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THE HERPETOFAUNA OF THE ISLAS DE LA BAHÍA, HONDURAS

LARRY DAVID WILSON AND DONALD E. HAHN[1]

SYNOPSIS: After a brief description of the Bay Islands' position, physiography, geology, vegetation, and previous work done there, the 35 species of reptiles and amphibians known from the Bay Islands are discussed with, where pertinent, their morphological variation, taxonomic relationships, and habitat preferences. No island subspecies are recognized and the names *Cnemidophorus lemniscatus ruatanus, Leptotyphlops phenops magnamaculata, Elaphe flavirufa polysticha,* and *Tretanorhinus nigroluteus dichromaticus* are placed in synonymy. No consistent pattern of increase in average numbers of ventrals over those of the adjacent mainland, such as is evident on certain other islands, occurs in the snakes of the Bay Islands.

The Bay Island herpetofauna is arranged into three assemblages on the basis of present-day distributions; an endemic assemblage (4 species), a West Indian assemblage (2 species), and a mainland Honduran assemblage (29 species). Three of the endemic species are related to mainland counterparts and one to West Indian counterparts. Of the mainland Honduran assemblage, 8 species are widespread geographically, ecologically, and altitudinally, 4 species occur in dry ecological formations, 1 is restricted to coastal situations, and 16 occur in wet ecological formations. Species that have colonized the Bay Islands are widespread ecologically and geographically, are relatively abundant, or inhabit "weed" habitats, or exhibit a combination of these features. The species compositions of the herpetofauna of the three major islands of the Bay Island group are distinctive and nonrecurrent and are largely depauperate reflections of the mainland herpetofauna. Colonization of the Bay Islands appears to have been effected by fortuitous, over-water dispersal. Inter-island dispersal has probably been largely limited to movements between islands.

A gazetteer of specimen localities is appended.

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Introduction

The Bay Islands lie on the periphery of Honduras, a region that has long been poorly known herpetologically. The herpetofauna of these islands is even more poorly known than that of the adjacent mainland. During the course of field work in Honduras, two trips were made to the Bay Islands. The first trip to Islas Roatán and Guanaja was made from 14 to 19 July 1967, by John R. Meyer, his wife Terry, and the first author. All three major islands (including Utila) were visited on a second trip from 12 to 24 August 1969 by the first author, his wife Betty, and the second author.

Our objectives in visiting these islands were to better determine what species are present, to amass sufficient collections to allow for a comparison of the Bay Islands herpetofauna with that of the mainland, and to study the overall geographic relationships of the Bay Island herpetofauna.

Acknowledgments

The following persons kindly loaned material in their care (museum abbreviations indicated): Walter Auffenberg, Florida State Museum (UF); James R. Dixon, Texas A&M University (TCWC); William E. Duellman, Museum of Natural History, University of Kansas (KU); C. J. McCoy, Carnegie Museum, Pittsburgh (CM); Douglas A. Rossman, Louisiana State University Museum of Zoology (LSUMZ); A. F. Stimson, British Museum (Natural History) (BMNH); John W. Wright, Los Angeles County Museum (LACM).

The senior author wishes to express his gratitude to John R. Meyer for his companionship in the field and for critically reading the manuscript. We would also like to thank Hobart M. Smith and Kenneth L. Williams for relinquishing their notes on the Bay Island herpetofauna. Finally the senior author wishes to acknowledge the technical assistance of Diana Dee Dugas.

Description of the Bay Islands

The Bay Islands comprise one of the 18 departments of the Republic of Honduras (Departamento de Islas de la Bahía). They include 3 major islands, Utila, Roatán, and Guanaja, 3 minor ones, and numerous cays (Fig. 1). Three relatively small islands, Santa Elena, Morat, and Barbareta lie close to the eastern end of Roatán.

The islands lie along a line extending east northeast from Bahía de Tela at the western end of the department of Atlántida. Tela, an important port town, lies on the edge of the Bahía de Tela. Utila, the island closest to this point on the mainland, is about 63 kilometers from Tela. The two other islands, Roatán (measured from the westernmost point) and Guanaja, are, respectively, 105 and 177 km from Tela. Utila is nearest to the mainland and is about 32 km from La Ceiba. Guanaja is next closest, about 42 km from Cabo de Honduras, near Trujillo. Roatán is most distant from the mainland, its nearest point being about 48 kw from the point where the Río Papaloteca, between La Ceiba and Balfate, empties into the Caribbean Sea. Utila is 30 km from Roatán and Roatán in turn (considering here the satellite island Barbareta as part of Roatán) is 20 km from Guanaja. The islands as a whole have an area of about 275 sq. km.

The Bay Islands are part of a Middle American mountain complex that begins as the Sierra Madre de Chiapas, forms the Sierra de Omoa of northwestern Honduras, and continues as a submarine ridge to Jamaica (Meyer 1969). The geological history of the islands has been little studied, but they were apparently connected with each other and with the mainland during the Miocene and Pliocene (Vinson and Brineman 1963). Structural change has occurred in the region since that time, and Utila is the only one of the islands presently situated on the continental shelf. At the close of the Pliocene, sea level was about 60 meters above the present level (Russell 1964). At that time much, but not all, of the Bay Islands would have been submerged. During the Pleistocene glacial advances Utila was probably connected with the mainland. Roatán and Guanaja are separated from Utila, the mainland, and each other by troughs too deep to be exposed by the 120- to 140-meter drop in sea level that occurred during each glacial stage. During Pleistocene interglacials the surface area of the Bay Islands would have changed relatively little, as 10 meters above present sea level is the highest level reached during any interglacial stage (Russell 1964). Rise

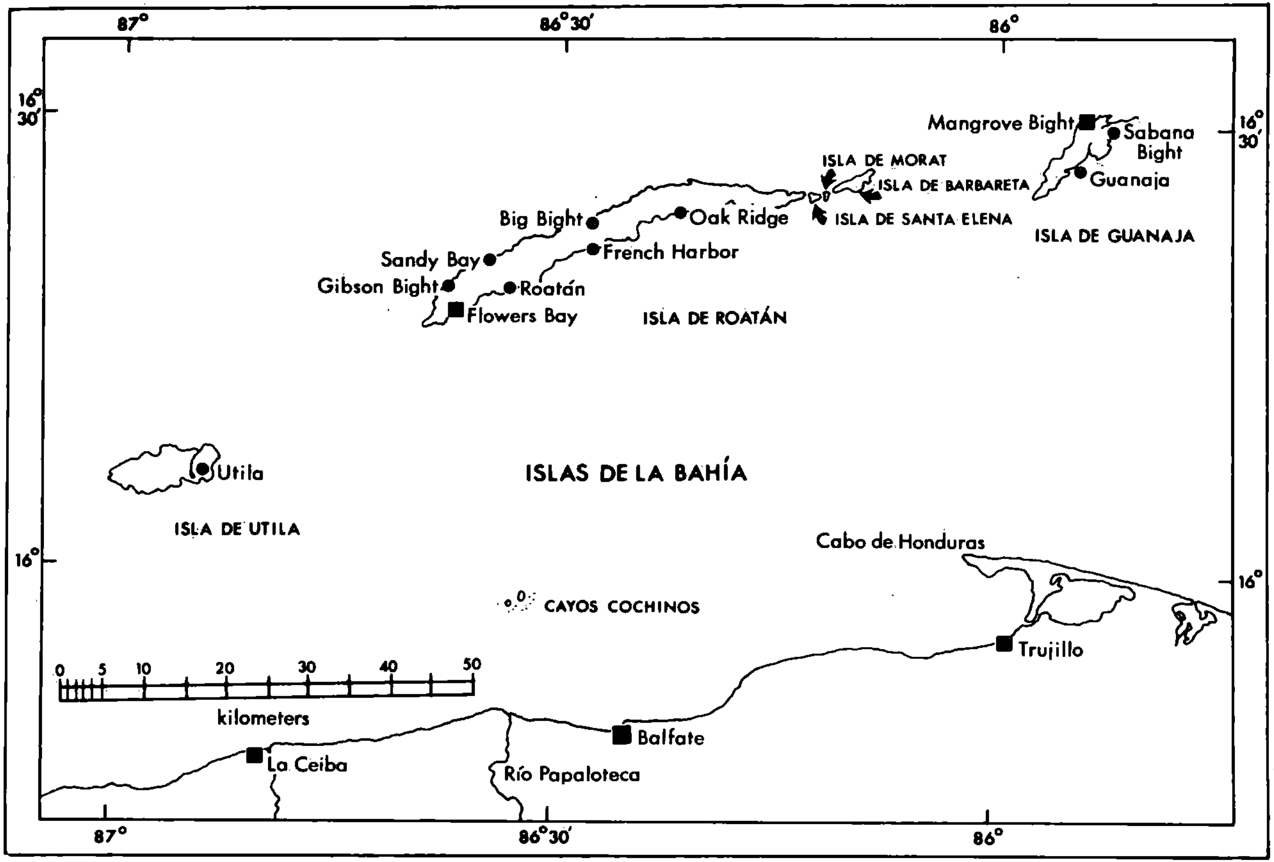


FIGURE 1.—Map of the Bay Islands of Honduras showing the place names referred to in the text.

in sea level during Pleistocene interglacials would have most profoundly changed the surface area of Utila, the least mountainous of the three major islands.

ISLA DE UTILA

This is the smallest of the three major Bay Islands. Its greatest length is 12.7 km; its greatest width 5.2 km. Utila is largely flat; most of its surface lies below 10 meters and almost half of the island is subject to periodic inundation. The highest land is a rolling upland averaging about 12 m in elevation at the eastern end. Pumpkin Hill, the highest point on the island (74 m) is near its northeasternmost end.

The eastern end of the island is by far the most heavily populated and is separated from the low, unpopulated western part of the island by a canal. About 1,500 people of English, African, and mixed descent inhabit this island (as is true of all of the Bay Islands), most of them concentrated in the town of Utila (apparently a few people live on Jewel and Pigeon Cays off the southwest end).

The low western portion of Utila is largely covered with marsh vegetation. The eastern portion is mostly covered with remnants of lowland rainforest. Along the beach is a narrow strip of coconut palms and the strand is covered either with short grasses (near the airstrip) or is bare. Mangrove swamps are located along the edge of some parts of the island, as well as inland. Just back from the sandy beach is a belt of exposed, pock-marked coral rock upon which grows a variety of vines, low shrubs, and sprawling, matted cacti (*Rhipsalis* sp.).

Apparently the island has no surface fresh water, though subsurface fresh water surfaces at the bottoms of certain caves near Pumpkin Hill.

ISLA DE ROATÁN

Roatán, the largest of the three major Bay Islands, is about 48 km long (excluding the three small satelite islands located at the eastern end), and its greatest width is 5.2 km. In contrast to Utila, most of Roatán is above 20 meters in elevation. The highest point (235 m) is Picacho Hill, near Oak Ridge.

The population of the island is strung out along the length of the coastline. The towns of Roatán (locally called Coxen Hole), French Harbor, and Oak Ridge, all on the south coast, are the largest settlements.

The higher elevations are covered with remnants of lowland rainforest. Coconut palm groves line the sand beaches. Patches of coral rock are exposed along the beach at some localities. As on Utila this rock is covered with a tangle of vines, low shrubs, small palms and the matlike cactus but is higher and less accessible. Other parts of the shore (*e. g.* the extreme eastern end of the island) are covered with mangrove forest.

Surface water is present on the island in the form of streams. A freshwater stream at the northern edge of Coxen Hole is the habitat of several species of frogs and snakes.

ISLA DE GUANAJA

Guanaja (its English name is Bonacca) is about 14 km long and is 6.2 km across at the widest point. As with Roatán, most of the island lies about 20 m in elevation. The highest point is Michael Rock Peak (415 m), approximately in the middle of the island.

Most of the people of Guanaja live near the southeastern end of the island on Shin Cay and Hog Cay. A few people also live at Sabana Bight on the northeastern end of the island and at Mangrove Bight on the northern end.

The highest elevations on the island are covered with a sparse growth of pine which gives way at lower elevations to scattered patches of lowland rainforest (most prevalent along streams). The beaches are largely sand-covered, backed by groves of coconut palms. Patches of mangrove forest occur sporadically along the periphery of the island (one such lies next to the main airstrip directly across from the cay on which the town of Guanaja is located). In addition there are some large rock outcroppings, some of which bound the shore. Numerous freshwater streams are present.

HISTORICAL REVIEW OF COLLECTING

The first extensive herpetological collections from the Bay Islands were amassed by G. F. Gaumer, a collector for F. D. Godman and O. Salvin, editors of "Biologia Centrali-Americana." A. F. Stimson, of the British Museum (Natural History), has been gracious enough to send us some detailed information about the activities of Gaumer and also of J. S. Colman, another collector, whose work is discussed below. According to information contained in correspondence between Gaumer and Salvin, neither Salvin nor Godman were on the Bay Islands. Salvin requested that Gaumer visit the Bay Islands. Gaumer collected on Roatán and Guanaja intermittently from about December 1885 to March 1888.

Among the material Gaumer collected were 3 *Leptotyphlops phenops*, 8 *Micrurus ruatanus*, 7 *Rana palmipes*, 1 *Elaphe flavirufa*, 2 *Oxybelis aeneus*, and 1 *Tantilla taeniata*.

In 1897 J. E. Jarnigan, then a United States consul on Utila, send two specimens of a ctenosaur to the National Zoological Park in Washington, D.C. These were later described as *Ctenosaura bakeri* by Stejneger (1900).

Thomas Barbour visited Isla de Roatán in 1928 (probably during March—fide E. E. Williams, pers. comm.), assembled a small collection (Barbour 1928), and first recorded the following species from the Bay Islands; *Anolis allisoni* (described as new), *Basiliscus vittatus* (recorded in error as *Basiliscus basiliscus*), *Iguana iguana*, and *Cnemidophorus lemniscatus*.

J. S. Colman was "the collector on Lord Moyne's yacht 'Rosaura,' which toured the Atlantic via Greenland, Newfoundland, the West Indies, Central and South America and West Africa" (A. F. Stimson, pers. comm.). The yacht apparently made several stops on the Bay Islands in 1937. According to Colman's "station list," collections were made from 23 through 26 October on the north shore of Roatán (23 October), on Isla de Elena (24 October), and along the north and west coasts of Isla de Guanaja (25 and 26 October). The yacht then made an excursion to the coast of British Honduras, touring some of the cays in that area. On 8 November the Rosaura was again back in the Bay Islands and additional collections were made on Guanaja (11 November) and Elena (12 and 15 November). Material Colman collected on Isla de Elena enabled Parker (1940) to describe *Sphaerodactylus rosaurae*. Other specimens collected included the following species not heretofore reported: *Ctenosaura similis, Boa constrictor, Drymarchon corais.*

D. Dwight Davis collected on Isla de Roatán and Isla de Guanaja in January 1940 during the Field Museum-Mandel Caribbean Expedition. The yacht 'Buccaneer' of Mr. Leon Mandel apparently made stops at Roatán, French Harbor, and Oak Ridge on Roatán and at an unspecified locality on Guanaja. Davis gathered a sizeable collection of about 216 specimens representing 18 species, the following 8 of which had not been collected previously: *Smilisca baudinii, Leptodactylus melanonotus, Rana pipiens, Crocodylus acutus, Sphaerodactylus continentalis, Anolis lemurinus, Anolis sagrei, Oxybelis fulgidus.*

While collecting data for a survey of the birds of Honduras, Arthur C. Twomey visited the Bay Islands three times (3-15 April 1947, 22-26 March 1948, and 12-24 April 1948—fide C. J. McCoy, pers. comm.). Although Twomey's collections were fairly extensive, including the first material from Isla de Barbareta, he found only one species, *Leptophis mexicanus*, that had not been taken previously on the Bay Islands.

During a 3-month trip to Honduras in 1963, Jerome V. Mankins spent a short time on Isla de Utila, where he collected a single specimen of *Anolis sericeus.* Mankins also spent some time on the Bay Islands (on Roatán and Guanaja) in 1965 and collected one specimen of *Oxybelis fulgidus*, three of *Elaphe flavirufa*, and one of *Hyla staufferi.*

In July 1966 Arthur C. Echternacht made a short sojourn to Isla de

Guanaja, where he collected "about a kilometer up and down the beach from a point directly across from the town of Guanaja" (Echternacht 1968). He collected one species, *Gymnophthalmus speciosus*, not previously found on the Bay Islands or anywhere in Honduras at that time.

During the summer of 1967 John R. Meyer and the first author spent 6 days on the Bay Islands. From 14-17 July they collected on Roatán, mostly in the environs of the town of Roatán, although they spent half a day in French Harbor and walked to the north side of the island on a road from the town of Roatán. They arrived on Isla de Guanaja on 17 July and remained there until 19 July, collecting on the shore opposite the town of Guanaja, at La Playa Hotel farther toward the northeast side of the island, and at Sabana Bight. Meyer and Wilson collected three species not heretofore found: *Hyla microcephala*, *Coniophanes bipunctatus*, *Tretanorhinus nigroluteus*. In addition, they assembled large series of other species from the islands.

During the summer of 1969 we made a trip to the Bay Islands to assemble material of the poorly-known herpetofauna of Utila and to make additional observations on the herpetofauna of Roatán and Guanaja. We spent 4 days (12-15 August) on Utila, where we collected in most parts of the eastern portion of the island, and 5 days (16-20 August) on Isla de Roatán, where most collecting was near the town of Roatán. We explored the western end of the island (mostly along the beach) and made a short trip to French Harbor. We spent 4 days (21-24 August) on Guanaja, where we collected in many of the same places Meyer and Wilson did in 1967. We added four species to the list known from the Bay Islands; *Chrysemys ornata*, *Mabuya mabouya*, *Dryadophis melanolomus*, and *Enulius flavitorques*. We were also able to observe and/or collect all those species known from the Bay Islands (except for *Rana palmipes*, *Hyla staufferi*, and the possibly exterminated *Crocodylus acutus*) that the senior author and Meyer did not find in 1967.

Species Accounts

The following 15 species have not been previously recorded from the Bay Islands:

Hyla microcephala
Hyla staufferi
Rana pipiens
Chrysemys ornata
Sphaerodactylus continentalis
Crocodylus acutus
Anolis lemurinus
Anolis sagrei
Mabuya mabouya
Boa constrictor
Coniophanes bipunctatus
Dryadophis melanolomus
Drymarchon corais
Enulius flavitorques
Leptophis mexicanus

In addition 14 species are recorded for the first time from Utila:

Smilisca baudinii
Chrysemys ornata
Crocodylus acutus
Phyllodactylus palmeus
Sphaerodactylus rosaurae
Anolis lemurinus
Basiliscus vittatus
Ctenosaura similis
Iguana iguana
Mabuya mabouya
Dryadophis melanolomus
Leptophis mexicanus
Oxybelis aeneus
Oxybelis fulgidus

These 13 species are recorded as new for Roatán:

Hyla microcephala
Rana pipiens
Crocodylus acutus
Sphaerodactylus continentalis
Anolis lemurinus
Anolis sagrei
Ctenosaura bakeri
Mabuya mabouya
Gymnophthalmus speciosus
Boa constrictor
Coniophanes bipunctatus
Drymarchon corais
Enulius flavitorques

The following 11 species have not been previously recorded from Guanaja:

Hyla microcephala
Smilisca baudinii
Leptodactylus melanonotus
Sphaerodactylus continentalis
Sphaerodactylus rosaurae
Basiliscus vittatus
Iguana iguana
Mabuya mabouya
Boa constrictor
Drymarchon corais
Elaphe flavirufa

Hyla microcephala Cope

Meyer and Wilson collected one specimen of this tree frog near a shallow stream at night on Roatán. This frog was also collected in shallow pools near the beach on Guanaja. Specimens of *H. microcephala* from the Bay Islands are typical of the subspecies *underwoodi* (*sensu* Duellman and Fouquette 1968).

SPECIMENS EXAMINED.—Isla de Roatán: 0.5-1 km N Roatán, ca. 10 m (LSUMZ 21315). Isla de Guanaja: La Playa Hotel (LACM 47312-19).

Hyla staufferi Cope

Only a single specimen of this widespread and common frog has been taken on the Bay Islands. We collected near the place on Guanaja where this frog was found without acquiring additional specimens. No habitat data are available.

SPECIMENS EXAMINED.—None.

ADDITIONAL SPECIMENS.—Isla de Guanaja: 5.5 mi W Sabana Bight (TCWC 21551).

Smilisca baudinii (Duméril and Bibron)

This ubiquitous tree frog is found on all three islands, though seemingly in lesser numbers than on the mainland. Two specimens were collected during the evening in shallow pools near the beach on the southeastern shore of Guanaja. A specimen was collected on Utila from trees near a cattle trough during the evening. Meyer and Wilson collected one specimen high in a mango tree in a pasture and several others in muddy pools on a gravel road extending north from Coxen Hole. Duellman and Trueb (1966) reported *S. baudinii* from Isla de Roatán.

SPECIMENS EXAMINED.—Isla de Utila: Utila (UF 28397). Isla de Roatán: 0.5-2 km N Roatán (LSUMZ 21291-93); near Roatán (UF 28544); 0.5-1.5 mi N Roatán (LSUMZ 22375). Isla de Guanaja: La Playa Hotel (LSUMZ 21294-95).

ADDITIONAL SPECIMENS.—Isla de Roatán: near Coxen Hole (FMNH 34551-54). Isla de Guanaja: 1 mi E of west end of island (TCWC 21964).

Leptodactylus melanonotus (Hallowell)

On Roatán this frog was commonly found at night along the edge of shallow streams. During the day it was found under logs in a mango tree grove. On Guanaja *L. melanonotus* was found in shallow pools near the beach at night and under logs in a coconut grove during the day. This species was first recorded from Roatán by Orton (1951).

SPECIMENS EXAMINED.—Isla de Roatán: 0.5-2 km N Roatán (LACM 47490-93); near Roatán (UF 28459, 28486-87, 28508, 28543); Roatán (LSUMZ 22319, 22333-34); 0.5-1.5 mi N Roatán (LSUMZ 22376-78). Isla de Guanaja: SE shore opposite Guanaja (LACM 47494; LSUMZ 22404; UF 28578-79); La Playa Hotel (LACM 47495-500); Sabana Blight (LSUMZ 22413-14; UF 28590).

ADDITIONAL SPECIMENS.—Isla de Roatán: Oak Ridge (CM 27606-07); near Coxen Hole (FMNH 34555).

Rana palmipes Spix

In 1900 Günther described *Rana bonaccana* from specimens collected by Gaumer on Bonacca Island (=Isla de Guanaja). In the original description, *R. bonaccana* was only compared to *R. clamitans* and *R. draytonii* (=*R. aurora draytoni*). Boulenger (1920) called attention to the small terminal discs on the toes of the Guanaja specimens and synonymized *R. bonaccana* Günther with *R. palmipes* Spix. We have examined a portion of the type series and concur with this disposition.

No additional specimens of *Rana palmipes* have been collected on any of the Bay Islands, but we have no reason to doubt the validity of the Gaumer record. More night collecting on Guanaja along suitable streams is needed.

Specimens Examined.—Isla de Guanaja: no other data (BMNH 95.7.15.21-24).

Additional Specimens.—Isla de Guanaja: no other data (BMNH 95.7.15.8-9, 1901.12.19.1).

Rana pipiens Schreber

In 1967 one specimen of the leopard frog was collected in a grassy pasture at night on Roatán. In 1969 this frog was found to be moderately common at night along the banks of a shallow stream.

Specimens Examined.—Isla de Roatán: 0.5-2 km N Roatán (LSUMZ 21619); near Roatán (UF 28460); Roatán (LSUMZ 22316-17); 0.5-1 mi N Roatán (LSUMZ 22379).

Additional Specimens.—Isla de Roatán: no other data (CM 28997); near Coxen Hole (FMNH 34547-50).

Chrysemys ornata (Gray)

The presence of this turtle in the Bay Islands is based on a shell in the possession of a Mrs. Morgan, a resident of Utila. The shell was purported to have been collected on Utila about 20 years ago. According to Mrs. Morgan, the turtles are uncommon and are found in the marshes on the west end of the island. Residents on Roatán and Guanaja report no fresh water turtles occur on either of these islands.

Specimens Examined.—One shell in the possession of a private individual.

Crocodylus acutus Cuvier

The distribution of the American crocodile in Honduras is poorly known and will undoubtedly remain so. Places on the Honduran mainland where Schmidt (1924) reported seeing numbers of specimens (Laguna Ticamaya, Lago de Yojoa) have largely been hunted out. Residents living near Lago de Yojoa report rarely seeing crocodiles now.

Crocodylus acutus appears to be even more uncommonly encountered on the Bay Islands, and may have been extirpated on Guanaja and Utila. Long-time residents of Guanaja report not having seen crocodiles for many years and a 76 year old lifelong resident of Utila has neither seen nor heard of an "alligator" in some 25 years. Small populations may remain in remote parts of the islands, such as the interior of the large marsh on Utila or the large mangrove swamp at the eastern end of Roatán.

Specimens Examined.—None.

Additional Specimens.—Isla de Utila: no other data (USNM 24488, 29420). Isla de Roatán: near Roatán (FMNH 34563).

Phyllodactylus palmeus Dixon

Dixon (1968) described this gecko on the basis of 19 specimens Meyer and Wilson collected on Roatán and Guanaja. We also collected a specimen on Utila, and others were seen but escaped. The Utila specimen was caught on a tree in the forest during the evening. The morning of 13 August 1969 we saw a young specimen under a pile of dead coconut palm fronds, and the evening of 14 August spotted two adults on the trunks of coconut palm trees near the main airstrip.

On Roatán in 1969 we made observations on the habitat preferences of this gecko (additional information is provided by Dixon 1968). One specimen was shot at night on the side of a palm tree along a stream and another at night on the bank of a roadcut. During the day, specimens were taken from the axils of the stems of coconut palm fronds on the beach.

Our observations indicate that *P. palmeus* is found in a number of habitats ranging from coconut palm trees on the beach to thorn palms in the forest interior. A basic requirement seems to be suitably darkened hiding places. One of the principal diurnal retreats of this lizard is the hollow interior of standing, dead palm trees, a habitat shared with the smaller *Sphaerodactylus rosaurae.*

Egg clutches, in addition to being laid in rotting palm stumps as reported by Dixon (1968), are also laid on the inner side of axils of coconut palm leaves.

On Utila this lizard is known as the "chumpatia" (=stump-tail?).

The single specimen available from Utila (UF 28398) has a snout-vent length of 71.4 mm (tail missing), approximately 60 transverse ventral scales from throat to anus, 46 tubercles in a paravertebral row from rear of head to base of tail, two postmentals in contact with only first part of infralabials, 21 interorbital scales, 29 longitudinal rows of ventral scales, 7 scales bordering postmentals, 9 scales bordering posterior edge of internasals, 14 scales between nostril and eye, 14 lamellae on fourth toe, 8 tubercles across base of tail, and 6 supralabials to a point below center of eye. The coloration is as described by Dixon (1968). All scutellational counts fall within the ranges given by Dixon for *palmeus,* including those features that distinguish *palmeus* from its closest relative, *P. insularis* from Half Moon Cay, British Honduras.

SPECIMENS EXAMINED.—Isla de Utila: Utila (UF 28398). Isla de Roatán: 0.5 km N Roatán (LSUMZ 16986-92); 3 km N Roatán (LSUMZ 16993-94); 1 km N Roatán (LACM 38514-15); Roatán (LSUMZ 22335-37); 3 mi W Roatán (LSUMZ 22350-51); near Roatán (UF 28458, 28541-42); near French Harbor (UF 28560-61). Isla de Guanaja: SE shore opposite Guanaja (LACM 38516-20; LSUMZ 22402-03).

ADDITIONAL SPECIMENS.—Isla de Roatán: no other data (BMNH 1889.11.13.42-43); 0.5 km N Roatán (TCWC 24016). Isla de Guanaja: no other data (KU 101377).

Sphaerodactylus continentalis Werner

Smith and Álvarez del Toro (1962) discussed using the name *S. continentalis* Werner for a gecko having keeled, juxtaposed dorsals and a large escutcheon extending in two rows to near the knees. The name *S. lineolatus* Lichtenstein was restricted by Grant (1959) to a Panamanian species with unkeeled, juxtaposed dorsals and a compact escutcheon showing no tendency to extend toward the thigh. We tentatively agree with this arrangement and utilize the name *continentalis* for our material from the Bay Islands, pending a long-overdue revision of the *lineolatus* group.

We studied two males and five females from Isla de Roatán. Snout-vent length ranges from 21.0 to 29.7 mm. The complete, unregenerated tail of one specimen (LSUMZ 22390) measures 25.0 mm (snout-vent length, 24.2 mm). Dorsal scales in sd, 13 to 20; number of ventrals in sd, 8 to 11; scales around body, 69 to 78. Two males have about 59 and 70 scales in the escutcheon, with this structure extending in two rows almost to the knees.

Coloration of all Bay Island specimens is drab brown, with little evidence of a pattern, in contrast to the great pattern variations seen in specimens from mainland Honduras (pers. observ.). Most specimens from the islands have very small dark brown spots scattered over the back and show two dark, more or less parallel lines extending posteriodorsally from the orbit or vestiges thereof. A series of light bands are usually present on the hind limbs, and one specimen (LSUMZ 22340) has a pair of dark-bordered light spots at the base of the tail. The Bay Islands specimens closely resemble a specimen from Veracruz, México illustrated by Taylor (1956b).

On Roatán we found *S. continentalis* in an oak forest on the top of a hill just north of the town of Roatán and under palm fronds at the base of coconut palms near French Harbor. In the oak forest the geckoes were moving about in the fallen leaves on the forest floor. On Guanaja, Meyer and Wilson found one specimen among rocks on a heavily vegetated hill west of the village of Sabana Bight.

SPECIMENS EXAMINED.—Isla de Roatán: Roatán (UF 28489; LSUMZ 22338-40); ca. 2 mi W French Harbor (LSUMZ 22390-92). Isla de Guanaja: 2 km W Sabana Bight (LACM 47778).

ADDITIONAL SPECIMENS.—Isla de Roatán: near Roatán (FMNH 34541).

Sphaerodactylus rosaurae Parker

Sphaerodactylus rosaurae was described by Parker (1940) on the basis of a single male specimen (BMNH 1938.10.4.1) collected on Isla de Elena by J. S. Colman. Since that time little additional material has come to light, and the existence of this sphaerodactyl has been essentially ignored. In the original description Parker (1940) compared *rosaurae* to the members of the *anthracinus* (=*scaber*) and *fantasticus* groups. S. *rosaurae* and the members of the *scaber* and *fantasticus* groups are all characterized by having the middorsal scales reduced in size (*rosaurae* and the *scaber* group members have a middorsal zone of granules).

The *scaber* group was reviewed by Schwartz (1961), who considered it to include three Cuban forms (*scaber, o. oliveri,* and *o. storeyae*), one Bahamian form (*a. anthracinus*), and one Hispaniolan form (*anthracinus copei*). In addition to a middorsal zone of granules, the members of the *scaber* group all have keeled and imbricate dorsal scales, smooth ventral and chest scales, and strong sexual dimorphism in color pattern. Members of the *fantasticus* group do not agree with the members of the *scaber* group in this combination of characters and were therefore excluded from the latter group by Schwartz (1961). Later, Schwartz and Thomas (1964) reviewed S. *copei,* which they considered not to be conspecific with S. *anthracinus,* and recognized four subspecies (*copei, enochrus, picturatus, cataplexis*) within S. *copei,* distinguished from one another primarily on the basis of female color pattern. At the same time they discussed the status of S. *anthracinus,* a nominal species originally described from "México," but considered by Barbour (1921) to be a species restricted to the Bahamas. Schwartz and Thomas (1964) felt it advisable, on the basis of the study of living material of *copei,* again to recognize *anthracinus* as a species distinct from *copei.*

Thomas (1968) again reviewed the *copei-anthracinus* tangle and suggested that *anthracinus* be considered a *nomen dubium,* inasmuch as the holotype is a unicolor male and therefore not assignable to any known West Indian population. The syntype series of S. *asper* from Andros Island in the Bahamas are also unicolor males. Barbour (1921) synonymized *asper* with *anthracinus.* Thomas further demonstrated that at least some new material from New Providence in the Bahamas was referable to S. *copei cataplexis,* otherwise known from the tip of the Tiburon Peninsula on Hispaniola. He also described an additional subspecies of S. *copei* (*polyommatus*) from Ile Grande Cayemite, off the north coast of the Tiburon Peninsula.

Sphaerodactylus rosaurae is a sphaerodactyl with a middorsal zone of granules (1 to 2 scales wide) and large keeled and slightly imbricate dorsal scales. Ventrals are smooth, imbricate, and round; chest scales are smooth. Gulars are smooth and tuberculate. Internasals number 0 to 2 (mode 1); upper labials number 3 to 5 (mode 4). Dorsal scales between axilla and groin 21 to 28; ventral scales between axilla and groin 22 to 29. Scales around midbody 41 to 53. Fourth toe lamellae 10 to 15. Escutcheon measurements range from 4 to 7 by 15 to 28. The size is large, males reach 38 mm in snout-vent length, females 39 mm.

Males and females of this species are strongly dichromatic, females more closely resembling the pattern of the juveniles. The dorsum of the body of juvenile *rosaurae* (Fig. 2A) is yellowish-green with four black bands; the tail is banded with black and white. The head is rust-red. A diffuse dark stripe extends from the rostral to a point between the anterior edges of the orbits where it fuses with a dark spot over each eye. The dark median stripe is flanked by a light band extending from the naris to the anterior edge of the orbit and each of these areas is in turn laterally flanked by a dark canthal stripe. A dark band extends from a point behind the eye, curves downward below the ear opening and dorsally again onto the occiput where it meets a similar band on the other side of the head. Large females (Fig. 2B) have an olive green dorsum with scattered black flecks, a light olive-green head with scattered rust-red flecks, and a light olive-green tail with scattered black flecks. Large males (Fig. 2D) have a light olive-green head and foreparts and gray hindparts and tail. Black spots on the head decrease in size and number with age until, in the largest males (about 38 mm snout-vent length), the dorsum of the head, body, and tail are entirely free of black spotting.

Ontogenetic color change from juveniles to adult females proceeds as follows: the tail bands become obliterated by the dark bands becoming lighter (olive-green) and the light bands becoming darker (yellowish-green); the light bands come to have scattered black pigment and the tail eventually becomes light olive-green with scattered black flecks in adult females; the dorsum of the body becomes darker with age (olive-green) and the dark bands become broken up into black flecks; the rust-red color of the dorsum of the head of juveniles becomes broken up into rust-red spots set against a light olive-green background in adult females.

Ontogenetic change in pattern and color in males essentially proceeds from the type of pattern seen in adult females by accentuation and deepening of the color of the dark head spots and progressive loss of dark flecking on the back and tail. Small males have a head covered with black spots and a few spots on the back. Large males, as stated above, lose all dark spotting.

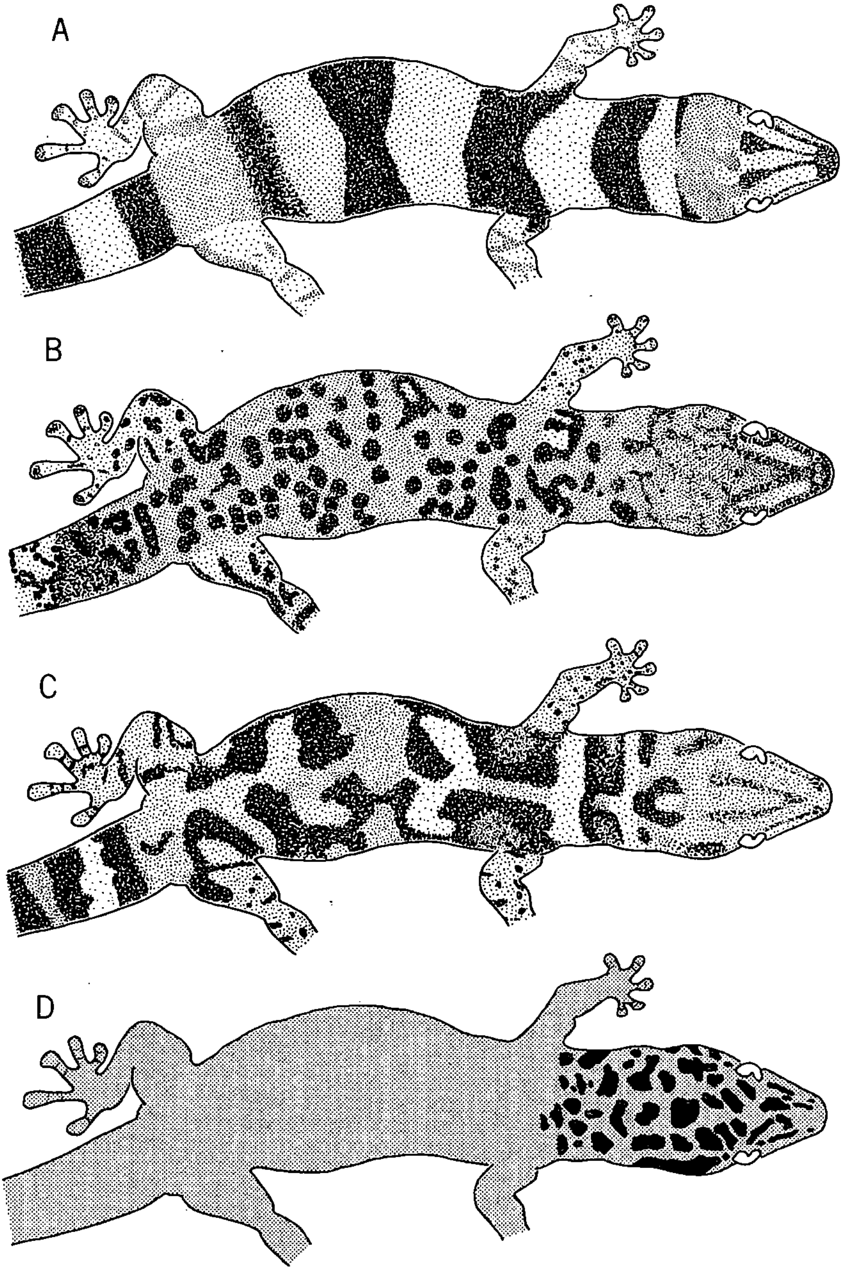


FIGURE 2.—A. Juvenile *Sphaerodactylus rosaurae* (LSUMZ 21940) from Isla de Roatán. B. Adult female *S. rosaurae* (LSUMZ 22298) from Isla de Utila. C. Adult female *S. rosaurae* (LSUMZ 21942) from Isla de Guanaja. D. Adult male *S. rosaurae* (LSUMZ 22297) from Isla de Utila.

A single female specimen (LSUMZ 21942) available from Guanaja (Fig. 2C) does not fit the color pattern description presented above which is based on females from Utila and Roatán. This female, measuring about 33 mm in snout-vent length, has a pattern that more closely resembles that of the juveniles in that the dark bands of the body are more prominent than in females of comparable size from Utila and Roatán. These bands are also broken middorsally, a feature that occurs in neither juveniles nor other adult females. Tail bands are similarly well-developed for a female of this size. Furthermore LSUMZ 21942 resembles S. *copei* in having a pale occipital spot outlined by a U-shaped black border.

Of the three species of the *scaber* group presently recognized (*scaber, oliveri,* and *copei*), *rosaurae* most closely resembles *copei* on the basis of large size, male and female color pattern, and size and shape of the escutcheon. It is entirely possible that S. *rosaurae* is conspecific with S. *copei,* but we do not wish to synonymize the two because of our meager knowledge of S. *copei.* Of the five subspecies of S. *copei* currently recognized, S. *rosaurae* most closely resembles S. *c. picturatus* in terms of female coloration.

Specimens of S. *rosaurae* were collected from stilt rootlets of coconut palm stumps, under rotten palm logs, inside hollow standing thorn palms, under palm fronds, in the axils of fronds on coconut palms, in crevices of rock coral, in abandoned thatched huts, and under rocks. S. *rosaurae* occurs from the beach front back into the hills that rise relatively abruptly from the beach.

On Utila this gecko is known as the "chumpatia" (=stump-tail?) or the "escupion" (probably a cacoëpistic form of the Spanish loan-word *escorpion*).

Specimens Examined.—Isla de Utila: Utila (LSUMZ 22297-98). Isla de Roatán: 0.5-1 km N Roatán (LSUMZ 21939-41); ca. 3 mi W Roatán (LSUMZ 22352-62; UF 28536); ca. 2 mi W French Harbor (LSUMZ 22385-89; UF 28557-59); near Roatán (UF 28488, 28496). Isla de Guanaja: SE shore opposite Guanaja (LSUMZ 21942); 2 km W Sabana Bight (LSUMZ 21943).

Additional Specimens.— Isla de Roatán: Roatán (FMNH 34542). Isla de Elena: no other data (BMNH 1938.10.4.1).

Anolis allisoni Barbour

This lizard is ubiquitous on Roatán and Guanaja, but, despite searching in similar habitats, it has not been found on Utila. It is a diurnal lizard of open places, sunning itself on tree trunks and other similar exposed situations. We saw this anole on banana trees, houses along the beach, coconut palms, thorn palms, oak trees, mango trees, and wooden fences. Bay Island *allisoni* occupy much the same habitat as this species does in Cuba (Ruibal and Williams 1961).

A. allisoni is a member of the *carolinensis* group and is most closely related to *A. porcatus* of Cuba (Ruibal and Williams 1961). In addition to occurring on Cuba (the provinces of Las Villas, Camagüey, and Oriente) and the Bay Islands, it is also found on Half Moon Cay (Schmidt 1941) and the Turneffe Islands (Ruibal and Williams 1961) off the coast of British Honduras.

Ruibal and Williams (1961) discussed variation in *A. allisoni* over its entire range, and suggested that the species is divisible into three morphological groups; a Cuban group, a Bay Island group, and a Half Moon Cay group. These authors list five variable characters, conclude that the Bay Island specimens more closely resemble Cuban specimens and the more geographically proximate Half Moon Cay specimens, and postulate that two temporally disparate invasions had occurred from Cuba.

We are unable to discern a dark patch above the forelimb or white scales on the nape in living or preserved material, characteristics cited by Ruibal and Williams (1961) as common to Cuban and Bay Island populations. There is evidence of a light stripe posterior to the ear in Bay Island specimens, and the rostral does strongly overlap the lower jaw in adult males and slightly overlaps the lower jaw (as in Cuban populations) in females and juveniles. We cannot comment on ventral coloration as we made no notation of this in the field, and coloration changes radically with preservation.

SPECIMENS EXAMINED.—Isla de Roatán: 0.5 km N Roatán (LACM 47770-74; LSUMZ 21644, 21433-35; UF 28472-84, 28497-99); 3 mi W Roatán (UF 28514-16, 28535); near French Harbor (UF 28562); Roatán (LSUMZ 22312-13, 22328-32); French Harbor (LSUMZ 22393). Isla de Elena: no other data (BMNH 1938.10.4.2). Isla de Barbareta: no other data (CM 27610). Isla de Guanaja: SE shore opposite Guanaja (UF 28566-72; LACM 47775-76; LSUMZ 21436-38, 22405); La Playa Hotel (LSUMZ 21439); Sabana Bight (LSUMZ 22412).

ADDITIONAL SPECIMENS.—Isla de Roatán: no other data (BMNH 1929.6.1.71; CM 28991-93; KU 47167; UMMZ 66825-2 spec., 67694-2 spec.; USNM 75859); Roatán (TCWC 21946); W end of island (TCWC 21947-49); Oak Ridge (CM 27600-20, 27601-18 spec., 27604-4 spec., 27605-6 spec.; FMNH 53807-21); near Roatán (FMNH 34539-66). Isla de Guanaja: no other data (CM 27612-9 spec.; FMNH 53822-27; KU 101379-88); 1 mi E of west end of island (TCWC 21968-70).

Anolis lemurinus Cope

Anolis lemurinus is common on Utila and Roatán, but thus far has not been found on Guanaja, despite search of similar habitats. On Utila *lemurinus* is known by the vernacular name "American flag," in reference to the bannerlike dewlap. The interscutellar portion of the dewlap is purplish-red to magenta, and the scales of the dewlap are white.

This anole is scansorial, being commonly observed on the sides of trees and in bushes both in the forest interior and in edge situations along paths and in pastures in the late afternoon. On both islands where it occurs, *lemurinus* avoids the beach habitat (occupied to some extent by *allisoni* and *sagrei* on Roatán) and other open places with few or no trees.

Stuart (1955) recognized two subspecies of *lemurinus*, a northern form that he called *bourgeaei*, having two or three scales separating the supraorbital semicircles in over 80% of the population, and a southern form (*lemurinus*), having the supraorbital semicircles separated by a single scale or in contact in about 95% of the population. Stuart envisioned *bourgeaei* to range from Veracruz south into Guatemala and *lemurinus* thence southward to Costa Rica (this anole also occurs in Panamá).

We studied a sample of 24 specimens from the Bay Islands, 12 from Utila and 12 from Roatán. The range in minimal number of scales separating the supraorbital semicircles is 1 to 2. The percent of occurrence of these conditions on Utila as opposed to Roatán is surprisingly different. Of 12 Utila specimens, 8 or 66.7% have a minimal number of one scale separating the supraorbital semicircles, 4 or 33.3% have 2; of 12 Roatán specimens, 3 or 25.0% have one and 9 or 75.0% have two. We are unable to offer an explanation for this situation, but we suggest that the solution lies in a complete reappraisal of variation in this species over its whole range.

SPECIMENS EXAMINED.—Isla de Utila: Utila (UF 28396, 28404-05, 28441-43; LSUMZ 22272, 22295, 22305-08). Isla de Roatán: near Roatán (UF 28463-70, 28500-01; LSUMZ 22314-15); 5 km N Roatán (LSUMZ 21353); 0.5-2 km N Roatán (LSUMZ 21354-59); 0.5-4 km N Roatán (LSUMZ 21360); 0.5-1 km N Roatán (LSUMZ 21361-65).

ADDITIONAL SPECIMENS.—Isla de Roatán: near Roatán (FMNH 34540).

Anolis sagrei Duméril and Bibron

The distribution of this anole on the mainland of Central America has been reviewed by Fugler (1968), who reported the first specimens from Honduras (Puerto Cortés) and discounted records south of that point. Ruibal (1964) discussed the distribution of this species on the Caribbean islands.

Twomey collected four specimens at Oak Ridge on Roatán on 7 and 8 April 1967. On 16 July 1967 Meyer and Wilson collected three specimens on palms and mangroves near the beach at French Harbor. On

20 August 1969 we collected 10 additional specimens at the same locality in French Harbor where the species is relatively abundant, but search of similar places near Coxen Hole failed to reveal its presence.

The status of this anole on the adjacent mainland has been discussed by several authors. Smith and Burger (1949) described specimens from Yucatán as *A. s. mayensis* on the basis of larger size and supposed color distinctions. Neill and Allen (1959, 1962) and Neill (1965) accepted this distinction, but Stuart (1955, 1963), Duellman (1965), and Fugler (*in* Duellman, 1965) did not in absence of a range-wide analysis of variation. Ruibal (1964) demonstrated that Mexican, Central American and Swan Island populations of *A. sagrei* are distinct from other populations of this species in having a larger size, but noted that "these various large forms merit further study."

We examined the ten specimens collected on Roatán in 1969 and found that the snout-vent length ranges from 42 to 63 mm. Five specimens, 42 to 48 mm in snout-vent length, have a pattern (either a straight-edged or scallop-edged middorsal stripe) and five specimens, 50 to 63 mm in snout-vent length, have no dorsal pattern.

We agree with those authors who hesitate to recognize a mainland subspecies of *sagrei* without a range-wide study of variation, although it appears that the Bay Island individuals more closely resemble specimens from the mainland than they do those from other island localities in the Caribbean.

Specimens Examined.—Isla de Roatán: French Harbor (LSUMZ 21369-70, 22394-97; UF 28547-52).

Additional Specimens.—Isla de Roatán: Oak Ridge (CM 27599, 27603; FMNH 53828-29).

Anolis sericeus Hallowell

We follow Stuart (1955) in the use of the name *sericeus* for the anole with a blue spot in the middle of an orange or yellow dewlap. This anole was first recorded from the Bay Islands when Meyer (1966) collected a specimen on Isla de Utila. Thus far this anole has been found only on Utila of the Bay Island group.

Anolis sericeus is largely found in edge situations both on the ground and in bushes, and is relatively uncommon compared to *A. lemurinus*, the only other anole known from Utila.

Stuart (1955) recognized two major populations of *A. sericeus* on the basis of differences in the numbers of dorsal and ventral scales, a small-scaled and a large-scaled form. Dorsal scale counts of two males from Utila are 55 and 60 and most closely resemble the range given by Stuart for the small-scaled form (57 to 73); the single female has 59 dorsals, 3 scales below the lower range limit given by Stuart (62 to 71). Counts of ventral scales on two males are 46 and 47 and fall within the range given by Stuart for the small-scaled form (39 to 50); the count for the single female falls within the range for the large-scaled form (36 to 46). The single male Meyer discussed has 47 ventral and 69 dorsal scales; both counts fall within the range of the small-scaled form.

SPECIMENS EXAMINED.—Isla de Utila: Utila (UF 28403, 28440, LSUMZ 22273).

ADDITIONAL SPECIMENS.—Isla de Utila: 2 mi N Utila (TCWC 19190).

Basiliscus vittatus Wiegmann

This lizard is common on all three of the major islands in both riparian and nonriparian situations, except the beach. Individuals are found both on the ground and in trees and shrubs.

Variation in this lizard has been most recently treated by Maturana (1962). The minimal number of scales between the supraorbital semicircles ranges from 1 to 3 in mainland Honduran specimens, the most frequent number being 2. The same situation obtains in the Bay Island material. Of 20 specimens examined, 5.0% have 1, 75.0% have 2, and 20.0% have 3. The minimal number of scales between the pineal scale and the supraorbital semicircles ranges from 1 to 2 in mainland Honduran specimens. The range for Bay Island specimens is the same; 50.0% have 1 and 50.0% have 2. On mainland Honduras the ratio of middorsal to midventral scales in the tail rings is 4/4, 5/4, or 6/4, the most common ratio being 5/4. Of 19 Bay Island specimens examined for this character, all but one (having a ratio of 6/4) have a ratio of 5/4.

Maturana (1962) demonstrated character displacement in the minimal number of scales in the toe fringe of the fourth toe. Specimens of *vittatus* from the southern portion of the range, where this species is sympatric with *B. plumifrons*, have a lower number of scales (modal number 32) than does *plumifrons* (modal number 39). In the northern portion of the range north of Costa Rica, where *plumifrons* does not occur, the number of scales in the toe fringe is higher (most common numbers are 36 and 37). Counts for specimens from mainland Honduras and Nicaragua range from 31 to 39, for Bay Island specimens 33 to 40, the most common numbers are 35 and 37. Maturana (1962) was of the opinion that the lower number of scales in the toe fringe in *vittatus* in areas where it is sympatric with *plumifrons* is a reflection of a lessening of aquatic habits in *vittatus*. Conversely in areas north of the range of *plumifrons*, *vittatus* is presumably capable of invading a more aquatic habitat.

SPECIMENS EXAMINED.—Isla de Utila: Utila (LSUMZ 22269-71; UF 28389-91, 28406-14, 28452-53). Isla de Roatán: 0.5-1 km N Roatán (LSUMZ 21644-45); Roatán (LSUMZ 22318); near Roatán (UF 28461-62). Isla de Guanaja: SE shore opposite Guanaja (UF 28573; LSUMZ 21646); La Playa Hotel (LSUMZ 21647).

ADDITIONAL SPECIMENS.—Isla de Utila: no other data (USNM 28626; CM 29002, 29014). Isla de Roatán: no other data (CM 28994); 0.5-1 km NNE Roatán (TCWC 21952-53); Oak Ridge (CM 27597; FMNH 53830); near Coxen Hole (FMNH 34543, 34556-60, 34583-85, 34587-92, 34597-601). Isla de Guanaja: no other data (BMNH 1938.10.4.80; KU 101434).

Ctenosaura bakeri Stejneger

Little information is available on the morphological variation or ecological requirements of *C. bakeri.* Bailey (1928) in his revision of the genus *Ctenosaura* had only two specimens at hand, the holotype and paratype. We observed and collected several additional specimens from Utila (the type locality) and Roatán.

Two species of ctenosaurs are found on the Bay Islands, the endemic *C. bakeri* and the widespread *C. similis.* The distributional relationships of the two are peculiar and merit further study. Both species occur on Utila, only *bakeri* has been found on Roatán and only *similis* on Guanaja. This distribution may be the result of sampling error, but we do not think so. Neither of the two species is rare where it occurs, and we believe we would have found *similis* on Roatán or *bakeri* on Guanaja were they present. Secondly, evidence suggests that *bakeri* may live in habitats on Roatán normally occupied by *similis* where the two species are sympatric on Utila. Contrawise, *C. similis* may live in habitats on Guanaja usually occupied by *bakeri* on Utila.

On Isla de Utila *similis* appears to be the more widespread and perhaps successful species. We collected only four juvenile *C. bakeri* (snout-vent lengths of 70, 71, 78, and 133 mm), three in the short grass lining the main airstrip adjacent to the town of Utila, and the other on coral rock on the beach at the eastern end of the island. We found *similis* in large numbers in a variety of habitats. We found juvenile *similis* in the same place as the juvenile *bakeri* and in considerably greater numbers. We also found juvenile *similis* on bare coral rocks on the strand at the northern end of the island and in a variety of places both in the forest and in pastures in the interior of the higher eastern end of the island. One adult was shot from a tree not more than 50 yards from the shore on the eastern end of the island; another was extracted from a hole in a stilt root of a mangrove in a mangrove swamp adjacent to the main airstrip. Apparently *C. similis* is widespread on the higher eastern part of Utila, while *bakeri* is more restricted in distribution. We collected no adult *bakeri* on this island.

On Isla de Roatán where only *C. bakeri* occurs, it is easier to find than on Utila, but it is by no means so common as is *similis* on either Utila or Guanaja. Most of our 11 specimens collected on this island were taken on large coral accumulations along the beach about 3 miles west of Roatán on the path to Flowers Bay, a small settlement near the west end of the island. The lava provides excellent protection. In addition, one juvenile *bakeri* was collected farther inland at night as it was sleeping, suspended on a portion of the whorl of thorns on the trunk of a thorn palm. This may indicate that *C. bakeri* is more ecologically widespread on Roatán than it is on Utila, occupying areas frequented by *similis* on Utila.

Only *C. similis* has been found on Isla de Guanaja and on this island they are common and apparently widespread. Juvenile *similis* were collected in grassy fields, on mangrove flats, and in pastures. Adults were collected from a large pile of granitic boulders near the beach a few hundred yards south of La Playa Hotel and were spotted on rock outcrops at other points near the beach. One large adult was seen high in a tree on a rocky hill about two miles west of Sabana Bight. On Guanaja *similis* occupies to some extent the type of habitat occupied by *bakeri* on Roatán.

The taxonomic arrangement of the genus *Ctenosaura* is still confused, as is the relationship of *Ctenosaura* to *Enyaliosaurus*. John R. Meyer is currently studying the problems of the relationship of the species now grouped in *Enyaliosaurus* to those now grouped in *Ctenosaura*. He (pers. comm.) advised us that he considers the two genera inseparable, and that *bakeri* appears to be closely related to both *palaearis* (now in *Enyaliosaurus*) and *similis* (now in *Ctenosaura*). Meyer is to report on morphometric examination of our *bakeri* material in a separate paper.

Specimens Examined.—Isla de Utila: Utila (UF 28437, 28471; LSUMZ 22275, 22293). Isla de Roatán: ca. 3 mi W Roatán (LSUMZ 22367-71; UF 28530-33); near Roatán (LSUMZ 22399); near French Harbor (UF 28553). Isla de Santa Elena: no other data (BMNH 1938.10.4.82).

Additional Specimens.—Isla de Utila: no other data (USNM 25324, 26317). Isla de Roatán: French Harbor (FMNH 53831).

Ctenosaura similis (Gray)

What is known of the ecological and geographical distribution of this species on the Bay Islands has been discussed in the preceeding account. Examination of the morphological features is being undertaken by John R. Meyer.

The vernacular name of both this lizard and *C. bakeri* is "bushwilly;" other pronunciatory variants are "witchwilly and "wishwilly" on all three islands.

SPECIMENS EXAMINED.—Isla de Utila: near Utila (UF 28392-95, 28415-29, 28445-51; LSUMZ 22276-77, 22287-92, 22299-302). Isla de Guanaja: La Playa Hotel (LACM 48412-14, 48457; LSUMZ 21655); SE shore opposite Guanaja (UF 28575-77; LSUMZ 22406-09); near Sabana Bight (UF 28581-89; LSUMZ 22410-11).

ADDITIONAL SPECIMENS.—Isla de Guanaja: no other data (KU 101438); 5.5 mi W Sabana Bight (TCWC 21954).

Iguana iguana (Linnaeus)

The iguana is known from all three islands. Meyer and Wilson collected one young specimen in 1967 on the road north from the town of Roatán, shooting the lizard from a vine overhanging the road. Another specimen was brought to us on Utila in 1969. This specimen (LSUMZ 22294), an adult represented by only a head, is typical of the subspecies *I. i. rhinolopha* (Dunn 1934), having well-developed horns on the snout.

Barbour (1928) noted that the iguana was extremely abundant on Roatán and that they were used as food. Man's depredations may account for their apparent scarcity now.

SPECIMENS EXAMINED.—Isla de Utila: Utila (LSUMZ 22294). Isla de Roatán: 0.5-4 km N Roatán (LACM 47849).

ADDITIONAL SPECIMENS.—Isla de Utila: no other data (CM 28998). Isla de Roatán: near Coxen Hole (FMNH 34594-96). Isla de Guanaja: no other data (CM 27617).

Mabuya mabouya (Lacepede)

The taxonomic history of Mexican and Central American *Mabuya* is in dispute. Dunn (1936) considered *M. mabouya mabouya* to occur in Mexico, Central America, northern South America, and the Lesser Antilles. According to Burger (1952), Mexican and Central American *Mabuya* belong to another subspecies, *M. m. alliacea.* Taylor (1956a) divided Costa Rican material of this genus into three species, all distinct from *Mabuya mabouya.* Webb (1958) determined the Mexican material to belong to *M. brachypoda,* a species Taylor (1956a) named on the basis of material from Costa Rica.

Material from the Bay Islands keys out to *Mabuya alliacea* or *M. unimarginata* in Taylor's (1956a) key, depending upon which character is used. We are of the opinion that Taylor gave no satisfactory reasons for regarding the Mexican and Central American populations as distinct from the wide-ranging *Mabuya mabouya,* and this, coupled with the difficulty in allocating the Bay Island material to any of the species recognized by Taylor (1956a), makes it imperative that we follow Stuart (1963) in the application of the specific name *mabouya* to the Central American members and in particular the Bay Island representatives of the genus *Mabuya*.

Specimens from the Bay Islands exhibit the following ranges in characters: number of midbody scales, 20-30; number of middorsal scales, 55-56; supralabial below eye, 6; number of chin shields in contact with infralabials, 1 or 2. The frontonasal is not in contact with the rostral in any specimen and is in contact with the frontal in all. The lateral light stripe is one scale row wide, extending from the tip of the snout to the point of insertion of the hind limb, bordered below by an irregular dark stripe about one scale row wide, and dorsally by a dark stripe two to two and one-half scales wide; an ill-defined dorsolateral light line is also present above the lateral dark stripe. The middorsal area is brown, with or without dark punctations.

This skink is largely arboreal; specimens from Utila were collected on the sides of trees. One was found about 8 m up the trunk of a mango tree.

SPECIMENS EXAMINED.—Isla de Utila: Utila (LSUMZ 22309). Isla de Guanaja: no other data (LSUMZ 21883).

ADDITIONAL SPECIMENS.—Isla de Roatán: Jonesville (TCWC 21955).

Cnemidophorus lemniscatus (Linnaeus)

The occurrence of this racerunner on the Bay Islands was first noted by Barbour (1928), who described a single specimen from Roatán as a new subspecies, *C. l. ruatanus*. Burt (1931) demonstrated that the characters Barbour used to distinguish *ruatanus* were duplicated in other, far-removed portions of the range, and accordingly he synonymized *ruatanus* with *C. l. lemniscatus*. Rand (1954) resurrected *ruatanus* from synonymy on the basis of a study of 47 specimens from Roatán and 13 specimens from mainland Honduras. Characters by which Rand separated the island from the mainland populations included numbers of femoral pores, ventral coloration, and degree of retention of the "basic" dorsal pattern. Differences in femoral pore numbers (mean of 21.4 and 20.7 for Bay Island males and females respectively, and 21.2 and 20.4 for mainland males and females respectively) are undoubtedly not significant. We noted no difference in any aspect of coloration between specimens from the two areas. In addition Echternacht (1968) found no difference in color or pattern between 24 specimens from mainland Honduras and 40 specimens from Panama.

Rand demonstrated that the basic pattern of eight light lines is retained to a larger size on Roatán than on the mainland.

Echternacht (1968) showed that the samples he studied from Honduras and Panama differed significantly from one another in the number of longitudinal rows of ventral scutes, nature of the contact between the frontoparietal suture and the granular scales separating the supraorbital scales from the median head scales (designated as COF), extent of the double row of granular scales(if present) between the supraciliary scales and the supraorbitals (designated as SO-SS), and the number of dorsal granules around the body. Our counts were made and coded using Echternacht's methods.

Echternacht (1968) gave a range of 8 to 10 (approximate mean derived from his graph, 8.2) longitudinal rows of ventrals for the Honduran sample and 8 to 12 (approximate mean, 9.6) for the Panamanian sample. All specimens from the Bay Islands examined for this character (50) have 8 longitudinal rows of ventrals. With regard to COF, Echternacht gave a coded character range of 2 to 6 for the Honduran sample (mean, 3.0); all Panamanian specimens studied have a character code of 2. The Bay Island material is like the Panamanian material in this regard; all have a COF code of 2. With respect to SO-SS Echternacht gave a coded character range of 2 to 10 for the Panamanian material (approximate mean, 3.2); all Honduran specimens have a character code of 2. Again, the Bay Islands sample resembles the Panamanian sample. The SO-SS range for the Bay Island material is 2 to 7 (mean 3.2). Counts of dorsal granules around the body in males of the mainland Honduran sample ranged from 96 to 112 (approximate mean 105), in females, 97 to 107 (approximate mean 102). The Panamanian sample shows a significant difference in these counts between males and females; male counts ranged from 108 to 120 (approximate mean 113), females 100 to 114 (approximate mean 106). Counts for 17 males from the Bay Islands varied from 98 to 114, for 32 females 91 to 119; the mean values are very close to Echternacht's mean values for the same counts on his material from the Honduran mainland, 105.1 for males and 102.2 for females.

Echternacht (1968) remarked that "the lack of variation of COF in Panamá and SO-SS in Honduras is striking, and I am unable to offer any explanation for it." Even more striking is the resemblance of our Bay Island sample to Echternacht's Panamanian sample in both of these characters rather than to the mainland Honduran sample.

C. lemniscatus is common and widespread on Utila and Roatán. It is commonest in the the short grass on the beach and other similar open, well-lighted areas. The Bay Island habitat of these lizards is essentially the same as on the mainland at La Ceiba and Trujillo (Echternacht 1968; pers. observ.).

On both Roatán and Utila the vernacular name for *C. lemniscatus* is "shake-paw" in reference to its characteristic behavior. They run for a short distance, stop, and wave a forelimb, as Dunn and Saxe (1950) described from the islands of San Andrés and Providencia and the Colombian mainland.

SPECIMENS EXAMINED.—Isla de Utila: Utila (UF 28366-88, 28430-36, 28444; LSUMZ 22278-86). Isla de Roatán: 0.5-1 km W Roatán (LACM 48063-64; LSUMZ 21689-90); 0.5-4 km N Roatán (LACM 48065-66; LSUMZ 21691-92); near Roatán (UF 28485); 3 mi W Roatán (UF 28509-13, 28534); ca. 2 mi W French Harbor (UF 28554-56; LSUMZ 22384).

ADDITIONAL SPECIMENS.—Isla de Utila: no other data (CM 28999-9001). Isla de Roatán: near Roatán (FMNH 34492-538).

Gymnophthalmus speciosus (Hallowell)

Echternacht (1968) reported the first known Bay Island specimen (KU 101352) of this microteiid from Guanaja. On 14 July 1967 Meyer and Wilson collected a specimen from the inside wall of a standing, rotten, hollow palm tree on Roatán. On 18 July 1967 an additional Guanajan specimen was collected from under a pile of rotten coconuts on the beach on the southeast side of the island. In August 1969 another specimen was collected on Roatán in leaves in a passageway through a large boulder.

All three LSUMZ specimens have the prefrontal in contact with the loreal on both sides and the frontal separated from the internasal, and they all have a light dorsolateral stripe present above the dark lateral band, supposedly characteristic of the South American *G. lineatus*. Stuart (1939) stated that *speciosus* and *lineatus*, if considered distinct species, would be the only members of the genus distinguished by pattern alone. A specimen of *G. speciosus* from the mainland of Honduras (LSUMZ 21492—Depto. Olancho) lacks the light dorsolateral line as is supposedly characteristic of *speciosus* (fide Stuart 1939).

Echternacht (1968) discussed variation in the number of supralabials to the posterior margin of the eye and pointed out that, although his Guanaja specimen has 5-5 supralabials to the posterior edge of the eye, counts on 20 specimens from Costa Rica and Panama vary from 4-4 to 5-5, with a high percentage of 4-4. All our Bay Islands specimens have 5-5 supralabials, but the Olancho specimen (LSUMZ 21492) has 4-4.

Echternacht (1968) also noted that the supraorbital scales are in contact behind the frontal in KU 101352, unlike the condition in any other specimen he examined or any he saw illustrated in the literature.

All three of our Bay Island specimens as well as the Olancho specimen exhibit the usual condition.

SPECIMENS EXAMINED.—Isla de Roatán: 5 km N Roatán (LSUMZ 21493); ca. 3 mi W Roatán (LSUMZ 22349). Isla de Guanaja: La Playa Hotel (LSUMZ 21494).

ADDITIONAL SPECIMENS.—Isla de Guanaja: no other data (KU 101352).

Leptotyphlops phenops (Cope)

The *albifrons* group, to which the Bay Island *Leptotyphlops* belongs, is in a notorious state of taxonomic confusion (Dunn and Saxe 1950, Thomas 1965). The taxonomic history of the *albifrons* group has been characterized by the attachment of many new names to unusual specimens with little attempt at synthesis. Currently four species of the *albifrons* group are recognized in Mexico and Central America: *L. phenops* (Cope) (with its subspecies *bakewelli*—fide Smith 1943); *L. ater* Taylor (*L. nasalis* Taylor is a synonym of *ater*—fide Dunn and Saxe 1950); *L. goudoti* (Duméril and Bibron); *L. albifrons* (Wagler). Taylor (1940) described *L. magnamaculata* as a distinct species on the basis of a single specimen from Isla de Utila. Since that time this form has been regarded as a subspecies of *L. albifrons* (Dunn and Saxe 1950, Thomas 1965, Echternacht 1968).

The holotype of *L. albifrons* (Wagler) from Pará, Brazil was destroyed during World War II and the original description is not sufficiently detailed to allow for an association of the name *albifrons* with any material of this group now available from South America (Smith and List 1958). These authors indicated that a neotype should be designated using a topotype. Orejas-Miranda (1967) in a recent review of Amazonian *Leptotyphlops* was unable to alleviate the confusion ostensibly because of a lack of sufficient topotypic material. He chose not to designate a neotype, but he did present the following diagnosis of *albifrons*, which he believed would distinguish it from *L. tenella* and other "related" nominal species of *Leptotyphlops* in the Amazonian region: "(1) supraoculars of medium size, larger than prefrontal; (2) two supralabials, the first not in contact with the supraocular; (3) less than 200 dorsal scales the length of the body; (4) 10 rows of scales around middle of tail; (5) coloration of light zig-zag stripes and light cephalic and caudal spots." He used the first two of the above characters to define the *albifrons* group, to which he assigned only *albifrons*.

As the holotype of *albifrons* has been destroyed and the original description is insufficiently detailed to allow association of the name with any taxon, the best course would be to designate *Stenostoma albifrons* Wagler 1824 a *nomen dubium.* Smith and List (1958) objected to this procedure because *albifrons* is firmly entrenched in the American herpetological literature. While many authors have used the name, no one has apparently been able definitely to associate any material with it. All material from the vicinity of the type locality of *albifrons* has proved representative of *L. tenella* (fide Orejas-Miranda 1967). The name *albifrons* has been the source of great confusion and always will be until it is eliminated.

Whatever the disposition of the name *albifrons*, the relationship of the Bay Island *Leptotyphlops* (to which the name *magnamaculata* has been applied) is with forms on the adjacent mainland of Central America, in particular *L. phenops*, which ranges from Veracruz, México on the Caribbean slope and Colima, México on the Pacific slope to northern Costa Rica (Scott 1969). Two subspecies have been recognized, *phenops* and *bakewelli* (Smith 1943). The character used to distinguish between the two is whether the rostral and prefrontal scales are fused. If they are fused, the rostral is in contact with the supraoculars; if the two scales are separate, the prefrontal excludes the rostral from contact with the supraoculars.

Wilson (1968) discussed a specimen of *L. phenops* from Honduras showing rostral-prefrontal fusion. Mertens (1952) also mentioned such a specimen from El Salvador. As these specimens came from within the range of the nominate subspecies which ranges from the Tehuantepec region south to Costa Rica, Wilson (1968) stated that "either *bakewelli* is a species distinct from *phenops* or . . . contact or non-contact of the rostral and the supraocular (which really only involves the fusion of the prefrontal and the rostral) is a normal occurrence within the species *phenops* and therefore *bakewelli* should be placed in the synonymy of *phenops*." He considered the latter situation more likely in the absence of additional distinguishing characteristics.

Since Wilson wrote that paper additional material has become available from Honduras, which reinforces the idea that rostral-prefrontal fusion occurs with some frequency in southern populations of *phenops* and is not solely characteristic of the northern population (*bakewelli*). Of five specimens from mainland Honduras for which we have data, four (LSUMZ 10205 from Depto. Choluteca, TCWC 23814-15 from Depto. Comayagua, and one unnumbered specimen from Depto. Cortés) illustrate rostral-prefrontal fusion and one (LSUMZ 23870 from Depto. Lempira) does not. Accordingly we consider further recognition of *bakewelli* unwarranted.

Dunn and Saxe (1950) discussed the relationship of *magnamaculata* to mainland representatives of the "*albifrons*" group, *phenops* and *goudoti*, both of which these authors treated as subspecies of "*albifrons*." They considered *magnamaculata* closer to *phenops* than to *goudoti, goudoti* being slimmer and having a lower dorsal scale count than *magnamaculata.* Other authors (Smith 1958, Scott 1969) regarded *goudoti* as a distinct species. Dunn and Saxe (1950) also pointed out that "the structural characters of the insular *Leptotyphlops magnamaculata* are quite within the variation of mainland *phenops,* but they are more vividly marked."

Data from Smith (1943), Hartweg and Oliver (1940), Oliver (1937), Davis and Dixon (1959), Mertens (1952), and Honduran specimens indicate a range in dorsal scale number of 221 to 265 for mainland *phenops.* Individual counts for 42 specimens from Mexico, El Salvador, and Honduras indicate a range of 230 to 263, $\bar{x}=245.5$. Twenty-three *magnamaculata* from all three islands range in dorsal scale number from 220 to 244, $\bar{x}=231.5$. The number of dorsal scales does seem to be higher on the mainland, but a more accurate assessment must await a study of material of *phenops* from the length of the range.

The light rostral spot is more extensive in *magnamaculata* than in *phenops,* judging from reports of the latter in the literature and examination of available material from mainland Honduras. In mainland *phenops* the light spot is apparently confined to the rostral and in some cases may be absent as it is in a specimen from Depto. Cortés, Honduras in the personal collection of John Dickson. In island specimens the light rostral spot is always present. In one specimen (LACM 63431) it is confined to the rostral; in all others it is more extensive. In 17 out of 20 specimens examined for this character, the light spot is present on the rostral, medial edges of the nasals, and anterior portion of the prefrontal and is not connected with the light stripes on the dorsum. In two specimens (FMNH 34593 and LSUMZ 21775) the light spot covers all but the ventral one-third of the rostral, the medial halves of the nasals and supraoculars, all of the prefrontal and frontal, most of the interparietal except for a dark spot in the center, and the medial edges of the parietals and occipitals; it is also in contact with the two median light stripes on the dorsum.

In comparison with Honduras mainland material the dorsal ground color of island specimens is darker and the scale edges are lighter and straighter (less zig-zag), especially on the middorsal portion, making the island specimens more vividly striped.

The light tail spot occupies a smaller portion of the tail in island specimens than it does on mainland Honduran specimens. In the island material it occupies the tail spine, 2 to 6 (usually 3) dorsal scales and 2 to 4 subcaudals. In mainland specimens it occupies about half of the underside of the tail.

In the absence of demonstrable scutellation differences between the island and mainland snakes, we feel that recognition of *magnamaculata* as a distinct species is unwarranted. Though minor pattern differences are apparent and *magnamaculata* could be recognized as a distinct infraspecific taxon of *L. phenops*, this action would not contribute measurably to our understanding of variation in this group.

On Utila and Guanaja this snake is known as the "silver snake" and is credited with being able to pass through the digestive tract of a chicken unharmed, as it is on San Andrés and Providencia (Dunn and Saxe 1950).

Specimens Examined.—Isla de Utila: no other data (UF 28399-400, 28438; LSUMZ 22274, 22296, 22303-04, 22310; CM 29004). Isla de Roatán: no other data (BMNH 90.2.4.27-28); near Coxen Hole (FMNH 34593); 5 km N Roatán (LSUMZ 21774); 0.5-1 km N Roatán (LSUMZ 21775). Isla de Guanaja: no other data (KU 101446-47; UF 28580); SE shore opposite Guanaja (LACM 63428-32); 2 km W Sabana Bight (LSUMZ 21776-78).

Additional Specimens.—Isla de Utila: no other data (LSUMZ 9702; USNM 54760). Isla de Roatán: no other data (BMNH 90.2.4.29). Isla de Guanaja: no other data (CM 27618).

Boa constrictor Linnaeus

The boa constrictor does not appear to be common on the Bay Islands, and we are aware of only four specimens in collections. One from Guanaja is represented by the head only. Three specimens have 241 to 246 ventrals ($\bar{x} = 244.0$) and 51 to 61 subcaudals, which fall within the ranges of the mainland subspecies, *C. c. imperator* (ventrals 225-253; subcaudals 48—70—fide Zweifel 1960 and Smith 1943). The maximum number of dorsal scale rows varies from 73 to 79, also within the range (61-79) for *imperator* (Peters 1960).

Specimens Examined.—Isla de Roatán: Coxen Hole (FMNH 34562); Oak Ridge (CM 27608). Isla de Elena: no other data (BMNH 1938.10.4.89). Isla de Guanaja: no other data (FMNH 53832).

Coniophanes bipunctatus (Günther)

Few specimens of this snake have been collected on mainland Honduras. We know of four, two being represented only by heads. In contrast on two trips to the islands six specimens were collected. The species appears to be relatively common along the bank of shallow streams on Roatán. None were seen in the stream (the habitat of *Tretanorhinus nigroluteus*), although one specimen tried to escape by swimming across the water. All specimens were collected at night.

On Roatán, the only island of the group where *C. bipunctatus* has been found, it is called the "night walker," the same name given to another nocturnal species, *Elaphe flavirufa.*

On the mainland this species is distributed from southern Veracruz, Mexico along the Caribbean versant to Panama (Stuart 1963, Myers 1969) although the species has not been recorded from Costa Rica (Scott 1969). Myers (1969) stated that the southernmost record for *C. bipunctatus*, prior to the discovery of a specimen from Panama, was Toloa, Depto. Atlántida, Honduras (MCZ 22046-47), but Campbell and Howell (1965) recorded a specimen from Sacpuka, a village on the Nicaraguan side of the Río Coco about 115 km upstream from the mouth.

Two subspecies are presently recognized although Conant (1965) suggested that "the status of the subspecies *biseriatus* (Smith 1940, p. 59) and variation in the species *bipunctatus* in general are in need of study."

Bay Island specimens generally agree in pattern with the description of the subspecies *bipunctatus,* although the pattern is variable as noted by Bailey (1939). The ground color varied from light or dark brown to reddish-brown. The lateral stripe is poorly developed, usually evident only on rows 4 and 5, and sometimes only on row 5. The inner edge of the dark lateral stripe is straight as is typical of the subspecies *bipunctatus* according to Smith (1940). On the middorsal row is a diffuse dark brown stripe. The venter is patterned with distinct dark brown or black spots as is typical of the species. The spots decrease in size posteriorly, but are much more boldly represented on the tail than Conant (1965, fig. 3) indicated for a specimen from Veracruz, or by Myers (1969) for a specimen from Panama. The ground color of the venter also varies. The venter of one specimen (LSUMZ 22348) in life was cream-colored anteriorly and yellowish-cream posteriorly as is apparently the case with mainland *bipunctatus.* The venter of another specimen (LSUMZ 22322) was cream anteriorly grading to pinkish-orange posteriorly. The ventral surfaces of two others (LACM 63426-27) were cream-colored medially and light pinkish-orange laterally, essentially like the Panamanian specimen discussed by Myers (1969).

The mean number of ventral scales is slightly lower than that reported for specimens from the mainland. Bay Island male *bipunctatus* have a range of 124 to 129 ventrals (4 specimens); two females both have counts of 129. The lowest count for male mainland *bipunctatus* is 127, recorded by Myers (1969) for a Panama specimen. The lowest ventral count for a female *bipunctatus* from the mainland is 130 (LACM 20479 from Sacpuka, Nicaragua). Two male Bay Island *bipunctatus* (LSUMZ 21733, 22348) have subcaudal counts of 95 and 96 respectively, within the range of mainland *bipunctatus*; both females have incomplete tails.

We accord no taxonomic significance to the apparent lower average number of ventrals, especially as relatively few specimens are available from the adjacent mainland for comparison. We agree with Conant (1965) that the species is worthy of review.

SPECIMENS EXAMINED.—Isla de Roatán: 0.5-2 km N Roatán (LACM 63426-27; LSUMZ 21733); Roatán (LSUMZ 22322, 22348); 0.5-1 mi N Roatán (LSUMZ 22381).

Dryadophis melanolomus (Cope)

We collected a single adult of this racer the morning of 13 August 1969 near the eastern end of Utila. It was coiled inside a coconut shell near a rotten log.

The specimen is a male with 178 ventrals and 111 subcaudals. Other scutellation data are typical for the species. The dorsum was slate gray, with no trace of striping, as is typical of specimens on the adjacent mainland (Depto. Atlántida) and of the subspecies *laevis* (old adults—fide Stuart 1941). No difference is evident in numbers of ventrals or subcaudals. Males from the Honduras mainland exhibit a range of ventrals from 177 to 191 and of subcaudals from 107 to 112.

SPECIMENS EXAMINED.—Isla de Utila: no other data (UF 28402).

Drymarchon corais (Boie)

Color pattern variation in this snake has been imcompletely studied. Duellman (1961) and Hardy and McDiarmid (1969) discussed specimens from Michoacán and Sinaloa respectively, that do not fit the diagnosis of *D. c. rubidus* given by Smith (1941). Bay Island specimens also differ from mainland Honduran *D. corais*, allocated to the subspecies *melanurus*. Whereas mainland specimens are olive-green on the anterior portion of the body, those from the islands are light grey judging by the color of two freshly-killed specimens. The pattern of the island *corais* is identical to that described for *D. c. melanurus* (Smith 1941), except that black pigment is present on all supralabials and on some of the lateral gulars in LSUMZ 22401.

Ventrals in the four Bay Island specimens (all males) range in number from 198 to 204 (mean 200.3); subcaudals range from 71 to 78 (two counts, mean 74.5). Both ventral and subcaudal counts fall within the range for male mainland *melanurus* given by Smith (1941). All Bay Island specimens have 14 scale rows at the vent; Smith (1941) listed only one *melanurus* of 14 examined with a count of 14, the rest have 15. Mainland specimens all have 15 scale rows at the vent, except one that has 13.

Although the Bay Island specimens are distinguishable to a certain degree from those on the adjacent mainland by dorsal ground color and number of posterior dorsal scale rows, we prefer not to recognize this population formally with a subspecific name for two reasons. First, we feel that a range-wide analysis of variation needs to be made in the species before the significance of the variation in Bay Island material can be properly evaluated. Secondly the degree of differentiation between the island material and that of the adjacent mainland is obviously less than that among the mainland subspecies.

On the Bay Islands this snake is called "clapansaya," the name used for *Spilotes pullatus* in British Honduras (Neill and Allen 1959).

SPECIMENS EXAMINED.—Isla de Roatán: near Coxen Hole (FMNH 34582); 1 km W Roatán (LSUMZ 21743); French Harbor (LSUMZ 22401). Isla de Guanaja: no other data (BMNH 1938.10.4.90).

Elaphe flavirufa (Cope)

This ratsnake was first recorded from the Bay Islands by Günther (1894) from a specimen Gaumer collected on Roatán. This specimen was described as a new subspecies, *E. f. polysticha*, by Smith and Williams (1966b), who claimed it differs from *E. f. pardalina* of the adjacent mainland solely by having a higher number of dorsal scale rows (a maximum of 34 in *polysticha*, 31 in *pardalina*; a posterior minimum of 23 in *polysticha*, 21 in *pardalina*).

Since the above paper was written, four more Bay Island specimens of *E. flavirufa* have become available, three collected by J. V. Mankins in 1965 and one by Meyer and Wilson in 1967. All four specimens agree with the descriptions of both *E. f. pardalina* and *polysticha* in terms of color and pattern, ventral numbers, and divided preocular. Ventral numbers of two males are 263 and 265; of two females 263 and 266. The scale reduction formulae of the four specimens are as follows:

LSUMZ 21747

$$29\ \frac{5+6(28)}{5+6(22)}\ 27\ \frac{+6(48)}{+6(42)}\ 29\ \frac{+8(65)}{+8(66)}\ 31\ \frac{+8(126)}{}$$

$$32\ \frac{7+8(138)}{}\ 31\ \frac{6+7(148)}{6+7(149)}\ 29\ \frac{5+6(155)}{5+6(155)}\ 27\ \frac{5+6(164)}{4+5(164)}$$

$$25\ \frac{5+6(184)}{5+6(187)}\ 23$$

TCWC 21957

$$31 \frac{-4(10)}{-6(10)} 29 \frac{+8(56)}{+8(58)} 31 \frac{+9(90)}{+8(87)} 33 \frac{8+9(144)}{7+8(139)}$$

$$31 \frac{-8(153)}{7+8(150)} 29 \frac{6+7(162)}{4+5(156)} 27 \frac{6+7(184)}{6+7(175)} 25 \frac{5+6(232)}{4+5(233)}$$

$$23 \frac{+4(258)}{} 24$$

TCWC 21958

$$31 \frac{7+8(7)}{6+7(7)} 29 \frac{+9(60)}{+7(63)} 31 \frac{+8(98)}{} 32 \frac{-7(133)}{}$$

$$31 \frac{6+7(146)}{6+7(147)} 29 \frac{7+8(156)}{5+6(155)} 27 \frac{5+6(167)}{5+6(165)} 25 \frac{5+6(195)}{4+5(198)} 23$$

TCWC 21959

$$31 \frac{6+7(8)}{?} 29 \frac{+7(52)}{+6(51)} 31 \frac{+7(87)}{?} 33 \text{ -?- } 31 \frac{-6(127)}{3+4(131)}$$

$$29 \frac{6+7(143)}{6+7(144)} 27 \frac{3+4(165)}{6+7(166)} 25 \frac{4+5(212)}{?} 23$$

Thus the Bay Island populations of *Elaphe flavirufa* have a higher maximum number of dorsal scale rows than do mainland populations, at least one higher, and the posterior minimum is also higher (except for *E. f. phaescens*, which have a posterior minimum of 23 to 25). Duellman (1965) discussed three additional specimens of *E. f. phaescens* from Yucatán but neglected to mention the number of dorsal scale rows.

The mainland subspecies of *Elaphe flavirufa* are distinguished from one another by a combination of color and pattern characteristics, ventral numbers, condition of the preocular, and numbers of dorsal scales. Thus *E. f. flavirufa*, *E. f. phaescens*, and *E. f. matudai* can be distinguished from one another by color and pattern, but *E. f. pardalina* is indistinguishable from *E. f. flavirufa* on this basis and is differentiated instead by numbers of preoculars and ventrals. *E. f. polysticha* is also like *flavirufa* and *pardalina* in color and pattern and is distinguished from both by yet another character, the number of dorsal scale rows. We believe that recognizing these nominal subspecies unduly simplifies the variational picture and suggest that a revision of the species *Elaphe flavirufa* will further demonstrate this interpretation.

The Bay Island *flavirufa* are obviously most closely related to that segment of the species patterned with light reddish-brown, black-bordered blotches on a tan background, with ventrals in excess of 260, and a divided preocular. This population ranges from eastern Guatemala through Nicaragua, including the mainland of Honduras. The island populations differ from those on the adjacent mainland apparently only in a slightly higher number of dorsal scale rows.

We suggest that *Elaphe flavirufa polysticha* Smith and Williams be relegated to the synonymy of *Elaphe flavirufa pardalina* (Peters). We further suggest that *E. f. pardalina* and *E. f. flavirufa* are names applied respectively to southern and northern segments of a single color pattern type. Dowling (1952) distinguished them by differences in ventral number, a character that appears to increase clinally from north to south, and condition of the preocular (single in the northern segment, divided in the southern).

One specimen of this species was collected from a tree alongside a road during the evening. On Roatán this snake is called the "night walker," referring to its nocturnal habits.

Specimens Examined.—Isla de Roatán: 0.5-2 km N Roatán (LSUMZ 21747); 1 mi NW Roatán (TCWC 21957-58). Isla de Guanaja: 3 mi W Sabana Bight (TCWC 21959).

Enulius flavitorques (Cope)

The evening of 19 August 1969 we collected on Roatán a single snake specimen of the genus *Enulius*, the first record of this genus for the Bay Islands. Allocation of the specimen to one of the three mainland species (*flavitorques*, *sclateri*, *oligostichus*) presents difficulties. The specimen (LSUMZ 22382) is a male with 165 ventrals, 121 subcaudals, 17 dorsal scales throughout, each with a single apical pit and 7 supralabials. The dorsum in life was dark grayish-brown grading to white on the lowermost scale row. The venter was white, the head rust brown above, and the supralabials white. There is no light collar although the light color of the chin extends dorsally to cover most of the lower temporal in the second row. Two small light spots are present on either side of the median parietal suture.

When Dunn (1938) reviewed the genus *Enulius* Cope, he recognized two species, *flavitorques* and *sclateri*. More recently Smith, Arndt, and Sherbrooke (1967) described a third species from Mexico, *oligostichus*, from a single specimen. The characters of these three species and the Bay Island specimen are compared in Table 1.

The Bay Island specimen most closely resembles *Enulius flavitorques* but differs in having a higher number of subcaudals (121 in the Bay Island specimen; a maximum of 117 in a male *flavitorques* from Jalisco, Mexico; 101 to 114 in Honduran male *flavitorques*). In addition as

TABLE 1.—COMPARISON OF THREE SPECIES OF *Enulius* WITH BAY ISLAND SPECIMEN.

Characters	*flavitorques*	*sclateri*	*oligostichus*	Bay Island Specimen
Ventrals	166–216	129–151	163	165
Subcaudals	85–117	96–100	82	121
Dorsal Scale Rows	17	15	15	17
Apical Pits	1	2	1	1
Supralabials	7	7	5	7
Color of Head	Light collar present or absent	Whole head white	No light collar	No light collar

Smith et al. (1957) pointed out, *flavitorques* from Central America (to which they apply the subspecific name *flavitorques*) most often have a light collar, which Mexican specimens lack. They cited Dunn's (1938) mention of collarless specimens from Panama, Nicaragua, and Guatemala (one specimen from each country). All 18 specimens of *flavitorques* examined from mainland Honduras have a light collar. The ventral counts of 165 for the Bay Island specimen is one lower than the range-wide minimum for *flavitorques*, but 11 male *flavitorques* from mainland Honduras have a ventral range of 178 to 198, $\bar{x} = 184.1$.

Even though there are definite differences in numbers of ventrals and subcaudals between the Bay Islands specimen and the material from the Honduran mainland, we believe that when additional specimens from the islands become available, they will show an overlap in these counts with those of *flavitorques* populations outside of Honduras. An analogous situation exists in *Oxybelis aeneus* (q.v.). Meanwhile, until additional island material becomes available, we prefer to allocate this specimen to *flavitorques*.

This specimen was found crawling in low vegetation on a roadcut.

SPECIMENS EXAMINED.—Isla de Roatán: 0.5-1.5 mi N Roatán (LSUMZ 22382).

Leptophis mexicanus Duméril and Bibron

Two specimens of this snake are known from Isla de Utila, a female (CM 29003) collected 18 April 1948 by Twomey, and a male (UF 28401) we collected 13 August 1969 during the morning on the ground in a banana clearing.

The two specimens exhibit the coloration typical of *L. m. mexicanus* and scutellational features fall within the ranges Oliver (1948) gave for this subspecies. Except for the subcaudal count of the male, the ventral and subcaudal counts fall within the range of 14 specimens examined from the Honduran mainland. The ventral count of the male is 155, the female 159. The subcaudal count for the male is 166 (5 scales higher than the highest count for five males from mainland Honduras with complete tails, but within the range for male *L. m. mexicanus*), for the female 160. All other scale features are typical for the species *mexicanus*.

SPECIMENS EXAMINED.—Isla de Utila: no other data (CM 29003; UF 28401).

Oxybelis aeneus (Wagler)

The neotropical vine snake is found on all three of the major islands and has also been collected on Isla de Elena and Isla de Barbareta. It is extremely common on Roatán and Guanaja but only a single specimen has been taken on Utila. *O. aeneus* primarily inhabits edge situations, especially along pathways through the forest and in clearings, where it is found in low shrubs and occasionally on the ground. We collected one specimen in the grass of a cleared banana field, another on the ground in a coconut grove along the beach, and yet another in the grass of the front yard of La Playa Hotel on Guanaja. During a half-hour walk from the town of Sabana Bight to the air field on the other side of the island's north end we collected some 11 specimens in low bushes along the path.

The Bay Island specimens have a higher average number of ventrals than those from the adjacent Honduras mainland (Table 2). The average number of subcaudals in the two populations differs insignificantly. The difference between the two populations in numbers of ventrals is not significant as relatively high numbers of ventrals occur elsewhere within the species' mainland range (Keiser M.S.).

O. aeneus is called the "whipping snake" on the Bay Islands.

SPECIMENS EXAMINED.—Isla de Utila: Utila (UF 28490). Isla de Roatán: no other data (BMNH 95.1.17.4-10); 1.5 mi E Roatán (TCWC 21916-18); near Roatán (FMNH 34544-46, 34564-81; LSUMZ 22363-64, 22366; UF 28491-95, 28520-28, 28545-46, 28564-65); 0.5-1 km N Roatán (LSUMZ 21763-64); Roatán (LSUMZ 21765-66, 22321, 22342-47); 2 km W Roatán (LACM 63420-24); ca. 3 mi W Roatán (LSUMZ 22372). Isla de Elena: no other data (BMNH 1938.10.4.92). Isla de Barbareta: no other data (CM 27609). Isla de Guanaja: no other data (BMNH 95.1.17.2-3, 95.2.20.20; CM 27615; FMNH 53833-34; KU 101451); SE shore opposite Guanaja (LACM 63425); La Playa Hotel (LSUMZ 21767); Sabana Bight (LSUMZ 22415-17; UF 28591-96); 3.5 mi W Sabana Bight (TCWC 21915).

Oxybelis fulgidus (Daudin)

The presence of *O. fulgidus* on the Bay Islands was first reported by Keiser (1969), who noted that Roatán specimens are yellow rather than green as this species is throughout its mainland range. Keiser's report was based on information supplied by Wilson and Meyer on a yellow specimen collected in 1967. Wilson and Meyer also found a dried road kill they did not preserve that probably was green in life. Keiser (1969) was unable to decide whether the yellow snakes represented a distinct species, or the yellow and green snakes represented a dichromatic insular population, which he considered more likely.

One of the prime objectives of the second trip was to determine which of the two alternate solutions is correct. We were fortunate in securing a green *fulgidus* from Utila. No green specimens were collected on Roatán or on Guanaja, but the green form may occur on Guanaja. A North American resident of the island recognized the green *fulgidus* we were carrying alive as a type of snake he had seen previously on Guanaja. The Utila specimen came from brush along the beach on the east side of the island.

The yellow snake is prosaically known as the "yellow snake" and the green one as the "green tommygoff."

The status of the green and yellow snakes of the Bay Islands will be dealt with by Edmund D. Keiser in a forthcoming paper.

The yellow snake appears to inhabit edge situations. One specimen was collected high in a mango tree and another about 3 meters up in a tree on the side of the path from Roatán to West Point.

Specimens Examined.—Isla de Utila: no other data (LSUMZ 22311). Isla de Roatán: 0.5 mi NE Roatán (TCWC 21914); near Coxen Hole (FMNH 34561, 34586); 0.5-1 km W Roatán (LSUMZ 21768); near Roatán (UF 28537, 28563; LSUMZ 22374, 22398); N side of island (LSUMZ 22365); 3 mi W Roatán (UF 28529). Isla de Elena: no other data (BMNH 1938.10.4.92).

Tantilla taeniata (Bocourt)

Prior to our work on the Bay Islands only a single specimen of the genus *Tantilla* had been collected there. Smith and Williams (1966a) used this Guanaja specimen as the holotype of a new species, *Tantilla tritaeniata*, which they distinguished from *taeniata* as follows: "*T. taeniata* . . . has a lower ventral count (145-149) than *tritaeniata* (161), the median light stripe is narrow anteriorly (as in *jani*, *triseriata* and others, but not in *tritaeniata*), and the light stripes are said to reach the extremity of the tail (as in *triseriata*, but in *tritaeniata* only the median line extends beyond the base of the tail, much as in *jani*). Moreover its nuchal collar is uninterrupted above, whereas it is interrupted in three places in the only specimen at hand of *tritaeniata*; this difference may or may not prove constant in larger series."

Wilson and Meyer (1971) synonymized *tritaeniata* with *taeniata* for the following reasons: "(1) the apparent difference in numbers of ventrals is the result of sexual dimorphism; (2) the character of the anterior end of the middorsal stripe in *tritaeniata* is not distinctive; (3) the difference between the neck band of the holotype of *tritaeniata* (interrupted medially and laterally) and that of the holotype of *taeniata* (not interrupted) is bridged by a specimen (LSUMZ 21770) from the mainland of Honduras in which the neck band is interrupted only medially."

Fortunately we found a second specimen of *Tantilla* on Guanaja, which supports the conclusions of Wilson and Meyer (1971). The specimen (UF 28574), a male with 157 ventrals, was found dead and the head is badly dessicated, but some pertinent characters are still visible. Wilson and Meyer (1971) gave a range of 147 to 153 ($\bar{x}=150.0$) for male and 158 to 178 (165.4) for females of *taeniata*. The number of ventrals in UF 28574 falls between these ranges and draws them closer together. The count of the male from Guanaja is at the upper extreme of the range for male *taeniata*, that of the female (161) is close to the lower extreme for female *taeniata*. The light lateral stripe extends onto the tail in UF 28574 but is not so well-defined there as it is on the body, and it is easy to see how its presence might be overlooked on the badly faded holotype of *tritaeniata*. The head and neck of UF 28574 are damaged, but, when immersed in fluid, it can be seen that the collar is divided both medially and laterally as in the holotype of *T. tritaeniata*. As stated above, Wilson and Meyer (1971) considered this character to have no taxonomic importance but the presence of a second specimen with the same type of collar suggests that this character is more typical of island specimens.

When UF 28574 was fresh the dorsum was brown, the middorsal stripe was orangish-tan, and the lateral stripe was cream. The venter was immaculate cream, with no trace of the orange-red coloration of the posterior venter seen in LSUMZ 21770 from Depto. Gracias a Dios.

The snake was collected along a stream through a coconut grove on the beach.

SPECIMENS EXAMINED.—Isla de Guanaja: SE shore of island (UF 28574).

ADDITIONAL SPECIMENS.—Bonacca Island (=Isla de Guanaja) (BMNH 94.12.28.23).

Tretanorhinus nigroluteus Cope

This snake is extremely abundant on Roatán. We collected 39 in a little over an hour the night of 14 July 1967 and several more in 1969. The snakes were in a clear, gravel-bottomed, fairly fast-moving stream with intermittent deeper pools and were more concentrated where the stream had dried up leaving these pools. The next night, 15 July 1967, we visited the stream to make behavioral observations of these snakes. Some of the time they lie motionless on the bottom of the stream, until a fish comes by and they try to catch it with a quick, sideways jerk of the head. At other times they swim around and forage actively. We found one with a goby in its throat. The snakes ignore the large shrimp that are also common in this stream.

The evening of 20 August 1969 we found an adult specimen crawling on a road, the only one ever seen out of water on the Bay Islands, although Meyer and Wilson collected them at night on the mainland San Pedro Sula-Puerto Cortés highway. We never saw them on the stream banks nor in the daytime, when they doubtless hide in the masses of dead leaves on the stream bottom or under the banks.

We also collected two specimens in 1967 in a stream near the La Playa Hotel on Guanaja. These snakes apparently prefer a stream without too steep a gradient. The species has not been found on Utila, which has practically no surface water.

When caught these snakes make no attempt to bite, nor did we notice any other defensive mechanism such as the cryptic response discussed by Petzold (1967) for *Tretanorhinus variabilis* of Cuba.

Five subspecies of *Tretanorhinus nigroluteus* are currently recognized (Dunn, 1939; Smith, 1965; Villa, 1969), *nigroluteus, lateralis, mertensi, dichromaticus, obscurus*. They are distinguished by varying combinations of discordant characters, perhaps the most generally used criteria for the formal recognition of infraspecific taxa. The better to assess the significance of variation in the Bay Island material, we have tried to summarize the significant variation in *T. nigroluteus* over its whole range.

Ventrals vary slightly, generally increasing gradually from north to south on the mainland. Bay Islands specimens have essentially the same number of ventrals as do those from the adjacent mainland. Females from the Corn Islands also agree generally with females from the mainland. Males average fewer, but the differences are not great.

The loreal may be single or vertically divided into two. Specimens from the northern portion of the range (México to Guatemala) have a single loreal; those from the southern portions (Panamá) almost invariably have two. Within the middle section of the range (Honduras to Nicaragua) the percentage of specimens with two loreals gradually increases southward. Villa (1969) pointed out that 5.3% of mainland Honduran specimens and 32.1% of Bay Island specimens have two loreals, against 89.1% of mainland Nicaraguan and 91.7% of Corn Island specimens.

The number of preoculars is usually 2 or 3. Dunn (1939) stated that the 3 preocular condition is "practically confined to Belize" (=British Honduras), as did Smith (1965), in distinguishing *mertensi* from *lateralis*. Smith believed it was confined to British Honduras, but Villa (1969) pointed out that 42.9% of the Corn Island *T. nigroluteus* have 3 preoculars.

In México, Guatemala, and British Honduras material, the dark groundcolor continues to the edge of the ventrals, the only break in the continuity being at rows 3 and 4 where a light stripe is present. Specimens from Honduras southward, including the Bay and Corn islands, have the first, second, and lower half of the third row light in color. The change from one condition to the other apparently occurs in northwestern Honduras and perhaps adjacent Guatemala. Two specimens from the northern portion of the department of Cortés (LSUMZ 23868-69) have a great deal more dark pigment on the first two scale rows than do the rest of the Honduran specimens, even two specimens (TCWC 19226-27) from a few miles south of the localities of the first two.

Ventral coloration has been stated to exhibit two types of variation. Neill and Allen (1959) pointed out that a young specimen from British Honduras was scarlet ventrally and black dorsally but an adult had a tan venter, and they suggested that the variation was ontogenetic. Conant (1965) described a young female (total length 245 mm) from Oaxaca as follows: "The belly was tan, but it changed to light orange-red posteriorly and was even brighter orange under the tail." Duellman (1963) described the venter of a specimen from El Petén, Guatemala, 407 mm in total length, as "dark grayish brown with cream-colored flecks anteriorly and creamy gray posteriorly." Bay Islands specimens as Villa (1969) demonstrated, have either a cream or red-orange venter. The two colorations cannot be associated with sexual or ontogenetic differences but are rather individual in nature. All Corn Islands specimens (Villa, 1969) have a light red venter.

The dorsal groundcolor may be relatively light as in the mainland specimens, except for British Honduras, so that the pattern can be clearly distinguished, or very dark (black) as in specimens from British Honduras and the Corn Islands.

The dorsal pattern consists of a double row of small spots which may or may not be fused anteriorly. Smith (1965) used the fused condition of the anterior paravertebral spots as a characteristic of *T. n. mertensi*, but Neill and Allen (1959) noted the same condition in a specimen from British Honduras, to which area Smith (1965) allocated *T. n. lateralis*.

The patterns of variation are so discordant that any attempt to recognize geographic subunits must be entirely arbitrary. We therefore refrain from using the trinomial *dichromaticus* for the Bay Islands specimens, as the only effect would be to simplify and obscure the variational picture.

On Roatán and Guanaja this snake is known as the "water snake" or "culebra de agua."

SPECIMENS EXAMINED.—Isla de Roatán: 0.5-2 km N Roatán (LSUMZ 21160-78; LACM 44417-36); 0.5-1.5 mi N Roatán (LSUMZ 22380, 22383; UF 28454-57, 28502-04, 28505-07, 28538-40); near Gibson Bight (UF 28517-19). Isla de Guanaja: La Playa Hotel (LACM 44438-39); Roatán (LSUMZ 22323-27, 22400).

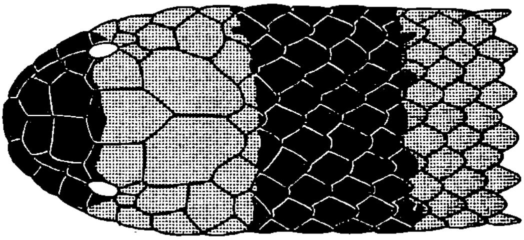
Micrurus ruatanus (Günther)

Günther (1895) described *Micrurus ruatanus* from eight specimens G. F. Gaumer collected on Isla de Roatán. He made no comparisons with other species but considered *ruatanus* to be "a distinguishable local form." Boulenger (1896) included this form in his inclusive species *fulvius* as pattern type E. Schmidt, in a series of papers on the genus *Micrurus* dating from 1925 to 1958 (Peters 1959), elucidated our understanding of this complex and difficult group of elapids. Schmidt (1933) revived *ruatanus* from the synonymy of *fulvius* and gave it specific status, suggesting that its relationships lie with the "*nigrocinctus* group" and apparently with *M. n. divaricatus* in particular. To our knowledge this is the last published reference to the species (the snake was also mentioned by Barbour (1928), who listed it as a subspecies of *Micrurus fulvius*), except for its comparison to *Micrurus schmidti* (= *M. stewarti*—fide Roze, 1967) described by Dunn (1940) and its inclusion as a distinct species in a checklist of New World coral snakes by Roze (1967).

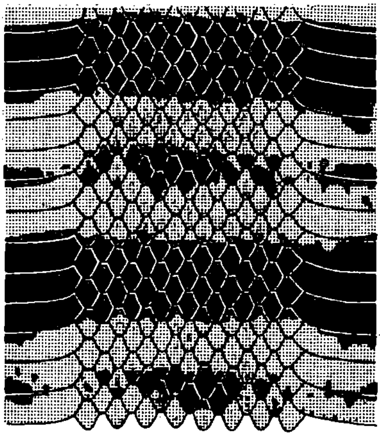
We secured three specimens (LSUMZ 22320, 22341, 22373) from Isla de Roatán, two of them from near the town of Roatán, the other from a village (Sandy Bay) on the north side of the island. The last specimen gives the first slight indication of the coral snake's distribution on the island. One specimen was found dead, draped over a tree limb at the side of a road, another was found dead on a road, and a third came from beneath a pile of coconut palm fronds.

In addition to these three specimens, we have examined five of the eight syntypes of *Elaps ruatanus* from Isla de Roatán (four from the British Museum and one subsequently deposited in the MCZ collection). The specimen upon which Roze (1967) based his statement that *M. ruatanus* occurs on the mainland of Honduras adjacent to the Bay Islands is not in our opinion *ruatanus*, but *nigrocinctus*. The status of this specimen will be discussed elsewhere.

We consider *Micrurus ruatanus* endemic to the Bay Islands. It has been collected only on Roatán. A 76 year old life-long resident of Utila told us that the coral snake used to occur on that island, but that



A



B

FIGURE 3.—A. Head pattern of a *Micrurus ruatanus* (LSUMZ 22373 from Isla de Roatán). B. Dorsal pattern of same specimen.

he had neither seen nor heard of one in some 60 years. None of the Guanaja residents we questioned knew of a coral snake on that island.

Micrurus ruatanus is dark red in life with a series of 33 to 45 black bands on the body. As mentioned in the original description (Günther, 1895), the black bands are not all the same length (Fig. 3B). Instead, bands about three scales in length tend to alternate with shorter bands one to two scales in length. This alternation is more evident in some specimens (BMNH 95.2.20.2, 95.2.20.4; LSUMZ 22373) than in others. Also the difference in band length is more pronounced posteriorly. Some of the posterior bands of LSUMZ 22373 are only three-fourths of a scale long. As Schmidt (1933) noted, the narrower rings are frequently interrupted laterally, as Günther (1895, pl. 57) pictured. The number of interrupted bands varies from 3 to 18 or 6.7-41.9% of the total band number. When the narrower band is only three-fourths of a scale long and interrupted laterally, it resembles the condition shown by some mainland specimens of *nigrocinctus*.

Sexual dimorphism is apparent in band number. Four females have a range of 41 to 45 ($\bar{x}=42.3$) and four males 33 to 39 (35.5). The first black band begins one to one and one-half scales posterior to the parietals. The snout is black back to a point just posterior to the prefrontal-frontal and prefrontal-supraocular sutures. The rest of the head is dark red in life (Fig. 3A).

As is usual, sexual dimorphism is expressed in numbers of ventrals and subcaudals. Males have a range in ventrals of 183 to 185 ($\bar{x}=$ 184.3), females a range of 193 to 203 (197.7). Three males have subcaudal counts of 46, females a range of 34 to 38 (37.5).

Supra-anal tubercles are present on male specimens (the tubercles are actually para-anal, not occurring on the dorsal scales above the anus).

Snout-vent length ranges from 433 to 620 mm, tail length from 59 to 80 mm. The tail length ratio ranges from 0.142 to 0.158 in three males and 0.098 to 0.113 in three females.

The inhabitants on the Honduras mainland regard snakes as dangerous, both venomous and nonvenomous. Strikingly enough, the Bay Islanders do not regard *Micrurus ruatanus* as poisonous, nor any of the other snakes occurring there. They claim no poisonous snakes exist on the islands because there are no toads present. They believe so many of the mainland snakes are poisonous because they eat toads. They consider toads poisonous and think snakes store the toad venom to envenomate other creatures.

SPECIMENS EXAMINED.—Isla de Roatán: no other data (BMNH 95.2.20.1-4; MCZ 26930); Roatán (LSUMZ 22320, 22341); Sandy Bay (LSUMZ 22373).

GEOGRAPHICAL RELATIONSHIPS OF THE BAY ISLAND HERPETOFAUNA

The known herpetofauna of the Bay Islands consists of 35 species: 6 frogs, 1 turtle, 1 crocodile, 14 lizards, and 13 snakes. On the basis of present-day distributions, these 35 species can be arranged into three assemblages; an endemic assemblage, a West Indian assemblage, and a mainland Honduran assemblage. The endemic assemblage includes four species, *Phyllodactylus palmeus, Sphaerodactylus rosaurae, Ctenosaura bakeri, Micrurus ruatanus.* The West Indian assemblage includes two species, *Anolis allisoni* and *A. sagrei.* The mainland Honduran assemblage consists of those species that occur on both the Bay Islands and the adjacent mainland of Honduras and includes 29 species. These categories are not entirely mutually exclusive however.

Of the two species comprising the West Indian assemblage, *Anolis allisoni* and probably *A. sagrei* are immigrants from Cuba (Williams

1969). Unlike *Anolis allisoni, A. sagrei* also occurs on the mainland of Central America and in Florida. It is apparently widespread on the eastern coast of the Yucatán Peninsula but is known from but a single locality on mainland Honduras (Puerto Cortés). *Anolis allisoni,* in addition to occurring on Cuba, also occurs on the cays off British Honduras.

Three members of the endemic assemblage have their relationships with species occurring on the Central American mainland and the fourth with one or more species in the West Indies. *Micrurus ruatanus* appears to be more closely related to *M. nigrocinctus,* which is widely distributed on the mainland (Chiapas, México to northern South America). *Phyllodactylus palmeus* is related to *P. tuberculosus,* another widely distributed mainland species (Sonora, México to Costa Rica), although it is apparently most closely related to *P. insularis* of the British Honduran cays. *Ctenosaura bakeri* is apparently closely related to both *C. similis,* ranging from the Isthmus of Tehuantepec, México to Panamá (also occurring on the Bay Islands), and *C. palaeris,* disjunctly distributed in the Motagua Valley in Guatemala and the Aguan Valley in Honduras. *Sphaerodactylus rosaurae* is clearly related to the members of the *scaber* group of the West Indies and in particular to *S. copei* of Hispaniola.

Of the 29 species in the mainland assemblage, only one, *Crocodylus acutus,* is also found in the West Indies. The mainland Honduran herpetofauna consists of 196 species as follows: 2 caecilians, 12 salamanders, 39 frogs, 9 turtles, 2 crocodilians, 48 lizards, 84 snakes. Thus, only 15% of the mainland herpetofauna is represented on the Bay Islands.

Meyer (1969) distinguished five components of the mainland herpetofauna: the highland component composed of species whose distributions are generally restricted to elevations above 1500 meters; the wide-ranging component composed of species distributed in most ecological formations and habitats within these formations; the dry-adapted component composed of species generally restricted to dry ecological formations, with some extending into drier habitats in the wet formations; the wet-adapted component composed of species generally restricted to wet ecological formations, with some extending into moist habitats in the dry formations; and the coastal component composed of species whose distributions are limited to coastal areas.

The highest elevation on the Bay Islands is found on Guanaja; Michael Rock Peak is 415 meters high. The lack of high elevations and of the appropriate ecological formations on the Bay Islands accounts for the total lack of highland component species.

Eight species occurring on the Bay Islands, *Hyla staufferi, Smilisca* *baudinii, Rana pipiens, Anolis sericeus, Basiliscus vittatus, Ctenosaura similis, Mabuya mabouya,* and *Boa constrictor,* are widely distributed on the mainland, geographically, ecologically, and altitudinally, and all occur on the coast of Honduras opposite the islands.

Four species are members of the dry-adapted component, *Gymnophthalmus speciosus, Drymarchon corais, Enulius flavitorques, Leptotyphlops phenops.* The ranges of all four on the mainland extend into relatively dry habitats in the tropical moist forest formation (Holdridge 1962), the ecological formation occurring on the Bay Islands.

One species (*Cnemidophorus lemniscatus*)is a member of the coastal component and as such occurs directly across from the islands on the beaches of the mainland.

The largest segment of the Bay Island herpetofauna (45%) belongs to the wet-adapted component of the mainland, represented by 16 species: *Hyla microcephala, Leptodactylus melanonotus, Rana palmipes, Chrysemys ornata, Crocodylus acutus, Sphaerodactylus continentalis, Anolis lemurinus, Iguana iguana, Coniophanes bipunctatus, Dryadophis melanolomus, Elaphe flavirufa, Leptophis mexicanus, Oxybelis aeneus, O. fulgidus, Tantilla taeniata, Tretanorhinus nigroluteus.* All these species except *Chrysemys ornata* have been recorded from the Atlantic coastal plain opposite the islands, and all occur in the tropical moist forest formation.

Factors Promoting Vagility

It is important not only to try to explain why certain members of the adjacent mainland herpetofauna occur on the Bay Islands, but also why the other members of the adjacent mainland herpetofauna do not occur there, if indeed they do not.

We can easily exclude from consideration as possible island colonizers the mainland species restricted to elevations above those that occur on the islands. Also easily excluded are those mainland species that do not inhabit the vegetation types represented on the islands. In Honduras this would include xeric formations. The failure of successful colonization also involves less easily demonstrable factors such as occurrence in and restriction to areas of deep shade, rainforest or montane situations, limited physiological tolerance (incapability of withstanding the rigors of the colonization voyage), peculiar ecological requirements not available on the islands, limited abundance, and limited invasion potential within the source area (Williams 1969).

As mentioned above, 196 species inhabit mainland Honduras. Eighteen of these have extremely limited distributions, are known from a single specimen, and are probably not in position to colonize the Bay

Islands. In addition many of these species reach their northern or southern limits of distribution within Honduras, as do several other more common species, and therefore have limited invasion potential within the source area. Twenty-four species are limited in distribution to ecological formations above 1500 meters (lower montane wet forest and lower montane moist forest formations), and another 14 are not known to occur below 600 meters in Honduras. An additional 23 species inhabit ecological formations other than the one (tropical moist forest) represented on the Bay Islands. Excluding these species, 117 species are left that occur at proper elevations and in proper vegetation types. Of these, so far as we know, 29 have invaded the Bay Islands.

Why more of the 117 species have not invaded the Bay Islands can be answered only in general terms, for as yet we do not have sufficiently detailed information about their ecological requirements. We can nevertheless discuss in a general way those characters of the members of the Bay Island herpetofauna that promote vagility, and conversely those characters of the rest of the 117 species that promote sedentation.

Certainly no single factor is responsible for the exclusion of much of the mainland coastal herpetofauna from the islands. One feature shared by a large percentage of the mainland-derived, nonendemic segment of the Bay Island herpetofauna is occurrence in most major habitats on the mainland. Meyer (1969) distinguished nine ecological formations (after Holdridge 1962) in Honduras. Occurrence in a greater number of these formations would appear to indicate a greater versatility or ecological latitude. The species that have colonized the Bay Islands inhabit from one to six of the nine formations, an average of 4.0. Only 9 of the 29 mainland-derived, nonendemic Bay Island amphibians and reptiles are found in fewer than four formations on the mainland. The rest occur in from four to six formations, are relatively versatile, and correspond to one of the major factors of vagility noted by Williams (1969). Of the nine species that are not presently known to occur in more than three ecological formations in neighboring Honduras, one is a turtle (*Chrysemys ornata*) and one a crocodilian (*Crocodylus acutus*), both of which could swim to the islands. *C. ornata* is known only from Utila and may have invaded it during the last glacial period. Two of the nine are lizards, one a gecko (*Sphaerodactylus continentalis*), a group notorious for its dispersal ability, the other a teiid (*Cnemidophorus lemniscatus*), a beach animal on both the island and the mainland, relatively tolerant of insolation, and probably preadapted to gaining a quick toehold on an island beach. The rest are snakes (*Boa constrictor, Coniophanes bipunctatus, Elaphe flavirufa, Oxybelis fulgidus,* and *Tantilla taeniata*), all of which are probably more widely distributed on the mainland of Honduras than is presently known and perhaps are more versatile.

In addition, all of the mainland-derived, nonendemic members of the Bay Island herpetofauna have extensive mainland ranges, often occurring far to the north and south of Honduras, and appear to have a good invasion potential, another factor of vagility mentioned by Williams (1969). The least extensive ranges are those of *Sphaerodactylus continentalis* and *Gymnophthalmus speciosus*, both of which belong to genera that have been successful not only on the mainland and Bay Islands but in the West Indies as well.

A good number of these species are abundant on the mainland, although for some such as *Elaphe flavirufa, Coniophanes bipunctatus,* and *Tantilla taeniata* this does not seem to be the case.

Most of the 29 species are capable of existing in disturbed ecotonal or edge situations. For some of the snakes (e.g., *Coniophanes bipunctatus, Elaphe flavirufa, Oxybelis fulgidus,* and *Tantilla taeniata*) we cannot make this statement because of insufficient information about mainland habitat preferences.

To summarize, the majority of Bay Island amphibians and reptiles derived from the mainland occur in a relatively large number of major habitats on the mainland. Most of those that don't have some other trait that to some extent preadapts them to live in an insular situation. They have extensive mainland ranges and, presumably, good invasion potential; they are relatively abundant, and are to some extent creatures of "weed" habitats (in the sense of Wright and Lowe, 1968). These characteristics are those cited as among the factors of vagility discussed by Williams (1969).

The next question is do those mainland species that are found in the same ecological formation as exists on the Bay Islands, but have not colonized these islands, possess the vagile features mentioned above or not? This question is more difficult to answer.

One striking feature is that many of the noncolonizing species occur in a limited number of major habitats. Only 28 of the 88 noncolonizing species occur in four or more ecological formations; the rest are more restricted.

Of the 88 noncolonizing species 28 have ranges that are limited (end within Honduras) from the north or south, or have spotty Atlantic slope distributions in Honduras.

Abundance does not appear to play much part in restricting the noncolonizing species, as many of them are locally plentiful.

A limited number of species seem to be restricted by the absence of peculiar ecological requirements on the islands. For example, lack of

TABLE 2.—OCCURRENCE OF REPTILES AND AMPHIBIANS ON THE THREE MAJOR ISLANDS OF THE BAY ISLAND GROUP.

Species	Utila	Roatán	Guanaja
Hyla microcephala	–	X	X
Hyla staufferi	–	–	X
Smilisca baudinii	X	X	X
Leptodactylus melanonotus	–	X	X
Rana palmipes	–	–	X
Rana pipiens	–	X	–
Chrysemys ornata	X	–	–
Crocodylus acutus	X	X	–
Phyllodactylus palmeus	X	X	X
Sphaerodactylus continentalis	–	X	X
Sphaerodactylus rosaurae	X	X	X
Anolis allisoni	–	X	X
Anolis lemurinus	X	X	–
Anolis sagrei	–	X	–
Anolis sericeus	X	–	–
Basiliscus vittatus	X	X	X
Ctenosaura bakeri	X	X	–
Ctenosaura similis	X	–	X
Iguana iguana	X	X	X
Mabuya mabouya	X	X	X
Cnemidophorus lemniscatus	X	X	–
Gymnophthalmus speciosus	–	X	X
Leptotyphlops phenops	X	X	X
Boa constrictor	–	X	X
Coniophanes bipunctatus	–	X	–
Dryadophis melanolomus	X	–	–
Drymarchon corais	–	X	X
Elaphe flavirufa	–	X	X
Enulius flavitorques	–	X	–
Leptophis mexicanus	X	–	–
Oxybelis aeneus	X	X	X
Oxybelis fulgidus	X	X	–
Tantilla taeniata	–	–	X
Tretanorhinus nigroluteus	–	X	X
Micrurus ruatanus	–	X	–

cool mountain streams may restrict such species as *Centrolenella fleischmanni* and *Eleutherodactylus rugulosus.*

A number of the noncolonizing species may be restricted because the animals occur in shaded situations within the forest, but what part this plays in individual cases is largely clouded by scanty ecological data. A certain number of species, such as *Leptodactylus labialis, Anolis tropidonotus, Ameiva undulata, Drymobius margaritiferus,* and *Ninia sebae,* that are not known to have colonized the Bay Islands are able to exist in "weed" habitats, and the reasons why they do not occur on the Bay Islands (if indeed they do not) are not readily apparent. Of these species, *Ninia sebae* appears to be a likely candidate for insular colonization, at least it fits the parameters detailed for a colonizing species. Some of these species may eventually be found on the Bay Islands.

TABLE 3.—SIMILARITY COEFFICIENT MATRIX FOR THE HERPETOFAUNA OF THE THREE MAJOR ISLANDS OF THE BAY ISLAND GROUP.[1]

	Utila	Roatán	Guanaja
Utila	*18*	13	9
Roatán	72	*27*	17
Guanaja	50	81	*21*

[1]Italicized numbers represent the total fauna of each area; numbers above those italicized indicate shared species and those below are the SC values.

INTER-ISLAND RELATIONSHIPS

The species compositions of the herpetofauna of the three major islands of the Bay Island group are distinctive and nonrecurrent (Table 2) in the sense of Savage (1967). Of a total of 35 species present on the island group as a whole, only 8 or 23% occur on all three of the major islands, 15 or 43% occur on two of the three islands, and 12 or 34% occur only on one island.

A similarity coefficient ($SC = \frac{100c}{n_1}$, where c equals the number of species common to two faunas and n_1 equals the number of species in the smaller of the two faunas) matrix for the three islands is presented in Table 3. Utila, with 18 species, shares the greatest number with the island closest to it, *i.e.*, Roatán. Roatán, with 27 species, shares the greatest number with the island closest to it, *i.e.*, Guanaja. Guanaja, with 20 species, shares the greatest number with Roatán. Nine species are shared between Utila and Guanaja, including the eight species that occur on all three islands and one (*Ctenosaura similis*) that has not been found on Roatán and apparently does not occur there.

Of those 14 species that occur on only two islands, 8 are common to Roatán and Guanaja, 5 to Roatán and Utila, and only 1, mentioned above, is common to Utila and Guanaja, and not found on the middle island, Roatán.

Of the 13 species found on only one island, four are found on Utila, five on Roatán, and four on Guanaja.

COLONIZATION OF THE BAY ISLANDS

The present-day species compositions of the herpetofauna of the three major islands in the Bay Island group are largely depauperate, but distinctive reflections of the mainland herpetofauna. The low level of differentiation on the islands suggests that colonization and/or separation of the islands from the mainland has been relatively recent. The evidence presented by Vinson and Brineman (1963) suggests that the former alternative may be the more reasonable one, though the presence of three mainland-derived endemic species suggests that they may have become isolated as relicts earlier in time, perhaps in the Pliocene, from wide-ranging mainland counterparts. The presence of an endemic species on the Bay Islands (*Sphaerodactylus rosaurae*), if it is indeed endemic, derived from the West Indies, suggests chance over-water dispersal.

It also appears that over-water colonization of the Bay Islands by mainland elements has been largely by chance. This is suggested by the absence of several potential mainland colonizers and by the fact that the islands' herpetofaunal compositions differ from one another. Furthermore, the largest and most ecologically diverse island (Roatán) supports the largest number of species and the smallest and most ecologically uniform island (Utila) supports the fewest. This suggests that the relationship between area, ecological diversity, and species composition is similar to that reported for other continental islands not recently in contact with the mainland (Savage 1967).

Interisland dispersal has apparently been largely restricted to movements between adjacent islands. It is of course also possible that islands having species in common were colonized independently from the mainland. Only 8 of the 35 species now known from the islands are found on all three of the major islands, and only a single species, *Ctenosaura similis*, displays a leap-frog distribution.

Level of Differentiation of the Mainland-Derived Snake Segment

Mertens (1934) and Zweifel (1960) have noted that "insular populations of snakes tend to have higher average ventral counts than their mainland relatives." Zweifel (1960) demonstrated that such is the case for all of the snakes inhabiting the Tres Marías Islands for which adequate samples are available. We have also compared the ranges and means for ventral counts (dorsal counts in the case of the worm snake) of mainland and island populations of the Bay Island snake species. Our results are given in Table 4. Data for six species, *Dryadophis melanolomus, Drymarchon corais, Elaphe flavirufa, Enulius flavitorques, Oxybelis aeneus, Oxybelis fulgidus,* are based on Honduran material; the rest are based on material from the length of the mainland range in Middle America.

Obviously the Bay Island snakes show no consistent pattern of ventral variation comparable to that demonstrated by Zweifel (1960) for the snakes of the Tres Marías Islands. Of 8 species for which adequate information on ventral variation in both island and mainland populations is available, 4 species show an increase in the average number of ventrals

TABLE 4.—VENTRAL AND/OR DORSAL SCALE COUNTS OF SNAKES FROM THE BAY ISLANDS AND THE MAINLAND.[1]

	Sex	Islands Mean	Islands Range	N	Mainland Mean	Mainland Range	N
Leptotyphlops phenops		231.5	220–244	23	245.5	230–263	42
Boa constrictor		244.0	241–246	3	241.6	225–253	61
Coniophanes bipunctatus	♂	126.2	124–129	4	135.0	130–140	8
	♀	129.0	129	2	138.6	134–145	13
Dryadophis melanolomus		178	178	1	181.5	177–191	16
Drymarchon corais	♂	200.3	198–204	4	199.3	191–205	10
Elaphe flavirufa		264.2	263–266	5	259.5	258–261	2
Enulius flavitorques	♂	165	165	1	184.1	178–198	11
Leptophis mexicanus	♂	155	155	1	153.0	145–161	17
	♀	159	159	1	155.2	151–159	11
Oxybelis aeneus	♂	189.0	184–195	34	182.8	176–188	12
	♀	192.1	181–198	29	187.1	181–195	13
Oxybelis fulgidus	♂	204.8	201–209	6	204.0	203–206	3
	♀	209.0	202–214	5	210.3	208–215	4
Tantilla taeniata	♂	157	157	1	150.0	147–153	3
	♀	161	161	1	166.5	158–178	4
Tretanorhinus nigroluteus	♂	134.4	130–139	18	135.9	133–139	19
	♀	142.6	137–147	32	143.1	138–148	24

[1]Where sexes are not listed separately, sexual dimorphism in ventral number is not apparent.

on the islands, 3 show a decrease (a decrease of average dorsal scale number in the case of *L. phenops*), and in 1 (*Oxybelis fulgidus*) the males show an increase and the females a decrease, though the mainland sample is small. The ventral counts for species represented on the islands by only a single specimen (or one male and one female specimen) fall within the range of the mainland counterparts, except in the case of *Enulius flavitorques* and the poorly known *Tantilla taeniata* (male specimen only). The lack of a consistent pattern of increase (or decrease) in the average number of ventrals on the islands suggests that the colonization of the Bay Islands by elements of the mainland herpetofauna has been due largely to recent and/or frequent, fortuitous overwater dispersal.

GAZETTEER

The localities on the Bay Islands listed here are those from which specimens have been collected, as well as other mentioned in the text. They are listed under the island where they occur. As might be expected in an area where the native and official languages differ, certain localities have both a Spanish and an English name. Where two names are available for the same locality, in most cases we have described the locality under the English name and cross-referenced to that name under the Spanish counterpart. Numbers in parentheses are north latitude, followed by west longitude, extrapolated from the 1:50,000 topographic sheets mentioned below and should be considered approximate.

Our primary cartographic references were the series of topographic maps (scale, 1:50,000) distributed by the Instituto Geográfico Nacional located in Comayagüela, Honduras. We have also utilized the Mapa General de la Republica de Honduras (scale, 1:500,000) prepared by Dr. Jesús Aguilar Paz (published in 1954), the Mapa General, Republica de Honduras (scale, 1:1,000,000) prepared by the Instituto Geográfico Nacional and published in 1968, and a commercial map of Isla de Roatán available from the Bay Islands Company, Isla de Roatán (scale, 1 inch = 1 mile).

Isla de Guanaja

Guanaja—town situated on a pair of cays about 450 meters from the shore of the island (16°26′, 85°53′).
Hog Cay—one of two cays upon which the town of Guanaja (*q.v.*) is built.
La Playa Hotel—American-owned hotel on southeast shore of island (16°28′, 85°51′).
Mangrove Bight—a village on the north shore of island (16°31′, 85°53′).
Michael Rock Peak—the highest point on island; 415 m (16°28′, 85°53′).
Sabana Bight—village on northeastern shore of island (16°29′, 85°51′).
SE shore opposite Guanaja—locality on island (16°27′, 85°54′).
Shin Cay—one of two cays upon which the town of Guanaja (*q.v.*) is built.

Isla de Roatán

Big Bight—a village on north shore of island (16°23′, 86°27′).
Coxen Hole—the local name for the capital of the department, Roatán (*q.v.*)
Flowers Bay—a small settlement near the west end of island (16°18′, 86°34′).
French Harbor—town on south shore of island (16°21′, 86°28′).
Gibson Bight—village on north shore of island (16°19′, 86°35′).
José Santos Guardiola—the Spanish name for Oak Ridge (*q.v.*).
Oak Ridge—town on south shore of island (16°23′, 86°21′).
Picacho Hill—the highest point on island; located near Oak Ridge; 235 m 16°24′, 86°19′).
Roatán—capital of the department of Islas de la Bahía (16°19′, 86°32′).
Sandy Bay—village on north shore of island (16°20′, 86°34′).

Isla de Utila

Jewel Cay—a small, populated cay off southwest end of Utila (16°04′, 86°58′).
Pigeon Cay—a small, populated cay off southwest end of Utila (16°04′, 86°58′).
Pumpkin Hill—the highest point on island; located near the northeast end of island; 74 m (16°07′, 86°53′).
Utila—town on south shore of island (16°06′, 86°54′).

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MSS must be submitted in duplicate (please no onionskin) and satisfy the following minimal requirements: They should be typewritten, double-spaced (especially tables, figure captions, and "literature cited"), on one side of numbered sheets of standard (8½ x 11 in.) bond paper, with at least one-inch margins all around. Tables (which should be unruled) and figure legends should be typed on separate sheets. All illustrations are referred to as figures. They must comply with the following standards: Photographs should be sharp, with good contrast, and printed on glossy paper. Drawings should be made with dense black waterproof ink on quality paper or illustration board. All lettering will be medium weight, sans-serif type (e.g. Futura Medium, News Gothic) in cutout, dry transfer, or lettering guide letters. Make allowance so that after reduction no lowercase letter will be less than 1 mm high (2 mm is preferred) nor any capital letter greater than 5 mm high. The maximum size for illustrations is 8⅝ in. x 14 in. (twice typepage size); illustrations should not be less than typepage width (4 5/16 in.). Designate the top of each illustration and identify on the back with soft pencil by author's name, MS title, and figure number.

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