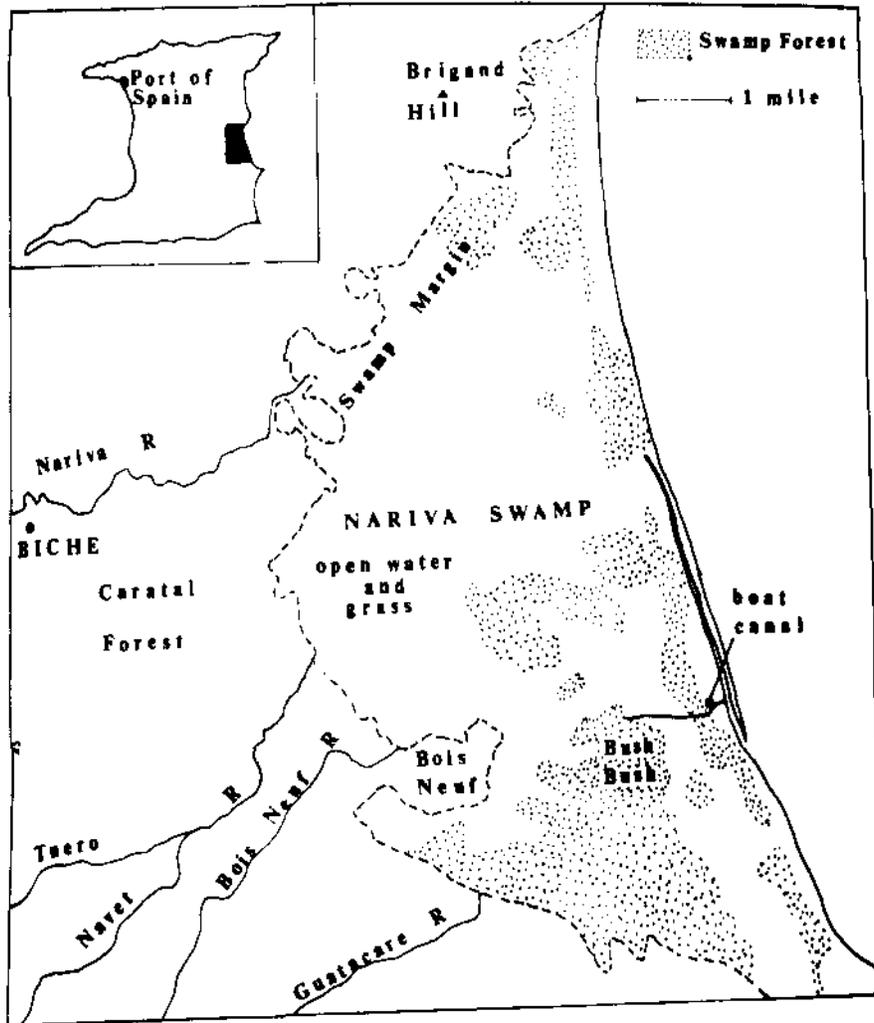


BUSH BUSH FOREST AND THE NARIVA SWAMP

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Map showing the position of Bush Bush Forest in the Nariva Swamp

For those who have visited the Brigand Hill lighthouse or, perhaps fortunately, have climbed to the top of the 884 foot high Mt. Harris, the view to the south surely must have been fascinating, indeed, somewhat awesome. Travellers on the Cocal road making their way to Mayaro are hardly aware of the existence of a vast inland swamp a few hundred feet to the west of them. The Nariva, some 32 square miles of fresh-water herbaceous swamp, is Trinidad's largest marshland; some 10 miles long, it is about 5 miles at its greatest width. Along its northern border near Caltoo Trace, a small portion of it has been reclaimed for rice culture but for the most part the swamp is a wild wasteland, difficult of access and known but to a few woodsmen, hunters, fishermen and naturalists.

Unlike the Caroni swamp with its large stretches of open water (subject to marked tidal action) and characteristic growth of mangrove trees, the Nariva is of uneven depth, with little open water, and covered more or less uniformly with a dense matting of so-called Cascadou grass, whose tangled mass of roots and stems emerges from the water in places to a height of 4 to 5 feet. In fact, when viewed from above such as at Brigand Hill or from an airplane, the swamp appears to be a great grassy savannah with no hint of the watery depths below. In some sections, however, particularly in the east and south, Moriche Palms and Palmiste (Cabbage Palms) grow in open stands, and elsewhere one finds extensive beds of 15-foot cane (**Cyperium sagittatum**) or the grotesque-looking aroid, **Montrichardia arborescens**. Other conspicuous plants include the Giant Sedge (**Cyperus giganteus**) and white-flowering **Crinum** "lilies". Only in the southern sections are to be found irregularly-shaped patches of high ground, islands in fact, and these are surrounded by swamp forests composed of palms and hardwoods such as Swamp Bloodwood, Sandwich Tree, Yellow Mangue and Water Olivier. Largest of these islands is Bush Bush Forest lying some 1½ miles west of the Cocal Road at the 46-mile post. Still further west an additional 1½ miles lies another conspicuous patch of high ground known as Bois Neuf island.

The eastern slopes of the Central Range drain into the swamp through several rivers, chief of which are the Navet (impounded near Tabaquite in 1959), Bois Neuf and Guatacara. These lose their identity soon after entering the Nariva. The bulk of the water drains from the area into the Atlantic through the short tidal Nariva River. Water levels in the swamp fluctuate widely. In the dry season, extensive areas often may be crossed on foot with relative ease but during wet weather the swamp is all but inaccessible except through a few man-made

canals. One of these was developed as a boatline by the Trinidad Regional Virus Laboratory when it initiated virus studies on Bush Bush island in 1959.

Starting from the 46-mile post on the coast road and proceeding westward along the boatline, one passes through a narrow belt of Red Mangrove, an intermediate zone of open swamp intermixed with lofty Palmiste, Wild Cashimar (Wild Sugar Apple, savored by monkeys) and Sandwich Trees and then an area of more or less open, grassy swamp with some growth of **Montrichardia**. Here unfolds a magnificent view of the vast open swamp with high points of the Central Range visible in the north. This open area is succeeded by dense, deeply shaded swamp forest dominated by Morich Palms and strongly buttressed Swamp Bloodwoods, a soft and luscious green festoon of aroids and other lianas through which the boat-line meanders until the high ground of Bush Bush island is reached. It is this last stretch, reminiscent of the Florida Everglades or flooded Amazonian swamp forest, which is most characteristic and impressionistic for the Bush Bush traveller. Here one can imagine (and at times see) "alligators" (caimans), Houillias (Anaconda), howler monkeys and gaudy parrots and macaws, the latter's raucous chattering adding depth to an already impressionable scene.

Bush Bush is a sandy, forested island. Irregularly shaped, it is perhaps $\frac{1}{4}$ to $\frac{1}{2}$ mile wide in most places and about 2 to 3 miles long. Its northern coastline has been mapped by the Virus Laboratory, but the southern borders of the island remain undefined owing to the proximity of other islets and intruding peninsulas of high ground. A more or less continuous canopy exists between Bush Bush Forest and the forested areas on higher ground to the south. The known part of the island consists of three peninsulas, the northerly projecting, finger-like Bush Bush Peninsula with its tip known locally as Restan, the larger, two-pronged Petit Bush Bush Peninsula, and the westward-projecting Big Bush Bush Peninsula. All three have fishing camps where periodically men come to net and trap the coveted Cascadou. The Virus Laboratory, in addition to providing a caretaker's camp at the end of the boatline and a staff house just south of the Restan area, cut and maintained many traces, thus making access to various parts of the island both easy and comfortable.

Monthly rainfall measurements were kept by the Virus Laboratory, commencing in 1961. Precipitation was found to be intermediate between that at Cocal Estate (4 miles to the north-east) and Newlands Estate (6 miles west near Biche), roughly averaging 80 to 90 inches annually. Temperature and humidity readings were kept during 1963 and 1964. During these years

the average monthly maximum temperature varied between 78.7 and 83.5 F and the average monthly minimum between 72.2 and 76.4 F (extremes 88 and 67 F). Relative humidity approached saturation during the nights in all months; during the afternoons the average minimum humidity was around 70% during the dry season and 90% in the wet season.

Bush Bush is covered with hardwood forest of the Evergreen Seasonal Forest type. It has a fairly well-defined canopy and an open forest floor characterized by Tirite and seedling trees. In the Restan area and at the tip of Big Bush Bush Peninsula repeated forest fires have left the forest sparser and lower than in the other sections. There is a great diversity of trees. Such woodcutting as occurred during the 10 years prior to the Virus Laboratory's activities was selective and did not alter the forest materially. In 1961, Dr. Wilbur G. Downs, erstwhile director of the Virus Laboratory, undertook a small sample tree survey in the center of Bush Bush Peninsula. In a block of forest 150 feet by 150 feet (half acre) there were 192 trees counted and measured. The forest profile was estimated to contain the occasional tree at the 100 foot level, a canopy at 70 to 80 feet, and a secondary canopy at 40 to 50 feet. Common trees include Mahoe, Bois Canot, Puni, Cajuga (Wild Nutmeg), Guatecare, Crappo, Laurier and the Cocorite Palm. Among the tallest trees are Yellow Olivier, Purple Heart and Silk Cotton. Strangler Figs envelope their victims and reduce them to rotten skeletons, be they palms or lordly hardwoods.

Separating Bush Bush proper from Petit Bush Bush Peninsula to the west is a small inlet known as Petit Bush Bush Swamp. The swamp here is characterized by the Sandwich Tree (Swamp Bloodwood or Cork Tree) interspersed with **Montrichardia**. The Sandwich Trees form a fairly continuous canopy at 25 feet and their sinuously buttressed trunks provide grotesque relief against the dark waters from which they emerge. In 1964 the Virus Laboratory built an elevated wooden causeway across Petit Bush Bush Swamp thus making the farther peninsula more accessible.

Epiphytes are not overly common on the trees, however several species of **Philodendron**, **Monstera** and **Anthurium** are known. There are four bromeliads of Wild Pines (**Gravisia aquilega**, **Aechmea bromeliifolia**, **A. mertensii** and **A. nudicaulis**). Ten orchids are now known. Wil Downs and T. Aitken found the aquatic orchid, **Habenaria repens**, growing in the boat line near the palm swamp forest 16th April, 1972. Nine species of orchid have been found; these are **Caularthron bicornutum** (the White Virgin Orchid, more commonly seen along the boatline), **Epidendrum stenopetalum**, **Coryanthes** sp. **Catsetum** sp., **Poly-**

stachea luteola, **Rodriguezia secunda**, **Oncidium ampliatum**, **Spiranthes acaulis** and **Triphora surinamensis**, the latter two growing in the ground.

The wildlife of Bush Bush Forest and environs is rich and varied. At least seven species of amphibian, 27 of reptile, 171 of bird and 59 species of mammal, including 32 species of bat, are known to inhabit the area permanently or semi-permanently. Included amongst the amphibians are the Paradox Frog whose tadpole is larger than the adult and the weird looking Surinam Toad, aestivating specimens of which have been dug up from the mud during dry season boatline cleaning operations. Reptiles include one crocodilian, 13 snakes, of which the fer-de-lance (mapipire balsin) and anaconda are the best known, 11 lizards and two turtles. Of the 400-odd species of bird recorded from Trinidad, 171 have been seen or collected in the Nariva Swamp area. Dr. C. Brooke Worth of the Virus Laboratory, with the help of fellow naturalists, has observed 114 species of birds distributed among 34 families in Bush Bush Forest proper. Dominant families include Manakins, Tanagers, Antbirds and Woodcreepers. There are 5 species of Parrots (including Macaws), 2 Owls, 2 Trogons, 11 Humming birds, a Potoo, Toucan, Limpkin and Guan among the more interesting forms. Of the 96 species of mammal (including 60 of bat) known from Trinidad, 59 species are known, or believed, to occur in Bush Bush. Included are deer, porcupine, anteaters, opossums (manicou) and various small rodents. Both Red Howler and Cebus monkeys are present and their bands are increasing in size and number following their decimation during the outbreaks of yellow fever during the 1950's.

These then are some of the rewards to be enjoyed in this captivating and unique (for Trinidad) wilderness. The nearby island of Bois Neuf is likewise rich in natural phenomena. It boasts one additional attraction, a fine mud "volcano" charmingly surrounded by lush growths of terrestrial bromeliads, some of which, such as **Hohenbergia stellata** and **Aechmea lingulata**, have not been observed in Bush Bush.

In closing, I am reminded of an article, originally entitled "Forest Voices", written one night in Bush Bush which appeared in the Guardian's "Nature Notes" series for 2nd October 1966. The title of the note as published by the Editor was "Cigale — shrillest of voices in the forest". Impressions gained in the forest of Bush Bush evoked the following lines: "To one unaccustomed to the forest, the sounds issuing therefrom may be strident, disturbing perhaps frightening. On the other hand, one who knows its animal inhabitants, particularly the birds, derives

great enjoyment in listening to the various calls as they conjure up in his mind's eye the owner of the voice.

Perhaps the most commonly heard sound in the forest is that of the Cigale, an insect whose immature stages are spent months or years (some species) below ground. It emerges to fly about briefly and rest on tree trunks where it sings its life away.

Punctuating the steady droning of the Cigales are the rather nondescript voices of small flycatchers, honeycreepers and tanagers. An antbird, following along at the head of a column of army ants, gives its halting, bouncing call.

A Black and White Manakin, holding court in its display grounds, snaps its wings which make a popping sound — thus its popular name “Casse-noisette” or nutcracker.

Suddenly nearby a Woodhewer voices its shrill, rollicking notes, to be answered distantly by its mate. A Hog Plum may be in fruit. Flocks of Amazon Parrots noisily descend to feed. Their harsh rapid chattering may be intermixed with an occasional more melodious drawn-out note. Yellow-tail Cornbirds hop about among the branches giving a constant “chuck”, but always there is the undertone of the Cigale.

As night falls the forest quiets. Near the swamp edge one hears the grunt and croak of frogs. Intermittently one may hear the eerie screech of the Crau or Limpkin — a solitary heron-like bird of the marshes.

Later the wind comes up. It may blow quite hard and sometimes brings rain. The wind whistles through the trees and branches fall; a steady pattering of leaves is heard on the roof.

As dawn approaches, the Howler Monkeys awake and bands of noisy animals move slowly through the trees to the feeding grounds. By 7 o'clock they are quiet again and so remain unless a squall of rain approaches when the old Howler raises his voice in strong disapproval.”