

Quarterly Bulletin of the Trinidad and Tobago Field Naturalists' Club

April-June

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A RAMBLE AROUND GRANDE RIVIERE

Christopher K. Starr

One approaches Grande Rivière, like Charlotteville, by a long, scenic descent from the interior to the sea. This is at the end of a drive of 16 or 17 km from Toco that has quite a Tobago feel to it. The loveliest part of this approach, to me, is the view from above of the broad, shallow stream that presumably gives the village its name. Without knowing the history of it, I imagine some long-ago wag or real-estate developer decided to call this stream a "big river", and even today some locals call it a river with a straight face. One enters the village by crossing a bridge over the Big River not far from where it empties into the sea.

On a day when I didn't feel like working, I set out to explore the Big River. The lower part is a popular liming area, but even a little way above the bridge one enters a zone of solitude. The sides are flanked by farmland in various stages of abandonment, and the scene felt more like Central America than anything I had experienced in Trinidad or Tobago.

I had thought I could simply wade the Big River for as long as it stayed in the flat, but many parts of it are far from shallow, even in the dry season. Still, this is far from virgin territory, and many before me had dealt with the problem of going upstream, so that there were discernible stretches of trail on shore around many of the deeper parts. In fact, there were probably such stretches wherever needed, but in some places I failed to find them, necessitating short detours through scrub-land.

The Big River has its share of fishes, and I noticed several species. The one that especially caught my attention was a slim, light-coloured bottom-dweller -- most likely the goby *Awaous taiasica* -- that clung to rocks and relucted to swim even when I trod close to it. And snails abounded in the water, at least two species. One, a globular beast with a very low spire, mostly about 1 cm across, was so numerous that I occasionally

found them clustered on top of each other. I don't recall having noticed such an abundance of snails in other Trinidad fresh waters.

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Big stingless bees (*Trigona amalthea*) were collecting resin for nest material at a wound in a tree trunk. Unlike honey bees, stingless bees commonly use a substantial admixture of plant resins and/or mud with the wax that they secrete. I once even saw stingless bees in the Philippines collecting tar at a road-construction site. In every case, they pack the material into the pollen baskets, or corbicula, on their hind legs for transport.

I always stop to look at army ants on the march, so it was a pleasure to spend a few moments observing a column of a small black species of the genus *Neivamyrmex* (seven species known from Trinidad). I found none of the much more conspicuous *Eciton burchelli*, but this common

species is certainly to be found in that corner of Trinidad. Occasionally an emperor butterfly (Morpho peleides) flitted by over the stream, easily recognizable at a glance by the flash of its iridescent blue wings.

While walking on shore I startled a big matte (*Tupinambis teguixin*), who skedaddled cleanly out of sight. I am always amazed that such a heavy-bodied lizard can move so fast and lithely, like a snake, while an iguana seems decidedly clumsy on the ground. Later I watched a young matte scale a rock face with surprising agility.

Less than a kilometre upstream is a seasonally dry shortcut across a tight bend in the stream. It was here that I made my most interesting find. On shoreside vegetation, reaching just a little over the water was an aggregation of spiders in a communal tangle web. It was not, as I imagined at first, the rather famous *Anelosimus eximius*, which I have occasionally found in the forest behind Mt St Benedict. Rather, this seems to be the first Trinidad record of *Philoponella republicana*, noted by the pioneer araneologist Eugène Simon in what may be the earliest published record of any social spider (1891). Inhabiting the web were females and males of various sizes, presumably representing at least two generations, so that this was not just a short-term aggregation but a structured colony. And at one lower edge was a single female of a familiar orb-weaver *Argiope aurantia*. She had no apparent association with the colony and had evidently just happened to spin her web in the same good hunting spot. Further upstream I came upon a much smaller group of the social spider

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MISSION STATEMENT

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of more uniform age, evidently a colony at an earlier stage of development.

The stream has occasional pools wide and deep enough for real swimming, and at a couple of places there is no shallow water at either side, so that one is obliged to give up wading and take to the shore. For part of the distance, the trail on the right-hand shore passes through such pleasant forest that one feels no hurry to get back to stream bed. This trail ends in a small hunters' camp at the water's edge.

At this point, about 22 km from the bridge, the character of the stream changes rather abruptly. It splits into two more or less equal branches between steep walls, so that each branch runs fast over and between big rocks. The relatively flat sand-and-gravel stream bed is left behind, and wading becomes laborious and even rather hazardous. The rocks are slippery where wet, and sooner or later one must suffer a serious fall if one perseveres.

I did not persevere. I ascended each branch only about 100 metres, enough to confirm that wading was no longer a reasonable option. My attention turned to the hills above. The hunters would not make camp at one extreme of their hunting area, so there should be trails up into the hills on either side. Casting about on the far side, I found one trail that seemed to lead into scrubby, uninteresting terrain. (Admittedly, I didn't search very hard; remember that I was avoiding work.) On the near

side, close to the camp, was a faint but definite trail leading into the forested hills above. I followed it just far enough to be sure it was serious about going into the heights.

Let me now interrupt the narrative and approach this particular point from a different direction. The Monte Video Road heading into the interior from the centre of Grande Rivière takes a more direct, less gradual route to Monte Video, the next village on the way back to Toco. It was evidently at one time the main road linking the two villages and is still in good shape, although narrower, rougher and less traveled. Branching off the Monte Video Road before it reaches the Big River is a side road leading to an old farm and a broad walking trail. The farm ends before long, and the trail ascends into forest, soon becoming a bench trail. One catches glimpses of the Big River below through the trees. The trail near the hunter's camp ascends to this bench trail.

The bench trail continues around and up until it abruptly stops, continuing as a simple trail. Looking ahead, the state of this trail appeared quite uncertain. I expect it goes on, with occasional interruptions from treefalls and landslips but I had neglected to bring water with me, and it seemed time to turn back.

The area around Grand Rivière has good potential to provide a satisfying Naturalist's Club field trip in the dry season. As a first-draft plan, one might think of a weekend trip beginning with a leather-back turtle watch on Saturday night. This could be followed the next morning with a walk up the Big River to the branch point, alternately wading, walking on the exposed stream bed and taking to streamside trails. The Club gives far too little attention to freshwater life on our fieldtrips, so that this wading phase could be very educational. There is no real hiking in this first phase and no waterfall at the end, factors that would neatly keep two classes of undesirables from joining the walk.

Upon reaching the stream fork, we could ascend to the bench trail for the dry-land forest phase. This last part requires some advance exploration and consultation with local field guides. We can hope for a satisfying forest route that goes back around to approach Grand Rivière from the interior.

Let me add one other note, this concerning the giant grasshopper, *Tropidacris cristata*. In the 2002 issue of the *Living World* journal (p57) I suggested that this species breeds only in the south of Trinidad, so that "the occasional specimens found in the north result from centrifugal movement out of the breeding areas and are a genetic dead-end." Perhaps not. I found this same species in Grande Rivière, in northernmost Trinidad, during April 2004, and early one morning I had seen enough of them to shake my hypothesis. It put me in mind of something I read and memorized long ago in a book by Nobel laureate Konrad Lorenz. If Sylvia Kacal (a former German teacher) were still with us, it would give me great pleasure to quote it to her: "Es ist für den Naturforscher eine gute Übung, jeden Morgen vor dem Frühstück eine Lieblingshypothese einzustampfen. Das erhält jung." (A natural scientist should make it a habit to tear apart one of his pet theories every morning before breakfast. That's the way to stay young.)

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FIELD TRIP REPORT

Aripo Savanna III October 26, 2003

John Lum Young

Not many realise that the Aripo Savannas, the last remaining undisturbed flat savannas in the country, are carded to accommodate the extension of the Churchill Roosevelt Highway (and the associated squatting along transport routes) to Sangre Grande in the 2005/2006 budget year. This highway extension has been much promoted by the Member of Parliament for Toco/Manzanilla, and the Prime Minister promised the start of construction.

Among the reasons for declaring the Aripo Savannas a Scientific Reserve in 1989 was that the area contains unique flora: savannas surrounded by Seasonal Forest and Marsh Forest, a vegetation type dominated by palms (Beard 1946) and only found at the Aripo Savannas. In addition there are 28 species of plants (of which 11 are rare within the savannas) that do not grow elsewhere in Trinidad, including the sedge *Rhynchospora aripoensis* not found in any other part of the world. There are also 5 other species that only grow on savannas. Detailed studies at Aripo have revealed about 150 species of which only 35 can be described as common in the country (Comeau 1990). It can be argued that if the rare and uncommon species disappear then the savannas will lose the unique qualities that made it worth preserving perhaps that is the strategy to revisit the "reserve" status.

Our first stop was the northern runway at Wallerfield currently used for drag racing. Wallerfield, named after Major Alfred J. Waller, was actually a 4 square mile air base within the larger Fort Read. [Today though the whole Fort Read area is called Wallerfield.] Built in 1941 by the US Army Air Corps in Trinidad Wallerfield became a major transit base for combat aircraft on their way to Europe via the South Atlantic route.

Mr. Schipp, a former Director of the Chaguaramas Military History and Aerospace Museum, explained that for 4 months in 1945, following the surrender of the Third Reich, Wallerfield made history. Project Green involved moving tired combat troops by air from Italy to Trinidad via North Africa, West Africa and Brazil. In Trinidad, the soldiers were taken to a recreational base at Manzanilla by army 'Duce

and a Half' (2½ ton) troop carry trucks where the soldiers spent 2 weeks winding down and adjusting to peacetime conditions before resuming transit to the U.S.A. Never before had such a large scale movement of men by air been attempted, and never before such a large number of functional aircraft operated from a single base.

Almost overnight from an air base of 300 men in total there were 4,000 aircraft mechanics plus all the other necessary support personnel. Though the operation lasted from June to September the base operated at full stretch for 2 months, with aircraft landing at the rate of 1 every 3 minutes. That type of traffic was seen occasionally at bases during the War but never at this sustained level. Wallerfield became the world's largest airfield, handling more planes on 1 field than all domestic US Cont'd on Page 6



Moriche Palms in the Aripo Savanna

BOTANY GROUP FIELD TRIP

Notes on the Flora and Fauna of the Caroni Swamp October 18, 2003

Nicholla Johnson

The group of 24 members and guests arrived at the banks of the Guayamare river at 8.00 a.m. from where we proceeded to walk along the bank. We first encountered the hairy Malvaceae Malachra fasciata (Wild Ochro) and the small Solanaceae Solanum jamaicense which is a lot less spiny than the popular Solanum stramonifolium. Also present, the Cyperaceae Cyperus ligularis with its brown inflorescences lined the sides of the path, and the Bignoniaceae vine Cydista aquinoctialis with its lilac bell-shaped flowers was found growing on numerous plants along the path. Another plant seen was Aniseia martinicensis and two different species of the yellow flowered Ludwigia spp. which is common along waterways in different swamp environments. The Lindernia crustacea was also seen, as well as the dark green, tall and round stemmed Cyperus articulatus, the popular small leafed Cynodon dactylon (Bermuda grass) and the flowering Compositeae Erechtites hieracifolius with tiny, feather-like flowers. Along the margins of the canals near the Eleocharis mutata (Cyperaceae) marsh were seen the aquatic ferns Ceratopteris thallictroides and Acrostichum aureum with the spore covered fertile tips of the fronds.

As we proceeded further into the Caroni Swamp the weed community also included the small purple flowered Commelina difusa (Commelinaceae), which has a notably open spathe, numerous tufts of Justicia pectoralis (Carpenter grass), other species of Cyperaceae Cyperus spp., the fern Blechnum serrulatum with the spores lining the mid rib of the leaflets, and the Malpighiaceae vine Stigmaphylum banisterioides with its uniquely shaped, yellow flowers. Other plants also seen were the Passifloraceae Passifloraceae Passifloraceae floraceae Solanum stramonifolium with its edible fruits.

We entered the more tree covered area and encountered numerous White Mangrove trees Laguncularia racemosa with their small fruits, waxy and blunt tipped leaves and red leaf peduncle. An overturned Avicennia germinans (Black Mangrove) with its thin, elongate leaves provided an opportunity to observe the pneumatophores (aerial roots) which were exposed and visible for close inspection. Nearby were also several Rhizophora mangle (Red Mangrove) individuals in fruit, and with still attached propagules that are the stages after the germination of the seeds while still attached to the tree. John Lum Young gave a brief discussion of the nature of these propagules that are weighted (heavier) at the base to ensure that they are properly embedded in the mud into which they fall upon detachment from the parent tree. Along the drier areas of the mangrove the dominant vegetation was the Sapindaceae Paullinia pinnata which was in fruit with its reddish-pink capsules distinct pinnate leaves (five leaflets), and winged leaf rachis. Numerous plants of this woody vine were seen climbing in many of the more open areas in the mangrove, along with the Bignoniaceae Cydista aquinoctialis that was in flower with some plants having maturing long flat pods.

Another species seen in the mangrove woodland was the Rubiaceae Randia formosa, with its beautiful, white, star-shaped flowers, and green and white striped fruit (likened to a small cucumber or melon). One orchid species Epidendrum stenopetalum growing atop a mangrove tree was identified by Gregory Lee Kin, and also seen were small, scrambling plants of the Bignoniaceae Macfadyena ungus-catii (Cat's Claw) with their small, hook-like structures for climbing. Fertile plants of the fern Campyloneurum phyllitidis were also seen amidst the prop roots of a Red Mangrove, and the purple flowered Melastomataceae Mouriri guianensis, which does not have the unique leaf venation of the family, Cont'd on Page 6

Botany Trip...from Page 5

was observed in the vicinity.

The group walked through lovely, open expanses of the beautiful fern *Blechnum serrulatum* in the areas of relatively dry land between the mangroves. It was noted that these plants provided a habitat for numerous species of Orb Weaver spiders. We had lunch (before returning to the cars) at the mouth of the Guayamare River where the sound of boats and the bells of Hindu prayer rites in the nearby Felicity area could have been heard. Unfortunately the beauty of the area was marred by the presence of numerous plastic bottles and other garbage that littered the watercourse. On our return the group had a spectacular close-up view of a perched immature Ibis, as well as the eggs shells and young hatchlings of a recently hatched nest of Caimans. (See Caroni Plates on Pages 23.)

Aripo III Savanna...from Page 4

airlines combined.

Our next stop was a suitable parking area on the old train line at Cumuto past Savanna I. From there we proceeded on foot along the old train line to Guaico. The sleepers and rails were no longer visible, with the thoroughfare reduced to a narrow pathway and the sidings being completely overgrown. The landscape now was very different to the terrain I walked through some 30 years ago. Back then some of the railway tracks and sleepers were still exposed. The forest bordering the southern side of the trail was as expected but I remembered there used to be similar forest along the northern side but that had changed. The original cover was cleared to run high-voltage electrical lines and with repeated burning the forest never regained its former glory.

Along the trail numerous Pois Doux (Inga sp.) trees were in fruit. The drooping leaves of the Bois Bande (Parinari campestris) were seen in the distance. Other trees observed included Cuchape (Cocoloba latifolia), Bois Mulatre (Pentaclethra macroloba) and Bois Canot (Cecropia peltata). A common vine running over the shrubbery along the trail was the Savanna Flower (Xyris sp.) Mr. Chineebass demonstrated that this beautiful yellow flower with the red heart was edible and in fact tasted like pommerac.

On retracing our steps from Guaico we left the train line near lamp pole #89 following a dim trail north through Heliconias (*Heliconia psittacorum*), shrubbery and ankle deep water which was representative of the vegetation along the broad swathe cleared to run the high tension wires.

Next we entered undisturbed Marsh Forest, a characteristic of which is the many palm varieties found there. In other forest types palms occur but they are not prevalent and the species are limited. In this unique environment we saw many palms including Cocorite (Attalea maripa), Timite (Manicaria sacifera), Carat (Sabal mauritiiformis) Palma Real (Oenocarpus batua), Euterpe precatoria and E. oleracea. Moriche (Maurita flexuosa), predominant on the edges of the forest, is an uncommon palm found growing naturally only in four other areas in Trinidad namely Nariva, Los Blanquizales Lagoon, Erin Savanna and the Valencia Wildlife Sanctuary.

The group emerged onto Savanna III, an open treeless expanse dominated by grasses and sedges, clearly demarcated from the forest. The annual rainfall of 260cm would normally support trees (and there was an isolated island of forest in the middle), however, modified soil conditions enable edaphic factors to override climate in determining vegetation type. The area is extremely flat with poor drainage and often flooded in the Rainy Season. The soils at the Aripo Savannas consist of fine sand over silty clay high in kaolinite. Intense leaching removes iron and aluminium from the upper soil horizons. In the Dry Season drought conditions persist. Full exposure to the sun causes cementation, with iron oxides producing a plinthite material that changes irreversibly to hardpan (Schwab 1988). Intense mottling (red blotches) owing to iron and aluminium oxides occurs beneath the upper horizons but above the hardpan. In addition there is the almost complete absence of humus.

Near the forest border one had to tread carefully as worms produced numerous closely packed mounds of earth from soil material that passed through the earthworms' digestive

Cont'd on Page 19

On the food plant of Anteros carausius carausius Westwood (Lepidoptera: Riodinidae)

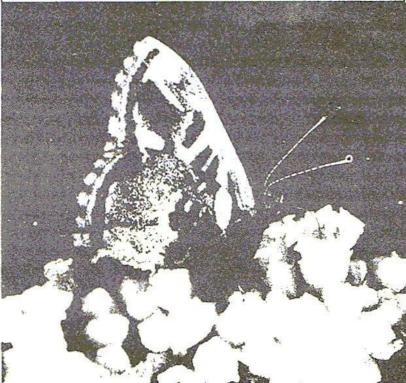
Matthew J.W. Cock

I first recorded this species from Trinidad on the basis of specimens that I had captured on Chacachacare Island in 1980, and an old, misidentified specimen in Sir Norman Lamont's collection in UWI from Gaspar Grande (Cock 1982). Since then, it has been found regularly on Point Gourde (S. Alston-Smith & M.J.W. Cock unpublished). In Cock (1982) I suggested "Bocas Brushfoot" as a suitable local name for this riodinid. A recent search of the internet showed that it is also referred to as the "Brilliant Metalmark", the "Fuzzy-legged Metalmark" and rather charmingly, the "Carousing Jewelmark". On balance, sticking to the scientific name may be a better idea!

DeVries (1997) states that the early stages and food plant are unknown, but J.P.W. Hall (pers. comm.) has pointed out that Kendall (1976) records A. carausius (as A. medusa Druce) trying to oviposit on the under surface of a leaf of Croton niveus Jacq., and reared a larva found on Phyllanthus adenodiscus Muell. (both Euphorbiaceae) in Mexico. Moreover, Janzen & Hallwachs (2003) have published 15 food plant records and larval photographs on their internet site of Costa Rican Lepidoptera caterpillars. These food plants are of five families and eight genera: Combretaceae (Conocarpus), Fabaceae (Andira, Diphysa, Inga), Flacourtiaceae (Casearia, Xylosma), Malpighiaceae (Byrsonima) and Rubiaceae (Lindenia). Nevertheless, the following observations are worth recording.

On 16 May 1999, I was collecting butterflies and caterpillars on Pointe Gourde when I found a pupa in a leaf shelter on a distinctive shrub, about 1.5 m tall with silvery white leaf under surface, and

Fig. 1 Adult male of *Anteros carausius* feeding on inflorescence of *Cordia curassavica*, Point Gourde, 16 May 1999 (M.J.W. Cock).



grey-green leaf upper surface, growing in a partially shaded situation, about half way to the main junction on the Point Gourde track. The pupa was pale, almost white, the shelter a leaf fold with holes eaten in it, and the pupa was formed within a weak silken cocoon inside the shelter. I examined the plant closely enough to see associated feeding which suggested that this was the correct food plant, and not just a convenient place to pupate, but thinking this was a moth pupa, I made minimal notes at the time and took no photographs or herbarium specimens of the food plant. Nine days later I had a pleasant surprise when a male Anteros carausius emerged.

The emerged pupa is 12 mm long, smoothly rounded with no projections or hair tufts; it is translucent white; spiracles T1 dark; abdominal spiracles white; short pale setae on abdomen. The cast L5 skin is white, with long white setae, while the head capsule is rounded, shiny translucent white.

Cont'd on Page 20

A NEW LIZARD?

Matt Kelly

April 18, 1998

Around 8:30 AM, I was hiking alone up in the hills high above the Bloody Bay River Valley on Tobago. Walking through deep bush, up the spine of a steep ridge, with a river below on either side, my guess was that I was at about 700 feet of elevation. The day was already getting oppressively hot, and there had been a slight rain the night before. I happened to glance upward, when my eye instantly locked on a strange sight. Even from a distance, I knew the lizard I was looking at was unusual. He was perched on the side of a tree, face down, watching me warily, from about 10 feet off the ground. I knew I could not let this fellow escape. I had never seen these colors on any anolis lizards I'd ever seen in T&T.

I slowly climbed up, and quickly out-maneuvered him. Now, I had this frustrated fellow in hand. I am not a trained herpetologist, nor an expert, but I relate my observations here, because I have a hunch that I found someone unusual.

He appeared to me to be of the genus, *anolis*, although the shape of his head was more pointed, triangular, or arrow-shaped than other anole lizards on Tobago such as the common *anolis richardii*, (these are the larger, dull-green anoles you find on tree trunks near the beach). This new lizard's body was not as elongated as other anoles' I'm familiar with on Tobago, being a bit shorter and stockier, and just slightly more plump. He was about 6.5 inches from snout to vent, and about 10.5 inches from snout to tail. His colour was a bright lime green on the dorsal side, and universal in the shading of the colour, none lighter or darker anywhere. He was bright white down the whole underside length of the body and tail, with universal colour, and no shading anywhere

As soon as I caught him, he hissed at me, opening his mouth, and revealing the inside of his mouth and throat to be all a dark black. I wondered if this was the natural color of his mouth, or was he ill? I determined this was the natural color. He was pretty powerful for his size.

The most remarkable thing about this "leopard lizard" was his markings. He had five very distinct elliptical or oval-shaped markings on each side (see illustration). Three above, in the mid-section, and two smaller-sized below, above the hip joint. Each oval marking was divided evenly down the mid-dle into the two contrasting colors of white on the forward section, and black on the rearward section (see illustration).

I gently pulled down his dewlap to examine the color. I believed this could give a clue to the habitat he comes from, or his peculiar life-history traits. He did have a dewlap, which appeared designed for display. His dewlap was all white. The dewlap seemed not very well developed, as in the example of anolis richardii. This could be for three possible reasons:

- 1. He was a juvenile, and not fully mature yet (I did not feel this was the case though).
- 2. He was a she, and possibly the females of this species either,
 - a. don't have as fully developed dewlap as males of their same species, or
 - b. just don't have as fully developed a dewlap as other anoles in general, or
 - c. don't display much, or at all.
- 3. This species uses other methods of display, such as other body markings, or behaviour, and does not rely so much on the dewlap in its communications and/or behaviour.

I really needed to document this finding in some way. I did not have a camera, (and ever since, I always travel with one). I did not want to take this lizard as a specimen for these reasons:

This lizard species may be extremely rare, and may even be limited to a very local population.

Therefore taking one healthy fellow out of the local gene pool could have devastating effects on the

future viability of the race.

- I did not wish to traumatize this creature more than necessary.
- I am ethically opposed to the taking of any life.

I drew an illustration and wrote a description when I returned home. I have held off in bringing this finding to the public, in the hope that I could find another one and get many detailed photos. Maybe someone will recognize this lizard and can tell me the name.

I have returned to the area many more times since, but to no avail. I will keep returning, and therefore offer this information now. As is. For now...

In further study, I find there is a tremendous amount if ongoing research into the "adaptive radiation" of the Caribbean anole lizards. Evidently, the genus of anole lizards has the characteristic of being able to successfully evolve into about 6 pre-determined natural niches. These fascinating lizards appear to evolve naturally into the same half-dozen niches, but by creating different and unique species for each different island they inhabit. Out of as many as 400 species of anoles, about 138 species have been identified fitting one of the 6 different characteristics in the Caribbean.

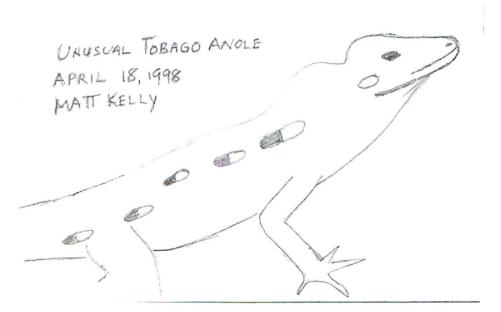
The less-slender, slightly-stockier build of my Tobago "leopard" lizard seemed more characteristic of an upper limb, or canopy dweller. I hope to find this lizard, or one of his relatives again soon, and I'll report back.

Sources:

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Unusual Tobago Anole: April 18, 1998

FIELD TRIP REPORT

North Post to Macqueripe John Lum Young

North Post, located on the ridge that forms the northern watershed of the Diego Martin Valley, sits on the summit of Pointe-a-Diable which rises sharply from the Caribbean Sea to 237m. Since Spanish times North Post has been serving as a signal station. In olden times observers would warn of approaching enemy ships by signalling with flags and balls to Cumberland Hill / Fort George that in turn relayed messages to Port of Spain. Today Telecommunication Services of Trinidad & Tobago (TSTT) maintains a wireless station on the site and international telecommunications protocol requires the company to monitor shipping radio frequencies for distress signals by sea craft.

The trail proceeds westward along the ridge. On the left there is a scenic view of the northern Diego Martin Valley with the villages of Patna, Waterwheel and Bagatelle. Above the eastern hills of the valley, Paramin, the highest village in Trinidad, was partly shrouded in the morning mist. On the right, the drop to the sea was precipitous. Looking back to the east the bird sanctuary of Saut d'Eau Island

could be glimpsed.

The trail initially passed through secondary growth as the area was under plantation cultivation in times past, evidenced by old cocoa trees. Some springs were flowing and this was good to see as the writer passed this way a few years before and the streams were dry in spite of the trip being made in the Rainy Season.

The route continued westward gradually descending along the contours entering less disturbed forest, except for relatively small areas that migrant gardeners had cultivated and abandoned. Some huge schist boulders were noted along the trail. Strewn on the forest floor was a yellow, rounded fruit with a sparse, sweetish pulp. Ray Martinez advised that this edible fruit was the Penny Piece (*Pouteria multiflora*) and the adult tree was a medium sized evergreen about 10m tall.



A view of the landscape

The descent continued and the sea could be heard smashing onto the rocks. In the morning sunlight, the copper-coloured trunk of the Naked Indian (Bursera simaruba) was pleasant to behold. B. simaruba is a medium-sized deciduous native ornamental common to dry coastal forest in both islands. The thin papery bark when peeled off by touch exposes a smooth, moist, dark green layer in stark contrast to the dry outward appearance.

The trail approached a stand of coconut trees and descended to about 30m elevation before climbing towards Tucker Valley and Macqueripe. The track petered out on a large bachac nest. After circling to find the way, the trail was found neatly hidden behind a large Silk Cotton (Ceiba pentandra).

Emerging on the paved road leading to the Macqueripe Road the group proceeded to the waiting vehicles.

Management Notices

Reminder

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NOTICE

Visit the website at http://www.wow.net/ttfnc to view photos from the Suriname Trip as well as to see full colour Plates of the Botany Group Trips reported in this issue's Bulletin.

Welcome New Members

Peter O'Brien Harris Bobby Oumdath

William J. Alexander Phillip Tompsett Cecilia Mitchell

Ian Stuart Brook

Publications

The 2003 Issue of the Living World Journal has been published. Please collect your copy at the next general monthly meeting.

- Members are asked to note that copies of the Native Trees of Trinidad and Tobago are still available for purchase at TT\$80.00 per copy.
- Issues of the Living World Journal from 1892—1896 are now available on one CD.

Cost:

Members:

TT\$175.00 plus postage

Non-members:

TT\$200.00 plus postage

Thanks

To Nora Jones for donation of 32 CDs of Issues of National Geographic from 1888—2000 for the Club's Library

To Deo Maharaj for Scanning Living World Magazines to create one CD.

FIELD TRIP REPORT

Tobago May 23-25, 2003

Jo-Anne Nina Sewlal

Twenty-six members went on the annual field trip to Tobago, departing on Friday 23rd, by plane or ferry. We boarded our vessel the M.V. Beauport, promptly at noon and departed at 2.pm for our 6 hour ride to Tobago. The ferry's facilities included a cinema, 2 restaurants and a bar. Unfortunately, the cinema was closed on our trip. There were lots of places to sit and sleep and, of course, there was a great view from the deck, and a good drenching when the waves broke over the sides of the ship. Our route took us through Second Boca located between Monos and Huevos. This afforded us a view of the northern coastline of Monos not often seen on the usual rides to Chacachacare. The base of the island was lined with caves, cut into the cliff by wave action. From the deck we saw 2 dolphins jumping among the waves. Schools of flying fish also jumped out as the ferry cut through the water.

On arrival at the docks in Scarborough we awaited the other members who came by plane. Some opted to patronise the only KFC, before departing for Man-O-War cottages in Charlotteville, on the north-eastern side of the island, about an hour's drive from Scarborough along Windward Road. The Turpin family built the cottages on what was originally Charlotteville Estates Ltd. comprising 445 hectacres purchased by their family in 1886. It was a working cocoa plantation until forced out of operation in 1986, due to economics, but some cocoa trees are still present.

Saturday's itinerary included a trip to Little Tobago or Bird of Paradise Island as it is also known, the highlight of the weekend. We arrived at the Speyside jetty at about 9.30am for the boatride to Little Tobago. On the 12 minutes journey one realises that Little Tobago is not as little as its name suggests. On landing we were greeted by a dilapidated hut and a sign noting the rules to observe while on the island. From Little Tobago one had a clear view of Goat Island, the former residence of the ornithologist James Bond, who published several checklists of West Indian birds between 1959 and 1970, as well as a Collins Field Guide to West Indian birds.

Little Tobago is 101 hectacres in area, located 11° 18' North Latitude and 60° 3' West Longitude, about 2.4 km from Speyside on the east coast of Tobago (Boodram 2001). Its topography consists generally of steeply sloping mountains and sheer cliffs (Boodram 2001), having a maximum altitude of 137m (Comeau et al. 1992)*. There are no watercourses only a single natural spring, which is dry for several months of the year (Dinsmore 1969, Niddrie 1980)*. To date there has been no classification of the soils on Little Tobago (Boodram 2001).

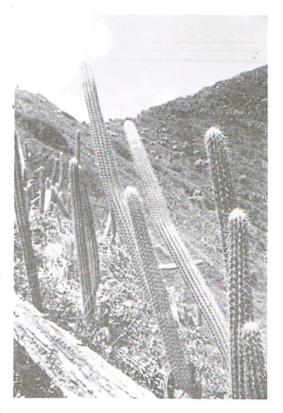
As early as the 17th and 18th centuries the island was used as a rendezvous point by the Caribs (Niddrie 1980)*. The island was purchased in 1918 by William Ingram. Being an avid bird lover, he obtained 24 pairs of Birds of Paradise (*Paradisia apoda*) from Aru Island, New Guinea releasing them on Little Tobago (hence the island's other name). Cultivation has occurred on parts of the island, notably in the 18th century for cotton, which were more productive than some parts of Tobago. However cotton could not compete on the European market and was discontinued, and the land reverted to deciduous forest. Sugar cane was also cultivated but, like cotton, was abandoned due to transportation and other difficulties. The island was declared a wildlife sanctuary in 1928 (Thelen & Faizool 1980)* and was administered and patrolled during the working week by the Forestry Division, Ministry of Agriculture, Land and Marine resources section.

Evidence of the Forestry Division's presence included strategically maintained bird feeders near

to wooden observation posts along the trails, and a dilapidated forestry station with a long, wide gallery that facilitated good views of the birds.

Trees and plants seen in Little Tobago included Naked Indian (Bursera simaruba), Coconut Palm (Cocos nucifera) near the jetty, an unidentified palm and a Chennet tree (Melicoccus bijugatus) close to the forestry station. The dry season was felt and evidenced by the presence of many Cactus sp. Bamboo vulgaris was also seen. From the second observation hut we saw Yellow Poui (Tabebuia serratifolia) dotting the nearby hills. Other common names for the T. serratifolia include Gold Tree, Sunshine Tree and Spring Bells. It is the national flower of Venezuela. It is also known as the strongest tree and its wood is dense, with a single cubic foot weighing up to 27-36kg. After blooming, rains can usually be expected (Hargreaves and Hargreaves 1965).

Notably few insect species were seen during the trip. Perhaps their populations were kept down due to predation by the wild fowls. Despite this, two colonies of the termite *Nasuititermes costalis* and an unidentified species of ant were seen. Spiders observed included those belonging to the family Pholcidae and Agelenidae, and from the genus *Argiope*, which had a heavy zig-zag pattern of silk around the centre of its orb web. The characteristic funnel webs of agelenid spiders were prolific



Cacti on Little Tobago

on the trails visited, mostly at the base of the epiphyte *Anthurium jenmanii*. Although ground vegetation is sparse, this plant is the most frequently occurring epiphyte with the highest relative coverage occurring among ground flora (Boodram 2001).

Morris (1976)* listed 58 avian species for Little Tobago, including 33 species which bred on the island. On our field trip we noted 12 species. Tropical Mockingbird (Mimus gilvus), Blue-gray Tanager (Thraupis episcopus), Blue-crowned Motmot, (Momotus momota), Red-billed Tropicbird (Phaethon aethereus), Brown and Blue-faced Booby (Sula leucogaster) and (Sula dactylatra) respectively, Bare-eyed Thrush, (Turdus nudigenis), Sooty Tern (Sterna fuscata), Magnificent Frigatebird (Fregata magnificens) and Laughing Gull (Larus atricilla). Two lizards were seen. Dinsmore (1970)* noted that several bat species, 7 lizard and one snake species inhabit the island.

We were very fortunate to have Dr. John Cooper who, with his wife, was exploring the possibility of conducting genetic studies on the domestic fowls said to have been introduced to the island in 1788. A tour guide we met on the island said, however, that the fowls had arrived only 50 years ago. A few more adventurous members went to the other side of the valley opposite the second lookout.

On returning to Charlotteville most rested, some went for a swim and others patronised one of the local restaurants, Sharon and Pheb's. Later that evening nearly the entire group met and limed late into the night over fish broth.

On Sunday morning, around 9: 45 a.m. about 15 members set out for the Fort Campbelton lookout. Then we headed for Campbelton's Bay nestled between Charlotteville and Hermitage Bay. We passed a couple of old cocoa houses, a reminder of the cocoa estate of bygone days.

On the way, we saw lots of Julie Mango trees, the Tobago Cherry and the less popular Yellow Flamboyant. Other plants included the Jumbie Beads (Abrus precatrious) which grow on a vine, and Bamboo vulgaris. Near the entrance to Campbelton's Bay a large collection of Gin-Cont'd on Page 18

Opinion

Looking Back

Jo-Anne Sewlal

Looking back on my first year with the Field Naturalists' Club, I have been to field trips, monthly meeting, panel discussions, and a book launch – by no means boring.

Let me begin by talking about the monthly field trips. It is refreshing to know that there are groups that are genuinely interested in nature and not just walking through the bush, liming and getting drunk, and calling that getting close to nature. What I have also found is that although the club may visit the same location for their field trips over the years, they are always different. But if one had been there before, one always had the option of going to find a cave or to map a new trail for future trips with more experienced club members.

I must also congratulate our field trip leaders, Dan Jaggernauth and John Lum Young, for being so efficient, which allowed us to complete our scheduled trips and sometimes go for unplanned but supervised exploring with other willing members of the group, and still arrive home at a decent time.

Next, there is the monthly lecture series which, I must admit, I have not attended on a regular basis due to my postgraduate studies at UWI. However, those that I have attended have been most informative and some quite entertaining. One that sticks out in my mind is, "Reptilia of Trinidad and Tobago" by Hans Boos.

Finally, there is the publication of the quarterly bulletins. This is very useful in documenting the flora and fauna of Trinidad and Tobago and how they have changed over time. Since, as I mentioned before, the club has visited the same place on more than one occasion over the years.

All in all, the club has fulfilled my criteria as one that is concerned about the environment and is promoting education on the country's environment. So to the Trinidad and Tobago Field Naturalists' Club – keep up the good work.

Jo-Anne Nina Sewlal Dep't of Life Sciences University of the West Indies

Nature Notes

The plants found along the trail from Teteron Bay to Scotland Bay

The Field Naturalists' Club - Botany Group walked from Teteron Bay to Scotland Bay on Saturday 15th March 2003 observing the diverse vegetation that make up the Seasonal Deciduous vegetation along the western peninsula of Trinidad.

The plant list was compiled by Dr. Victor Quesnel (Trinidad and Tobago Field Naturalists' Club) and Mr. Winston Johnson (Trinidad and Tobago National Herbarium).

Plant List

Abrus precatorius Acnistus arborescens Acrocomia aculeata Adiantum villosum Aegiphila obovata Albizia niopoides Amaioua corymbosa Andira inermis Anthurium jenmanii Apeiba schomburgkii Apkelandra pulcherrima Bambusa vulgaris Basanacantha phyllosepala Bidens alba Blechum pyramidatum Bredemeyera lucida Bromelia plumieri Brosimum alicastrum Carica papaya Casearia guianensis Casearia spinescens Casearia sylvestris Castilla elastica Cecropia peltata Cedrela odorata

Ceiba pentandra Centrosema pubescens Chromolaena odorata Chrysophyllum argenteum Cissampelos pareira Citharexylum fruticosum Clidemia hirta Cnidoscolus urens Coccoloba fallax Cocos nucifera Combretum fruticosum Copaifera officinalis Cordia alliodora Cordia curassavica Cordia panamensis Costus guanaiensis Costus scaber Coursetia ferruginea Coutarea hexandra Crotalaria retusa Croton gossypifolius Croton hircinus Cupania americana Desmanthus virgatus Desmoncus polyacanthos

Dioclea guianensis Diospyros inconstans Dipteryx odorata Dracaena fragrans Enicostema verticillatum Erythrina pallida Erythrina poeppigiana Erythroxylum havanense Eugenia dussii Euterpe precatoria Ficus nymphaeifolia Flemingia strobilifera Genipa americana Gliricidia sepium Gonzalagunia hirsuta Gouania velutina/polygama Guarea guidonia Guettarda odorata - multistemmed shrub with very few leaves Heliconia bihai Heliconia psittacorum Heteropterys macrostachya Hiraea reclinata Hura crepitans Hylocereus lemairei Hymenocallis tubiflora

Cont'd on Next Page

Olyra latifolia Roupala montana Hyptis suaveolens Roystonea oleracea Oplismenus hirtellus Indigofera suffruticosa Rudgea hostmanniana Panicum sp. [?maximum] Inga fastuosa Sabal mauritiiformis Justicia secunda Passiflora serrato-digitata Sansevieria hyacinthoides Paullinia pinnata Lantana camara Schizachyrium condensatum Peltogyne floribunda Lasiacis anomala Petrea arborea Securidaca diversifolia Lonchocarpus benthamianus Senna bacillaris Philodendron acutatum Lygodium venustum Sida acuta Mabea occidentalis Phoradendron sp. Smilax (probably S. cumanensis) Piper aduncum Macfadyena unguis-cati Solanum lanceifolium Piper marginatum Machaerium robinifolium Piper tuberculatum Spermacoce verticillata Maclura tinctoria Piptocoma acuminata Spondias mombin Manilkara zapota Pisonia cuspidata Stachytarpheta jamaicensis Maranta gibba Stigmaphyllon finlayanum Pisonia eggersiana Maytenus tetragona Swartzia pinnata Pitcairnia integrifolia Merremia glabra Pithecellobium unguis-cati Swartzia simplex Merremia quinquefolia Tabebuia serratifolia Pleonotoma variabilis Merremia umbellata Trema micrantha Miconia virescens Pluchea carolinensis Triumfetta lappula Protium guianense Monstera sp. Vitex capitata Mucuna pruriens Protium sagotianum Waltheria indica Psidium guajava Muntingia calabura Warszewiczia coccinea Myrospermum frutescens [fallen fruits] Psiguria umbrosa Wedelia caracasana Pteris vittata Ochroma pyramidale Wissadula contracta Oeceoclades maculata Rhynchospora sp. Xiphidium caeruleum Rollinia exsucca

(See Scotland Bay Botany Trip Plates on Pages 20-22)

Striped Owl

Matt Kelly May 6, 1999

About 2:30 p.m. on May 6, 1999, my wife, Mary, and I were driving west on the Windward Road heading from Roxborough towards Scarborough. As we drove through Glamorgan, three local boys, probably in their late-teens or early 20's, nearly jumped out in front of our car, shaking a big, strange-looking bird at us, and demanding we stop and buy it from them. I was inclined not to stop and support this kind of behavior. But, the bird was something unusual. I couldn't recognize it as something common.

We stopped. The boys showed us a young owl they had in a cardboard box, and demanded we buy it for \$100 TT. The sight of this rare, beautiful and terrified bird, being shaken in front of passing vehicles by these uncaring boys made me furious. I told them what they were doing was against the law, and I was heading to the nearest phone to report them. One rasta boy, about 20, who seemed to have put himself in charge of this affair, cooly told me, "This is my hustle, man." We told them that we know the local laws, and it is a crime to interfere with wildlife, especially in the "closed" season.

I asked where they got this bird. They said they found the nest, and climbed a tree, and took this young bird out. They didn't know what kind of bird it was. They figured "a tourist will buy it, and take it home."

The other boys seemed to be getting nervous. The rasta boy said he'd take \$50. I didn't want to give him anything. The boys were getting ready to split, with the owl. Mary and I thought for a moment, and figured we had to leave with that bird. It probably would be the bird's only chance. I took out \$40, and offered it to them. They took it and gave us the owl in the cardboard box.

We brought the owl back to our place in the country near Englishman's Bay. He appeared to be in the late stage of being a juvenile. I wondered if he may be viable on his own, and let him try to fly. Evidently, he was not ready to fledge yet and could only flap, run and jump about 15 feet. We would be leaving T&T in 6 days and could only "parent" him till them. I hoped he could fledge in 5 days!

The owl was about 12"-13" tall. He had a white circle around his face, similar to a barn owl, but he was not a barn owl. He was striped, and of a brown-orange color. He hunched up his wings, above his back, and hissed at you when you came close to him. This was his defense. I didn't try to see if he would bite me, for his beak looked pretty fearsome. He had huge, beautiful eyes.

I put him in our tool shed, with a pan of water, and a just-killed 10" snake we took from the road, and left him alone for a while to calm down. In handling this beautiful bird, I was amazed at the powerful needle-sharp tips he had on his talons. I used my heavy-duty work gloves to handle him, and even



then, he was able to pierce through the tough material with ease. I was not sure what kind of owl he was. At the time, the best I could make out from ffrench's book was a "Striped Owl."

Even though it was morally difficult for us being strict vegetarians, we went out and bought a package of frozen chicken parts.

We came back the next morning with a piece of thawed chicken, and a hardboiled egg. The owl had not touched the snake, but the water level in the pan was down considerably. I mashed up a piece of raw chicken with my cutlass, and of

Cont'd on Page 18

ger Lily or Ostrich Plume Ginger or Red Ginger (*Alpinia purpurata*) was seen. It originates from South East Asia and is used as an ornamental. The 'flowers' are really a collection of waxy looking bracts with the small white flowers hidden inside (Lennox and Seddon 1980). *Heliconia* sp., also known as Wild Banana or Lobster's Claw, like the Ginger Lily, is an ornamental with bracts (Lennox and Seddon 1980) and was also commonly seen.

At Campbelton's Bay most members rested on the beach while others swam and explored. We found the remains of a structure with two compartments, initially thought to be a fort. But because of its low altitude and thick walls, it was most likely used for storing gunpowder or housing prisoners. A rare find, according to Dan Jaggernauth, was a coconut palm that possessed two sets of roots. The first set was found about 2m above the ground. The second was rooted in the sand, however; the trunk between the two sets of roots was noticeably thinner than that above the first set. This could possibly be caused by an accumulation of moisture at the position of the first root system.

Afterwards, most converged at Jemma's Restaurant at Speyside for lunch. The original plan that afternoon was to go to Pirate's Bay located about a 15-minute walk from the Cottages. However, most members just opted to explore the island in little groups. At around 4.30pm those leaving by plane departed, and at about 6.00pm those by boat enjoyed our last ride through the Tobagonian countryside.

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From Page 18

fered small pieces to the owl on the end of a long thin piece of bamboo. He warily took some pieces, and ate them. We refilled his water, and left him again for a while with a plate of mashed up chicken meat.

When we came back later in the day, neither the egg nor the raw chicken was touched, but the water level was down a bit again. I got the thin bamboo stick, and fed him some more raw chicken. He was evidently still accustomed to being fed.

The next day, I offered him the chance to fly. He could only run, flap and jump like the previous time. We needed to find him "parents" who could fledge him. We contacted our friends, Pam and D.J. Phillips, who run the Tobago Branch of the T&T S.P.C.A. We explained the situation and they agreed to foster-parent the owl till he fledged. We judged that it wouldn't be long. We were getting quite attached to this lovely young guy (or girl?). He was feeding from me regularly now, although still hesitatingly.

On Sunday, May 9, we drove our owl to the Phillips' home. We set the owl up in a shady spot in the yard inside a dog's transportation (carrying) cage. We put a stick inside for him to perch on. The Phillips brought out some raw and unspiced sausage. I offered the owl some from my hand, and he took some. We felt he was in good hands when we left.

In following up with the Phillips' they related that the owl ate the food they offered him for about two more weeks. They had heard from someone that other owls such as this one had been seen in the hills above Moriah. They took the owl up there, and opened the cage. He flew away, into the bush. We have had no reports of any further sightings. We all hope he is still doing well there with the other Striped Owls of Tobago.

B

From Page 6

tract. These worms (about 10cm in length) produce a hump of earth, free of cemented soil and therefore play an important role in soil development in this harsh environment. Many

plants grew on the humps as opposed to the depressions, including a variety of Sphagnum Moss (Sphagnum perichaetiale) that is unique to the Aripo Savanna.

In order to thrive in these harsh conditions some of the Savannas' plants made interesting adaptations that included being parasitic and insectivorous. Strung over the grasses and sedges was the orange-coloured parasitic Love Vine (*Cassytha filiformis*) that feeds off the savanna plants. Also identified was the *Drosera capillaris* (Sundew) a very small plant (less than 5cm in height) with club shaped leaves covered by tiny glandular hairs that secrete sticky droplets to trap small insects. The droplets contain enzymes necessary for digestion and absorption. Once a small insect touches the leaves the hairs grow quickly and fold around the insect. This increased leaf surface in contact with the insect speeds up the rate of digestion (Johnson 1985).

Other insectivorous plants at the Aripo Savannas number 13 species of Bladderworts (12 *Utricularia* and the *Genlisea pygmaea* of which the *Utricularia adpressa*, *U. benjaminiana* and *G. pygmaea* are very rare). Bladderworts (LENTIBULARIACEAE) thrive in aquatic or semi aquatic conditions and therefore are more prevalent in the Rainy Season when the Savannas are under water. In the Dry Season they can be found in ditches where water collected. When the Savannas dry out, the plant dies and its seeds wait for the next wet cycle to germinate. These plants have tiny bladders, the size of pinheads, attached to an elaborate root system. The wall of each bladder is thin, usually only two cells thick. The bladders function on the basis of a pressure differential. Once the valve opening into the bladder is sealed, the hairs lining the interior wall absorb the water within the bladder. This creates a negative pressure inside the bladder. Four sensory hairs located on the valve's exterior cause the valve to open when touched by a small unsuspecting insect. As a result of the negative internal pressure there is a sudden influx of water into the bladder and the flow carries the insect with it. Chemical secretions within the bladder then aid digestion (Withycombe 1924).

It is a pity that apart from a newspaper article by Professor Kenny there does not appear to be any effort to ensure the preservation of the unique habitat that comprises the Aripo Savannas and Scientific Reserve.

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Trinidad and Tobago Field Naturalists' Club Botany Trip to Scotland Bay Saturday $15^{\rm th}$ March 2003



Group Members



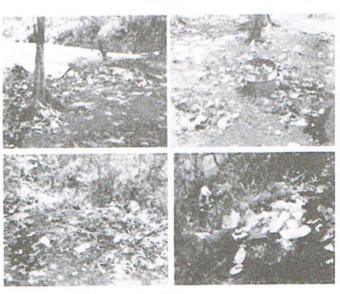
View of Tetron Bay



Group resting



Scotland Bay



Garbage at Scotland Bay



Peltogyne floribunda Purple heart



Understory vegetation Anthurium jenmanii



Piperaceae Piper aduncum



Piperaceae



Genipa americana



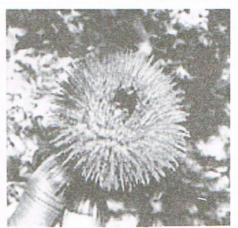
Pitcairnia integrifolia



Convolvulaceae Merremia glabra



Cow Itch Mucuna prariens



Apeiba schomburgkii



Bignoniaceae Cydista aquinoctialis



Securidaca diversifolia



Acanthaceaea Aphelandra pulcherrima



Senna bacillaris

Trinidad and Tobago Field Naturalists' Club Botany Trip to Caroni Swamp Saturday 18th October 2003



Ceratopteris thallictroides fern growing along waterways Mangrove



Campyloneurum phyllitidis fern species amongst the prop roots of a Red



Cyperus ligularis (Sedge)



Neil and Dan show the propagule of the Red Mangrove - Rhizophora mangle



Dan stands on the pneumatophores of a fallen Black Mangrove - Avicennia germinans



The sedge dominated marshes of the Caroni Swamp



John and Lester look on as Victor describes the pinnate leaves, winged rachis and the red fruits of *Paullinia pinnata*

Trinidad and Tobago Field Naturalists' Club P.O. Box 642, Port of Spain, Trinidad and Tobago

From Page 7

The photographs of larvae on Janzen & Hallwachs' (2003) website show a rather nondescript white caterpillar covered with long white setae.

I did not return to Point Gourde again until March 2003. I had no trouble recognising the food plant again, and pressed samples (M.J.W. Cock No. 0265) were subsequently identified by Winston Johnson of the National Herbarium as *Croton niveus*. Philcox (1979) reports that *C. niveus* is widespread in the Caribbean and Tropical America, but "in our area this plant is known only from the Bocas Islands and the north-western peninsula". Specifically, he gives records from Chacachacare, Monos, Gasparee, Carrera Island, Point Gourde Islands, and Staubles to Teteron Bay. I can add that it is quite common along the Point Gourde track, at least in the forested section from the bottom to the main junction. The close parallel between the recorded distribution of the food plant and that of the butterfly suggests that this is the only food plant in Trinidad. Furthermore, the match between the white larva and pupa and the white leaf under surface suggests a close relationship. However, the diversity of food plants recorded by Janzen & Hallwachs (2003) suggests it may be premature to leap to this conclusion.

I draw this information to the attention of local collectors, to encourage the confirmation of this record and discovery of further details of the life history of this little known species.

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Kendall, R.O. (1976) Larval food plants and life history notes for some metalmarks (Lepidoptera: Riodinidae) from Mexico and Texas. Bulletin of the Allyn Museum 32, 12 pp.

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Editor's Note

Guidelines for Articles:

Font Type: Times New Roman. Font size: 12 point. Maximum Length: 1,750 words (approx. 3 pages).

You can email your articles to any of the following: 1) mendsr@bp.com 2) cpierre@energy.gov.tt 3) ttfnc@wow.net, or to any member of the Management Committee.

The deadline for submission of articles for the 3rd Quarter 2004 issue of the Bulletin is August 15, 2004