

# A Consideration of the Terrestrial Reptile Fauna on Some Offshore Islands North West of Trinidad

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THE northwestern peninsula of the island of Trinidad is separated from the Paria Peninsula of Venezuela by a passage known as the Dragon's Mouth. This passage is divided into four 'Bocas' or 'Mouths' by three large islands named Monos, Huevos and Chacachacare. These form part of the territory of Trinidad and Tobago.

To the southwest of these islands, tucked under the Paria Peninsula, is Patos Island, handed back to Venezuela in 1942. Up until that year this island had belonged to Trinidad and Tobago.

To the south of the northwestern peninsula of Trinidad there are several smaller islands of various sizes. Three larger ones are, Gaspar Grande (Gasperee), Cronstadt, and Carrera, and there are eight others, Centipede Island (Gasparillo), Little Centipede Island, and the Five Islands or Cotorras (really six), Pelican, Rock, Nelson, Lenagan, Caledonia and Craig. Pelican Island and Little Centipede Island are little more than rocks, yet have had houses built on them in the past.

These islands are utilized as follows: —

|                  |  |
|------------------|--|
| Patos            | Fishing and weather station.                                 |
| Chacachacare     | Leprosarium, Light House and Coast Guard Station.            |
| Huevos           | Private House  |
| Monos            | Private houses and estates                                   |
| Gaspar Grande    | Private houses and hotel resort                              |
| Centipede        | Not used   |
| Little Centipede | Not used. Ruins exist  |
| Cronstadt        | Holiday house and mining company                             |
| Carrera          | Security Prison  |
| Pelican          | Not used. Ruins exist  |
| Caledonia        | Not used. Ruins exist.                                       |
| Craig            | Not used. Ruins exist. Joined to Caledonia                   |
| Lenagan          | Not used. Ruins exist.                                       |
| Nelson           | Outpost Army and Coast Guard. Detention and research centre. |
| Rock             | Not used.  |

(See figure 1- Map)

## Climate

All these islands are quite dry, receiving sporadic rains in the wet season from June to December. The vegetation is usually dry scrub, interspersed with cacti, thorn-bushes and ground Bromeliads. Only on Monos and Chacachacare are there any damp valleys supporting seasonal streams. Inhabitants on these islands depend on collected rain water or imported water for their supply.

## Reptiles on the Islands

Collections of reptiles have been made on nearly all of these islands and in some cases the collections or sightings have been recorded and published. A history of these collections and observations is given below.

### PATOS ISLAND

This island, lying south and about three miles from the Paria Peninsula of Venezuela, was, until 1942, part of the territory of Trinidad and Tobago. It has been visited many times by naturalists and collectors who made observations of its reptilian fauna. Though the visits and collections began early in this century, the first written record of a reptile from Patos Island that I have been able to locate was by the naturalist R.R. Mole (1924), who recorded *Drymobius boddaerti* being observed there, and that his friend and oft-times co-author, F.W. Ulrich had collected three specimens of *Oxybelis fulgidus* there (Mole, 1926).

At present there are three specimens of *O. fulgidus*, labelled from Patos in the collection of the University of the West Indies, St. Augustine, that may be the ones collected by Ulrich.

Burt and Burt (1931) recorded the lizard *Cnemidophorus lemniscatus lemniscatus* from the island (though they misspelled it "Patas" B.W.I.) based on a specimen No. 8362 in the American Museum of Natural History received from the New York Zoological Society in 1916.

Parker (1935) described the gecko *Phyllodactylus mulleri* as a new species. It had been collected on Patos Island by Dr. Vesey Fitzgerald some time earlier and lodged in the British Museum as specimen No. 1934. 7.5.1. Parker noted the misspelling of Patos by Burt & Burt.

Stuart (1941), in his review of the snakes of the genus *Dryadophis*, listed *D. boddaerti boddaerti* from Patas Island, based on a specimen No. 8724 in the American Museum of Natural History, which was also received from the New York Zoological Society in 1916. Stuart, too, misspelled the name of the island.

Dixon (1962) synonymised *Phyllodactylus mulleri* with *P. ventralis*. This fact seems to have been unknown to Lancini when he published his paper on the reptiles of Patos Island (1963).

Underwood (1962) seems to have been ignorant of the record of *Phyllodactylus* on Patos, though he predicted the presence of this genus on "the islands of the Dragon's Mouth."

Having collected there in 1961 and 1962, Lancini (1963) added the following taxa to the reptiles from Patos.

*Iguana iguana iguana*  
*Hemidactylus mabouya*  
*Thecadactylus rapicaudus*  
*Gonatodes vittatus vittatus*  
*Mabuya* sp. (observed only).

Peters & Donoso-Barros (1970) list from Pato (sic) *Mabuya mabouya mabouya*, giving the species and subspecies unknown to Lancini. *Phyllodactylus ventralis* they accept instead of *P. mulleri* from Patos Island, and they list *Cnemidophorus lemniscatus lemniscatus* from Pato (sic.)

The genus *Mastigodryas* replaced *Dryadophis* according to Peters and Orejas-Miranda (1970). This snake had been known as *Drymobius boddaerti* both on Patos Island and mainland



Trinidad (Mole 1924) based on the original listing in Boulenger (1893) and this taxon was used up to recent times by many workers who were unaware of, or who ignored Stuart's (1942) revision of the genus *Dryadophis*, wherein he assigned the snakes found on Trinidad and Patas (sic) to the taxon *Dryadophis boddaerti boddaerti*.

Emsley (1977) listed *Leptotyphlops goudotii* as being known from Patos Island but does not give his source. It is unlikely that he collected there as the Venezuelan authorities have been extremely reluctant to allow anyone, except Venezuelans, to visit this island for almost twenty years. Emsley, (pers. comm. 1982) says that there may be specimens in the University of the West Indies collection, but so far I have been unable to find any support for this record.

Thus, the list of reptiles from Patos Island with the scientific names updated is as follows:

#### Lizards

*Iguana iguana iguana* (Linnaeus).  
*Mabuya mabouya mabouya* (Lacépède).  
*Cnemidophorus lemniscatus lemniscatus* (Linnaeus).  
*Phyllodactylus ventralis* O'Shaughnessy.  
*Hemidactylus mabouia* (Moreau de Jonnes).  
*Thecadactylus rapicaudus* (Houttuyn).  
*Gonatodes vittatus vittatus* (Lichtenstein).

#### Snakes

*Leptotyphlops goudotii goudotii* (Duméril, Bibron & Duméril).  
*Mastigodryas boddaerti boddaerti* (Sentzen).  
*Oxybelis fulgidus* (Daudin).

### CHACACHACARE ISLAND

Chacachacare Island is the westernmost island belonging to Trinidad and Tobago and is separated from Venezuela to the west by the Grand Boca and from Huevos Island to the east by the Third Boca or Ship's Mouth. No complete recent reptile list has ever been compiled for Chacachacare Island.

The first mention of a reptile on Chacachacare is by R.R. Mole (1924) when he listed the snake *Drymobius boddaerti* from there. (See Patos Island for comment on this genus.)

Underwood (1962) listed the following reptiles, having collected there when he was head of the Zoology Department at the University of the West Indies in St. Augustine in the 1960s.

#### Lizards

*Gonatodes vittatus*  
*Hemidactylus mabouia*  
*Hemidactylus brooki*  
*Iguana iguana*  
*Ameiva ameiva tobagana*  
*Cnemidophorus lemniscatus lemniscatus*  
*Gymnophthalmus underwoodi*  
*Scolecocaurus trinitatis*

In listing *Scolecocaurus*, Underwood was unaware that Vanzolini (1961b) had argued that this genus should be a synonym of *Bachia*. This concept was accepted by Thomas (1965) when he relegated the specimens from Trinidad to sub-specific status of *Bachia alleni*, making them *B.a. trinitatis*, although Vanzolini (1961a) had redescribed a specimen from Trinidad as *Bachia trinitatis*. Kluge (1969) described a new species, *Hemidactylus palaichthus* and reassigned the lizards, formerly called *H. brooki* on Trinidad and Chacachacare Island, to this taxon.

Medem (1970s) recorded that "Bobby, a fisherman resident of Staubles Bay had seen a dead specimen" of *Crocodylus intermedius* "floating out of Boca Grande, north west coast, Chacachacare island in 1962-1964". This was certainly a stray

from the Orinoco River in Venezuela.

Dixon (1973) relegated Vanzolini's *Bachia trinitatis* to synonymy of *Bachia heteropa trinitatis*, which form was found in Trinidad, Chacachacare Island and the adjacent Venezuelan mainland.

Tuck & Hardy (1973) showed that the correct name for lizards in the genus *Ameiva* on Trinidad and Chacachacare was *Ameiva ameiva atrigularis*.

The following is an updated list of the reptiles recorded from Chacachacare Island. New records are marked with an asterisk. (\*)

#### Lizards

*Iguana iguana iguana* (Linnaeus).  
*Anolis chrysolepis planiceps* Troschel \*1981 Personal collection specimen.  
*Polychrus marmoratus* (Linnaeus). \*1982 Matt. Cock coll. CIBC.  
*Ameiva ameiva atrigularis* Garman.  
*Bachia heteropa trinitatis* (Barbour).  
*Cnemidophorus lemniscatus lemniscatus* (Linnaeus).  
*Gymnophthalmus speciosus speciosus* (Hallowell). \*Pers. comm. J. Cole (1981) AMNH Coll. R. Mendez.  
*Gymnophthalmus underwoodi* Grant.  
*Hemidactylus mabouia* (Moreau de Jonnes).  
*Hemidactylus palaichthus* Kluge.  
*Thecadactylus rapicaudus* (Houttuyn). \*Pers coll. 1981.  
*Gonatodes vittatus vittatus* (Lichtenstein).  
*Gonatodes ceciliae* Donoso-Barros. \*Pers. coll. 1981 Photos

#### Snakes

*Mastigodryas boddaerti boddaerti* (Sentzen).

#### Crocodiles

*Crocodylus intermedius* Graves.\*

### HUEVOS ISLAND

Huevos Island lies between Chacachacare Island on its west and Monos Island on its east and is separated from them by the Third Boca or Ship's Mouth and the Second Boca or Egg's Mouth respectively.

The first list of reptiles for Huevos Island was made as a result of a visit to the island by the Field Naturalists' Club in 1965. The following reptiles were noted. (Boos, 1967).

#### Lizards

*Plica plica*  
*Anolis chrysolepis*  
*Iguana iguana*  
*Cnemidophorus l. lemniscatus*  
*Mabuya aeneus*  
*Gonatodes vittatus*

#### Snakes

*Drymobius boddaerti* (See comment on Patos Island)

Six pairs of anoles from Barbados, *Anolis roquet cinereus* were released on the island (Boos, 1967) as an experiment in survival. In 1976 the survival of this lizard was checked and confirmed by two sightings (Boos, 1977-1978), and the correct taxon was used *Anolis extremus* (Schwartz & Thomas, 1975).

Emsley (1977) noted several snakes for Huevos Island, but does not say whether he collected them himself. That he did so is unlikely, as Huevos Island has been privately leased by the present lessees since 1927, and exploration and expeditions to the one area likely to supply specimens around the private house and buildings — have been severely curtailed. Personal communication with Mike Emsley (1982) has not clarified these



records, as his notes are lost, and he did not specify where his specimens might be lodged. He did not say if he made the trips to the island himself, with or without the permission of the lessees. In one fell swoop his listing increases the snake fauna of Huevos Island from one to six species.

An updated and corrected list of the reptiles on Huevos Island follows:

#### Lizards

*Iguana iguana iguana* (Linnaeus)  
*Anolis chrysolepis planiceps* Trochel.  
*Anolis extremus* Garman.  
*Plica plica* (Linnaeus)  
*Cnemidophorus lemniscatus lemniscatus* (Linnaeus).  
*Mabuya mabouya mabouya* Lacepede).  
*Gonatodes vittatus vittatus* (Lichtenstein).

#### Snakes

*Atractus trilineatus* Wagler\*  
*Leptodeira annulata ashmeadi* (Hallowell)\*  
*Mastigodryas boddaerti boddaerti* (Sentzen)  
*Oxybelis aeneus* Wagler\*  
*Sibon nebulata nebulata* (Linnaeus)\*  
*Tantilla melanocephala melanocephala* (Linnaeus)\*

\*Recorded by Emsley (1977). The snakes marked with an asterisk (\*) should be considered suspect until recollected and recorded.

It is interesting to note that when I collected the *Anolis chrysolepis planiceps* in 1976, I housed it temporarily with a female *Cnemidophorus lemniscatus lemniscatus* taken on the same trip. The *Anolis* came to grief, being eaten by the *Cnemidophorus*, which also died owing to over-gorging.

#### MONOS ISLAND

Monos Island is separated from Huevos Island on its west and the mainland on its east by the Second Boca or Egg's Mouth and the First Boca or Mono's Mouth respectively.

The reptile fauna has been surveyed by Boos (1983) and the following is a list of the reptiles of Monos Island.

#### Lizards

*Iguana iguana iguana* (Linnaeus).  
*Plica plica* (Linnaeus).  
*Ameiva ameiva atrigularis* (Garman)  
*Bachia heteropa trinitatis* (Barbour)  
*Gymnophthalmus underwoodi* Grant. Sighting only.  
*Mabuya mabouya mabouya* (Lacépède).  
*Gonatodes ceciliae* Donoso-Barros. Photos taken.  
*Gonatodes humeralis* (Guichenot).  
*Gonatodes vittatus vittatus* (Lichtenstein).  
*Sphaerodactylus molei* Boettger.  
*Hemidactylus palaichthus* Kluge. M.C.Z. Spec. No. 159776.  
*Thecadactylus rapicaudus* (Houttuyn).

#### Snakes

*Boa constrictor constrictor* (Linnaeus).  
*Drymarchon corais corais* (Boie). Probably extinct on Monos Island.  
*Mastigodryas boddaerti boddaerti* (Sentzen).

#### Crocodiles

*Caiman crocodilus crocodilus* (Linnaeus).

#### GASPAR GRANDE ISLAND (GASPAREE)

This limestone island lying to the south of the north-western peninsula of Trinidad is extremely dry and scrub-covered.

Many holiday houses are built on the northern coast line. The first mention of a reptile on this island is by R.R. Mole

(1926). He listed the snake *Drymobius boddaerti*, having collected it there himself. Medem (1970s) reports *Caiman crocodilus crocodilus* from Gaspar Grande Island. I had a specimen brought to me, caught on a home-owners jetty on the north coast of the island in 1979. These animals are no doubt strays from the swampy area of Tucker Valley on the mainland of Trinidad where they are also found. Over the years between 1966 and 1981 I have collected and observed reptiles on this island. Specimens and reports have also been brought in to me and a list is given below, with notes where necessary.

#### Lizards

*Iguana iguana iguana* (Linnaeus). Hatchlings in Nov. 1967.  
*Anolis aeneus* Gray.  
*Polychrus marmoratus* (Linnaeus). Coll. at Pt. Baleine 1967  
*Thecadactylus rapicaudus* (Houttuyn).  
*Amphisbaena fuliginosa fuliginosa* (Linnaeus). Regurgitated by *Micrurus*.

#### Snakes

*Boa constrictor constrictor* (Linnaeus). Caught on construction site, Bombshell Bay Develop. (Pers. comm. D. Chalmers, 1979).  
*Mastigodryas boddaerti boddaerti* (Sentzen).  
*Pseudoboa neuwiedii* (Duméril, Bibron & Duméril). Spec pers. Coll. Coll. J. Correia.  
*Micrurus psyches circinalis* (Duméril, Bibron & Duméril).

#### Crocodiles

*Caiman crocodilus crocodilus* (Linnaeus).

#### GASPARILLO (CENTIPEDE) ISLAND AND LITTLE CENTIPEDE ISLAND

These two islands, Little Centipede being little more than a rock, lie between Gaspar Grande and the mainland of Trinidad. They are both covered with dry shrub vegetation. Because of the roughness of the terrain and the difficulty of landing on these two islands, little collecting has been done there. There are ruins of a small building on Little Centipede Island. Iguanas are probably found there, though the only reported reptile is listed below.

#### Lizards

*Anolis aeneus* Gray.

#### CRONSTADT ISLAND

Though this island is declared a Wild Life Sanctuary, one half of it is mined for its limestone. The fauna is therefore depleted. I have only recorded the following.

#### Lizards

*Iguana iguana iguana* (Linnaeus)

#### CARRERA ISLAND

This island is almost totally taken up with the buildings of the prison. There are some areas that are still covered with secondary bush and some gardening is in evidence. There is a small plantation of coconut palms.

I visited Carrera Island with the permission of the Prison Authorities and recorded the following.

#### Lizards

*Iguana iguana iguana* (Linnaeus)  
*Anolis aeneus* Gray.



*Hemidactylus mabouia* (Moreau de Jonnes).

There were numerous domestic cats all over the island, living in a semi-feral state. These were possibly responsible for the absence of the lizard *Ameiva ameiva atrigularis*, which I had expected to find there.

#### THE COTORRAS (FIVE ISLANDS)

Visits were made to four of the six "Five Islands" or Cotorras, and the following reptiles recorded.

##### PELICAN ISLAND

This island is little more than a rock where, however, there are the remains of a pier, water cistern and two houses. No reptiles were recorded.

##### CALEDONIA ISLAND

One of the largest islands of the Cotorras, it is joined by a stone man-made causeway to nearby Craig Island. The vegetation on Caledonia Island is thick and overgrown. There are ruins of several buildings, water cisterns and piers, and the whole of Craig Island is occupied by the ruins of a building. The following reptiles were recorded from Caledonia Island.

##### Lizards

*Anolis aeneus* Gray.

*Ameiva ameiva atrigularis* Garman.

*Thecadactylus rapicaudus* (Houttuyn).

The remains of *Anolis* and *Thecadactylus* were found floating in a large half-filled water cistern. Shell fragments of eggs similar to those laid by *Gonatodes* or *Hemidactylus* were found in a fissure in the limestone rocks of Caledonia Island.

##### CRAIG ISLAND

No reptiles were recorded.

##### LENAGAN ISLAND

There were two large ruined buildings on Lenagan Island and the pier on the eastern point seems to be still used by fishermen. The island is densely covered with scrub forest. The following reptiles were recorded.

##### Lizards

*Anolis aeneus* Gray.

*Gymnophthalmus underwoodi* Grant. (J. Kenny, UWI Report. pers comm. verbal).

##### NELSON ISLAND

I have not visited this island. It is occupied by the Protective Forces. The buildings are sometimes used by the Natural Science Faculty of the University of the West Indies for field-trips, and Prof. J. Kenny recorded the following reptiles there (pers. comm. verbal).

##### Lizards

*Hemidactylus mabouia* (Moreau de Jonnes).

*Thecadactylus rapicaudus* (Houttuyn).

##### ROCK ISLAND

Not visited.

Prof. J. Kenny reports that iguanas, *Iguana iguana iguana*, have been seen on all the Cotorras, and they probably swim easily

between the islands. Table I gives the listing for the offshore islands for easy comparison.

#### DISCUSSION

The reptile fauna of Trinidad is an impoverished South American one, consisting of relict and recently immigrant populations. In their turn, on a smaller scale, the offshore islands support an impoverished reptile fauna of Trinidad on the east and Venezuela on the west.

It is difficult to tell which reptiles are relicts and which are recent immigrants. There are some clues, however, that give us some guidelines to this problem. Relict or long-established colonists usually occupy every suitable habitat.

Recent colonists are usually restricted to suitable habitats close to their point of entry. Other suitable habitats nearby or that exist elsewhere have usually not been colonized. The spread of a species can often be traced and noted. Worth (1967) noted the appearance of *Cnemidophorus* in a man-altered suitable habitat, and the presence of this lizard on the man-made savannah-like conditions of the Waller Field air strips constructed in 1944 has been noted (Everard & Boos, 1975).

The distribution and spread of *Cnemidophorus* on Trinidad is a good example of colonization in action, and this example is sharply focused when their presence on the offshore islands is considered.

These islands which separate the Dragon's Mouth into four passages or Bocas, seem to be the tops of a sunken or drowned mountain range which runs eastward out of the Paria Peninsula of Venezuela through these islands and continues on Trinidad as the Northern Range.

The Bocas have been gouged and scoured deeper by the incoming and outgoing tides over the centuries. Whatever reptile fauna was stranded on the islands when the Bocas were formed, and survives there today, varies very little from the mainland species from Venezuela in the west and Trinidad in the east.

Some species, especially the snakes, must have been unable to survive owing to the changes in climate and the curtailed size of their accustomed range. This is evident when one considers the richness in the quantity and diversity of genera and species on the mainlands nearby. However the process of migration and colonization has continued, and not only has Trinidad been affected. The stage at which one such dramatic colonization has reached is well illustrated when one critically observes the reptile fauna of the offshore islands. The method by which such colonizations are made should be considered here. That it does happen should be in little doubt. (Mole, 1926. Kenny, 1977, 1978-1979, Medem, 1970s).

Animals are rafted from the South American continent on materials carried by the floods from the vast outpourings of the Amazon and Orinoco River systems to the south and west of Trinidad. Some end up on Trinidad, Tobago and sometimes far beyond.

I have recently had a young anaconda, *Eunectes murinus gigas*, brought to me from Pt. Galeota. It was caught in the large mats of vegetation floating in the sea. Richard Joseph has caught the water snake, *Helicops angulatus*, on the beach at Erin and more recently a large fresh-water turtle, *Chelus fimbriatus* was taken by Mary Alkins from Chatham Beach on the south coast of Trinidad.

All these waifs undoubtedly came from Venezuela, rafted on vegetation or swimming across the narrows to Trinidad. How else can we explain the presence of the very tiny, delicate Mole's Gecko, *Sphaerodactylus molei*, collected on the almost barren terrain of Soldado Rock, three miles west of Icacos Point (Boos, 1983b)?

By considering the reptile fauna of the islands off the north-western peninsula of Trinidad, the stage at which such recent colonization has arrived can be illustrated. Physical factors affecting these islands have played an important part in determining which immigrant species, and how far each immigrant



TABLE 1: Distribution of reptiles on the islands off the north-west peninsula of Trinidad, W.I.

|                              |       |              |        | X = recorded |               | O = probable      |           |         |         |           |       |         |        |      |
|------------------------------|-------|--------------|--------|--------------|---------------|-------------------|-----------|---------|---------|-----------|-------|---------|--------|------|
| LIZARDS                      | Patos | Chacachacare | Huevos | Monos        | Gaspar Grande | Gasparillo & L.C. | Cronstadt | Carrera | Pelican | Caledonia | Craig | Lenagan | Nelson | Rock |
| Iguana iguana iguana         | X     | X            | X      | X            | X             | O                 | X         | X       | O       | O         |       | O       | O      | O    |
| Mabuya mabouya mabouya       | X     | O            | X      | X            | O             |                   |           |         |         |           |       |         |        |      |
| Cnemidophorus l. lemniscatus | X     | X            | X      |              |               |                   |           |         |         |           |       |         |        |      |
| Phyllodactylus ventralis     | X     |              |        |              |               |                   |           |         |         |           |       |         |        |      |
| Hemidactylus mabouia         | X     | X            | O      | O            | O             |                   | O         | X       |         | O         |       | O       | X      |      |
| Hemidactylus palaichthus     |       | X            | O      | X            |               |                   |           |         |         |           |       |         |        |      |
| Thecadactylus rapicaudus     | X     | X            | O      | X            | X             | O                 |           |         |         | X         |       |         | X      |      |
| Gonatodes v. vittatus        | X     | X            | X      | X            | O             |                   | O         | O       |         | O         |       | O       | O      |      |
| Gonatodes humeralis          |       | O            | O      | X            | O             |                   |           |         |         |           |       |         |        |      |
| Gonatodes ceciliae           |       | X            | O      | X            |               |                   |           |         |         |           |       |         |        |      |
| Polychrus marmoratus         |       | X            | O      | O            | X             |                   |           |         |         |           |       |         |        |      |
| Anolis chrysolepis planiceps |       | X            | X      | O            | O             |                   |           |         |         |           |       |         |        |      |
| Anolis aeneus                |       |              |        |              | X             | X                 |           | X       |         | X         |       | X       |        |      |
| Anolis extremus              |       |              | X      |              |               |                   |           |         |         |           |       |         |        |      |
| Plica plica                  |       | O            | X      | X            | O             |                   |           |         |         |           |       |         |        |      |
| Gymnophthalmus underwoodi    |       | X            | O      | X            | O             |                   | O         | O       |         | O         |       | X       |        |      |
| Gymnophthalmus s. speciosus  |       | X            |        |              |               |                   |           |         |         |           |       |         |        |      |
| Bachia heteropa trinitatis   |       | X            | O      | X            | O             |                   |           |         |         |           |       |         |        |      |
| Ameiva ameiva atrigularis    |       | X            |        | X            |               |                   |           |         |         | X         |       |         |        |      |
| Sphaerodactylus molei        |       | O            | O      | X            | O             |                   |           |         |         |           |       |         |        |      |
| Amphisbaena f. fuliginosa    |       |              |        |              | X             |                   |           |         |         |           |       |         |        |      |
| SNAKES                       |       |              |        |              |               |                   |           |         |         |           |       |         |        |      |
| Mastigodryas b. boddaerti    | X     | X            | X      | X            | X             |                   |           |         |         |           |       |         |        |      |
| Oxybelis fulgidus            | X     |              |        |              |               |                   |           |         |         |           |       |         |        |      |
| Oxybelis aeneus              |       |              | X      |              |               |                   |           |         |         |           |       |         |        |      |
| Sibon n. nebulata            |       |              | X      |              |               |                   |           |         |         |           |       |         |        |      |
| Leptodeira annulata ashmeadi |       |              | X      |              |               |                   |           |         |         |           |       |         |        |      |
| Tantilla m. melanocephala    |       |              | X      |              |               |                   |           |         |         |           |       |         |        |      |
| Atractus trilineatus         |       |              | X      |              |               |                   |           |         |         |           |       |         |        |      |
| Drymarchon c. corais         |       |              |        | X            |               |                   |           |         |         |           |       |         |        |      |
| Pseudoboa neuwiedii          |       |              |        |              | X             |                   |           |         |         |           |       |         |        |      |
| Leptotyphlops g. goudotii    | X     |              |        |              |               |                   |           |         |         |           |       |         |        |      |
| Boa c. constrictor           |       |              |        | X            | X             |                   |           |         |         |           |       |         |        |      |
| Micrurus psaltes circinalis  |       |              |        |              | X             |                   |           |         |         |           |       |         |        |      |
| CROCODILES                   |       |              |        |              |               |                   |           |         |         |           |       |         |        |      |
| Crocodylus intermedius       |       | X            |        |              |               |                   |           |         |         |           |       |         |        |      |
| Caiman c. crocodilus         |       |              |        | X            | X             |                   |           |         |         |           |       |         |        |      |

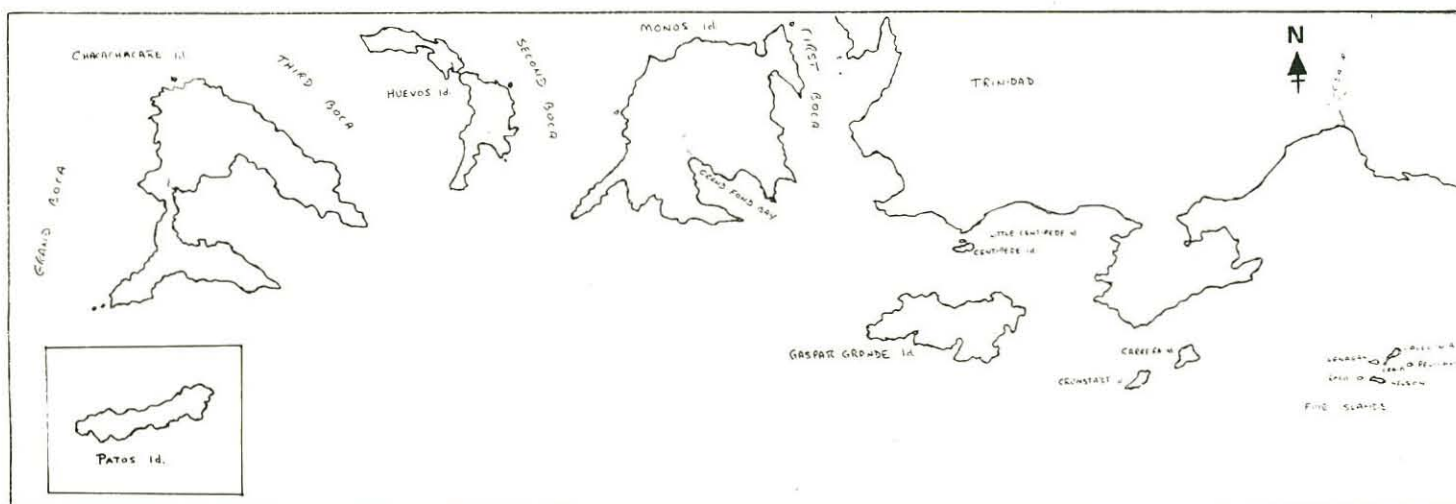


FIG. 1: The islands off the north-west peninsula of Trinidad.



species has reached. We can also speculate on which species are relict populations, judging by their presence or absence on the islands.

In some cases, where the species has not been collected or recorded on a specific island, it is perhaps only a matter of time and more diligent collecting before it turns up. This is indicated by the common presence of the species on both the Venezuelan and Trinidadian mainlands as well as on nearby islands. (Boos, 1983).

Where mainland climatic conditions, especially humidity, are found on these islands, some reptiles, at present not recorded on individual islands, should be reasonably expected to be found in the future. These reptiles which are found at present on both the Venezuelan and Trinidadian mainlands as well as on some of the islands, are more than likely relict populations or older colonizations. These expected populations are represented by a circle symbol on Table I.

The routes of recent colonization of Trinidad primarily and the islands secondarily, seem to be from two different directions or arcs, with certain species establishing themselves wherever they have encountered suitable habitats. Where there are suitable habitats available and no colonists, we must assume that the immigrants have not yet arrived. The two colonization arcs are as follows.

Both arcs begin as one column south and east of Trinidad, originating in South America and are given impetus by the floodwaters of the Amazon and Orinoco Rivers. Carried north-westerly by the mid-Atlantic current, travellers on this highway of colonization reach Trinidad at its south eastern corner. Here the column is split into the two arcs. The first (Arc A), is pushed west, and passing along between the south coast of Trinidad and the north coast of Venezuela, it deposits its waifs wherever they can make landfall. More of these waifs would seem to reach Trinidad than are swept back to the Venezuelan side, for the westward flowing current is further swollen, kept away from Venezuela and pushed toward Trinidad, by the outpourings of the distributaries of the Orinoco delta flowing into the area. (Field, 1975).

The winds, too, in the rainy season from June to December when the raft-carrying floods are the heaviest are from the south east and assist in pushing the floating debris to Trinidad. This arc empties into the Gulf of Paria and sweeps out between the islands that divide the Dragon's Mouth. The waters of the Gulf of Paria are further enriched by any fauna that may be carried down the rivers flowing out of the Perdenales Area of Venezuela.

The second Arc, (Arc B), splits off at Pt. Galeota, the south-easternmost point of Trinidad, and flows north along the east coast, is forced further east briefly by Pt. Galera, and eventually reaches Tobago and beyond.

That these two arcs are a major highway in the colonization process is vividly demonstrated by the presence or absence of the lizard *Cnemidophorus lemniscatus lemniscatus* in the suitable and available habitats on Trinidad and the off-shore islands.

Wherever the currents that constitute arc A or B, have passed or touched, and there is a suitable habitat available, this lizard is found. On all the beaches along the south and east coast of Trinidad and on the southwestern tip of Tobago colonies have established themselves.

The lizard *Cnemidophorus lemniscatus lemniscatus* is a hardy, habitat-specialist opportunistic, widespread colonizer (Worth, 1967). Where established, it thrives around human habitation (Hoogmoed, 1973). It is found over a large area of tropical south and central America. On Trinidad it is found along the beaches of the south coast following the direction of Arc A, and though it is not known to this author if it is found on beaches of the eastern shores of the Gulf of Paria, or the southern and northern beaches of the Paria Peninsula, it is found on Patos Island, Chacachacare Island, and Huevos Island.

Here, on Huevos Island, the northward and eastward curve of colonization of Arc A seems to end. It has not crossed to Monos Island. It is also found up along the east coast beaches of Trinidad as far north as Matura Bay. This seems to be as far north as it has colonized in the east of Trinidad. Small colonies have

reached inland to Bush Bush Island in the Nariva Swamp (Worth, 1967) and Waller Field (Everard & Boos, 1975). I have not collected it or observed it as far north as Toco Point (Pt. Galera), or on any of the suitable beaches on the north coast. Arc B is shunted out to sea by the north east peninsula of Trinidad, and Tobago is the next stop, where *Cnemidophorus* is also found in abundance at first landfall there — Crown Point.

So far the pincers of Arc A and Arc B have not closed. *Cnemidophorus* has not crossed the mainland mass of Trinidad in a westward direction from the small colonies in Bush Bush and Waller Field. It does not occupy suitable niches on beaches of the north coast, having not had any currents to ride around Pt. Galera and further west. Instead it has ended up in Tobago.

So far it has not been collected or observed on Monos Island where there are suitable habitats for it to colonize, nor has it been seen on any of the smaller offshore islands listed above, or on the beaches facing west and south on the northwestern peninsula of Trinidad.

It has got to Huevos where it occupies the one small suitable habitat — a stretch of sand not more than 200 metres long, and the hot scrub-covered hillside around the single human habitation.

On Patos Island, there are two species of reptile, a lizard, *Phyllodactylus ventralis*, and a snake, *Oxybelis fulgidus*, that are found on the Venezuelan mainland (Donoso-Barros, 1968; Roze, 1966), but not on Trinidad.

Though it is possible that these two species of reptile are relict on Patos Island, when the following information is considered, that they are immigrants appears to be more likely.

Firstly, if they are relict on Patos Island, being stranded there when the island was separated from the continent by the rising of the oceans, why are they not found on Trinidad and the offshore islands which were cut off at the same time? Had they been there then, they would, more than likely, exist there now as relict populations.

Secondly, on the distribution map for *O. fulgidus* (Roze, 1966, p 192). (See Fig. 2 adapted from Roze), the species is present in the entire east of Venezuela, including territory south of the Orinoco River, but is excluded from the vast distributary system of the Orinoco River where the majority of immigrants to Trinidad are likely to originate. The area where it is found also includes the Paria Peninsula, and the drainage of the San Juan, Guanipa, and Manamo Rivers, which flow through the lowlands south of the Paria Peninsula, and north of the exclusion zone of the Orinoco distributaries.

The San Juan, Guanipa and Manamo Rivers empty into the Gulf of Paria, and any colonists being carried by the floodwaters of this river-system are unlikely to make landfall on Trinidad as the ocean and wind currents are unfavourable for this to happen. They have no choice but to be pushed north by the prevailing winds and currents, and then east along the south coast of the Paria Peninsula, and out the channels between the islands of the Dragon's Mouth.

However rafting colonists have a good chance of reaching Patos Island which stands in the direct path of vegetation rafts exiting the Gulf of Paria, and is a natural landfall for these colonists.

To speculate that the Patos specimens of *O. fulgidus* came from the area on the south bank of Orinoco River, one would have to ask why Trinidad had not been colonized from this source as well. This would seem to be a much more natural course of events with a greater chance of success than for all the waifs originating from this area to bypass Trinidad completely and to be swept up on Patos Island.

Though *O. fulgidus* has been recorded from Trinidad in the literature several times (Beebe, 1952; Wehckind, 1955, 1960; Underwood, 1962.) these records have been incorrect. (Emsley, 1977.)

To recapitulate: If *O. fulgidus* is relict on Patos Island it should be relict as well on Trinidad and the northwestern offshore islands. If a colonist from any other source but the river system of the San Juan, Guanipa and Manamo Rivers it would



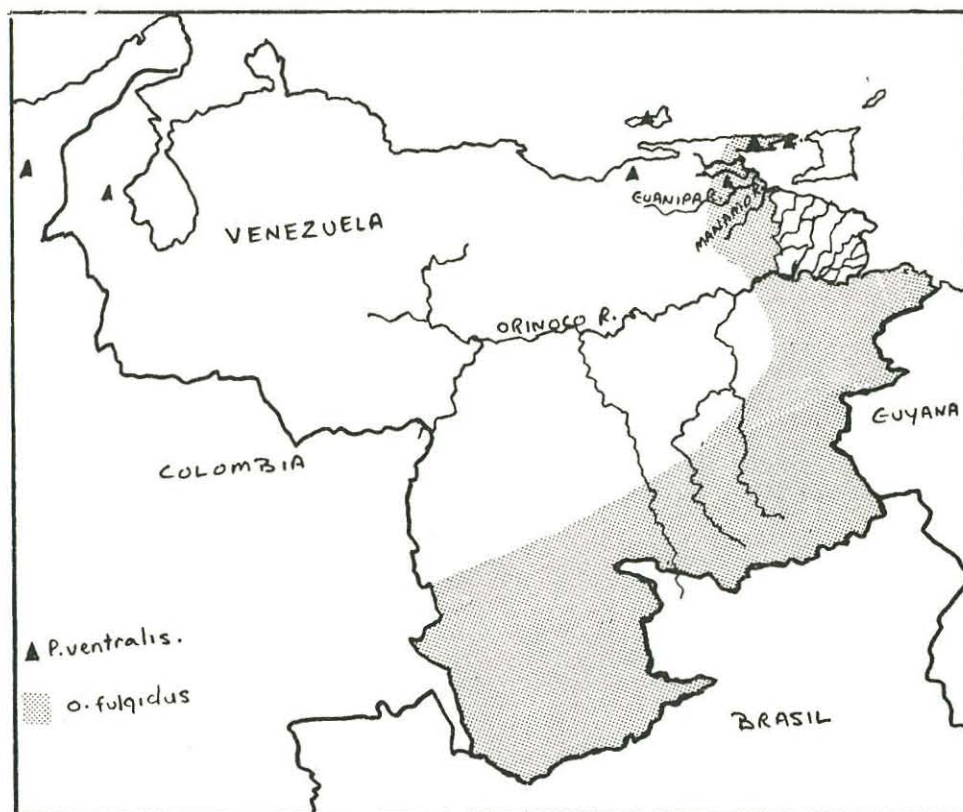


FIG. 2: Range of *O. fulgidus* and *P. ventralis*.

be on Trinidad as well.

Thus it must be an immigrant species on Patos Island, originating from an area that is unlikely to affect Trinidad.

A similar situation refers to the lizard *Phylladactylus ventralis*. It prefers a dry habitat and is found along the northern coast of South America, the Paria Peninsula, Margarita Island and Patos Island (Donoso-Barros, 1968). If it is relict on Patos Island it should be relict as well on the indentical dry shrub habitat on Chacachacare Island, Huevos Island, and perhaps as well on Monos Island and the northwestern peninsula of Trinidad for the same reasons as outlined above for *O. fulgidus*. But to date it has not been collected in these areas.

So it is fairly reasonable to surmise that it has managed to reach and colonize Patos Island by being rafted down rivers that pass through its range south of the Paria Peninsula. It has not reached any other islands further west across the channels of the Dragon's Mouth of Trinidad.

Thus it is my contention that these two reptiles are recent colonists of Patos Island, but colonists poured into Arc A rather late in its course, affecting Patos Island, but perhaps too late to affect the other islands or Trinidad.

Another piece of evidence that pinpoints the origin of the reptiles on Trinidad and especially the offshore islands is the presence and colour pattern of the one snake found so far on five of these islands.

*Mastigodryas boddaerti boddaerti* is found on Patos, Chacachacare, Huevos, Monos, Gaspar Grande and the mainland of Trinidad.

The colour variety of this snake that is found on Trinidad is the same as the one on Gaspar Grande and distinctly different from that found on the other islands (except Monos).

This snake is relict on Trinidad and possibly relict on Gaspar Grande, though there could be a constant repopulation of this island from the mainland. Snakes are good swimmers and the distance between Gaspar Grande and the mainland is not too great or affected by any great climatic or physical barriers to hamper constant immigration from Trinidad on the floodwaters of the Caroni and Cuesa Rivers.

The ones found on Patos, Chacachacare and Huevos Islands

are all similarly patterned and are distinct from those from Trinidad. Though listed to date as *M. b. boddaerti* it is possible they are a different species. The exact taxonomic designation of these snakes that occur on these islands is open for revision. They should be similar to, or the same as, those found in the dry scrub land of the Paria Peninsula and are more than likely relict on Patos, Chacachacare, and Huevos Island.

The ones found on Monos Island, which geographically are between the two other populations seem to lean both ways. Not many specimens have been taken on Monos Island and there is the added difficulty in that this snake has a juvenile form radically different in colour pattern from the adult. The reptile fauna of Monos is more than likely derived mainly from Trinidad than elsewhere (Boos, 1983) though there might have been and still be input from the Venezuelan mainland along both Arc A and B (via Trinidad) creating a unique situation on Monos where species or colour intergrades are to be found.

By charting the distribution, observing the habitat preference, studying the geographical factors of wind, currents, climate and topography affecting it, and by concentrating on one lizard, *Cnemidophorus lemniscatus lemniscatus* the process of colonization in action can be demonstrated.

The islands off the north west peninsula of Trinidad are a living theatre of change where not only recent colonization can be demonstrated, but with more research and collection more information can be gathered about what went on in the past.

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