small insects. Also found in the seasonal forest near the summit of Christoffel Mountain, Curaçao, and in various flowering leguminous trees in xerophytic scrub.

Food — The examination of 8 stomachs showed nothing but large quantities of minute insects of various kinds and once a very small snail of 1 mm in length. Among the insects found were mainly small beetles (75%) and small Diptera (50%).

Distribution — *Setophaga r. ruticilla* is a breeding bird from eastern North America. It winters throughout the West Indies, in Central America, and in northern South America south to the Guianas and Ecuador. It is known as a common winter resident in Colombia and Venezuela, and also in Trinidad.

Protective measures — Not protected by law.

128 **Dolichonyx oryzivorus** (Linnaeus)

Bobolink

Fringilla oryzivora LINNAEUS, Syst. Nat. ed. 10 *1*, 1758, p. 179 — South Carolina.
Dolichonyx oryzivorus, CORY 1909, p. 201 (Aruba); RUTTEN 1931, p. 141 (Aruba); HELLMAYR, *10*, 1937, p. 221 (Aruba); DE JONG 1948, p. 9 (Aruba); VOOUS 1953, p. 187 (Bonaire); VOOUS 1955, p. 174 (Aruba, Curaçao, Bonaire).

Native name — *Para di aña* (Curaçao), Chuchubi spaño (Bonaire).

ARUBA, CURAÇAO, BONAIRE. — Passenger migrant.

BONAIRE: *Slagbaai Plantation*, 8.XI.1951 (1 ♀); *Lac*, 17.XI.1951 (1 ♀).

Taxonomy — Both specimens are in plain winter dress and do not show any sign of body-moult.

Iris dark brown; bill brown, lower mandible lighter; legs and feet light horn-colour.

Measurements — BONAIRE: ♀, wing 88.5, 93.5, tail 62, 63.5.

Status — Previously known only from a single male collected by FERRY in Aruba on 25.IV.1908 (CORY). HELLMAYR, however, mentions having examined *two* specimens from Aruba!

We met with two solitary individuals of this species in Bonaire only, and succeeded in collecting both.

It was observed in Curaçao in the autumn of 1952 and 1954 by KOELERS (*in litt.*) and others; first date of arrival on 13.IX.1954. On 11.X.1954 a flock of about 25 individuals was observed at Rustenburgh, Curaçao (VAN DER WERF *in litt.*). Not recorded from the Venezuelan islands.

Biotope — We observed these birds in dense *Croton* vegetation (Slagbaai) and on the inner edge of mangroves (Lac).

Distribution — *Dolichonyx oryzivorus* is a breeding bird from temperate North America. It migrates through the West Indies and along the Gulf and Caribbean coasts of Central America, south to central and southern South America. As a passage migrant it is known from both Colombia (DE SCHAUENSEE 1951, p. 1001) and Venezuela (PHELPS & PHELPS 1950, p. 307).

Protective measures — Not protected by law.

129 **Icterus nigrogularis curasoënsis** Ridgway

Yellow Oriole

Icterus curasoënsis RIDGWAY, Proc. U.S. Nat. Mus. 7, 1884, p. 174 — Curaçao.
Icterus xanthornus curaçaoënsis, BERLEPSCH 1892, p. 82 (Curaçao); HARTERT 1893, p. 295 (Aruba), 317 (Curaçao), 328 (Bonaire).
Icterus curaçoënsis, PETERS 1892, p. 114 (Curaçao).
Icterus xanthornus curasoensis, ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 165 (Curaçao); CORY 1909, p. 201 (Aruba), 207 (Curaçao), 212 (Bonaire); RUTTEN 1931, p. 142 (Aruba, Curaçao, Bonaire); HELLMAYR, *IO*, 1937, p. 135 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 9 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 24 (Bonaire).
Icterus nigrogularis, VOOUS 1953, p. 252 (Aruba, Curaçao, Bonaire).
Icterus nigrogularis curasoënsis, VOOUS 1955, p. 176 (Aruba, Curaçao, Bonaire).

Native name — *Trupial cachó* (Curaçao, Bonaire); *Gonsalitu* (Aruba).

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: *Spaans Lagoen*, 6.XII.1951 (1 ♂); *Baranca Cora*, 8.XII.1951 (1 ♀); *Dos Playa*, 10.XII.1951 (1 ♀); Fontein, 29.VI.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: Scherpenheuvel, 10.IX.1936 (2 ♂, collected by Wagenaar Hummelinck; Leiden Mus.); *Santa Barbara*, 25.IX.1951 (1 ♀); *Groot Sint Joris*, 3.X.1951 (1 ♀), 17.X.1951 (1 ♂); *Groot Piscadera*, 28.XII.1951 (1 ♀), 14.I.1952 (1 ♀); *Malpais*, 1.X.1951 (2 ♀); Porto Marie Baai, 15.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Sint Jan*, 22.III. 1952 (1 ♂); *Groot Santa Marta*, 10.X.1951 (2 ♀); Santa Cruz, 27.IV.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). BONAIRE: *Onima*, 12.XI. 1951 (1 ♂), 28.XI.1951 (1 ♂); Goto, 27.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.).

Taxonomy — Compared with specimens from continental northern South America (Venezuela 1, British Guiana 2, Surinam 2) the birds from Aruba, Curaçao, and Bonaire are paler and more yellow throughout. In the insular specimens the colour of the under parts varies between Light Cadmium and Cadmium Yellow, whereas in continental birds the under parts are a bright Cadmium Yellow. Indi-

vidual variation in insular specimens is, however, rather conspicuous, being most noteworthy in the intensity of the yellow coloration on the sides of the head and the crown. Insular birds differ from continental ones furthermore in having a longer and much more slender bill and much broader white edgings to the inner primaries, secondaries, and greater wing coverts, which, however, may become almost lost by wear. I found no difference in coloration between the two sexes, nor between specimens from Aruba, Curaçao, and Bonaire, although specimens from Aruba showed a tendency towards a slightly shorter and thicker bill, thus approaching the continental race *nigrogularis*.

In the immature dress, which is apparently worn for a considerable time, the upper parts are darker, more golden greenish, less yellowish, whereas the tail is olive-brown with golden-greenish feather-margins, instead of black with a narrow white tip.

Iris dark brown; bill black, base of lower mandible bluish-grey; legs and feet a lighter or darker bluish-grey.

Measurements — ARUBA: ♂, wing 101, tail 94, bill (measured from forehead) 24.5; ♀, wing 92, 93, 94, tail 82, 91, bill 25, 25, 26. CURAÇAO: ♂, wing 97, 97.5, 99, 99.5, 100, tail 88, 88, 88.5, 90, 94.5, bill 26.5, 27, 27, 29, 29; ♀, wing 90.5, 92.5, 94, 95, 95.5, 96.5, 97.5, tail 84, 84, 84, 86.5, 86.5, 89, 91, bill 26.5, 27, 27, 27, 27, 27.5, 27.5, 27.5. BONAIRE: ♂, wing 98, 102, tail 91, bill 26.5, 28, 28.5. — Additional measurements of the length of the bill (measured from forehead) have been kindly supplied to me by BLAKE (*in litt.*) from the material preserved in the Chicago Natural History Museum: ARUBA: ♀, 22, 22.5, 23.5, 24, 25. CURAÇAO: ♂, 26, 27, 28.5; ♀, 26, 26.5, 27, 27. BONAIRE: ♀, 27, 27.

Summary of the length of the bill (measured from forehead):

Aruba	♂ 24.5	♀ 22–26 average (8) 24.1
Curaçao	♂ 26 –29 average (8) 27.5	♀ 26–27.5 average (12) 27.0
Bonaire	♂ 26.5–28.5 average (3) 27.7	♀ 27, 27

Additional material may prove Aruba birds to be distinct on the basis of a shorter and thicker bill.

Status — According to all previous records the species is not at all scarce in Aruba and Curaçao, but rather rare in Bonaire.

We found it locally common in Curaçao, somewhat less common in Aruba, and decidedly rare in Bonaire.

In the Venezuelan islands it is known only from Margarita (*helioeides*).

Biotope — In contrast to *Icterus icterus* this species was most frequently found in xerophytic, thorny scrub with an undergrowth of *Opuntia*. It was, of course, also found in fruit plantations, but it appeared more regularly also in mangroves and lonely tamarind trees growing among dry scrub. It seemed to like the close vicinity of water either for its daily habitat or for its nesting places.

Food — The examination of 14 stomachs showed animal matter in 14 instances (100%) and vegetable matter in 8 instances (57%). The animal diet consisted mainly of insects, among which were small beetles (64%), larvae, pupae and imagines of Diptera (29%), caterpillars (14%), a grasshopper (7%), a cicada (7%); once a spider and once a Soliphuga. — The vegetable matter contained various unidentifiable kinds of small fruits (29%). We observed this species feeding on the ripe fruits of date palms and of *Malpighia*. The prevailing insectivorous habits are very noteworthy! Probably the most important part of the insect-diet is caught in flowering trees and shrubs (*Tamarindus indica, Haematoxylon brasiletto*).

Reproduction cycle — Females with large, growing follicles in the ovary were collected on 10.X.1951 (Curaçao), 10.XII.1951 (Aruba) and 14.I.1952 (Curaçao). Although we observed many fresh nests we could nowhere be sure whether these nests were used for breeding or served other purposes. Hence, I must trust upon the records by VAN DER WERF (*in litt.*) of a nest with 3 young in February 1952 and one with 2 young on 18.VIII.1952, both in Curaçao. All data combined clearly indicate that the species does not follow a distinct breeding season.

Nest — The nest resembled a large, penduline weaver's nest, attached to the outermost twigs of the highest branches of tamarinds, manchioneel trees or other relatively high trees. They were delicately woven, regularly far more than half a meter in length, bottle-shaped, with a narrow entrance at the top. Although we never observed more than one pair in the neighbourhood of a nesting tree, we rarely found less than two nests together. Nests were often found hanging high over the water.

Call-notes — A harsh chatter or a disagreeable mewing, much in contrast to the melodious calls of *Icterus icterus*.

Zoogeography — *Icterus n. curasoënsis* inhabits Aruba, Curaçao, and Bonaire. In continental South America it is replaced by the closely resembling form *nigrogularis*, which ranges from Colombia to Trinidad and the Guianas. It is a common species along the arid tropical coast, inhabiting both the Goajira Peninsula of Colombia (DE SCHAUENSEE 1951, p. 998) and the Paraguana Peninsula of Venezuela (BARNES & PHELPS, Sr., 1940, p. 9). It occurs also in Margarita (*helioeides*). As the species is restricted to northern South America and does not occur in the Lesser Antilles, it is a strictly South American element in the avifauna of the Netherlands Leeward Islands.

Protective measures — Protected by law.

130 **Icterus icterus ridgwayi** (Hartert) Plate VIIIb

Troupial

Xanthornus icterus ridgwayi HARTERT, Nov. Zool. *9*, 1902, p. 299 — Aruba.
"Icterus. Cuv. (tropicus) — Tropiaal", SIMONS 1868, p. 154 (Curaçao).
"Icterus vulgaris subsp.?, Turupial", PETERS 1892, p. 114 (Curaçao).
Icterus vulgaris, HARTERT, Bull. Brit. Orn. Cl. *1*, 1892, p. XII (Aruba, Curaçao).
Icterus icterus, HARTERT 1893, p. 297 (Aruba), 317 (Curaçao); RIDGWAY, *2*, 1902, p. 264 (Curaçao); VOOUS 1953, p. 253 (Aruba, Curaçao).
Icterus icterus ridgwayi, CORY 1909, p. 200 (Aruba), 207 (Curaçao); RUTTEN 1931, p. 141 (Aruba, Curaçao); HELLMAYR, *10*, 1937, p. 139 (Aruba, Curaçao); BARNES & PHELPS, Sr., 1940, p. 9 (Aruba, Curaçao); DE JONG 1948, p. 9 (Aruba, Curaçao); BOND 1950, p. 181 (Aruba, Curaçao); VOOUS 1955, p. 177 (Aruba, Curaçao).

Native name — *Trupial*.

ARUBA, CURAÇAO. — Resident.

ARUBA: *Ceru di Pos di Noord*, 11.XII.1951 (1 ♀); *Calabas*, 11.XII.1951 (1 ♂); *Arikok hills*, 7.IV.1952 (1 ♀); *Baranca Cora*, 8.XII.1951 (1 ♂); Fontein, 4.VII. 1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: Scherpenheuvel, 10.IX.1936 (1 ♀, collected by Pijpers, Rutten & Vermunt;

Leiden Mus.); *Santa Barbara*, 25.IX.1951 (1 ♂); *Groot Sint Joris*, 3.X.1951 (4 ♂); *Santa Catharina*, 2.I.1952 (1 ♀); *Julianadorp*, 17.I.1952 (1 egg, complete clutch!); *Groot Piscadera*, 4.X.1951 (1 ♂, 2 ♀), 14.I.1952 (1 ♂, 1 ♀); Porto Marie Baai, 19.IV.1930 (1 sex unknown, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Groot Santa Marta*, 10.X.1951 (1 ♀); Santa Cruz, 27.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.), 26.II.1948 (1 ♂, collected by Croockewit; Amsterdam Mus.); *Grote Knip*, 23.X.1951 (3 ♀).

Taxonomy — The orange colours in the plumage of this species are subject to considerable fading and sun-bleaching: the freshly moulted plumage is deep orange, resembling RIDGWAY's Orange or Cadmium Orange; whereas the worn plumage is yellow, corresponding with Light Cadmium. Apart from these striking seasonal differences there is also some individual variation and age variation (juvenile birds are more yellowish than adults). In addition, in the collected series Aruba birds tend to be darker orange throughout than specimens from Curaçao!

The racial characteristics of the troupials from Aruba and Curaçao as compared with those from the continent are those of length and of basal depth of the bill. Island birds have the bill larger than continental birds. See also: PHELPS & PHELPS, Bol. Soc. Venez. Cienc. Nat. *72*, 1948, p. 204 (largest bills are found in Curaçao, not in Aruba!).

Iris yellow or yellowish-white, naked orbital skin leaden-blue; bill black, base of lower mandible bluish-grey; legs and feet bluish-grey or bluish-horn.

Measurements — ARUBA: ♂, wing 118, 118.5, 120, average 118.8, tail 99, 100, 100, average 99.7, bill (measured from forehead) 34.5, 35, 36, average 35.1; ♀, wing 108.5, 111, 113.5, average 111.0, tail 93, 94, 96, average 94.3, bill 31.5, 32, 32.5, average 32.0. CURAÇAO: ♂, wing 115, 116, 118, 118.5, 120, 120, 121, 121.5, 122.5, average 119.2, tail 92, 97, 100, 100, 101, 104, 105, 105, average 100.5, bill 36, 36, 36, 36.5, 37.5, 37.5, 37.5, 38, average 36.7; ♀, wing 106, 106, 108, 111.5, 112.5, 113, 113, 113, average 110.4, tail 90, 90, 92, 92, 93, 93, 94, 97, 99, average 93.3, bill 33, 34.5, 34.5, 34.5, 35, 35, 35, 36, 36, average 34.8.

Status — In spite of the fact that this species is apparently known from the earliest times of European visits to the South Caribbean region, PETERS in 1890 and after him HARTERT in 1892 seem to have been the first to have recorded its presence in Curaçao and Aruba. All subsequent authors agree in stating that the troupial is fairly common in Aruba and Curaçao, but absent in Bonaire.

We found this species rather numerous in Curaçao. It was also fairly common in Aruba, where, however, one may get an exaggerated impression of the species' abundance owing to the conspicuousness of this fiery orange bird in the scarce xerophytic vegetation of the barren island. Not seen in Bonaire.

In the Venezuelan islands the species occurs only in Margarita (*ridgwayi*: PHELPS & PHELPS, Bol. Soc. Venez. Cienc. Nat. *72*, 1948, p. 204).

Biotope — Generally distributed throughout all places where the vegetation is of a less xerophytic type. It was most abundant in the old fruit plantations, where sapodilla (*Achras*), mango (*Mangifera*) and *Melicocca* provide ample food, shade, and protection. It often visited the gardens close to the houses (Plate VIII), but it was absent in the thorny scrub of cactus and acacia, where — in contrast — we often found *Icterus nigrogularis*. In Aruba we found it regularly in the dense scrub with acacia and *Cereus*, probably because other vegetations were lacking in large parts of the island. In mangroves we found *Icterus nigrogularis*, not *Icterus icterus*!

Food — The diet of the troupial appeared to be more varied than at first was

expected: 13 stomachs from Curaçao contained insects in 11 instances (85%), fruits in 8 instances (62%) and undetermined vegetable matter in 3 instances (25%). Even those specimens that had been collected while feeding on the fruits of *Achras sapota* proved in addition to have in the stomach the remains of great numbers of various insects, among which were mainly beetles. — Four stomachs from Aruba contained insects in all 4 instances (100%) and vegetable matter in 2 instances (50%). The insect diet consisted of caterpillars of 30–40 mm in length, beetles, and once a large wasp. One specimen shot while feeding on a flowering *Opuntia wentiana* proved to have a great mass of various components of the flowers of this cactus in its stomach. Our field observations indicated that troupials were also regularly feeding on the fruits of *Annona muricata, Mangifera indica, Malpighia,* various kinds of cactus, as also on the ripening ears of *Andropogon sorghum.*

Reproduction cycle — Specimens with enlarged gonads have been collected between 2.I and 14.I.1952. A nest with one egg was found in the same period; it remained the only egg for one week, when, on 17.I.1952, it was collected and subsequently proved to be slightly incubated. During the time of this visit (January 1952) the activity of the troupials in calling and fighting had increased extraordinarily as compared with a few months earlier. Seven months later, on 17.VIII.1952, again a nest with 2 young was found in Curaçao (KOELERS *in litt.*). The species therefore does not seem to follow a distinct breeding season.

Nest — A delicately woven structure, bag-shaped and semi-pendulant, but much less conspicuous than the long, bottle-shaped nests of *Icterus nigrogularis.* Old nests were seen as low as at about 3 m in dense, thorny scrub of acacia, *Crescentia* and *Lemaireocereus* (Julianadorp, Curaçao).

Egg — Regularly ovate in shape. Purplish-white, with irregular black spots and fine markings and scrawls of black and blackish-brown and underlaid with larger greyish spots. The markings are somewhat concentrated near the broader pole. Measurements: 27.8 × 20.0 mm.

Field observations — The melodious calls of this species were frequently heard throughout the day, the birds even calling their name at the hottest hours from the top of some organpipe cactus. Call: "true-pee-éw, true-pee-éw".

Zoogeography — *Icterus i. ridgwayi* inhabits the arid Caribbean coast of Colombia and northwestern Venezuela, including the Goajira and Paraguana peninsulas; in addition the islands Aruba, Curaçao, and Margarita. In the remaining parts of northern Venezuela, from Carabobo to the Paria Peninsula, it is replaced by the race *icterus*, completing the species' range. It is a definite South American element in the avifauna of the Netherlands Leeward Islands.

Protective measures — Protected by law.

131 **Piranga olivacea** (Gmelin)

Scarlet Tanager

Tanagra olivacea GMELIN, Syst. Nat. *1, 2,* 1789, p. 889 — New York.
Piranga olivacea, VOOUS 1953, p. 187 (Curaçao); VOOUS 1955, p. 179 (Aruba, Curaçao).

Native name — unknown.

ARUBA, CURAÇAO. — Passenger migrant.

CURAÇAO: *Julianadorp*, 24.X.1951 (1 ♂ imm.); near *Willemstad*, 14.IV.1952 (1 ♂ ad.).

Taxonomy — The adult male from 14.IV.1952 is in nearly full breeding dress (scarlet), no more than one or two olive-green feathers on the lower abdomen remaining from the green winter plumage.

Measurements — CURAÇAO: ♂ ad., wing 94.5, tail 66; ♂ imm., wing 99, tail 71.

Status — Not previously recorded.

A first-year male, found dead at Julianadorp, Curaçao, was presented to us during the time of autumn migration (24.X.1951). During the winter the species was apparently absent, but when spring migration had started I observed an adult male at Oranjestad, Aruba, on 7.IV.1952 (present from 3.IV until about 10.IV.1952, VAN ERP *in litt.*) and received a further male specimen caught in the near surroundings of Willemstad, Curaçao, on 14.IV.1952.

Not recorded from the Venezuelan islands.

Food — The stomachs examined contained both the remains of insects (Coleoptera, green Heteroptera) and vegetable matter.

Distribution — *Piranga olivacea* is a breeding bird from eastern North America. It winters mainly in northwestern South America, from Colombia south to Peru and Bolivia. It has not yet been observed in Venezuela. Its migration route leads mainly along the east coast of Central America; in the West Indies it is therefore a rare passenger migrant (BOND 1950, p. 161).

Protective measures — Not protected by law.

132 **Pheucticus ludovicianus** (Linnaeus)

Rose-Breasted Grosbeak

Loxia ludoviciana LINNAEUS, Syst. Nat. ed. 12 *1*, 1766, p. 306 — Louisiana.
Hedymeles ludovicianus, DE JONG 1948, p. 9 (Curaçao); JUNGE, Ardea *39*, 1951, p 238 (Curaçao).
Pheucticus ludovicianus, VOOUS 1953, p. 187 (Bonaire); VOOUS 1955, p. 180 (Curaçao, Bonaire).

Native name — Para bobo (probably general name for many of the autumn passengers).

CURAÇAO, BONAIRE. — Passenger migrant.

CURAÇAO: Willemstad, early X.1932 (1 ♀, collected by Brother M. REALINO; Leiden Mus.).

Measurements — CURAÇAO: ♀, wing 100, tail 72.

Status — Previously only known from an exhausted female caught early October 1932 in the gardens of the Sint Thomas College, Willemstad, Curaçao (JUNGE) and from an immature male collected on 2.XI.1940 in exactly the same locality (DE JONG).

We observed a solitary and very shy female on 5.XI.1951 at Fontein, Bonaire. It was the only specimen of the species noticed.

Not recorded from the Venezuelan islands.

Distribution — *Pheucticus ludovicianus* is a breeding bird from eastern North America. It winters mainly in Central America and northwestern South America, whence it is known from Colombia, Ecuador, western and northern Venezuela (PHELPS & PHELPS 1950, p. 350; SCHAEFER *in litt.*). The main migration route is apparently through Central America.

Protective measures — Not protected by law.

133 **Passerina cyanea** (Linnaeus)

Indigo Bunting

Tanagra cyanea LINNAEUS, Syst. Nat., ed. 12 *1*, 1766, p. 315 — South Carolina.
Passerina cyanea, VOOUS 1953, p. 187 (Curaçao); VOOUS 1955, p. 180 (Curaçao).

Native name — unknown.

CURAÇAO. — Passenger migrant.

CURAÇAO: *Julianadorp*, 12.XI.1951 (1 ♀).

Taxonomy — The specimen was in the possession of a thick layer of subcutanous fat, proving that it was on migration.

Bill horn-colour; legs and feet bluish-black.

Measurements — CURAÇAO: ♀, wing 63.5, tail 48.

Status — Not previously recorded.

The above mentioned specimen, which struck dead against a window at Julianadorp, is the only evidence of the occurrence of this species in Curaçao.

Not recorded from the Venezuelan islands.

Distribution — *Passerina cyanea* is a breeding bird from eastern North America. It winters chiefly in Central America. Recently the species was reported for the first time from Venezuela (♂ imm., XII.1950, Perija Mts., western Venezuela: AVELEDO & PONS, Contr. Oc. Mus. Hist. Nat. La Salle, Caracas, Ser. Zool. *7*, 1952, p. 22). The occurrence of the species in Curaçao and western Venezuela represents a noteworthy extension of the known winter range.

Protective measures — Not protected by law.

134 **Spiza americana** (Gmelin)

Dickcissel

Emberiza americana GMELIN, Syst. Nat. *1*, *2*, 1789, p. 872 — New York.
Spiza americana, CORY 1909, p. 201 (Aruba); RUTTEN 1931, p. 138 (Aruba); HELLMAYR, *11*, 1938, p. 130 (Aruba); DE JONG 1948, p. 9 (Aruba); VOOUS 1955, p. 181 (Aruba).

Native name — unknown.

ARUBA, CURAÇAO. — Passenger migrant.

CURAÇAO: Malpais, 4.XI.1955 (1 ♀ ad.; Collection Koelers, Curaçao; 1 ♀ imm., collected by Koelers; Amsterdam Mus.).

Taxonomy — The first-year female is much lighter and greyer, less warm brown above, than the adult female, and has less yellow on the breast, the cheeks, and the superciliary; the tips of the tail feathers are sharply pointed, not rounded as in the adult specimen. In the first-year bird the oviduct was thin and straight; in the adult specimen the oviduct was thin, but twisted (KOELERS *in litt.*). Both specimens were fat; they showed some moult of the small body feathers.

Iris dark brown; bill horny-brown, with bluish-grey underside of lower mandible, which was most conspicuous in the adult specimen; legs and feet horn-colour.

Measurements — CURAÇAO: ♀ ad., wing 78, tail 55; ♀ imm., wing 79, tail 56.

Status — Previously only recorded from one male collected by FERRY in Aruba on 24.IV.1908 (CORY).

We did not observe this species, but a specimen was caught on board a tanker close to Bullen Baai, Curaçao, on 5.X.1954 and is now in the Collection ANSINGH (Curaçao).

During the autumn migration of 1955 large flocks of the species varying in number between 30 and 60 specimens were observed at Malpais, Curaçao, between 29.X and 6.XI, when ANSINGH and KOELERS collected a total of 5 specimens, 2 of these having been referred to above. The birds moved among the high grass and herb bottom-vegetation in the acacia-scrub (KOELERS *in litt.*).

Not recorded from the Venezuelan islands.

Distribution — *Spiza americana* is a breeding bird from central North America. It winters mainly in Central America and northern South America, whence it is known from Colombia (DE SCHAUENSEE 1951, p. 1086), Venezuela (PHELPS & PHELPS 1950, p. 353), and the Guianas.

Protective measures — Not protected by law.

135 **Tiaris bicolor sharpei** (Hartert)

Black-Faced Grassquit

Euetheia sharpei HARTERT, Bull. Brit. Orn. Cl. *7*, 1893, p. XXXVII — Aruba, Curaçao, Bonaire; type from Curaçao.

"Fringilla L. cinerea — Moffi", SIMONS 1868, p. 154 (Curaçao).

Euetheia bicolor, BERLEPSCH 1892, p. 81 (Curaçao); ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 165 (Curaçao).

Euetheia sharpei, HARTERT 1893, p. 295 (Aruba), 314 (Curaçao), 328 (Bonaire).

Euetheia bicolor sharpei, RIDGWAY, *I*, 1901, p. 543 (Aruba, Curaçao, Bonaire).

Euethia bicolor sharpei, HARTERT 1902, p. 299 (Aruba, Curaçao, Bonaire).

Tiaris sharpei, CORY 1909, p. 201 (Aruba), 209 (Curaçao), 213 (Bonaire); RUTTEN 1931, p. 138 (Aruba, Curaçao, Bonaire).

Tiaris bicolor sharpei, HELLMAYR, *II*, 1938, p. 126 (Aruba, Curaçao, Bonaire); DE JONG 1948, p. 9 (Aruba, Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 25 (Bonaire); VOOUS 1955, p. 182 (Aruba, Curaçao, Bonaire).

Native name — *Moffi*.

ARUBA, CURAÇAO, BONAIRE. — Resident.

ARUBA: north of *Oranjestad*, 9.XII.1951 (1 ♂); *Westpunt*, 11.XII.1951 (1 ♂); *Arikok hills*, 19.XII.1951 (2 ♂); *Baranca Cora*, 8.XII.1951 (1 ♀); *Boca Prins*, 12.

XII.1951 (1 ♂); Fontein, 29.VI.1930 (1 ♂, 1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Ceru Pretu*, 13.XII.1951 (1 ♂). CURAÇAO: *Santa Barbara*, 25 IX.1951 (2 ♀); *Groot Sint Joris*, 3.X.1951 (5 ♂, 2 ♀); *Ronde Klip*, 29.X.1951 (4 ♂); Piscadera, 23.XI.1936 (1 juv., collected by Wagenaar Hummelinck; Leiden Mus.); *Groot Piscadera*, 26.X.1951 (1 ♂, 1 ♀), 31.X.1951 (1 ♂), 23.XI.1951 (1 ♀); *Malpais*, 1.X.1951 (1 ♂), 15.X.1951 (1 ♂); *Hato*, 29.I.1952 (1 ♀); Porto Marie Baai, 15.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Groot Santa Marta*, 10.X.1951 (1 ♂); *Sint Hyronimus*, 24.X.1951 (1 ♂); Savonet, 1.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Savonet*, 27.X.1951 (1 ♀). BONAIRE: *Kralendijk*, 14.XI.1951 (1 ♂); *Guatemala Estate*, 10.XI.1951 (2 ♂); *Pos Amor*, 10.XI.1951 (1 ♂), 16.XI.1951 (1 ♂); *Onima*, 12.XI.1951 (1 ♀); Fontein, 20.V.1930 (1 ♂, 2 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Fontein* 6.XI.1951 (3 ♂), 15.XI.1951 (1 ♂); Goto, 27.V.1930 (1 ♀, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Wanapa*, 26.XI.1951 (1 ♂).

Taxonomy — Extremely variable in coloration, particularly in the male plumage. Compared with specimens of the race *omissa* from northern Venezuela (2 ♂), Dominica (1 ♂), St. Martin (4 ♂), and Saba (2 ♂) the males from Aruba, Curaçao, and Bonaire are considerably paler above, more greyish-green, rather than deep olive-green. One male from Aruba (nr. 11748, 19.XII.1951) is particularly noteworthy for the almost neutral grey tinge of the freshly moulted upper parts, but another male from the same island (nr. 11746, 13.XII.1951) has the upper parts very dark greenish and is on a whole not to be distinguished from the Venezuelan and Lesser Antillean series of males! In addition the Leeward Island birds have the under parts a less deep black, the flanks a lighter grey, less tinged with olive, and the under tail coverts have broader and lighter greyish edges. — The females from Aruba, Curaçao, and Bonaire are considerably paler throughout than females from northern Venezuela and the Lesser Antilles; their upper parts are more greyish-olive, whereas on the under parts a tinge of buffish-white is predominating.

Recently a pale race (*huilae*) has been described by MILLER (Proc. Biol. Soc. Wash. *65*, 1952, p. 14) from the arid regions of the Upper Magdalena Basin, Colombia. Through the kindness of Dr. A. H. MILLER I was able to examine 2 males and 1 female from the type-locality. They proved to be close to the birds from Aruba, Curaçao, and Bonaire, but were generally somewhat paler still!

According to prevalent opinions in the literature male specimens in a female plumage have to be considered as juveniles; this may be right in a number of cases, but in another place I have expressed my views on the possibility of the males of this species having an eclipse plumage (VOOUS 1955, p. 74–75). With this new material at hand I regret I have nothing particular to add to this question. I can only state having male specimens in various stages of moult, from the plain brown female plumage to the full blackish plumage. Males in a transitional stage of plumage are from the following collecting dates: 29.X (2), 31.X (1), 6.XI (1), 9.XII (1), 11.XII. 1951 (1). On comparing the state of the gonads of males in full blackish plumage with that of males in plain brown dress, it appears that in the first-mentioned category the testes are invariably in an enlarged state (average of testes in 14 males, 5.6 × 4.2 mm), whereas in the second group the testes are very small or only moderately swollen (average of testes in 6 males, 2.9 × 1.6 mm). Singing males were mostly in the black plumage, but from 2 individuals in plain brown plumage shot

while in full song, one turned out to be a male (26.XI.1951, Bonaire; testis 4 × 2 mm), the other a female (3.X.1951, Curaçao; ovary active, oviduct swollen and twisted)!

Iris dark brown; bill black (♂ in nuptial plumage) or light horn-brown or horn-grey, with base of the lower mandible slightly paler (♂ in female dress; ♀); legs and feet various shades of horn-brown.

Measurements — ARUBA: ♂, wing 55.5, 55.5, 57, 57.5, 57.5, 57.5, 58, average 56.9, tail 39.5, 40.5, 42, 43, 43, 43.5; ♀, wing 55.5, 56.5, tail 39.5, 40.5. CURAÇAO: ♂, wing 51.5, 52.5, 53, 53.5, 54.5, 54.5, 54.5, 55, 55, 55, 55, 55.5, 56, average 54.2, tail 38.5, 38.5, 39.5, 40, 40, 40.5, 41, 41, 41, 41.5, 41.5, 42, 43. BONAIRE: ♂, wing 53.5, 53.5, 54, 54, 54.5, 54.5, 55, 55.5, 55.5, 55.5, 56, average 54.7, tail 39, 40, 40, 41, 41.5, 41.5, 42, 42, 42; ♀, wing 53, 54.5, 55, 55, tail 37, 38, 39, 42.

Status — First recorded from Curaçao by ERNST PETERS in 1892. The first observations in Aruba and Bonaire are from HARTERT in the same year, but published one year later (1893). All subsequent authors have mentioned this species as being extremely plentiful in all three islands.

We found it rather abundant in Curaçao and Bonaire, but decidedly scarcer in Aruba. It is one of the species of birds which are most familiar among the native inhabitants of the islands and is usually considered to be the counterpart of the European sparrow.

In the Venezuelan islands this species is known in very slightly distinct forms from Blanquilla and Los Hermanos (*johnstonei*, PHELPS, Jr., 1948, p. 106 and 116), Tortuga (*tortugensis*, PHELPS, Jr., 1945, p. 283), and Margarita (*omissa*, YÉPEZ, BENEDETTI & PHELPS, Sr., 1940, p. 38).

Biotope and habits — Although these birds apparently occurred in every biotope, they were most numerous in dry acacia and cactus scrub with open sandy places and a rich vegetation of small herbs and dry grasses. They were very common along roadsides and in farm yards and were often seen in small flocks near houses and in gardens. They also occurred in fruit plantations and in bushes of manchioneel and have also been observed in mangroves. In Aruba they were most numerous at the bottom of the dry river beds in the Arikok hills, where they were protected against the force of the trade wind and where they moved among the open places of sun-burnt sand and gravel in search of small seeds. — We had the impression that these birds often congregated into breeding companies of 20–30 individuals, but we have also found solitary nests. On the whole, however, they were rather social, and large flocks were observed sleeping together in the undergrowth of a big stand of mahogany at Ronde Klip, Curaçao, on 29.X.1951.

The song was a poor, pleasant twittering, sounding like chee-chee-chee-chee-chee, and was usually delivered from a conspicuous, though rather low post.

Food — The examination of the stomachs of 38 specimens showed the presence of vegetable matter in 100% of the cases; stray insects were present in 2 instances only (5%). Seeds of various kinds, but mostly of extremely small size (1 mm or less) formed the bulk of the contents found in the stomachs and the crops, but we also found pieces of plant stems in 3 instances (8%) and the remains of fruit flesh and seeds of *Cereus* (3%). Most of the feeding was done on the ground, but three times we observed these birds eating from the fruits of organpipe cacti.

Reproduction cycle — We saw nests with eggs or young on the following dates: 23.X.1951 (Curaçao, 2 small young), 26.XI.1951 (Bonaire, 1 egg, 2 small

young), 29.XI.1951 (Bonaire, 3 eggs), 2.I.1952 (Curaçao, 1 egg, 2 small young), 19.I.1952 (Curaçao, 2 eggs), 20.I.1952 (Curaçao, 1 egg), 23.I.1952 (Curaçao, 4 eggs).

Local information on the point seems to indicate that the species breeds throughout the year, but we were unable to check this.

Nest — The nests found were irregular, globulous structures with a narrow entrance at the side. They were made from grasses and other plant stems, plant fibres, and thin twigs and lined with feathers (of pigeon), woollen threads, and *Cocos* fibres. They were placed at different heights, from slightly less than 50 cm from the ground to over 2.50 meter. We found nests made among the thorny branches of *Acacia* and *Prosopis*, in *Cereus* and *Opuntia wentiana*, and once in a small, isolated *Rhizophora* tree not high above the water (Sint Joris Baai, Curaçao).

Eggs — Broad-ovate in shape. Colour: pale bluish-white or purplish-white with irregular primary and secondary markings of brownish or purplish-brown and fine streaks of blackish; in most instances the pigmentation is condensed near the broader pole, where it may form either a dark cap or a well-defined collar. Measurements (mm):

(1) 17.0 × 12.5
17.0 × 12.9
17.4 × 13.2
17.7 × 13.1

(2) 17.2 × 13.0
17.7 × 13.2

Parasites — Miss THERESA CLAY (London) kindly identified some Mallophaga found on my specimens as *Machaerilaemus sp.*

Zoogeography — *Tiaris b. sharpei* inhabits Aruba, Curaçao, and Bonaire. Slightly different forms inhabit the north coast of Venezuela and Colombia, including the Goajira Peninsula (*omissa*), west to the Upper Magdalena Basin (*huilae*). The species has furthermore a wide range throughout the Lesser Antilles, Bahama Islands, and Greater Antilles, excepting Cuba. In view of its wide range in the West Indies, its absence in Central America and its limited range in continental South America, this species seems to be of a West Indian distributional origin, having colonized the adjacent coastal districts of Venezuela and Colombia from the Lesser Antilles. The subspecific identity of the populations at present inhabiting the Lesser Antilles, Tobago, Margarita and northern Venezuela seems to support this suggestion. The origin of the birds at present living in Bonaire, Curaçao, and Aruba is not certain, since we probably never will know whether they have reached the islands from the nearby continental coast or directly from the Lesser Antilles (see: Zoogeography, p. 46).

Protective measures — Protected by law (WESTERMANN 1946, p. 82).

136 **Ammodramus savannarum caribaeus** (Hartert)

Grasshopper Sparrow

Coturniculus savannarum caribaeus HARTERT, Nov. Zool. *9*, 1902, p. 298 — near Kralendijk, Bonaire.

Ammodromus savannarum HARTERT,, Bull. Brit. Orn. Cl. *1*, 1892, p. XII (Curaçao, Bonaire); HARTERT 1893, p. 314 (Curaçao), 327 (Bonaire).

Coturniculus savannarum savannarum, RIDGWAY, *1*, 1901, p. 206 (Curaçao, Bonaire).

Coturniculus savannarum caribaeus, HARTERT 1902, p. 298 (Curaçao, Bonaire).

Ammodramus savannarum caribaeus, CORY 1909, p. 208 (Curaçao), 213 (Bonaire); RUTTEN 1931, p. 139 (Curaçao, Bonaire); HELLMAYR, *II*, 1938, p. 495 (Curaçao, Bonaire); PHELPS & PHELPS 1951, p. 25 (Bonaire); VOOUS 1955, p. 185 (Curaçao, Bonaire).

Ammodramus savannarum, DE JONG 1948, p. 9 (Curaçao).

Native name — unknown. HARTERT mentions Raton de cero and Para de cero (Bonaire).

CURAÇAO, BONAIRE. — Resident.

CURAÇAO: *Montagne*, 26.I.1952 (1 ♀); *Ronde Klip*, 5.II.1952 (1 ♀); Suffisant, 11–12.I.1952 (1 ♂, 1 ♀; Collection Ansingh, Curaçao); *Malpais*, 18.III.1952 (1 ♂); *Hato*, 27–29.I.1952 (2 ♂, 1 ♀). BONAIRE: *Wanapa*, 25.XI.1951 (1 ♂).

Taxonomy — Compared with 9 specimens from Jamaica (*savannarum*; British Museum Nat. Hist., U.S. Nat. Mus.) the birds from Curaçao and Bonaire are slightly paler above, particularly on the hind neck and the mantle, where the blackish centres of the feathers are less extensive and less intensively black. The lateral crown stripes are on the average broader and appear blacker in the birds from Jamaica, whereas in those from Curaçao and Bonaire the under parts are a paler buff throughout and the abdomen more conspicuously white. Measurements slightly smaller in Curaçao and Bonaire; bill more slender, less high, thus less stubby than in Jamaica. — In the series from Curaçao and Bonaire the spiny, pointed tail feathers showed noteworthy results of the action of wear and sun-bleaching.

Iris dark brown; bill light horn-colour, the culmen often darker and the lower mandible slightly lighter; legs and feet fleshy-horn or pale flesh-colour.

Measurements — CURAÇAO: ♂, wing 55+, 57.5, 57.5, 58, tail 39, 39, 41, bill (measured from forehead) 13, 13, 13.5, tarsus 18.5, 19, 19; ♀, wing 52, 54+, 55.5, 55.5, tail 37, 40, 40, bill 12, 12.5, 13, tarsus 18, 18, 19. BONAIRE: ♂, wing 59, tail 43, bill 12, tarsus 18.

CURAÇAO and BONAIRE (*caribaeus*)

wing	♂ 57.5–59 average (4) 58.0	♀ 52–55.5	average (3) 54.3
tail	♂ 39 –43 average (4) 40.5	♀ 37–40	average (3) 39.0
bill	♂ 12 –13.5 average (4) 12.9	♀ 12–13	average (3) 12.5
tarsus	♂ 18 –19 average (4) 18.6	♀ 18–19	average (3) 18.3

JAMAICA (*savannarum*)

wing	♂♀ 55.5–62.5	average (8) 59.2
tail	♂♀ 37.5–44	average (9) 40.6
bill	♂♀ 13.5–14.5	average (8) 13.9
tarsus	♂♀ 20 –21	average (9) 20.5

Status — The species was first found in the Netherlands Leeward Islands by HARTERT in 1892 "in a stony valley of grass and low bushes" near Beekenburg, Curaçao, and, more abundantly, at the "Aruba Estate" near Kralendijk, Bonaire. Afterwards FERRY (CORY) collected one specimen in Bonaire in May 1908. None of the subsequent visitors has detected the presence of this species except DE JONG, who mentions having seen a specimen which he thought to be this species, near Caracas Baai, Curaçao, in May 1944.

We have specimens from Curaçao and Bonaire, but observed the species in Curaçao only, the single Bonaire specimen being brought to us by a school boy who caught it in the open bush of Wanapa. We have records from the following localities in Curaçao, where it seems to occur in small colonies: Montagne (BRONNEBERG, KOELERS), Santa Barbara (KOELERS), Noordkant, (KOELERS), Suffisant (ANSINGH), Malpais, Hato.

Not recorded from the Venezuelan islands.

Biotope and habits — The species seemed to prefer grassy plains and xerophytic meadows with scattered low bushes of acacia; also open *Croton* vegetations. Near Suffisant (Curaçao) it occurred among a xerophytic vegetation which was kindly identified by Brother ARNOLDO (Curaçao) as consisting mainly of *Stemodia maritima* and *Lippia reptans*, the latter herb having white flowers and great numbers of small seeds ("maishi rabu"). In all these localities these birds showed almost terrestrial habits, moving silently through the dense herb vegetation where they were very inconspicuous and on our approach taking flight only at the last possible moment. They were not at all shy, but remained unnoticed by us for almost two full months, when we finally discovered their true habitat. Flight weak and very different from that of *e.g. Tiaris bicolor.* — Call notes soft and very high-pitched; song feeble and grasshopper-like.

Food — All 7 stomachs examined contained vegetable matter, mainly very small seeds (100%), but also minute insects (43%), among which were small Diptera and Heteroptera.

Reproduction cycle — Measurements of the testes of the collected males are as follows: 7½ × 5 mm (25.XI), 9 × 5½ mm (27.I), 6 × 6 mm (29.I). One of the collected females had the gonads Thus, active, showing a follicle in the ovary of about 2½ mm in diameter (29.I). quite it is proved that the species was nesting at least during the months November to January.

Egg — CURAÇAO: Greyish-white, with slight greenish tinge and small primary spots of brown and rusty-brown and secondary patches of grey near the broader pole, suggesting a kind of coloured ring. Measurements: 17.6 × 13.8 mm.

Zoogeography — *Ammodramus s. caribaeus* inhabits Curaçao and Bonaire only. The species has a wide range in North and Central America, but in the West Indies it occurs in Jamaica, Hispaniola, and Puerto Rico only. Apart from in Curaçao and Bonaire isolated populations live in addition in some restricted localities in western Colombia and Ecuador. It does not occur in Venezuela or on the Caribbean coast of Colombia. In view of the close taxonomic similarity of the populations inhabiting the Greater Antilles, Curaçao and Bonaire, the latter may be considered to be of a West Indian rather than of a South American distributional origin, but the evidence is not at all exclusive.

Protective measures — Not protected by law.

137 **Zonotrichia capensis insularis** (Ridgway) Plate IX

Rufous-Collared Sparrow

Brachyspiza capensis insularis RIDGWAY, Auk *15*, 1898, p. 321 — Curaçao.
"Fringilla. L. (frontatus saltator) — choncho-zoga-el", SIMONS 1868, p. 154 (Curaçao).
Zonotrichia pileata, ROBINSON, Flying trip to the tropics, Cambridge, 1895, p. 165 (Curaçao).

Brachyspiza capensis insularis, BERLEPSCH 1892, p. 82 (Curaçao); HARTERT 1893, p. 295 (Aruba), 314 (Curaçao); RIDGWAY, *I*, 1901 p. 349 (Aruba, Curaçao); HARTERT 1902, p. 298 (Aruba, Curaçao); CORY 1909, p. 201 (Aruba), 207 (Curaçao); RUTTEN 1931, p. 139 (Aruba, Curaçao); DE JONG 1948, p. 9 (Aruba, Curaçao).

Zonotrichia capensis insularis, HELLMAYR, *II*, 1938, p. 585 (Aruba, Curaçao); CHAPMAN, Am. Mus. Nov. *1051*, 1939, p. 13 (Aruba, Curaçao); CHAPMAN, Bull. Am. Mus. Nat. Hist. *77*, 1940, p. 398 (Aruba, Curaçao); VOOUS 1955, p. 185 (Aruba, Curaçao).

Native name — *Chonchorogai*.

ARUBA, CURAÇAO. — Resident.

ARUBA: *Andicuri*, 17.XII.1951 (1 ♂); *Arikok hills*, 17 and 10.XII.1951 (2 ♂); Fontein, 29.VI.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.). CURAÇAO: *Santa Barbara*, 25.IV.1951 (1 ♂, 1 sex unknown); *Ronde Klip*, 29.X. 1951 (1 ♂, 1 ♀); *Julianadorp*, 14.IV.1952 (1 ♂); *Groot Piscadera*, 11.X.1951 (2 ♂, 1 ♀), 26.X.1951 (1 ♂), 23.XI.1951 (1 ♂), 14.I.1952 (2 ♂); *Malpais*, 26.IX.1951 (1 ♂, 1 ♀), 27.XII.1951 (1 ♂); *Hato*, 29.I.1952 (1 ♂); *Groot Santa Marta*, 28.IX. 1951 (1 ♂, 1 sex unknown), 10.X.1951 (2 ♂), 20.I.1952 (1 ♂ juv.); *Sint Nicolaas*, 3.XII.1951 (1 ♂); Santa Cruz, 27.IV.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); Savonet, 1.V.1930 (1 ♂, collected by Pijpers, Rutten & Vermunt; Leiden Mus.); *Savonet*, 27.X.1951 (1 ♂), 14.IV.1952 (1 sex unknown).

Taxonomy — A few representative specimens of my series from Aruba and Curaçao have been compared in the PHELPS Collection (Caracas) with 21 birds from northern Venezuela (*venezuelae*). The islands birds proved to be paler above, whiter below, with lighter coloured flanks and smaller patches to the sides of the breast. Bill somewhat stronger. They represent a remarkably pale, tropical, insular race. One out of a total of 31 insular specimens (3% : nr. 11825, sex unknown, 28.IX.1951, Groot Santa Marta, Curaçao) is conspicuous in the series in having the under parts considerably tinged with buffish-brown and in having the upper parts a rather darker reddish-brown, thus, tending towards specimens of the continental race *venezuelae*! — I could not find any difference between birds from Aruba and Curaçao, the alleged heavier bill of Aruba birds being too inconstant and variable a character for further racial splitting.

In this species the feathers of the hinder crown are slightly elongated and can be erected so as to form a kind of crest, which is extremely conspicuous in the field. I am not aware of a difference in crest-length between males and females, nor of any other sexual plumage character.

The series does not show any appreciable result of wear and sun-bleaching, a fact which probably depends on the secretive life of this species. However, in some of the specimens the tail feathers showed signs of rather heavy abrasion.

Iris brown; bill dark horn-brown, lower mandible slightly lighter; legs and feet pale horn-colour.

Measurements — ARUBA: ♂, wing 67, 68.5, 69, 69.5, average 68.5, tail 57, 57, 59, 60.5, average 58.4, bill (measured from forehead) 15.5, 16, 16.5, 16.5, average 16.1. CURAÇAO: ♂, wing 62.5, 63, 63, 65, 65.5, 66, 66.5, 66.5, 66.5, 66.5, 67, 67, 67, 67, 68, 68, 68, 68.5, 69.5, average 66.4, tail 54, 54, 55, 56, 56.5, 56.5, 56.5, 57, 57, 57, 58, 58, 58, 58, 58.5, 59, 59.5, 60.5, average 57.2, bill 15, 15, 15, 15, 15, 15, 15.5, 15.5,

15.5, 15.5, 15.5, 15.5, 15.5, 15.5, 15.5, 15.5, 16, 16.5, 16.5, average 15.5; ♀, wing 63.5, 64, 64, 65, tail 55, 55, 56, 56.5, bill 15, 16, 16. — Bill of 10 males from northern Venezuela (*venezuelae*) 13–15.5, average 14.4.

Status — First recorded from Curaçao by ERNST PETERS in 1890; afterwards also found by HARTERT and all subsequent authors in Aruba and Curaçao. HARTERT states that it was rare in Aruba in 1892, but FERRY (CORY) collected no less than 14 specimens within 25 days of collecting in the same island in 1908. Not recorded from Bonaire.

We found it very common in Curaçao, but decidedly scarcer in Aruba, although it was there by no means rare. Not found in Bonaire.

Not recorded from the Venezuelan islands.

Biotope and habits — We found this species in open bush and thorny scrub, in fruit plantations, in farm yards and around human dwellings, in the gardens of Willemstad and Oranjestad, and even in the streets close to busy traffic (Plate IX). In Aruba it was more common in the least visited valleys in the Arikok hills. Most of its feeding was done on the ground, the birds scratching earth and sand with their strong feet after the manner of other buntings, particularly of other representatives of the genera *Zonotrichia* and *Passerella* which I have watched in captivity.

Reproduction cycle and song — Although we did not find nests or eggs of this species we collected a recently fledged chick in Curaçao on 20.I.1952. In addition between 28.IX.1951 and 29.I.1952 over 10 males with swollen testes were collected (testis up to 9 × 7 mm). We also observed definite pair formation and noticed a distinct increase in the intensity of the song from the end of October until the beginning of January. Nests and eggs have been found in Curaçao by HARTERT in July; according to local information the species also nests in August. Thus, breeding of the species does not seem to be restricted to any season. A photo of the nest with eggs is given on Plate IX.

The song is very sweet and decidedly bunting-like, sounding like tssee-tssee-tsseeteerrr .... The song has been compared with that of northern species of the genus *Zonotrichia* and appeared to show close resemblances (CHAPMAN, Bull. Am. Mus. Nat. Hist. 77, 1940, p. 421–422). A considerable difference was noticed, however, in the intensity of the song of this species in the islands compared with one which I heard singing in the coastal mountains of northern Venezuela between Caracas and Maracay, somewhat above 1000 m altitude, the continental bird singing much less "strongly". BOND (*in litt.*) likewise informs me of having heard a distinct difference in the song of this species in Curaçao and in the Greater Antilles. CHAPMAN mentions other instances of geographical variation in the song of the species.

Food — Examination of the contents of 26 stomachs showed vegetable matter in 25 instances (96%; mainly small seeds) and additional animal matter in 9 instances (35%; various small insects and spiders). The seeds were usually rather small, but seemed to be larger on the average than those found in the stomachs of *Tiaris bicolor*.

Zoogeography — *Zonotrichia c. insularis* inhabits Aruba and Curaçao, living in an arid tropical region. Its closest relative lives in the subtropical mountain zone of northern Venezuela (*Z.c. venezuelae*). The species is absent in tropical Venezuela (except for stray specimens collected in the middle Orinoco region) and in the Paraguana Peninsula, also in the tropical Caribbean coast regions of Colombia including the Goajira Peninsula, but it does occur in various mountainous districts

in Colombia. The species as a whole ranges throughout the subtropical and temperate regions of Central and South America, from southern Mexico and Guatemala to Tierra del Fuego. In the West Indies it occurs in Hispaniola only. The species is undoubtedly of a North American origin, as has been suggested by CHAPMAN (Bull. Am. Mus. Nat. Hist. *77*, 1930, p. 381–438), but I agree with BOND (Wilson Bull. *60*, 1948, p. 220–221) that it is likely that it colonized South America in late Tertiary times, rather than during the last pleistocene glaciation. Aruba and Curaçao seem to have been accidentally colonized from the South American continent and not through the West Indies, as the only West Indian race (*antillarum*) does not show any close taxonomic affinities to the South Caribbean forms.

Protective measures — Not protected by law, but protection is recommended by WESTERMANN (1946, p. 83), with whom I agree.

INDEX TO THE SPECIES AND THEIR DISTRIBUTION

Page	*Number*	Bird species occurring in Aruba, Curaçao and Bonaire	*Aruba*	*Curaçao*	*Bonaire*	*Neth. Windward Islands:* St. Martin Saba St. Eust. (species)
48	1	*Podiceps dominicus speciosus* L. Arrib.	—	×	×	—
49	2	*Podilymbus podiceps antarcticus* (Less.)	—	×	×	×
50	3	*Puffinus lherminieri lherminieri* Less.	—	×	—	×
51	4	*Phaëthon aethereus mesonauta* Peters	—	×	—	×
52	5A	*Pelecanus occidentalis occidentalis* L.	×	×	×	×
52	5B	*Pelecanus occidentalis carolinensis* Gm.	×	—	—	×
54	6	*Sula leucogaster leucogaster* (Bodd.)	×	×	×	×
55	7	*Phalacrocorax brasilianus brasilianus* (Gm.)	×	×	×	—
57	8	*Fregata magnificens* Mathews	×	×	×	×
59	9A	*Ardea herodias herodias* L.	(×)	×	×	×
59	9B	*Ardea herodias repens* Bangs & Zappey	—	×	×	×
61	10	*Egretta alba egretta* (Gm.)	×	×	×	—
62	11	*Egretta thula thula* (Mol.)	×	×	×	×
63	12	*Dichromanassa rufescens colorata* Griscom	×	×	×	—
65	13	*Hydranassa tricolor ruficollis* (Gosse)	×	×	×	—
67	14	*Florida caerulea* (L.)	×	×	×	×
69	15	*Bubulcus ibis ibis* (L.)	×	—	—	—
69	16A	*Butorides virescens curacensis* Oberholser	×	×	×	×
69	16B	*Butorides virescens virescens* (L.)	—	—	×	×
72	17	*Nycticorax nycticorax hoactli* (Gm.)	—	×	×	—
73	18	*Nyctanassa violacea bancrofti* Huey	×	×	×	×
75	19	*Eudocimus albus* (L.)	—	×	—	—
75	20	*Ajaia ajaja* (L.)	×	—	—	—
76	21	*Phoenicopterus ruber ruber* L.	×	×	×	×
82	22	*Anas discors* L.	×	×	×	—
83	23	*Anas bahamensis bahamensis* L.	—	×	×	—
85	24	*Anas americana* Gm.	×	×	—	—
86	25	*Aythya affinis* (Eyton)	×	×	—	—
87	26	*Buteo albicaudatus colonus* Berl.	×	×	×	—
89	27	*Pandion haliaetus carolinensis* (Gm.)	×	×	×	×
90	28	*Milvago chimachima cordatus* Bangs & Penard	—	×	—	—
91	29	*Polyborus cheriway cheriway* (Jacquin)	×	×	×	—
94	30	*Falco peregrinus anatum* (Bp.)	×	×	×	—
95	31	*Falco columbarius columbarius* L.	×	×	×	—
96	32	*Falco sparverius brevipennis* (Berl.)	×	×	—	×

Page	*Number*	Bird species occurring in Aruba, Curaçao and Bonaire	*Aruba*	*Curaçao*	*Bonaire*	*Neth. Windward Islands:* St. Martin Saba St. Eust. (species)
98	33	*Colinus cristatus cristatus* (L.)	×	×	—	—
101	34	*Porzana carolina* (L.)	—	×	×	×
101	35	*Porphyrula martinica* (L.)	—	×	—	—
102	36	*Fulica caribaea* Ridgway	—	×	—	—
103	37	*Haematopus palliatus palliatus* ≶ *prattii*	×	×	×	—
106	38	*Arenaria interpres morinella* (L.)	×	×	×	×
107	39	*Pluvialis squatarola* (L.)	×	×	×	×
108	40	*Pluvialis dominica dominica* (P. L. S. Müll.)	—	×	—	—
109	41	*Charadrius hiaticula semipalmatus* Bp.	×	×	×	—
110	42	*Charadrius alexandrinus nivosus* (Cass.)	×	×	×	—
112	43	*Charadrius collaris* Vieill.	×	×	×	—
113	44	*Charadrius vociferus vociferus* L.	×	×	×	×
114	45A	*Charadrius wilsonia cinnamominus* (Ridgway)	×	×	×	—
114	45B	*Charadrius wilsonia wilsonia* Ord	×	—	—	—
116	46	*Numenius phaeopus hudsonicus* Lath.	×	×	×	×
117	47	*Tringa flavipes* (Gm.)	×	×	×	×
118	48	*Tringa melanoleuca* (Gm.)	×	×	×	×
119	49	*Tringa solitaria solitaria* Wilson	—	×	—	×
120	50	*Actitis macularia* (L.)	×	×	×	×
122	51	*Catoptrophorus semipalmatus semipalmatus* (Gm.)	—	×	×	—
122	52	*Limnodromus griseus* (Gm.)	—	×	—	—
123	53	*Capella gallinago delicata* (Ord)	—	×	×	×
124	54	*Calidris canutus rufa* (Wilson)	—	—	×	—
124	55	*Calidris alba* (Pall.)	×	×	×	—
126	56	*Calidris pusilla* (L.)	×	×	×	×
127	57	*Calidris mauri* (Cab.)	×	×	×	—
128	58	*Calidris minutilla* (Vieill.)	×	×	×	—
129	59	*Calidris fuscicollis* (Vieill.)	×	×	×	—
130	60	*Calidris melanotos* (Vieill.)	×	×	×	—
131	61	*Micropalama himantopus* (Bp.)	—	×	×	—
132	62	*Himantopus himantopus mexicanus* (P. L. S. Müll.)	×	×	×	—
133	63	*Burhinus bistriatus vocifer* (L'Herm.)	—	×	—	—
134	64	*Stercorarius parasiticus* (L.)	—	×	—	—
135	65	*Larus atricilla atricilla* L.	×	×	×	×
137	66	*Sterna hirundo hirundo* L.	×	×	×	×
140	67	*Sterna dougallii dougallii* Montagu	×	×	×	—

Page	Number	Bird species occurring in Aruba, Curaçao and Bonaire	Aruba	Curaçao	Bonaire	Neth. Windward Islands: St. Martin Saba St. Eust. (species)
142	68	*Sterna anaethetus melanoptera* Swains.	×	×	—	—
143	69	*Sterna fuscata fuscata* L.	×	×	—	×
143	70	*Sterna albifrons antillarum* (Less.)	×	×	×	—
145	71	*Sterna maxima maxima* Bodd.	×	×	×	×
147	72	*Sterna sandvicensis eurygnatha* Saunders	×	×	×	×
150	73	*Phaetusa simplex* (Gm.)	×	—	—	—
151	74	*Anoüs stolidus stolidus* (L.)	—	×	—	×
151	75	*Anoüs minutus americanus* (Mathews)	—	—	×	—
152	76	*Columba squamosa* Bonn.	×	×	×	×
153	77	*Columba corensis* Jacquin	×	×	×	×
156	78	*Zenaidura auriculata vinaceo-rufa* (Ridgway)	×	×	×	—
158	79	*Columbigallina passerina albivitta* (Bp.)	×	×	×	×
161	80	*Leptotila verreauxi verreauxi* (Bp.)	×	×	×	—
163	81A	*Amazona barbadensis barbadensis* (Gm.)	×	—	—	—
163	81B	*Amazona barbadensis rothschildi* (Hartert)	—	—	×	—
166	82A	*Aratinga pertinax arubensis* (Hartert)	×	—	—	—
166	82B	*Aratinga pertinax pertinax* (L.)	—	×	—	—
166	82C	*Aratinga pertinax xanthogenius* (Bp.)	—	—	×	—
173	83	*Forpus passerinus viridissima* (Lafr.)	—	×	—	—
174	84A	*Coccyzus minor minor* (Gm.)	×	—	—	—
174	84B	*Coccyzus minor maynardi* Ridgway	—	×	×	—
175	85	*Coccyzus americanus americanus* (L.)	×	×	×	—
176	86	*Crotophaga sulcirostris sulcirostris* Swains.	×	×	×	—
179	87	*Guira guira* (Gm.)	—	×	—	—
179	88	*Tyto alba bargei* (Hartert)	—	×	—	—
181	89	*Speotyto cunicularia arubensis* Cory	×	—	—	—
182	90	*Caprimulgus cayennensis insularis* (Richm.)	×	×	×	—
184	91A	*Chordeiles minor gundlachii* Lawr.	—	×	—	—
184	91B	*Chordeiles minor minor* (Forster)	—	×	—	—
185	92	*Florisuga mellivora mellivora* (L.)	×	—	—	—
186	93	*Chlorostilbon mellisugus caribaeus* Lawr.	×	×	×	—
188	94	*Chrysolampis mosquitus* (L.)	×	×	×	—
191	95	*Ceryle alcyon alcyon* (L.)	—	×	×	×
192	96	*Sphyrapicus varius varius* (L.)	×	—	—	—
192	97	*Muscivora tyrannus tyrannus* (L.)	—	×	—	—

Page	*Number*	Bird species occurring in Aruba, Curaçao and Bonaire	*Aruba*	*Curaçao*	*Bonaire*	*Neth. Windward Islands:* St. Martin Saba St. Eust. (species)
194	98	*Tyrannus melancholicus chloronotus* Berl.	×	×	×	—
196	99	*Tyrannus dominicensis dominicensis* (Gm.)	×	×	×	×
199	100	*Myiarchus tyrannulus brevipennis* Hartert	×	×	×	—
201	101	*Sublegatus modestus pallens* Zimmer	×	×	×	—
203	102	*Elaenia chiriquensis albivertex* Pelzeln	—	—	×	—
204	103	*Elaenia martinica riisii* Sclater	×	×	×	×
206	104	*Progne subis subis* (L.)	—	×	—	×
207	105	*Progne chalybea chalybea* (Gm.)	—	×	—	—
208	106	*Petrochelidon pyrrhonota pyrrhonota* (Vieill.)	—	×	×	—
209	107	*Riparia riparia riparia* (L.)	—	×	×	—
209	108	*Hirundo rustica erythrogaster* Bodd.	×	×	×	×
211	109	*Mimus gilvus rostratus* Ridgway	×	×	×	—
214	110	*Margarops fuscatus bonairensis* Ph. & Ph.	—	—	×	×
216	111	*Hylocichla mustelina* (Gm.)	—	×	—	—
216	112	*Hylocichla ustulata swainsoni* (Tschudi)	—	×	—	—
217	113	*Hylocichla fuscescens fuscescens* (Stephens)	—	×	—	—
217	114	*Vireo olivaceus olivaceus* (L.)	—	×	—	—
218	115A	*Vireo altiloquus bonairensis* Ph. & Ph.	×	×	×	×
218	115B	*Vireo altiloquus barbatulus* (Cab.)	—	—	×	×
220	116A	*Coereba flaveola uropygialis* Berl.	×	×	—	×
220	116B	*Coereba flaveola bonairensis* Voous	—	—	×	×
223	117	*Mniotilta varia* (L.)	—	×	—	×
224	118	*Protonotaria citrea* (Bodd.)	—	×	—	—
227	119	*Dendroica petechia rufopileata* Ridgway	×	×	×	×
231	120	*Dendroica fusca* (P. L. S. Müll.)	—	×	—	—
232	121	*Dendroica castanea* (Wilson)	—	×	—	—
232	122	*Dendroica striata* (Forster)	—	×	×	—
233	123	*Seiurus aurocapillus* (L.)	—	×	—	×
234	124A	*Seiurus noveboracensis noveboracensis* (Gm.)	(×)	×	(×)	×
234	124B	*Seiurus noveboracensis notabilis* Ridgway	—	×	—	×
234	124C	*Seiurus noveboracensis limnaeus* McCab & Mill.	—	×	—	×

Page	*Number*	Bird species occurring in Aruba, Curaçao and Conaire	*Aruba*	*Curaçao*	*Bonaire*	*Neth. Windward Islands:* St. Martin Saba St. Eust. (species)
234	125	*Oporornis agilis* (Wilson)	—	×	—	—
234	126	*Oporornis philadelphia* (Wilson)	—	×	—	—
235	127	*Setophaga ruticilla ruticilla* (L.)	—	×	×	×
236	128	*Dolichonyx oryzivorus* (L.)	×	×	×	—
237	129	*Icterus nigrogularis curasoënsis* Ridgway	×	×	×	—
239	130	*Icterus icterus ridgwayi* (Hartert)	×	×	—	—
241	131	*Piranga olivacea* (Gm.)	×	×	—	—
242	132	*Pheucticus ludovicianus* (L.)	—	×	×	—
243	133	*Passerina cyanea* (L.)	—	×	—	—
243	134	*Spiza americana* (Gm.)	×	×	—	—
244	135	*Tiaris bicolor sharpei* (Hartert)	×	×	×	×
247	136	*Ammodramus savannarum caribaeus* (Hartert)	—	×	×	—
249	137	*Zonotrichia capensis insularis* (Ridgway)	×	×	—	—

REFERENCES

BARNES, Jr., V. & PHELPS, W. H., 1940. Las aves de la Península de Paraguaná *Bol. Soc. Venez. Cienc. Nat. 46*, p. 269–301.

BERLEPSCH, H. VON, 1892. Die Vögel der Insel Curaçao nach einer von Herrn Ernst Peters daselbst angelegten Sammlung. *Journ. f. Orn. 40*, p. 61–104.

BOND, J., 1945. *Checklist of birds of the West Indies*. Ac. Nat. Sc. Philadelphia.

BOND, J., 1947. *Field guide to birds of the West Indies*. New York.

BOND, J., 1950. *Checklist of birds of the West Indies*. Ac. Nat. Sc. Philadelphia, 3rd ed.

CORY, C. B., 1909. The birds of the Leeward Islands, Caribbean Sea. *Field Mus. Nat. Hist. Publ., Orn. Ser. 1* (5), p. 193–255.

CORY, C. B., 1918. Catalogue of birds of the Americas and the adjacent islands, *2* (1). *Field Mus. Nat. Hist. Publ., Zool. Ser. 13*.

CROOCKEWIT, H. W. E., 1949. Een reis naar de Nederlandse Antillen. *Ardea 36*, p. 280–281.

EUWENS, P. A., 1909. De flamingo. *Levende Natuur 14*, p. 16–19.

FRIEDMANN, H., 1950. The birds of North and Middle America, *11*. *Bull. U.S. Nat. Mus. 50*.

GABRIEL, A., 1938. *Tschogogo. Aus dem Leben der Flamingos*. Stuttgart.

GORSIRA, M. B., 1940. De Curaçaosche Nimrod. *Curaçao (weekly) 2* (51), *3* (1).

HARTERT, E., 1893. On the birds of the islands of Aruba, Curaçao, and Bonaire. *Ibis*, p. 289–338.

HARTERT, E., 1902. Reise nach den Inseln des Caribischen Meeres. Die mit Sicherheit festgestellten Vögel der Inseln Aruba, Curaçao und Bonaire. *Nov. Zool.* 9, p. 273–309.

HELLMAYR, C. E., 1927. Catalogue of birds of the Americas and the adjacent islands, *5*. *Field Mus. Nat. Hist. Publ., Zool. Ser. 13*.

HELLMAYR, C. E., 1934. *Idem, 7*. *Field Mus. N.H. Publ., Zool. 13*.

HELLMAYR, C. E., 1935. *Idem, 8*. *Field Mus. N. H. Publ., Zool. 13*.

HELLMAYR, C. E., 1937. *Idem, 10*. *Field Mus. H. H. Publ., Zool. 13*.

HELLMAYR, C. E., 1938. *Idem, 11*. *Field Mus. N. H. Publ., Zool. 13*.

HELLMAYR, C. E. & CONOVER, B., 1942. Catalogue of birds of the Americas and adjacent islands, *1* (1). *Field Mus. Nat. Hist. Publ., Zool. Ser. 13*.

HELLMAYR, C. E. & CONOVER, B., 1948. *Idem, 1* (2). *Field Mus. N. H. Publ., Zool. 13*.

HELLMAYR, C. E. & CONOVER, B., 1948. *Idem, 1* (3). *Field Mus. N. H. Publ., Zool. 13*.

HELLMAYR, C. E. & CONOVER, B., 1949. *Idem, 1* (4). *Field Mus. N. H. Publ., Zool. 13*.

JONG, M. DE, 1948. De vogels van Curaçao, Aruba en Bonaire. *Limosa 21*, p. 1–9.

JONKERS, B., 1938. Verhandeling over de in het wild levende dieren en de jacht op het eiland Curaçao. *Ned. Jager 43* (46), p. 547–549, (47) p. 557–559, (48) p. 571–573, (49) p. 581–583, (50) p. 594–596, (51) p. 607–608, (52) p. 622–624; *44* (5), p. 51–53, (6) p. 64–66, (7) p. 76–78.

JUNGE, G. C. A., 1951. Het voorkomen van de Roodborstkardinaal, Hedymeles ludovicianus (L.), op Curaçao. *Ardea 39*, p. 238–239.

MARTIN, K., 1888. *Bericht über eine Reise nach Niederländisch West-Indien und darauf gegründete Studien. 1, Land und Leute.* Leiden.

OORDT, G. J. VAN, 1949. Bijdrage tot de kennis van de avifauna van Curaçao en Bonaire. *Bijdr. Dierk. 28*, p. 323–326.

PETERS, E., 1892. Die Vögel Curaçaos nach meinen Journalnotizen vom 21. August bis 5. September 1890. *Journ. f. Orn. 40*, p. 104–122.

PETERS, J. L., 1931. *Checklist of birds of the world, 1.* Cambridge, Mass.

PETERS, J. L., 1934. *Idem, 2.*

PETERS, J. L., 1937. *Idem, 3.*

PETERS, J. L., 1940. *Idem, 4.*

PETERS, J. L., 1945. *Idem, 5.*

PHELPS, W. H. & PHELPS, Jr., W. H., 1948. Two new subspecies of birds from Bonaire Island. *Proc. Biol. Soc. Wash. 61*, p. 171–174.

PHELPS, W. H. & PHELPS, Jr., W. H., 1950. Lista de las aves de Venezuela con su distribución, *2. Bol. Soc. Venez. Cienc. Nat. 12* (75), p. 1–427.

PHELPS, W. H. & FERNÁNDEZ YÉPEZ, A. & BENEDETTI, F. L., 1940. Las aves de Margarita. See: YÉPEZ, BENEDETTI & PHELPS .

PHELPS, W. H. & PHELPS, Jr., W. H., 1951. Las aves de las islas Los Roques y Las Aves y descripción de un nuevo canario de mangle. *Bol. Soc. Venez. Cienc. Nat. 13* (76), (1950), p. 7–30.

PHELPS, W. H. & PHELPS, Jr., W. H., 1951. Las aves de Bonaire. *Bol. Soc. Venez. Cienc. Nat. 13* (77), (1950), p. 161–187.

PHELPS, Jr., W. H., 1945. Las aves de las islas Los Testigos, Los Frailes y La Tortuga. *Bol. Soc. Venez. Cienc. Nat. 9* (60), (1944), p. 257–283.

PHELPS, Jr., W. H., 1948. Las aves de la isla La Blanquilla y de los morros El Fondeadero y La Horquilla del archipiélago de Los Hermanos. *Bol. Soc. Venez. Cienc. Nat. 11* (71), (1947), p. 85–118.

RIDGWAY, R., 1884. On a collection of birds made by Messrs. J. E. Benedict & W. Nye, of the United States Fish Commission steamer "Albatross". *Proc. U.S. Nat. Mus. 7* (11), p. 172–180.

RIDGWAY, R., 1901. The birds of North and Middle America, *1. Bull. U.S. Nat. Mus. 50.*

RIDGWAY, R., 1902. *Idem, 2. Bull. U.S. Nat. Mus. 50.*

RIDGWAY, R., 1911. *Idem, 5. Bull. U.S. Nat. Mus. 50.*

RIDGWAY, R., 1914. *Idem, 6. Bull. U.S. Nat. Mus. 50.*

RIDGWAY, R., 1916. *Idem, 7. Bull. U.S. Nat. Mus. 50.*

RIDGWAY, R., 1919. *Idem, 8. Bull. U.S. Nat. Mus. 50.*

ROBINSON, W., 1895. *A flying trip to the tropics.* Cambridge, Mass.

RUTTEN, M. G., 1931. Over de vogels van de Hollandsche Benedenwindsche Eilanden (Antillen). *Ardea 20*, p. 91–143.

RUTTEN, M. G., 1934. Twee nieuwe vogels van Curaçao. *Ardea 23*, p. 214–215.

RUTTEN, M. G., 1935. Waarnemingen van drie voor Curaçao nieuwe vogelsoorten. *Ardea 24*, p. 204–205.

SCHAUENSEE, R. MEYER DE, 1948. The birds of the Republic of Colombia. *Caldasia 5*, p. 251–379.

SCHAUENSEE, R. MEYER DE, 1949. *Idem*, p. 381–644.

SCHAUENSEE, R. MEYER DE, 1950. *Idem*, p. 645–871.

SCHAUENSEE, R. MEYER DE, 1951. *Idem*, p. 873–1112.

SIMONS, G. J., 1868. *Beschrijving van het eiland Curacao* ... Oosterwolde.

SWAEN, A. E. H., 1943. De flamingos van Bonaire. *Ardea 32*, p. 163–178.

VOGELVRIEND (M. de Jong), 1942–1946. Gevleugelde vrienden. *Hou en Trouw* (Curaçao) *14* (1942), p. 232—*18* (1946), p. 375.

VOOUS, K. H., 1953. Vogeltrek op de Nederlandse Benedenwindse eilanden. *West-Indische Gids 33*, p. 183–190.

VOOUS, K. H., 1953. Enkele bekende vogels van de Nederlandse Antillen. *West-Indische Gids 34*, p. 252–255.

VOOUS, K. H., 1954. Het ornithologisch onderzoek van de Nederlandse Antillen tot 1951. *Ardea 41* (1953), p. 342–349.

VOOUS, K. H., 1955. The birds of St. Martin, Saba, and St. Eustatius. *Studies Fauna Curaçao Caribb. Islands 6*, no. 25, p. 1–82.

VOOUS, K. H., 1955. An undescribed race of Coereba flaveola from Bonaire. *Studies Fauna Curaçao Caribb. Islands 6*, no. 26, p. 83–85.

VOOUS, K. H., 1955. *De vogels van de Nederlandse Antillen* (*Birds of the Netherlands Antilles*). Uitg. Natuurwet. Werkgr. Ned. Antillen 5 (The Hague-Curaçao).

VOOUS, K. H., 1955. Origin of the avifauna of Aruba, Curaçao, and Bonaire. *Acta XI Congr. Int. Ornith.* Basel (1954), p. 410–414.

WESTERMANN, J. H., 1946. Bird preservation in the territory of Curaçao. Uitgaven Natuurwet. Studiekring voor Suriname en Curaçao, Utrecht (*Publ. Found. Sci. Research Surinam Curaçao*) *1*, p. 78–85.

WESTERMANN, J. H., 1947. Natuurbescherming op de Nederlandsche Antillen, haar ethische, aesthetische, wetenschappelijke en economische perspectieven. *West-Indische Gids 28*, p. 193–216.

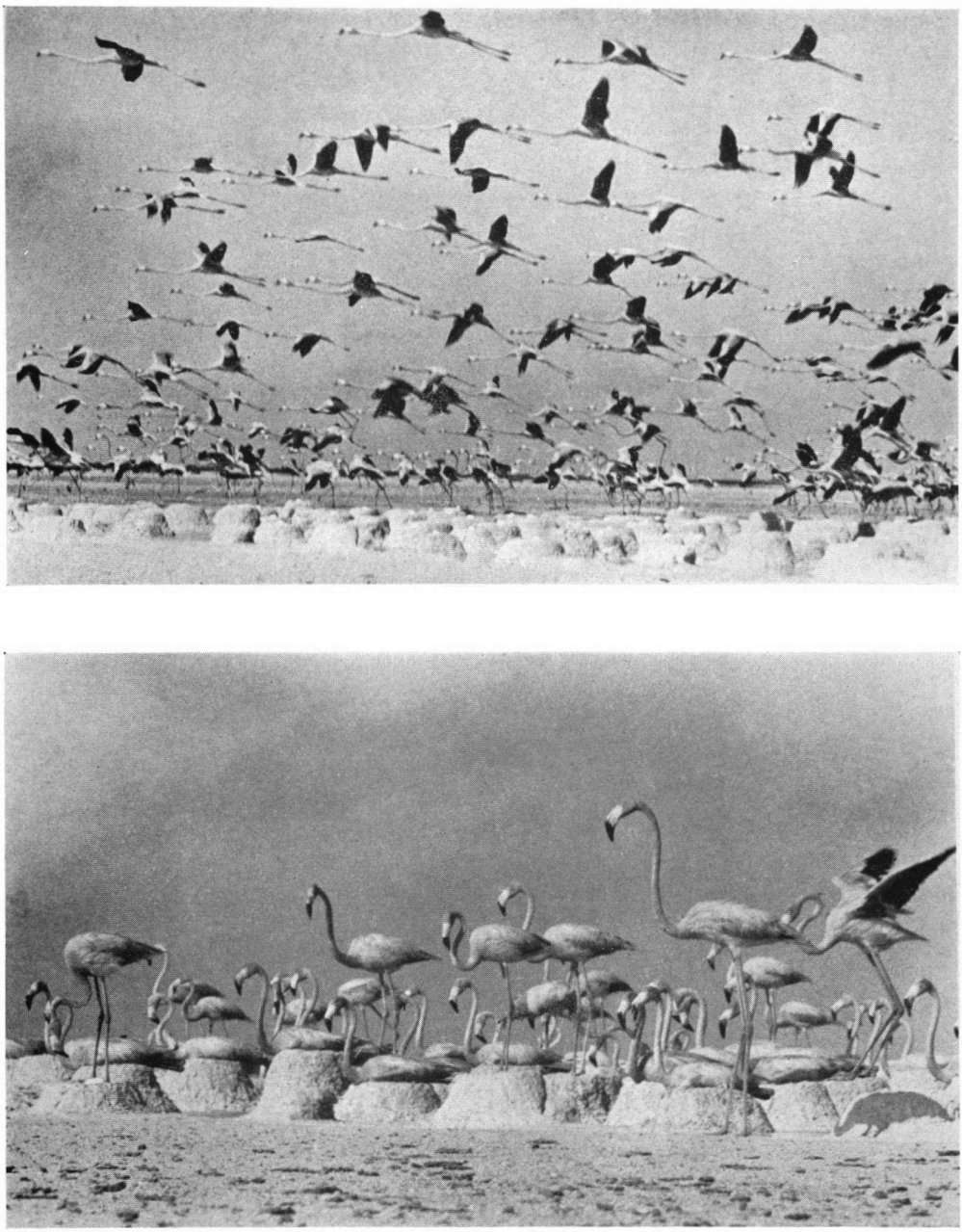
WESTERMANN, J. H., 1948. Beschouwingen over ontwerpen van enige Curaçaose landsverordeningen op het gebied van de jacht, fauna- en natuurbescherming. *Publ. Found. Sci. Res. Surinam Curaçao 4*, p. 53–64.

WESTERMANN, J. H., 1953. Nature preservation in the Caribbean. *Publ. Found. Sci. Res. Surinam Neth. Ant. 9*, Utrecht.

WETMORE, A., 1939. Observations on the birds of northern Venezuela. *Proc. U.S. Nat. Mus. 87*, p. 173–260.

WOLLEBAEK, A., 1934. Curaçao. *Norsk Geogr. Tidsskr. 5*, p. 95–109.

YÉPEZ, A. FERNÁNDEZ, BENEDETTI, F. L. & PHELPS, W. H., 1940. Las aves de Margarita. *Bol. Soc. Venez. Cienc. Nat. 6* (43), p. 91–132.



I. *Phoenicopterus ruber ruber*. Breeding colony in the Pekelmeer, Bonaire, May 1951. (Phot. K. MAYER)

PLATE II

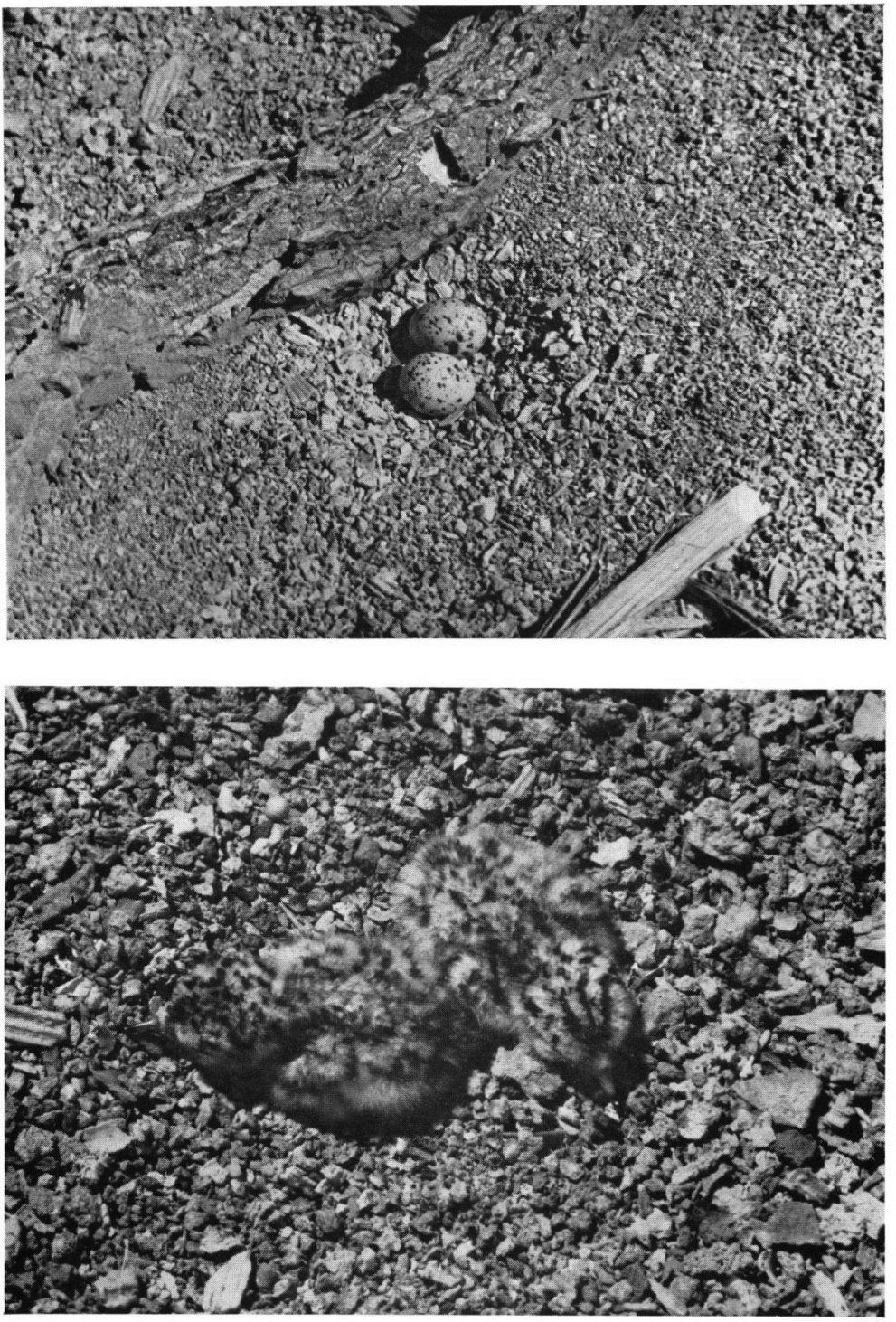
II. *Himantopus himantopus mexicanus*. Various nesting sites in Curaçao (1955): on dried mud flats (above) and on coral rock (below). (Phot. Brother M. ARNOLDO)

III. *Sterna hirundo hirundo*. Breeding on islet in the Spaanse Water, Curaçao, May 1955: adult bird on nest (above), nest with egg and downy chick (below). (Phot. Brother M. ARNOLDO)

PLATE IV

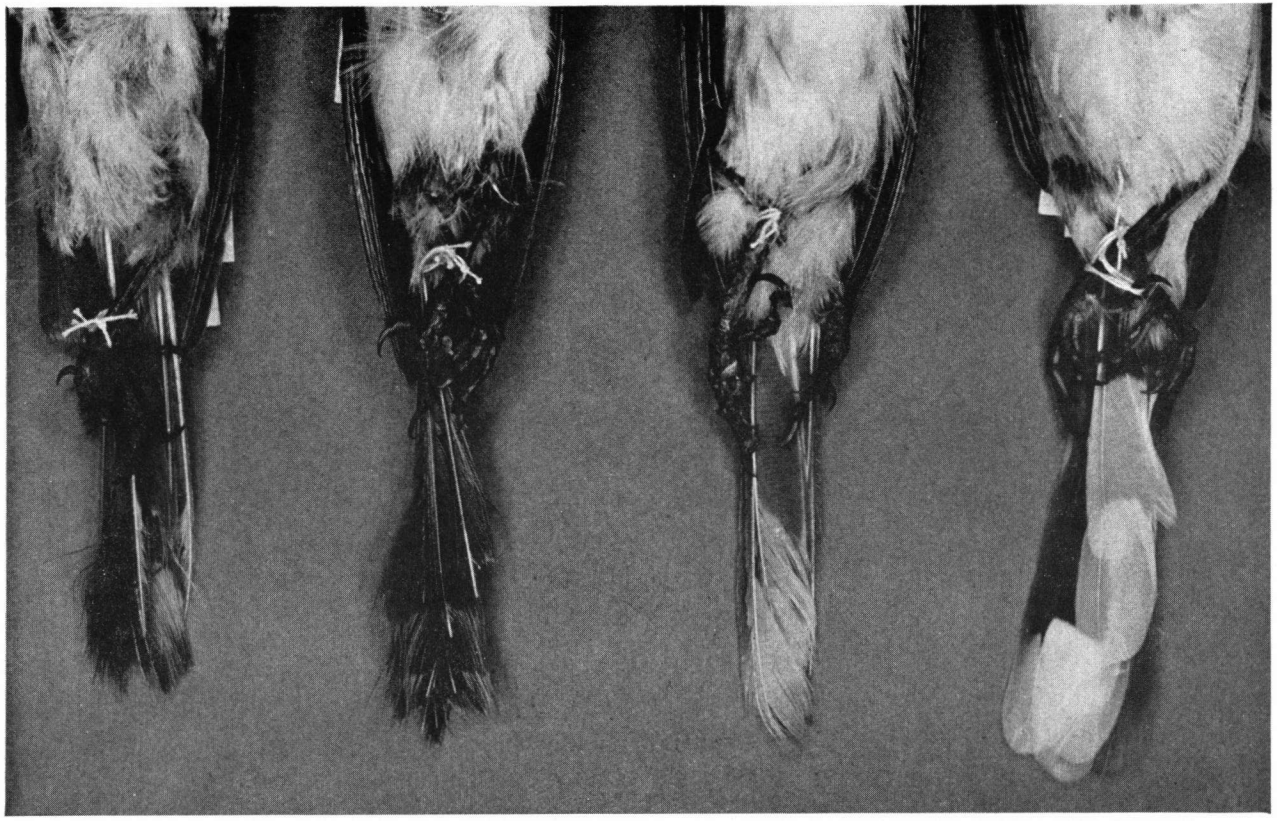
IVa. *Sterna hirundo hirundo*. Nest with 3 eggs on islet in the Spaanse Water, Curaçao, May 1955. (Phot. Brother M. ARNOLDO)

IVb. *Sterna dougallii dougallii*. Nest with 2 eggs on islet in the Jan Thiel lagoon Curaçao, May 1955. (Phot. Brother M. ARNOLDO)



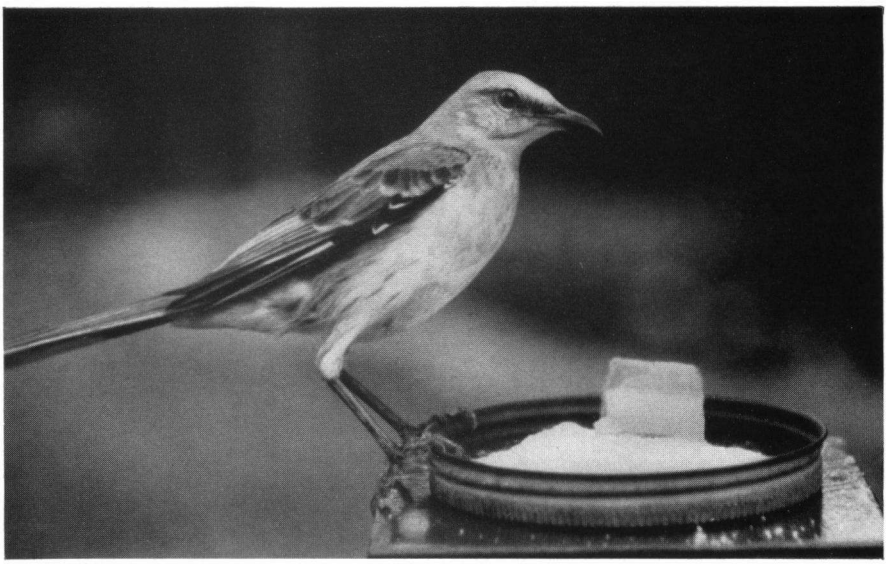
V. *Sterna albifrons antillarum*. Nest with 2 eggs (above) and 2 downy chicks (below) on islet in the Jan Thiel lagoon, Curaçao, May 1955. (Phot. Brother M. ARNOLDO)

VI. *Sterna sandvicensis eurygnatha*. Breeding colony on islet in the Jan Thiel lagoon, Curaçao, July 1954. (Phot. Brother M. ARNOLDO)

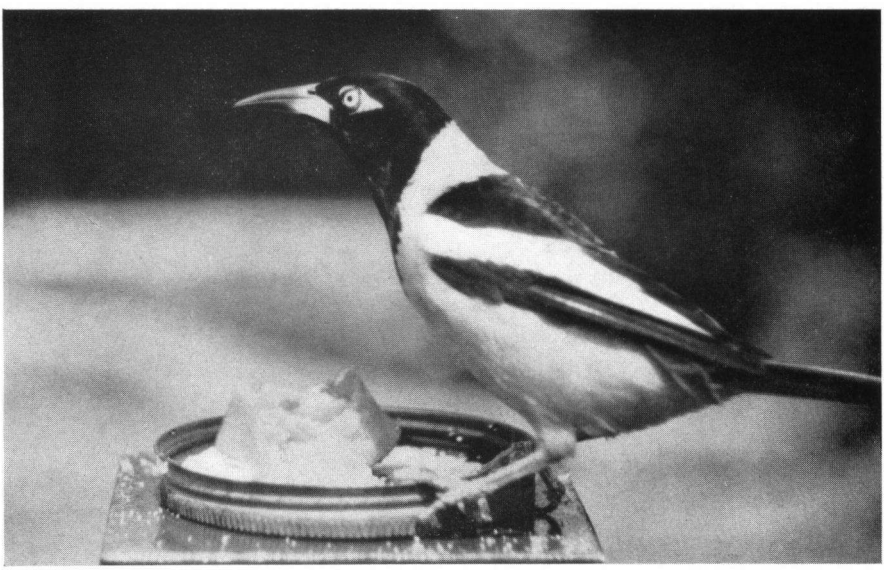


VII. *Mimus gilvus rostratus*. Various stages of wear of tail feathers: from right to left, 2 Jan. 1952 (Curaçao), 10 Nov. 1951 (Bonaire), 11 Oct. 1951 (Curaçao), 11 Oct. 1951 (Curaçao). (Phot. J. J. HOEDEMAN)

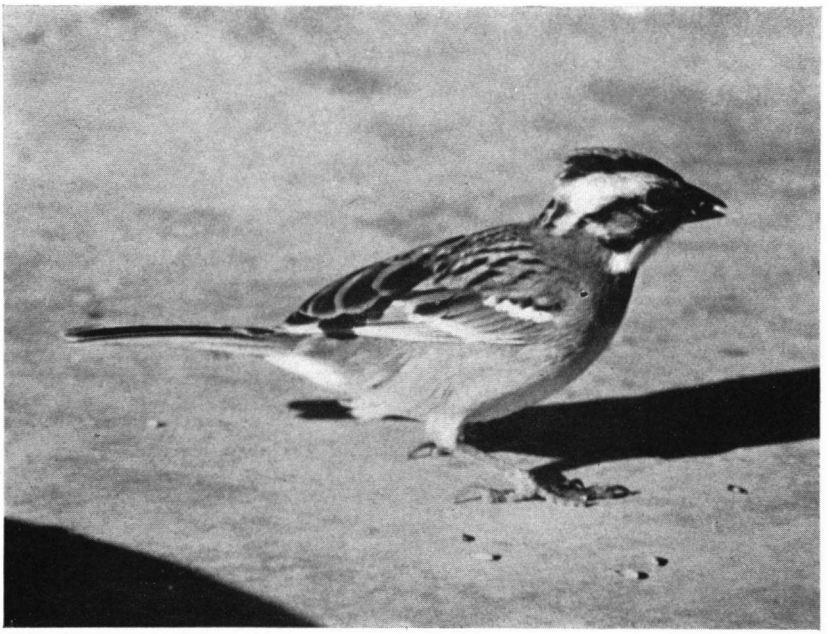
PLATE VIII



VIIIa. *Mimus gilvus rostratus*. On feeding table, Rio Canario, Curaçao, 1955 (Phot. Dr. Ir. R. FLACHS)

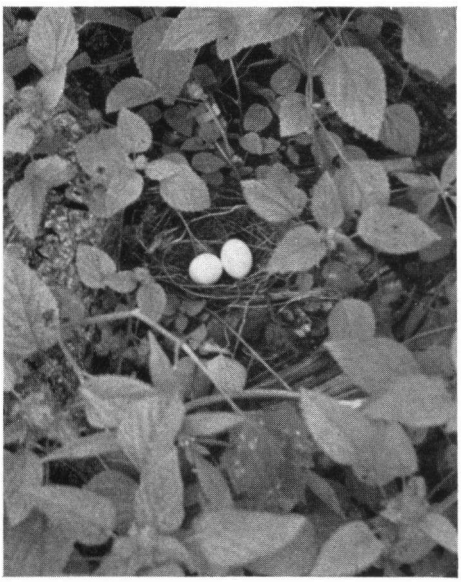


VIIIb. *Icterus icterus ridgwayi*. On feeding table, Rio Canario, Curaçao, 1955 (Phot. Dr. Ir. R. FLACHS)

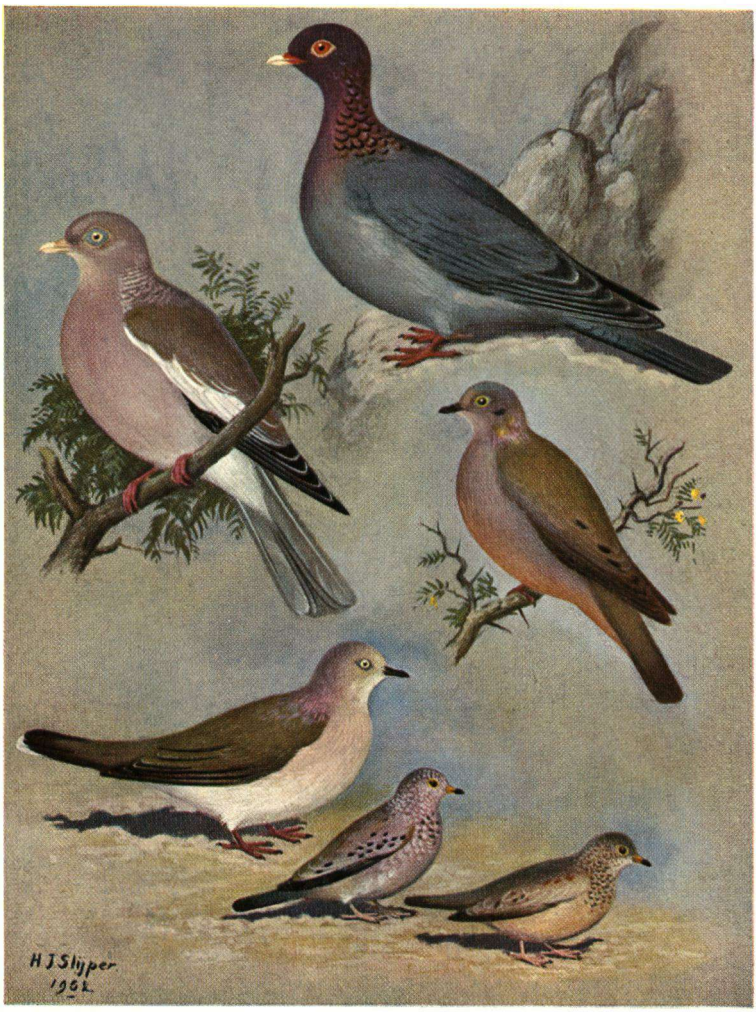


IX. *Zonotrichia capensis insularis*. Adult bird (above) and nest between herbs on ground (below) in Curaçao. (Phot. Brother M. ARNOLDO)

PLATE X



X. *Columbigallina passerina albivitta*. Various nesting-sites in Curaçao: on top of a palm-leaf (above), on the ground (bottom left), in manchioneel tree (bottom right). (Phot. Brother M. ARNOLDO, above, bottom right; B. DE JONG, bottom left).



XI. 1 *Columba corensis*, 2 *Leptotila verreauxi verreauxi*, 3 *Columbigallina passerina albivitta* ♂, 4 *idem* ♀, 5 *Zenaidura auriculata vinaceo-rufa*, 6 *Columba squamosa*. (After Voous, "De Vogels van de Nederlandse Antillen", 1955, pl. 13)

XII. 1 *Amazona barbadensis rothschildi*, 2 *Ceryle alcyon alcyon* ♂, 3 *Aratinga pertinax arubensis* (Aruba), 4 *Aratinga pertinax xanthogenius* (Bonaire), 5 *Aratinga pertinax pertinax* (Curaçao). (After Voous, "De Vogels van de Nederlandse Antillen", 1955, pl. 15)

XIII. 1 *Muscivora tyrannus tyrannus*, 2 *Myiarchus tyrannulus brevipennis*, 3 *Elaenia martinica riisii*, 4 *Sublegatus modestus pallens*, 5 *Tyrannus melancholicus chloronotus*, 6 *Tyrannus dominicensis dominicensis*. (After Voous, "De Vogels van de Nederlandse Antillen", 1955, pl. 18)