

C.S. ELTON

JOURNEY IN THE WEST INDIES, BRAZIL & COLOMBIA, 1965

(The black and white prints were made by Denys Kempson
{= D.K.} from my Kodachrome colour transparencies; some
photos by others named)

(This is the Top Copy, lodged with my family; 2nd Copy
will be lodged in The Royal Society archives)

Editor's notes:

Although based on notes and photographs compiled at the time, this report seems to have been written 1973-1975, with some notes & appendices added later. The manuscript is mainly typed with a manual typewriter on loose-leaf quarto, with many handwritten additions & corrections. Only the text-bearing pages were numbered with the many pages of illustrations and the notes at the end inserted without numbering. The original pagination is maintained with the numbers, when present, shown in text boxes, but for ease of reference, consecutive page numbers shown in { } are added to the header. Pages that begin or end in mid-sentence are shown as such. The typeface is expanded to 14 pt where the original pagination allows. CSE identified the photographic prints and other illustrations with (, k 1; I-1) etc. They are scanned to high resolution, so can be shown larger in the transcript than they were in the original, thus resolving more detail. Species names and proper nouns appear in italics, but other underlining is shown as such. Handwritten text and corrections are not distinguished from typing. Abbreviations are shown in full where the meaning is clear. Incomplete or ungrammatical sentences and inconsistent use of upper/lower case, number format, inverted commas etc. are unaltered and only blatant spelling errors are corrected. Editor's notes and explanations are shown in { }.

CSE's family mentioned are: son Rob(ert), wife Joy and daughter Katie.

JOURNEY TO THE WEST INDIES & SOUTH AMERICA IN JUNE-JULY 1965

Charles Elton

11 June. Rob drove me, with Joy, to London Airport, where the BOAC {British Overseas Airways Corporation} plane was supposed to start at 11.45 a.m., though it did not actually get off until about one. With a stop at Bermuda, where they sprayed the aircraft with insecticide and searched for insects, we reached Antigua at about 5.45 p.m. (but it was 4-5 hours more flying time than this different shows). Took a taxi up to the Sugar Mill Hotel, on a hill above the airport, Katie having booked a room for me there. It was hot, in upper 80s, and the windows were mosquito-screened but there was a roof fan.

12 June. Got up at dawn, about 6 a.m. and looked for birds from my balcony. In some fields below a few cattle egrets (*Bubulcus ibis*) were following horses and cattle about and several strange birds flew across. It was now I discovered that my new camera, Retina II F, had the shutter out of order, and I could take no photos. This was the camera that had already been sent back to Kodak factory to have a defect in the exposure meter put right. (Kodak took it back and eventually withdrew all II F).

By 9 a.m. I had climbed up into the very small plane for Montserrat, which takes about five passengers squashed together. It was a little misty, but in a quarter of an hour we reach the rough airfield on the east side of the island (Blackburne Airport). This lies below grand folded forest mountains (rising to several thousand feet in the centre of the island). Katie pushed cheerfully into the forbidden immigration room, and was turned out by a grinning black sergeant of police, who knew all about us. Through here, met Mrs Wade who had driven Katie across the island to fetch me. The winding hill road passes through such villages as Smoky Hill, Harris' Lookout, Streatham, Hodges Hill and Dyers Village. Katie had been at a big Government House dance until 5 a.m. and had to be dragged out of bed after three hours' sleep. K's letter described me at the Airport as "looking very nice in his new clothes, but of course the same old Dar".

Today was the Queen's Birthday, which is taken very seriously here, and there was a unit of cadet troops filling one of the streets, and a lot of people out and about though not in the town for their usual Saturday business. Katie got Bob Hare, an English engineer in the Agriculture Department to come and look at my camera, as he is an expert camera mechanic. He pronounced that the film was exposed by turning the cocking lever, and the shutter shut when one pressed the button! K. therefore very nicely let me use her Sportsmen camera and I took part of a film on it here and in Trinidad, which was successful.

12 June... As we were both tired, we had drinks and then rested most of the rest of the day, apart from a short walk through the hot town. At first sight it seemed very shabby, but in a few days I began to experience the charm of its nature and the friendly people. Even today they stopped and were introduced, and K. seemed to know everyone. And quite a lot of what you think is gimcrack and tawdry in the tropics turns out to be a means of keeping cool. But not all. I was staying at the Wade Inn, a rather newly built hotel right in the old town, belonging to Mr and Mrs Wade, coloured people who also ran a shop and insurance business. Katie was living with them as part of the family and they were evidently fond of her. Mrs Wade is short and solid, very kind but rather highly strung, always amusing. Mr Wade is large and imperturbable, but underneath with a sense of humour and was often pulling K.'s leg. The heat was not easy to get used to, and one sweated a lot (and in the first week or so I collected a good deal of prickly rash), but there are morning and evening breezes on this island that ameliorate it a lot. Here and throughout my journeys I ordinarily wore thin cotton vest and pants and socks, aertex shirt, terylene trousers, and ordinary brown leather shoes; for bush work (of which there was hardly any here), I had a brown cotton bush shirt with two buttoned pockets, brown drill trousers, and canvas basketball shoes with rubber soles, also a bush jacket (cotton, with 4 buttoned pockets) used only in mountain places or on boats. Terylene soft hat, later a Trinidad cotton white hat with a green underbrim and ventilation holes. I frequently carried a very light, blue, nylon raincoat in my fishing haversack, but wore it only once, – in the high wet paramo of Colombia.

13 June. Montserrat. An early breeze over underlying warmth, steep climbing sun, pigeons tumbling in the air above the houses. My room is mosquito-screened (rather inefficiently, and some got in and bit badly, – very small dark ones, probably from pools in the surface road drains where they go underground), but K. slept under a mosquito net, with her windows open. As at the Antigua hotel, breakfast was entirely British in character, unlike the rest of the food.

In the morning we went to the northern part of the island, driven by a very good young man, nephew of the Wades, John Wilson, together with a nice old gentleman known as “Uncle”, who was settling in a cottage being built, after many years in Boston. The steep hillsides are forested or scrubby, but mixed with small holdings, and it is not easy to distinguish this untidy tropical farming from wild land, though the bananas and breadfruits and mangoes stand out.



Postcard photo 1966 of Ohance Peak (bare patch due to a soufrière)

13 June.... Montserrat is shaped like a slightly asymmetrical guillemot's egg and is about five by ten miles, with three main mountains down the centre. It is beautiful and green. The steep forests come down in places to the road, and we stopped at a cold spring where all the tourists are expected to drink in order to bring them back again to the island. The trees, both live and dead, often have tufts of epiphytic bromeliads, a large and a small one, on them.

Coming back we made a detour down to Fox's Bay, where we were left (K. and I) for the middle of the day. Forest comes down to the shore, and contains dry features like clumps of aloes. There were manchineel (*Hippomane mancinella*) trees, which I was warned are very poisonous to touch (Core says they have a poisonous latex). The sand is almost black in places, and was extremely hot. I bathed with Katie in the warm sea, but the blistering sun overhead soon sent me to cover. K. lay and sunbathed, while I prowled about in the woodland edge. Out at sea a brown pelican (*Pelicanus occidentalis*) flew steadily past, and there were three frigate birds (*Fregata magnificens*) soaring, a dark male, a female with white breast and neck, and a young one with white head. They have scissor-like long black tails, and are large. On a tree in the shade was a minute hummingbird, dark metallic green above, with a light throat, and a crest and very short thin beak (= Antillean crested hummingbird (*Orthorhynchus cristatus*))). There were thrush-like birds in the canopy, and also an ani (*Crotophaga {sic, now Crotophaga}* ani) a black social cuckoo with a curious arched beak. Later on the shore rocks, a black-headed gull of some kind (= laughing gull (*Larus atricilla*)). Frigate birds diving to sea surface in long soars.

Many insects flew about, including a dingy-coloured "peacock" with two eyes, brimstone-coloured ones and whites; also dragonflies, a sandwasp, tiny ants (last on ground). Evidently the woodland shelter is sought for, and some of the trees had fruits on. At the base of some trees were brown masses of termite nests. There were no shells on the beach.

John collected us and we drove back to have a siesta, after a solid lunch. As a result of day my arms got rather heavy sunburn, and the top of my head, proving that the tropical sun is much stronger than it looks. But with polaroid glasses I never had any sunstroke or headaches at any time on this whole tour.

At teatime we were driven up to the house of the island's temporary English M.O.H. [= Minister or Health], Dr Smith and his wife. They were about to leave soon. There were also another volunteer, Steve Walker, engaged on soil erosion etc. (a good young man from the Lake District), and Patrick Smythe (livestock officer). It was very fascinating to listen to these white people eagerly and seriously discussing the island and its people and the ways and means and difficulties and aims.

13 June.... This dedicated purpose was my first experience of something I met with in other places during my journey. It has to work against a tremendous inertia of the populations involved.

In the evening we were driven up to the house of the Carlsons, who live in an old stone house with strange cellars and old rooms in the lower part. It was about 500 ft. above the sea, and catches a breeze that was cool enough to make me borrow a cardigan to wear after dinner. Mr Arne Carlson is a middle-aged Canadian, rather terse but tough and courageous and intelligent, and his wife Hazel and a rather racy woman Miss Fernie made a good but long party. Arne was training primary school teachers. Here we also met Mr and Mrs Cochrane, well-off people living in the "beachette" estate in the north-west of the island, also Canadians. Pretty dog-tired when I got back.

In the night dogs come out into the streets and start loud territorial barking, distantly answered from other quarters, but I conditioned the nearest one by banging the window at it.

Tonight I persuaded myself that the moon had suffered a slight eclipse.

14 June. Montserrat. Today we were invited to visit the country estate of Mr Kingsley Howse, who lives next door to the hotel with his family in a large rambling house. So he took K. and me in his car north to Woodlands, the original house of his family, which has been 4 generations on the island; though he is not so well off as they used to be, he does have an estate. This wooden house looks out on the sea, with wooded mountains at its back. It was decaying a bit and had some termite damage. The untidy grounds had various beautiful flowering trees and shrubs, some with epiphytic bromeliads on. There was a line of tall shrubs called Spanish Pride (I think a *Caesalpinia*), yellow and orange legumes; lots of *Hibiscus* of different colours; pink "ginger" shrubs. There are breezes here, and a lovely mixture of flowers and untidy horticulture, and he produced some special kind of mango fruits, which K. eventually smuggled into Trinidad!

A small hummingbird, green above and white below (probably ♀ Antillean crested hummingbird (*Orthorhynchus cristatus*)) visited the flowering shrubs. A donkey was grazing. A small lily pond. Beyond it the sea in the distance below. K. wrote "Kingsley showed us his 'Heath Robinson' water supply which also works the electricity generator – typical of that family. They used to live there when the children were younger, in a sort of idyllic dream-like setting, rather removed from life." The estate foreman came down from the hill on a pony and when K. was introduced he said animatedly: "Ah! You are the English nurse?"



Katie at Howse Estate, with white frangipani right 14 June 1965 (K 7)

14 June... Mr Howes is a young middle-aged man, and a very good naturalist who knows the island like his back garden. When the Queen Mother called at Montserrat during a convalescence cruise, she asked for some flowers, and he produced a wonderful bunch of *wild* flowers, and she had him on board to explain what they all were. He gave us a remarkable disquisition on practically every natural object we saw on the way. Among other places we stopped at was a pleasant, but now rather spoiled and dilapidated agricultural botanic garden, with things like baobab tree, cycads and so on. He stopped and picked little green marble-sized fruits that are sticky, also soap fruit. Here are some of the things I learnt about the island:

The mountains and the enormous-size debris of the lower slopes are all volcanic. Springs are piped down from the (central) mountains, where the forests are all natural on very steep slopes. Vast edible frogs called “mountain chickens” live up there. There are lizards (we saw some in his garden, and I noticed various small ones later on in other places) but no poisonous snakes. He had discovered a new kind of “snake” (a caecilian, *fide* Dr. Griffin, 1970) in Montserrat that had been described. There are many rats both domestically and in the forests, species not clear. On our drive he pointed out thrushes, ground-doves (same as seen on Antigua (= *Columbina passerina*)), another dove, grey flycatchers – two sitting on telephone wires and looking like nuthatches or kingfishers dressed in grey and white (they were a sort of kingbird (*Tyrannus dominicensis*)). The tiny hawk I saw yesterday he called a sparrowhawk (= *Falco sparverius*). The flycatchers often eat bees. The bromeliads sometimes have tree-frogs in, and probably mosquitoes, although the Health Department are not interested in spite of their precautions against yellow fever in the island from house mosquitoes. (Dr Smith made it clear that the island is rather free from infectious diseases like malaria and yellow fever, also has no filariasis or hookworm).

On the way home we called briefly at the house of the Sturges, on an open upland, where were young wife, baby and large dog. After lunch the usual siesta, while K. dashed into town to see her dressmaker, in preparation for the holiday in Trinidad.

Mrs Wade in the evening drove us down to visit a young couple living at O’Garra’s Estate, a rather desolate region in the south-west of the island where some consortium is building a powerful radio station for entertainment of South America. K. wrote: “we were invited for the evening to the Zimmermans (Elfie and Marcus). They are a very sweet young Swiss couple who arrived here about 2 months ago. He is working on Radio Antilles and is a radio engineer. She is trained as a primary school teacher but isn’t working here. They have a little house

14 June... at O'Garra's down in the south-west part – rather cut off, especially for her as they haven't got a car. She gets into town on local 'buses' – usually a truck ... It is the driest part of the island and provided a complete contrast to the rather lush scenery Dar had seen in the morning. When we arrived we had a drink of fresh lime-juice and then they took us for a walk to see what the country was like – very dry, almost like a desert, with a lot of cactuses growing. When we got back to the house we had a swim, leaving Dar to spectate this time. The sea down here is rougher and the coast wilder than farther north. It was a good invigorating swim. We had supper by oil-lighting which I love – as the electricity supply doesn't go so far south (by the way they also have no main water supply most of the time and have to get all their water from a tap from a reserve tank outside)."

The walk through the desert was over a ghastly dusty and stony trail in strong trail, through tall *Cereus*¹, aloes, prickly pear (last about 1 ft.), and bushes, with much bare sterile soil, and traces of goat activity on the hill slopes. (Steve Walker told me that this southern part of the island is partly drier but the effects exaggerated by goats). On an overhanging cliff face were innumerable four-cell wasp or bee nests. I saw a young rat clamber down from a cactus, probably having been after fruits. While I "spectating" on the veranda looking out on the dark blue sea, I saw some anis (black cuckoos) among green fruiting low trees round the house. They have these helmeted beaks, a long tail that can turn at any angle but is trailed in flight. (= *Crotophaga ani*)

Conversation with the Swiss and myself was halting, but K.'s German made the party go. Later a young Spaniard called Miguel (also doing radio here) came in and drove us home in the dark. On this island everyone drives at full tilt through the most crowded villages, blowing the horn, and children and grown-ups just jump for. But there are not many cars yet. These night drives when one is travelling are always a great delight, however, and there was some moon.

After I went to bed, K. settled down to washing and ironing, but was then persuaded to go out to a dance at the Quarterdeck with two young men!

¹ (Probably *Pilocereus*, see J.S. Baird, 1949)

14 June... The Quarterdeck is a small bar right down on the beach on the edge of the town of Plymouth, which I have visited with Katie one day, meeting one or two rather blimp-like older characters. Near it is the hotel that the unfortunate friend who went bankrupt had lived.

I forgot to record that Mr Howse showed me on the lower part of a roadside tree white encrusting patches that are a fungus that shows bright phosphorescence at night, and of course makes people think of ghosts. He says that there are several kinds of bracket fungi on trees in the mountain forest, one or two of which are edible. I did not see any fungi on the island, but on the other hand never got into the wild forest.

15 June. Montserrat. In the morning Mr Cochrane drove us up to Miss Behan's little house opposite the hospital. She is a small, animated, very sweet and talkative Irishwoman, who was formerly matron of this hospital. She had evidently done hospital work in various rough parts of the world. She is very nice and we drank coffee with her. She will take over the hospital for three months again when the present matron goes on leave. While we were there a young coloured man in pale brown government dress walked in casually and inspected all the rooms, e.g. looking at a flower vase of water. He was checking on yellow fever mosquito house habitats.

We two then crossed, in the intense heat, to a small hospital where K. is in the 8th month of her N.U.S. voluntary year of service. K. wrote: "I introduced him to a lot of the nurses who were there, and of course everyone including the patients and the maids were rather thrilled and interested to meet 'Miss Elton Daddy'. Among others he met Nurse Wolfe, who is most my friend and they had a good long chat. Also Nurse Wade, the theatre nurse, and three of the senior student nurses who are rather my friends. Nurse Barzey (second-in-command) and Nurse Greenaway (children's ward) were off-duty. I took him on a comprehensive tour round the hospital and then up to Matron's house" The place is pathetically poorly equipped and rather shabby, and the cooking and laundry arrangements remarkably primitive. Yet the nurses were smartly dressed in their uniforms, and lively and nice, and the patients no doubt looked after as well as the resources allowed. I would say much about the hospital, but it is not really part of my diary the chief thing was to see the actual place where K. had lived out so many problems and made so many friends.



Katie and Steve Walker by a sulphur fumarole (with clouds of SO₂ and steam) at Galways Soufrière, Montserrat.

16 June, 1965

(K14)

15 June... Following an afternoon rest while K. packed to go away, we strolled across the road to a very nice rambling house with a great pink flowering leguminous tree hanging over it, and flowering shrubs along the garden wall, to which humming-birds come. This is a guest-house owned by Mr & Mrs MacLeod, very good Scottish people who came from Trinidad. Mr M. used to be a plantation manager there. He was pretty knowledgeable about natural history, and knows the birds of Montserrat quite well. These people have a huge Great Dane. Some other characters joined in our drinks on the veranda, where I began to attract mosquitoes.

Supper was, as often, in almost darkness outside in the hotel 'yard', and we stayed some time talking to the Wades. They have a small adopted child, Donna, and it seemed common for K. to take her back and put her to bed.

16 June. Montserrat. In the morning K. and I did various tasks in the town, visiting the Royal Bank of Canada (which is coldly air-conditioned, unlike any other place I have been into), the air travel office down near the water-front, and some of the shops where K. was laying in things for her journey. "I took Dar with me and he was rather amused to see how everyone greeted me in the street, and the cheerful crowded atmosphere of the town". Indeed Katie seemed to be universally liked, and to have found the secret of getting on with all classes and colours. The local dialect, though strictly speaking English, is almost incomprehensible to me, and only lately has K. mastered it to some extent. The sound of all those negro voices is curiously flat and metallic, and can rise to a very rough edge when they are excited. It was baking hot and we went back for a drink, and after lunch a rest.

From 4.30 – 6 p.m. K. and I were taken by Steve Walker in his Land Rover to see the sulphur fumaroles up on Galways Soufrière in the south of the island. This meant driving up an incredibly steep and rough trail into the mountains to part of the way up the mountain that is an old volcano, and on whose slopes there is still heat and eruption of sulphur. First we went through ravaged badly soil-eroded slopes where some new attempts were being made to stem the damage, but below which there is material almost being washed into the sea. Then through rather shifting cultivation of pineapple and strange root crops and bananas etc. Where it is left to revert, dense thickets of guava (*Psidium guajava*) come in first and this scrub is made into charcoal. At last, with great joltings, we arrived at real rainforest – or rather its edge by the road. There was a laurel-like "cedar", tree ferns, huge aroids², and lots of firms and other plants from the roadhead we walked into a strange blasted valley, very steep, and with

² (Probably *Philodendron giganteum*, see J.S. Baird 1949).

16 June... more undamaged forest above. The vegetation near the sulphur fumaroles is just killed by the fumes, and we ourselves found them fairly choky. A small torrent stream coming down from above was running through rocks and boulders covered with grey matter, and as one got higher this turned to a bottom of pure yellow sulphur. The path was very rough and slippery. At one place I walked by a big boulder that had cracked right down the middle, and from the crack came a hot knife of air. Finally you reach the two boiling fumaroles with a mist of sulphur dioxide gas coming out. They were several yards across. High above us the Soufrière Hills rise to 3000 feet and there are other fumaroles round their slopes. At perhaps 1500 feet above, one could see a lot of forest, and tree fern patches, and also a stretch of bracken! And on those steep slopes away from the fumes peasants had their shifting fields, and we met a man with his donkey loaded with stuff coming down.

During these days I was gradually getting accustomed to the heat and food and general activity socially, and by having one or two showers every day and changing underwear and socks and resting a bit, found myself beginning to feel more natural. It made all the difference to have such a good “manager”, and such interesting people to meet but it was still very like a dream.

17 June. MONTSERRAT – TRINIDAD. Today was a fairly small-scale and I don't remember much what happened, but in the afternoon we left and were driven by the good Mrs Wade to the Airport. The mountains were looking very massive and a bit misty. We left on the little plane at 5.30 and reached Antigua at 5.45 p.m. At the immigration counter we were told that the West Indies Airlines ‘Sunjet’ from New York would be four hours late, so that we could not go on to Trinidad until the early hours. So we took a taxi up to the Sugar Mill Hotel and got an evening meal there after visiting a strange little bar they had outside. Then we sort of camped out in the lounge or hall with our baggage, while Katie rang up Gay Kerr in Trinidad and told her about our predicament. She got through very quickly and clearly. Later on, the hotel manager (who knew us both from having stayed there) kindly gave us a bedroom (at no cost to us) where Katie and I were able to lie down and rest. Eventually, after a rather hot and tiring wait we got on board at 1.45 (instead of 9.45), and arrived at Piarco Airport about 4 a.m. Here a patient hired driver (who had waited most of the night) took us up in his taxi to the

18 June... Trinidad. Kerrs' house at Pointe-à-Pierre, where we arrived at 5 a.m. At the airport my hand luggage was searched for weapons. There is a large central hall full of tropical plants and dim-lit. The drive was a very sleepy one through flat cultivated untidy country with lots of wooden houses on stilts, and palm trees. Denis and Gay live on the Texaco residential estate with several hundred houses, and inside a security compound with guards at the gate. Originally their's was about the first house and then in much more natural surroundings. They came out in their dressing gowns to greet us, and after cold drinks and showers we were soon in bed, and slept through the morning.

This house is on a gentle slope facing at the back onto a reservoir with sand-banks on which many water-birds congregate, and it and neighbouring houses are set in green lawns with a great many ornamental trees including Bougainvilleas and red or orange Flamboyants (*Delonix regia*). From the veranda one can see a great deal of small bird life in the garden. Today I did not have much time for bird-watching, because after lunch we were organised, K. and I, to go round the Texaco plant under the guidance of the chief P.R.O.³, Max Marshall. I learned a great deal about the sources and uses of oil, and we went down to the long jetty where the incoming oil is piped from ships, and there were brown pelicans patrolling over the sea. Though now owned by American money, this place (formerly Regent Petrol) is entirely run by British staff still.

After a further rest, we guided ourselves to attend the big concert that Denis and Gay were running in the evening, first having dinner with a party of people at the Texaco Staff Club. It was extremely hot, but one had to wear a tie and one's best jacket, though my clothes were a bit below the mark. Here I met Mr & Mrs Ffrench, the husband being a young man who is a classics and music teacher (English) and also an authority on Trinidad birds. He helped me to confirm the names of the good many birds I had been seeing. The concert was all done by amata people, mainly but not only from the oil company, and it included all races – white, black and Indian (i.e. from India). Denis conducted it mostly, occasionally laying down his baton to snatch up his flute and join in. Then there was a choir too. The music was a wide spectrum of classical, middle music but not much in the pop lines. There was an excellent Chinese conjuror, also on the oil company staff. It broke up into talking and dancing about 1 a.m., and by 1.30 a.m. I had had it and was taken home more or less speechless; but K. danced on and on.

³ {Public Relations Officer}

19 June. Pointe-à-Pierre, Trinidad. I give below a list of the birds seen in the Kerrs' garden and on the shore of the lake below, while I was staying with them. They were mainly named from R. Meyer de Schauensee's book "*The Birds of Columbia*", which includes a great many species also found in the Caribbean, and which I carried round with me on this tour. Some were named or confirmed also by Mr Ffrench or by Dr Brooke Worth.

In the garden – a sort of artificial savannah of tropical planted trees, with lawns and rough grass and shrubs and domestic habitats from the house:

Common ground-dove (*Columbigallina* or *Columbina passerina*): very small, black bird size; grey head, rest plump light brown with two vertical black stripes on wing.

Great kiskadee (*Pitangus sulphuratus*) – a tyrant flycatcher (Tyrannidae): It gets its name from the French "Quesque ci dit". About 9 in. long, bright sulphur yellow below, white throat, black head and white stripes, outer tail-feathers rufous-edged. A very stout bird with a wide almost night-jar-like gape, and a heavy beak.

2 Bananaquits (*Cereba* {now *Coereba*} *flaveola*) – a honeycreeper (Cerebidae). Upper parts grey, two broad eye-streaks, white spot ('wing speculum') half-way down wing, throat grey, underparts and (in movement of rump) yellow. 4-5 in. Visiting deep mauve flowers of Bougainvillea.

2 Palm tanagers (*Thraupis palmarum*)- (Thraupidae). Paler than the next species, more greeny on head and below, and a rather abrupt dark hind wing region. (Brooke Worth confirmed) 7½ in.

2 Blue-grey tanagers (*Thraupis virens*). Cobalt blue with some black feathers above, greyish below. No 'marks'. Visiting banana bait. c. 7 in

2 Yellow orioles (*Icterus nigrogularis*) – an 'American oriole' (Icteridae). Bright golden yellow, but lores, throat and tail black, white margins on wing and on tail feathers. 8-8¾ in.

Blue-black grass-quit (*Volatinia jacarina*) – a finch. A small bird c 4½ in., shiny blue-black with white eye-ring.

On the sand-bank of the reservoir, unless otherwise mentioned:

A few common egrets (*Casmerodius albus*), white birds a little over 3 ft. with yellow beak and black legs.

Neotropic cormorant (*Phalacrocorax olivaceus*). Not unlike our species but smaller. One evening ten came and at dusk roosted in a very insubstantial Casuarina tree at the end of the grounds, and not in a clump but on the end branches.

1 collared plover (*Charadrius collaris*). A very pale version of our own ringed plover that ranges the American tropics.

Black skimmer (*Rhynchops nigra*). 16-18 in. Like a vast clumsy tern, but in another family (Rhynchopidae) that uses its large under bill to skim animals from the sea surface. The beaks look very odd with black tip and orange base. The upper parts and top of the head are black, forehead and lower parts white. At one time I saw 22 resting on the sand.

Large-billed tern (*Phaetusa simplex*). 15 in. These were cruising and diving as well as resting, and I saw them later on the Amazon too. They have yellow beaks, very thick, and are broadly black or grey above and whiter below. Black crown.

The garden has a few humming-birds, but they move so fast that I could not describe them!



West Coast of Trinidad, seen from Pan-Am jet. The house on Texaco estate Pointe-à-Pierre of Denis & Gabrielle Kerr is on the right shore of the big reservoir-lake L.
1 July 1965. (IV-27).
Texaco oil complex and jetty centre

19 June... Pointe-à-Pierre , Trinidad. Got up at 11 a.m. after the social rigours of the night before, and spent the morning bird-watching from the veranda. K. and I rested a bit in the afternoon and after tea Denis took us all for a drive into the town, passing both the rich Texaco residences and through the bazaar-like untidy native quarters of town, Indian and Negro. It was very hot. We stopped at the Naparime Bowl, a new theatre in which Denis is interested, and which can be used for several purposes including outdoor performances. At night fire-flies sparked in the garden trees. One that flew into the house (kept) seemed to be a Cantharid beetle, quite small.

Today I began to take a weekly anti-malaria pill of Daraprim, mainly in anticipation of Belém. These produce no perceptible effect otherwise. The climate in Trinidad feels much more damp and sticky than that of the Leeward Islands, though cooling breezes do occur at times. The temperatures are in the eighties {Fahrenheit} and the rainy season has just begun, but showers are very short though heavy. The heat rather obliterates concentration of one's thoughts.

20 June. Pointe-à-Pierre and Caroni Swamp, Trinidad. Early today I saw a pair of ground-doves carrying nest material into the veranda eaves. We pottered about in the morning, and I watched birds and wrote letters home. In the afternoon we (Denis, Gay, Katie, a local white ♀ school-teacher and myself) went {on} and exciting expedition to the Caroni Swamp, where Scarlet Ibis abound. The Texaco area lies in south-west Trinidad, while mountains are highest along the north coast, where Port-of-Spain abuts them in the north-west. It was Sunday. The sunlight was very strong. The 30 mile drive took us to the place where the boat starts, but the boatman had not turned up. So we drove along to his house, where S.Oudit Nanan and Sons advertise themselves as running: "The Best Sight Seeing Tour: Visit Trinidad Everglade: World Famous Bird Sanctuary: The Nesting Ground of the SCARLET IBIS, Snow Egrets, Blue Herons, Rosette {sic = Rosette} Spoon Bill and thousands of other birds in the Caroni Swamp : Sight Seeing and Photography: Blue River Fishing – Reel and Rod Trolling and Casting – Tarpan, Snook, Salmon and other Fishes: Conducted Tours by Motor Boat".

The proprietor (or his son?) of this "Daily Service of the Swamp" , whose address is Bamboo Settlement No. 1, Princess Margaret Highway, Curepe, is a middle-aged Indian (from India), with a weatherbeaten face, good manners, some English speech, and a considerable knowledge of the



Caroni mangrove swamp, Trinidad, (from jet-plane), home of scarlet ibis.
1 July 1965. (IV-29)



Darker area defines Caroni Swamp. Photo overlaps one above (cf. straight channel & 3 big lakes) and was taken looking southwards. (IV-30)



South end of Caroni mangrove swamp on West Coast of Trinidad, taken from jet-plane, 1 July 1965. The winding river can be seen in the far distance in the previous photo (IV-30). (IV-29).



Mangrove swamp, Caroni Swamp Trinidad, 20 June 1965 (K 24)

20 June... Caroni Swamp, Trinidad. waterways and wildlife. We packed him and his outboard motor into the car with us and return to the narrow channel where the boat was moored. K. wrote a good description of the swamp: "The swamp covers several square miles and is tidal, partly salt and partly freshwater and covered with small mud islands which are covered with mangrove trees – the only vegetation of the swamp. These grow very quickly and throw down a whole lot of roots from their branches which grow down into the ground into the water, forming a fantastic forest of roots. The water forms partly channels between these and partly wide open lakes. They say you could very easily get lost without a guide, as all the channels and lakes look like. Our guide was very helpful and knew a lot about the local birds. We had a small outboard motor. Otherwise it was rather like going down the Amazon. The birds were fantastic, big, beautiful birds, a very brilliant scarlet, and hundreds of them. Towards the evening they all flew together and settled on one enormous mangrove tree, covering it and making it look as if it had red blossoms... Since it is the breeding season, one is not allowed to go very near."

The scarlet ibises (*Eudocimus ruber*) were the most abundant waterbirds we saw hundreds of them, some feeding out on mud flats, others flying over – often fairly close –, and then the evening assembly for roosting. They are really wonderful, especially when the sun lights up their plumage in flight. There were smaller numbers of white common egrets (*Casmerodius albus*), but they also flocked to roost near the ibises and I saw over fifty in one tree. These roosting birds were very restless, and it was probably a fisherman going too near, for they would all rise up in a brilliant scene and eventually settle again. Scattered individuals of the little blue heron (*Florida caerulea*) were quite common, the young ones being whitish. Besides these we saw four or five of the rare and diminishing roseate spoonbill (*Ajaia ajaja*), rather larger than the ibis and with much pink on the feathers. The boatman said that there are now less than 10 pairs here. No ducks or grebe were seen, but on the mud among mangrove trees I saw a clapper rail (*Rallus longirostris*), not unlike a large English water rail. There was a three and a one of the lesser yellow-legs (*Tringa flavipes*), a sort of sandpiper, on mud banks. Oysters live on the mangrove roots, where there are also crabs. In the mud we saw fidler crabs, with the one claw so much bigger than the other. The red mangrove was apparently the dominant tree, but mixed with it, perhaps in fresher channels, was another tree with



Channel among mangrove trees in the Caroni Swamp, Trinidad.

20 June, 1965. (K 18)



Cover of "*Sea Frontiers*" 21(1) 1975. ROSEATE SPOONBILL

20 June... Caroni Swamp, Trinidad. different, but also whitish flowers. I had thought these might be another sex, but find the mangrove is monoecious. Where the land level rises a bit behind the intertidal edge there are currently some other trees, and some of these had dark termite nests wrapped round their trunks. I do not remember noticing any bromeliads on the mangroves (cf. their abundance on the Pacific coast, later). The boatman spoke of a marsupial, and opossum called the manicou, also agouti, living here. As we came back to base in the dusk, I suddenly noticed a 'nightjar' on a branch of mangrove, which was standing stiffly upright vertically, almost pressed against the trunk. This was a common potoo (*Nycteribius* [= *Nyctibius*] *griseus*), which Dr Brooke Worth confirmed the name of: he had never seen one though often hearing them. They are a special family Nycteribiidae [= Nyctibiidae] found only in the Neotropics and they all have this stiff erect posture.

As we drove home through the dusk we could see hundreds of fairly large bats flying over the fields. While flying back from Paramaribo later on I got some excellent photographs of the Caroni Swamp from the air, to match good ones taken on Katie's camera during this marvellous day.

21 June. Pointe-à-Pierre, Trinidad. Rather early after breakfast Gay drove Katie and me to Port-of-Spain where I was to join Harold Trapido for the beginning of the official part of my tour. As we came into the town I saw hundreds of black vultures (*Coragyps atratus*) sailing round over the town refuse dump and river front (named for me by Dr Brooke Worth). These birds I met with at every place on my South American journeys, attached to man, often even in very small hamlets. It was blistering hot as I went to the bank to cash travellers cheques, and shopping with Gay and K: we bought a white sand-hat, two white shirts for polite evening wear (which I never used) and they also got me certain medicaments including a valuable stuff called Caladryl (a calamine lotion for heat rash etc.) and a supply of biros. My most important business was done with the camera department of a big department store called Harriman and Co. Here I bought a new Kodak Retina I F for £33.6.8 (160 Trinidad dollars) which Denis Kerr gave me a cheque for, I getting Joy to pay this amount into his London A/C. This was similar to Retina II F which had gone wrong, but has no range-finder, a lack that I did not find serious, and the camera gave first-rate service, and was used next day. The firm also agreed to send home to D.K. at the Bureau my dud II F. This lucky solution of troubles I owed to Denis Kerr and the P.R.O. of Texaco who found the camera in Port-of-Spain.

21 June... Port-of-Spain , Trinidad. And through Texaco I got a one-third discount on the price!

I said goodbye to Gay and Katie and was left at the Queen's Park Hotel, where I found Harold Trapido, who had come from Cali to make the complete round with me – and enormous boon because he is a very experienced traveller, knows Spanish well (having been 14 years in Panama), and understands money matters etc. We went to the Trinidad Virus Laboratory, which is jointly run between Trinidad and the Rockefeller Foundation. The Director is Dr Leslie Spence, a Trinidadian, who took a whole bunch of us out to lunch in a large restaurant where we struggled with rather voluminous salads and so on. One remarkable fact about public health is that all the booklets warn you against eating raw salads in the tropics and say all vegetables must be cooked or else you get worms or amoebic dysentery or what not. Yet everywhere, and including with all sorts of health chaps, we got limp lettuce with our diet. But they do distinguish between the water supplies of different places. Thus Montserrat, Trinidad and Cali water could be drunk, but Belém not, nor Barranquilla.

This afternoon was spent in fairly diffuse but interesting discussion, with Dr C. Brooke Worth (the mammalogist), Dr T.H.G. Aitkin (entomologist, but mine of other natural history information e.g. he is an authority on the trees and bromeliads), and Dr D. Jonkers (a young very articulate for a virologist who had been directly involved also in the mammal field trapping). Worth was about to leave Port-of-Spain , and there was rather an atmosphere of dislocation. Another young man was Ricker, who was doing some technical work with fluorescence tests for virus.

It was a relief to be in a cool air-conditioned building, and there is a very nice small library, in which I noticed the *Handbook of British Mammals*. This laboratory is said to be the best equipped physically of the Foundation's American units for virus work. But Belém, though less grand, is more brilliantly productive. Cali is hardly on its feet yet.

The main field area is 'Bush-Bush' in the big Nariva Forest on the east coast. The outline story is that they have had 19 kinds of virus from there, that 7-9 of these have been found in small mammals (rodents), that the vectors are mosquitoes. There are 92 species of mosquitoes in the Bush Bush, out of 150-200 known in Trinidad!! They probably cause big blood losses. There are several species of rodents, of which *Zygodontomys brevicauda*, *Oryzomys laticeps* (grey belly) and *Heteromys anomalus* (cheek

21 June... Port-of-Spain, Trinidad. pouches – is called the pouch rat, has a white belly) are the chief ones. All are largish rats with long tails and live on the ground. There is *Oryzomys concolor* that is arboreal. They are nocturnal.

The extraordinary event is that after several years of commonness with fluctuations (breeding is not continuous) the rodent population suddenly crashed. Theoretically this could have been due to trapping out, and we discussed the trapping (cropping) figures this way. But I got the impression that trapping was not closely spaced enough to account for this, and also the trap area is set in a large forest around it. At the same time the viruses of these rodents disappeared entirely from the mosquito vectors (which are still there) – a species of *Culex* mainly. (Brooke Worth has got lab. populations going of *Z. brevicauda* and *O. laticeps* but not of *H. anomalus*).

The team now waits for this situation to develop further.

Today I began to have fairly marked diarrhoea which continued more unpleasantly for the next two days but cleared up by the time I reached Belém (used Enteroviaform). H.P. and I went to Dr Jonkers' house for drinks in the evening, and continued a rather desultory discussion, as he did nearly all the talking. It was a nice house, situated under a steep forested hill, and his children drifted around us.

22 June. Nariva Swamp, Trinidad. I woke at six and saw the dawn from my window, over the hill behind the race-course. Starting fairly early, Dr Tommy Aitken drove H.D. and me to the Nariva Swamp, about 46 miles each way *via* Arima, on fairly good roads. The last stretch runs close to the Atlantic Ocean of Cocos Bay, along coco-nut palm plantations, on some of which were dark termite nests. On the way through a town we noticed hanging "stocking" nests of the yellow-rumped corn-bird or cacique (*Cacicus cela*) on trees – this is a sort of oriole bigger than a thrush with brilliant black and golden yellow plumage. On some of the trees were dead bromeliads (and also live ones) – *Grabisia aquilegia*- on which herbicide control is being done in order to remove mosquito reservoirs. T.A. pointed out flying fork-tailed flycatchers (*Muscivora tyrannus*) coming over from that night roost in the trees of Caroni Swamp.

We went in a Commer van that held equipment and could bring back specimens for the lab. pathology work. I did not take in all the details of the work, because I was feeling pretty groggy all day and did not keep proper notes;



Starting into Navira Swarm (and Bush Bush), Trinidad. Dr. Tommy Aitken (L.), Harold Trapido and Indian boatman.

22 June, 1965 (I-6)

From: DOWNS, W.G., AITKIN, T.H.G., WORTH, C.B., SPENCE E.L., JONKERS, A.H. (1965) *Amer. J. Trop. Med. Hyg.* 17, pp 224-36.

From: DOWNS, W.G., AITKIN, T.H.G., WORTH, C.B., SPENCE, E.L. & JONKERS, A.H. (1968). *Amer. J. Trop. Med. Hyg.* 17, pp 224-36.

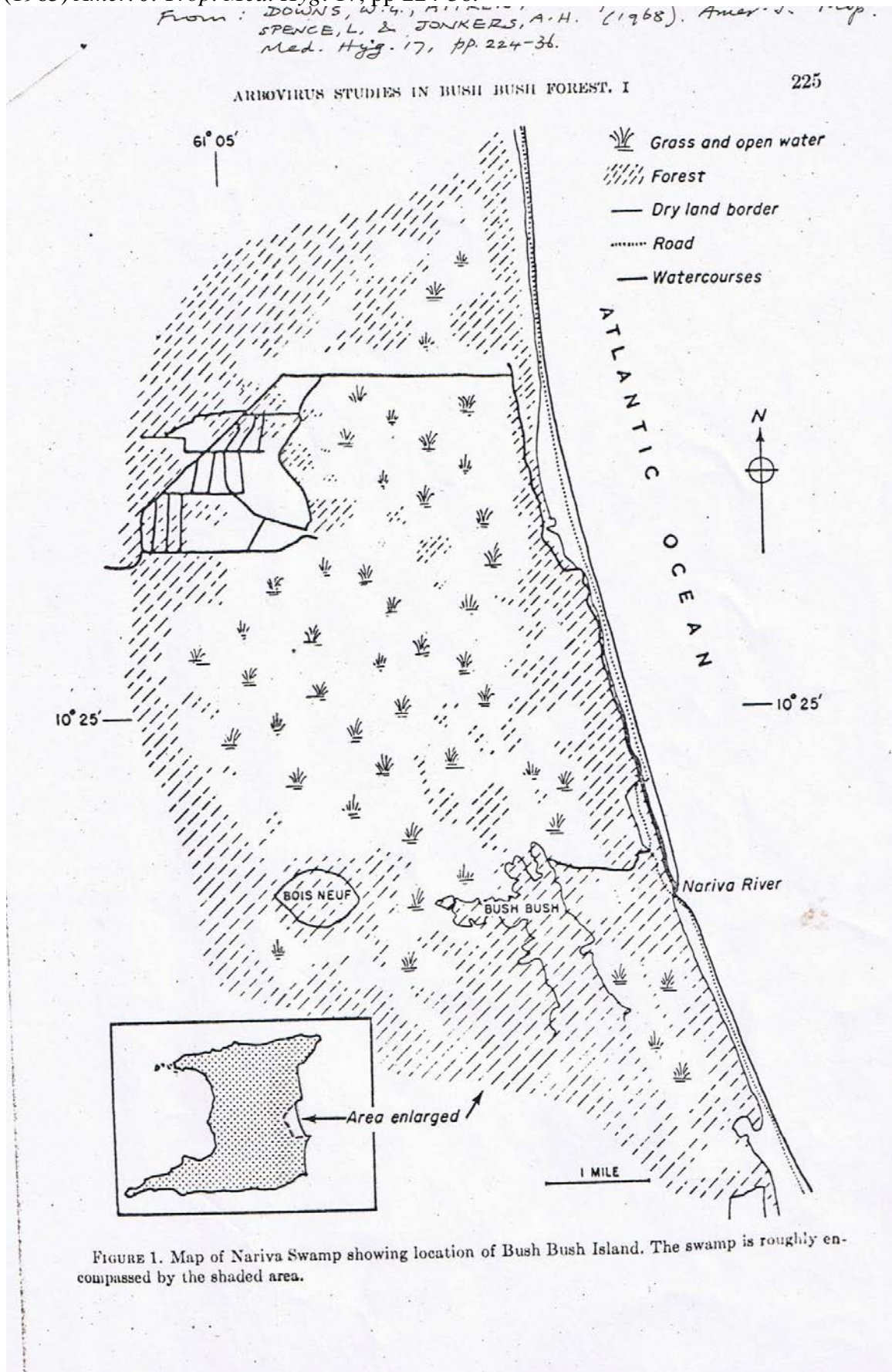


FIGURE 1. Map of Nariva Swamp showing location of Bush Bush Island. The swamp is roughly encompassed by the shaded area.

22 June...Nariva Swamp, Trinidad. but I was able to get some good photos. Today I realise that in the heart of the forest one cannot get exposures even on Kodachrome X, without flash, which I did not have time to use, and which does not illuminate very far anyway. So always one's forest photos were in edge or clearings or paths not too shaded.

{In margin}: see NOTE {on page 83 of this transcript}

Two Indian (from India) assistants appeared from the cottage by the road, and one of them got the outboard canoe or punt ready, in which we chugged along a narrow channel between marshes full of tropical lushness, and further on a lot of tall buriti palms (*Mauritia setigera*), and eventually we came to a wonderful luxuriant marshy forest with palms and other trees, many lianas and ferns and epiphytes. Just before here we saw two black vultures soaring about, and also a sulphury flycatcher (*Tyrannopsis sulphurea*), a grey and whitish bird with brilliant yellow beneath and a bit of yellow on top of the head. Next we arrived, still in dense forest, at the thatched hut on stilts where the Indian trapper and technician lives like the Yongy Bongy Bo, dependent on rain-water, and supplies from outside. Here is the famous joke notice about Bush Bush being a nature reserve for viruses, of which a list is given. After a sandwich lunch in the hut, myself very hot and damp indeed and sweating like mad, we set off on a long walk for at least two miles along forest paths, and partly also along duck-boards (which Americans call broad-walks) through fetid swamp forest with brown and rather repellent pools in which an occasional frog was heard, and where mosquitoes abounded. I really cannot remember the locations much. There were these two kinds of forest: rain-forest on land and swamp forest. The former had quite a lot of big trees in it. [Dr W.G. Downs organised a complete survey of 150 x 150 ft. of forest here in January 1961, in about the middle of the area. Only trees above 6 in. girth were counted, yet there were 192 of which 68 were 6 in.-1 ft. girth and 64 1-2 ft. Eight were over 8 ft. there were 25 species plus 19 indeterminate trees. Very few were over 80 ft. – some had been cut out 10-12 years before. Five species were much commoner than the rest. There were also a lot of lianas and some strangler figs. Araceae were very common as epiphytes, bromeliads rather uncommon, and arboreal orchids rare.] I kept noticing the number of aroids. The forest is nowhere near clear beneath, always having a great deal of undergrowth and young woody stuff, though in many places one could have made a way through it. There were at intervals a fair number of buttress-based trees. At



Dense swamp forest on the outskirts of Bush Bush, in Nariva Swamp, Trinidad. It has many palms, ferns, and other epiphytes, and lianas. 22 June, 1965.

Red-breasted macaws up here. (I-8)

From: DOWNS, W.G., AITKIN, T.H.G., WORTH, C.B., SPENCE E.L., JONKERS, A.H.
(1965) *Amer. J. Trop. Med. Hyg.* 17, pp 224-36.

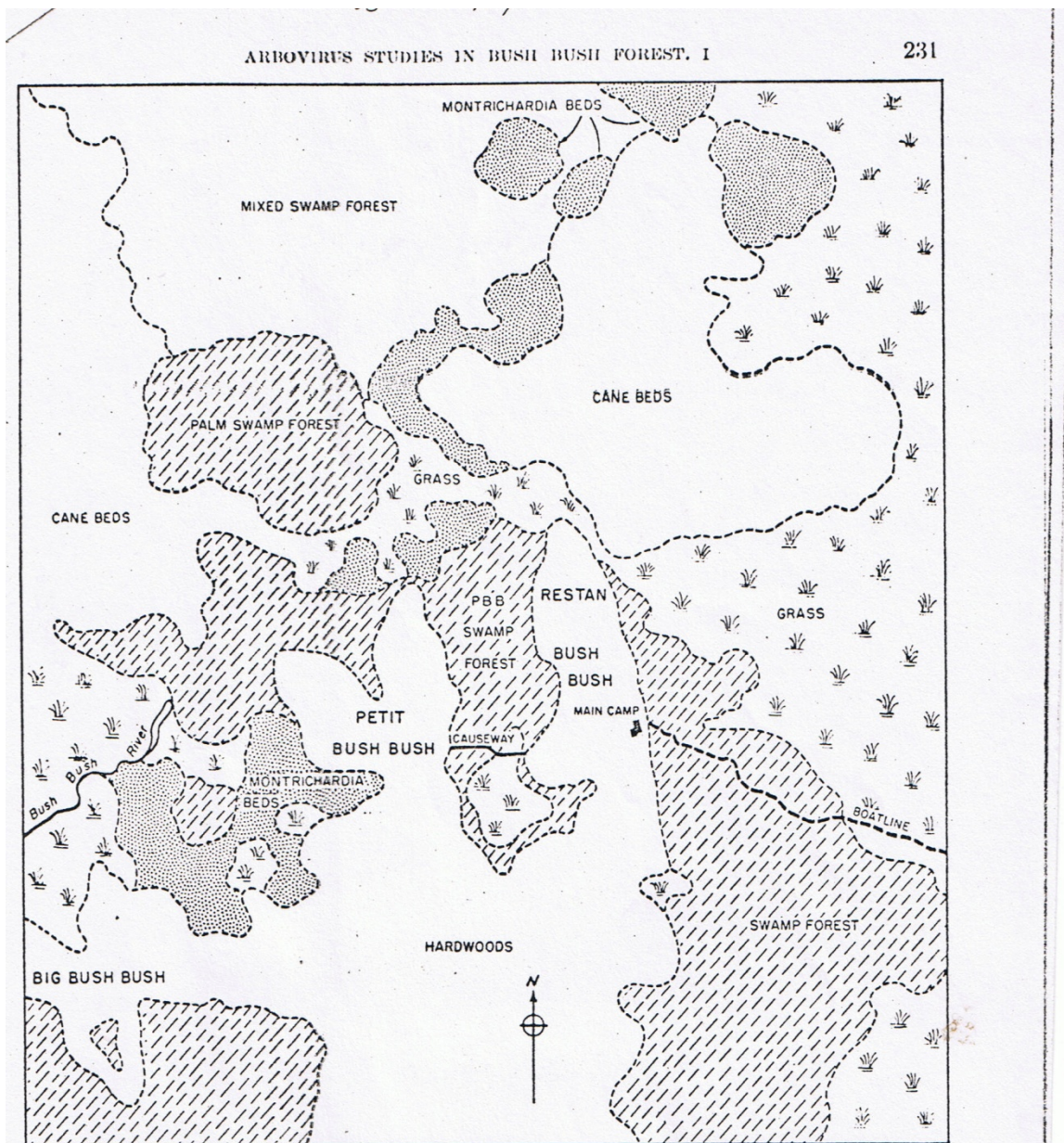


FIGURE 5, b

abruptly over a 3-foot range during the rainy season.

Temperature and humidity readings were made in Bush Bush during 1963 and 1964 with a continuous recording thermohygrograph. 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; the recorded extremes were 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 about 90% during the rainy season.

Bush Bush Island is covered with hardwood forest, with a well-defined canopy and an open forest floor characterized by Tirite (*Ischnosiphon arouma*) and seedling trees (Fig. 8). In the Restan area, repeated recent fires have left the forest sparser and lower than in the more southern sections. As in all tropical forests, there is great diversity of species. Such woodcutting as occurred

22 June... Nariva Swamp, Trinidad... the heart of the area that is used for mammal trapping is another hut where the scientists did most of their work, and sometimes Brooke Worth stayed for long periods. On the forest pathway were remarkable concourses of bright orange heteropterous bugs, busy sucking the fallen fruits of the mahoe trees (*Sterculia caribaea*).

{In margin}: see NOTE {on page 84 of this transcript}

These were fairly large, perhaps half inch, bugs, and one saw similar concourses in many places. Aitken pointed out to me many fallen fruits of different species names I have forgotten, but they were indeed common everywhere we went; whereas in the other forests I visited, in Brazil and Columbia, I did not seem to see anything like this variety or amount. Saw a flame-headed manakin (or golden-headed m. *Pipra erythrocephala*); a greeny-brown small *Cebus albifrons* monkey in thick scrubby layer of the forest; and a small lizard (*Plica plica*) which was on the trunk of a small tree and circled around like a squirrel to avoid being seen (got its photo). At one or two points there were processions of leaf-cutting ants marching with bits of leaf hoisted above them vertically. Their nests are enormous underground affairs, where they breed fungi to feed their young, by using the leaf material as a bed. They seem to occupy glades where the trees had been defoliated more or less, twenty yards across or more. But their influence seemed to be local and they were not everywhere. There were butterflies, among which was a huge blue *Morpho*, and fairly commonly a small species called metal-mark (*Helicopsis cupido*) with beautiful blue-grey metallic markings and spots. Its food-plant here is an aroid-like plant, *Montrichardia arborescens*, which grows up to six feet or more. I photographed one that had its white flowers, and also some leaves heavily eaten by the larvae of this moth. Except for some mosquitoes, said to be from the canopy habitats, the air was singularly empty of insects other than butterflies and these were scarce. Sounds were not abundant either. But I think I was told of the voice of a howler monkey (red h.m. (*Alouatta seniculus*)), and there were some bird notes.

In a glade I photographed the only bracket fungi (or toadstool either) that were visible in the whole walk: growing on the stump of a balata tree (*Manilkara bidentata*) almost at ground level and covering it with large flat brackets, tough, with no insect signs. The tree had been cut 7 years before. The photo also shows the kind of thin litter of big leaves that one saw in all the tropical forests. I photographed another stump of a large tree, 4-5 ft. high, this having a substantial green epiphytic plant, moss etc. on it. The swamp forest



Tommy Aitken and C.S.E. looking at forest litter, Bush Bush, Trinidad. Common shape of forestry leaves behind. 22 June, 1965

(From black and white photo by Harold Trapido).

22 June... Nariva Swamp, Trinidad. through which one went over narrow raised broad-walks, is very thick and has many lianas etc. We also v Page 19 another swamp in the open among trees, at the top of which a little way on were five Amazon parrots (or 'orange-winged' p. – *Amazona amazonica*). When I disclosed that I was ill, we decided to shorten the walk, and went back to the Indian's hut where the boat was at the end of the channel. Here I felt utterly exhausted and for the only time on this whole tour put my head down and felt like dying! After a rest and a drink, we went back the way we had come, in the punt, and were lucky to see some red-breasted macaws (or red-bellied m. *Ara manilata*) high up in the palms. It was still blazing hot and fine. We picked up a couple of men who had been working on the boundary markers for this area, which is to become a definite reserve on account of its rich wild life. Got in about five p.m.

Tommy Aitken is Californian in origin but looks and sounds much more like a Texan: a tall soldierly man, with a relaxed manner and a tremendous knowledge of natural history. As I went the round of Rockefeller organisations I soon began to realise how their men are hand-picked for excellence, and how they have to be good at a variety of things – not only their scientific work, but at diplomacy with foreigners among whom they live and whom they seek to influence, yet eventually leave to run things. This life needs an unusual combination of mental and physical resilience and endurance. I found it fairly hard work to keep up with them.

23 June. Port-of-Spain etc., Trinidad. Up at 6.45 a.m. ready to visit the Northern Range with Aitken. We drove out to Arima and then northwards up the Arima Valley (in the centre of the range). On the way we digressed up a winding lane in thick high forest to the laboratory at "Simla", where William Beebe worked for so many years, and latterly David Snow from Oxford. It is a large rambling comfortable house right in the forest, with various rather simple outhouse labs., now run by a youngish Englishman, Michael Emsley, who is working on Heliconine butterfly polymorphs. Here we saw a cocoa-thrush, olive-brown in colour (*Turdus fumigatus aquilonalis*).

After coffee at Simla, we drove on up the valley to the high look-out point on the divide at 2100 ft., from which one looks over a rolling ocean of green rain-forested hills to the ocean itself. The valley sides look forested, but actually much of it is cocoa plantations, with big trees (immortelles) kept to shade the cocoa shrubs. The top part of these hills is a good forest reserve now kept pretty intact, in which we walked a short way.



“Simla” Trinidad (Photo from a New York Zoological Society pamphlet 1966)

22 June... Port-of-Spain etc., Trinidad. There were many large trees, buttressed, mixed with smaller ones, and fairly thick but not impenetrable vegetation below, lianas everywhere hanging in ropes, and a lot of epiphytes. Of bromeliads I photographed one at about 20 ft. up and 80-90 ft. tree: the bromeliad had wide strap leaves, and was *Guzmania lingulata*. There were some mosquitoes about, biting, probably from bromeliads. Somewhere up in these forests a bell-bird (fam. Cotingidae) was calling. The path was bordered by a low layer, less than 1 ft. high, of selaginellas, which I was to see in many other tropical forest edges later on. It began to rain so we went back to the car and to Port-of-Spain for a late lunch. The discontinuity of my notes on those two days partly reflects the rather episodic cornucopia of Aitken's knowledge, partly my own dazed incomprehension of the first sight of real rain-forest, and partly my state of health.

After a siesta I took a taxi to the Virus Lab. and joined Brooke Worth and one or two others, to say goodbye. We left for the airport at 5 p.m., and after waiting about and buying whiskey or the Belém chaps, left on Pan-American plane at 6.45 p.m. This plane stopped at Georgetown and Paramaribo, and arrived at Belém airport at midnight. Our passage was all in the dark. There was an unorganised mob of passengers at this "Portuguese" airport, but we saw four Rockefeller men waiting for us, including Dr Robert E. Shope (young recently retired Director) and Dr Jack Woodall (young new, English, Director). The latter seized my baggage and steered me through the formalities and drove H.T. and me to the Grand Hotel, which we reached at 2 a.m., a little travel-worn. Retired to room with air-conditioning that only partly worked and was very noisy, and found that it was necessary to avoid drinking the tap water, and used instead bottles of a weirdly-tasting mineral-water from a reputedly sacred well now commercially exploited.

24 June. Belém, Brazil. This city lies on the south bank of the Pará River about 75 miles from the open ocean, but has a 10-12 ft. tide, though the water is fresh. It is garish and raucous, yet some of the streets and buildings have a faded dignity, and the mango tree avenues are pleasant. In the morning we visited the Belém Virus Lab.⁴, A small and modest building (remining one a bit of the B.A.P. [= Bureau of Animal Population, CSE's base in Oxford] conditions) where a close team works in great harmony at very high pressure and is directed with a touch of genius. The first director was Otto Causey. Shope has been

⁴ [In 1970, the R.F. pulled out.]



Belém

24 June.... Belém, Brazil. ... there for six years. He is a young, very lithe and active dark-haired virologist from Yale, with only quick mind and brilliant genuine charm that has made his relations with the Brazilians very good. This is especially important because this is the one of the three labs. that does not have a local national at the head.

Belém has very good forest reserves on the outskirts of the town that have given a prodigious supply of natural viruses, and there are really few Brazilians good enough who are willing to work in a University of what is now a backwater city in Brazil. Woodall is a young fair-haired energetic yet very relaxed and good-tempered Englishman with experience under Haddow in Africa. Both these men gave a remarkable amount of their busy day to looking after Harold and me, and patiently telling me details for my notes. The lab. is cool with air-conditioning, but I was still pretty tired, so fell asleep in a chair in the tiny Director's office, while interminable technical conversation went on around me.

For lunch we were taken to a big water-front restaurant, from which I saw the tremendous Amazon system for the first time, with black vultures fossicking about on the muddy shore below us. Then back to the lab., now for talk about mammal trapping and mosquito-catching apparatus (an ingenious suction trap run by a small fan and battery, for hand use in the field). Work started in 1954 in the local rain-forests, which get partly inundated at intervals. It was at that time directed to yellow fever ecology. In 1962 there was a change to wider interests in viruses. The mammals trapped are mostly rodents, *Proechimys*, *Oryzomys* and *Nectomys* (a water rat), plus small marsupials. In the last 2¼ years the numbers have not fluctuated much, yet there is a high breeding rate, though partly seasonal. The traps are in a grid spaced 100 m on a 500 metre square area, at fixed points. 19 kinds of viruses have been recovered from them, about 51 from the whole area (i.e. including birds and mosquitoes). Antibody identifications are much more numerous than isolations of live virus because latter is only active for a few days, whereas antibodies often last for life. A notice up in the lab gave the following positive virus recoveries from vertebrates in 1964:

"Spp."	No. examined	No +ve
6 Primates	341	3
7 Marsupials	698	4
8 Bats	422	1
6 Edentates	17	0
13 Rodents	3116	37
6 Carnivores	10	0

1 *Boa* specimen, 206 Lizards (13 spp.), 1255 toads (1 sp.)
-ve 2188 birds (? spp.) had 6 +ve.

24 June.... Belém, Brazil. The tremendous sustained effort of obtaining alive these 8284 animals, let alone doing the rest (and each individual record is also kept as to allow of back-tracking from the elaborate pathology records to the exact field data), gives an idea of the drive and vitality behind this programme.

Among other people I met today (and briefly at the airport in the night) were Dr Sirié, an Institut Pasteur doctor working in Addis Abbaba, who went round on many of our field trips at Belém. There was also a first-class little team from the U.S. National Museum, Washington: Dr Philip S. Humphrey, a very good field ornithologist and taxonomist, with his teenage son and friend, and a young graduate called Tom Lovejoy, from Yale. Humphrey had worked here before, and is combining mist-netting and marking and weighing etc. with taking blood-sample for the virus survey. In the evening we all dined together at the hotel and I turned in early.

There is not much to do in this hotel (or some others I was in) except sit in the bar or in one's own room. The bar here was air-conditioned and good for writing in, with supplies of Pepsi-Cola; but it was, as often in the Americas, very dimly lit. My bedroom had an open large hanging cupboard with an electric light on the floor, to promote drying of clothes. I was greatly helped by a room-man who spoke English, as he had worked in London, my efforts to get things by the hotel telephone having ended with the operator girl roaring with laughter and saying "You're crazy!" The damp heat here was rather awful, and the food more awful still, and while at Belém I tended to starve a bit.

25 June. Belém to Serro do Navio, Brazil. Up at 5 a.m. and away by taxi without breakfast to the airfield down mango-lined streets in a cool yellow dawn, with H.T., Dr Sirié and our organiser, Dr Francesco Pihero (or Pinheiro). The last is a charming young Brazilian virologist who supervises some field work that is done at Serro do Navio. He spoke pretty good English, as he had trained in the U.S. He arranged everything and was very good company: slender, well-built, dark-haired and dark complexion. At the airport with sun coming up over the trees, we ate hot cheese sandwiches made of toast, and very black coffee, and then boarded the small D.C.3 Aircraft and flew for an hour across to the small airport near Macapá, on the other side of the Amazon Delta (see map over). I got some very good photos of river and forest from the plane, as we flew over the island of Marajo, which separates the Pará River from the Amazon main river, though there are channels between the two, inland. The island is some 200 miles across.



Rain-forest and a huge swamp on the Island of Marajo, with branches of the Par  River system; seen on the way from Bel m to Macap . 25 June 1965 (I-29)



Savannah on latter right soil, with small forest patch, between Pôrto Santana and Pôrto Grande Amapá, N. Brazil. 25 June 1965 (I-37)



L. to R.: Dr Sirié, Dr Francesco Pihero, Dr Harold Trapido, at Serro do Navio, Amapá. 26 June 1965 (II-17)

25 June. Belém to Serro do Navio, Brazil... The vast forest has partly been cleared for huge cattle ranches, whose buildings and herds of cattle could be seen at intervals. In other stretches there was solid forest stretching beyond sight, or intersected by big channels or seamed with marshes. On one photo were openings that looked like healing up of shifting cultivation. The top canopy is uneven, with big trees standing up above the rest, and not touching. The weather was clear and sunny and the landscape really illimitable and impressive.

Belém is in the province of Pará, which was the town's name in Wallace's time. Macapá is a town in Amapá Territory, on the north side of the Amazon. Our journey was to the comparatively new big manganese mine of ICOMI, indirectly owned by Bethlehem Steel Corporation, but entirely run by Brazilian staff. It is an oasis of civilised life, entirely self-run, surrounded by endless tropical forests, and connected to the main river system by a railway. Taking a taxi, we joined the long slow ore train at a small station in nowhere, where families of mine staff were also waiting. The distance to Serro do Navio is 194 kilometers, and takes five hours. We were in a long coach together with very loud-talking Brazilians and their children and no water. However, after two or three hours boxes of food were given us, containing sandwiches, 2 boiled eggs an orange and some fruit-juice. The whole of this journey and our stay at the mine settlements (except for the plane flight) was free, because the Virus Lab. has field work going on up there and the company is keen on public health. The travelling was rather fatiguing in the great heat and swaying of the train, but the scenes outside were fascinating. For the first half of the journey it was all savannah i.e. flattish country with low grassy vegetation carrying scattered rather small scrubby trees not much more than ten feet high. It was barren of visible life, and only at the south part were there any cattle, though it is said to be kept as it is by being burned every year or so.

Now and then we passed big pools or little lakes and swamps, evidently made by the railway embankments holding up drainage. These had beautiful palms and lush tropical swamp plants and water lilies, and I saw a grey and white kingfisher. The half-way station Pôrto Grande is on a big river (the Araguari) lined with fine tropical forest, and here the savannah is soon left behind and forest begins, though much of the edge of it visible from the train has already begun to be occupied by small-holders who are encouraged to grow fruit and vegetables for the settlement.

Eventually we pulled in to the mine settlement and were taken in

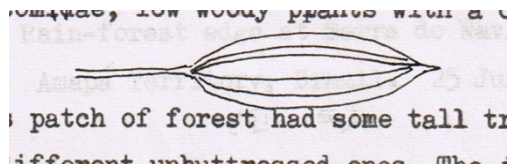


Rain-forest on the R. Araguari (or ?Amaparí), Pôrto Grande, Amapá Province,
Brazil. 25 June, 1965.

(II-2)

25 June. Belém to Serro do Navio, Brazil. a car to the centre. There are some 2500 souls here, including a large number of children; a church, cinema, football field, restaurant etc. and much construction work was still going on, road banks being made and planted – they have grass and most beautiful flowering shrubs, with the sheer deep forest outside on all sides, which one can see rolling away for ever. In the north it seemed to be more hilly. The forest edges (as also seen from the train) often have *Cecropia* trees, crumpety trees with huge leaves like horse chestnut but smaller. There is a total impression of order and comfort combined with a slight suggestion of Big Brother watching everyone – the work people carry a numbered label with their name and photograph, pinned on their chests. The guest rooms were fabulously comfortable, with good light tropical furnishings, huge ‘ice-box’ (i.e. frig.), very lush showers, beds, lights etc. and set among flowery trees and grass. And Yale-locked. But one’s eye kept being riveted by the vast forest beyond, like the sea. After a shower and lunch we visited the nearest of the three pieces of rain-forest that have been more or less preserved here and are used for the virus work.

I was rather tired and still had a fair amount of skin rash on chest and arms, and there was so much to see that I did not take many notes today, except the photos. At the forest edge were some *Cecropia* with very badly perforated leaves, from insect eating, that I photographed against the sky. Damage of this kind was enormously prevalent (though well short of defoliation except occasionally on parts of one plant) in many plants from the ground zone up to 50 ft. But not on all kinds of trees: especially noticed on *Cecropia* and on the common kinds of Melastomaceae, low woody plants with a characteristic laurel-sized leaf like this:



i.e. no mid-rib

This patch of forest has some tall trees, buttressed, mixed with many thinner different and buttressed ones. The jungle was not so thick that one could not make a way through it outside the paths. This was the upper slopes of terrestrial forest. Lower down was a rather pterodactyl-type swamp across which one had to walk on narrow slippery duckboards six feet aloft, for about 200 yards. Rich, rich vegetation, and many epiphytes on the trees, as well as lianas, including spiny liana *Drepanocarpus (Machoeium) lunatum*, in both zones. I photographed an iron-hard big log, one which grew small bryophytes and young Melastomaceae. This was my first realisation that some tropical trees decay very slowly. There

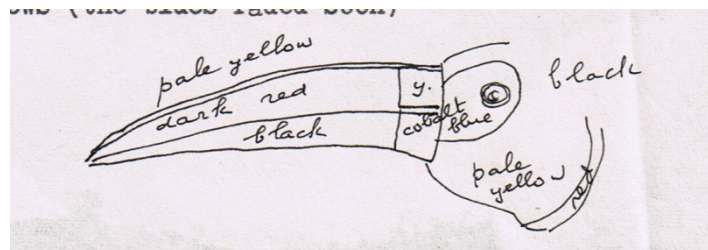


Cecropias with leaves badly eaten by insects. Rain-forest edge at Serro do Navio, Amapá Province, Brazil. 25 June, 1965. (II-5)

25 June..... Belém to Serro do Navio, Brazil. I looked out for fungi and noticed at least six kinds, including a large soft pale brown bracket; smaller soft or hard bracket; a tiny cup on a short stalk, diameter about 1 in. The first two sorts had some insect damage, but I saw no insects. These were on or on fallen logs, and one did not see them often, and hardly ever the same one twice.

We saw no birds this afternoon, but there was constant calling of the “tintiol”, which name copies of the note, “fui fui pheesaw”, the bird being the “grey screaming piha” *Lipaugus vociferans*. This Contingid is said by De Schauensee to have a “deafening lash-like three-syllable call”, but Humphrey who later identified it from my description referred to it as the “wolf-whistle bird”!

The virus lab. work is centred just outside this bit of forest, in the company’s mortuary, which is so seldom used that it is available. I asked if there was any chance of getting the toucan skull and beak that Rob had asked for. There are, besides the technician, two small and very good bushcraftsmen who do the trapping. One said (in Portuguese) they shot toucans sometimes for their friends, and “we have two in the ice-box, if you would like one) – which Harold and I thought very funny in this remote neck of the woods. They dissected the skull and beak of one and we got it, nice and clean, next day. It was later on partly dried under Bob Shope’s air-conditioner in his lab. Office, and finally in the courtyard of H.T.’s house in Cali. I saw the original fresh bird in the fridge: beak colours as follows (the blues faded soon)



It is basically a black plumage, red band below pale yellow breast, red below rump, upper tail coverts yellow, feet blue. It is rather like *Ramphastos vitellinus*, but Carlos Lehmann saw it in Cali pronounced it a different species, of Brazil, because of the red instead of black on the bill, and I think perhaps smaller size. *R. toco*? It was brought home to Oxford successfully. It cost 500 cruzeros, equal in this inflated currency to 5s {= £0.25p}. We also were shown skins of small opossums called *Philander*, I think about a foot long, also a tiny marsupial the size of a mouse, and a (large black and white) water marsupial (*Chironectes*), as well as rodents.

Dinner in the restaurant, after free drinks at the bar. They put different fruit drinks on the table at each meal.



As black and white photo on next page. View north from Serro do Navio. (II-21) (26 June 1965).



Open-cast mining of manganese oxides ore, Serro do Navio, 26 June 1965. Red laterite soil on top. (II-19)



Endless wild forest seen from the manganese mine at Serro do Navio, Amapá Territory, Brazil, looking northwards. Part of the mine settlement is visible.

26 June. (II-21)

26 June, Serro do Navio & Macapá, Brazil. This morning we visited the other two local forest areas where virus work is done. I got some good photos of tall trees, epiphytes etc. No.2 we drove to and parked in an open place almost surrounded by tall trees, so that one got a clear view of an unnatural edge. Where this had developed, one saw *Cecropias* as successional stage, mixed with other stuff. One 50-70 ft. tree had dense bromeliads and thick lianas growing on it, and another c. 100 ft. one also had epiphytes. On the trunk of a big tree with high stretch of clear trunk was a termite nest at c. 30 ft., in which parakeets had nested the previous year (i.e. in holes in the nest). A dead tall bole had a woodpecker nest hole. Here mosquitoes were to be noticed, and two genera were *Wyeomyia*, living in bromeliads; and *Trichoprosopon*. Also saw *Haemogogus*, the genus that carries yellow fever and lives in canopy (?tree holes); metallic blue body and bright white variegated legs. It hovers absolutely still in the air near one before approaching. But there is no yellow fever here (in any case I was vaccinated against it).

A lot of natural and some felled logs on the ground inside the forest also old huge 4 ft. diameter stumps, which resembles others seen so far in that it is fairly but not impossibly thick and has plenty of field layer and scrub layer vegetation growing up.

There was one species of tree "Acapu" (*Vouacapoua americana*) that had been felled because it was very hard wood, and among other things is used to make the mammal traps. It has a fruity smell. I strolled along for a short while in the path in thick forests, and saw two kinds of small ?warblers; heard parakeets in the 100 ft. tops of the trees; and watched a small "wood-pecker" on a small tree, but one does not see much in a short time.

On a tall tree outside I saw a yellow-headed vulture (*Cathartes burrovianus*) perched high up. At 10 a.m. we left to look at Forest No.3. This has a main road through it, and there are some very tall trees above the thick lower forest, which is similar to the others and had a few small bracket fungi on logs. One sees a very thin litter, including some fallen green leaves. Under the thin rind of a huge log was a colony of termites, the first I had ever seen alive.

As regards fungi, it seemed so far on this trip that there are very few colonies in the forest, each very locally distributed, never very many together, and you don't often see the same kind twice, and they never appear to come on standing trees or boles. Yet the trees, or some of them, perhaps most of them, rot when they fall.

26 June.... Serro do Navio & Macapá, Brazil. Returned to the mortuary (lab.) To collect the toucan beak, and here had wonderful drinks of iced water. Then drove round to see the main manganese mine on a low hilltop. It is obtained by open-cast working, and the zone we saw lay under only a few feet of red laterite soil. From this place one can get a superb vista of forest. As we drove along a small troop of at least 6 small black marmosets (*Saguinus midas*) ran across into thick low forest edge and hid among the creepers. They have yellow feet. This was about 11 a.m. When we return to our quarters, we were given a sample of manganese crystals to take with us, black with a yellowy reflection.

At 12.45 we started back by train. No rain had fallen, but it started just as the train was leaving! I now learned that the table salt we had at the mine contained an antimalarial chemical (chloroquinone, I think). There is much shifting cultivation in the forest edge by the railway line, with cassava, banana etc. After Pôrto Grande we entered the savannah zone again and I tried to define the vegetation. The scrub is up to 15 ft. high, with a few to 20 and even occasionally 25 ft., scattered, occupying less than half the ground, which is covered with grasses and sedges. No cattle, no nothing. But there were some cattle near Macapá. There were numerous specimens of a puzzling plant on the slopes, 6 in. or so high, and with a head of horsetail or bromeliad form, and a short thick stalk = sedge, *Bulbostylis spadicea*. The laterite soil everywhere here is clay-like, and you could see the rain running off it in small erosion channels.

{In margin}: see Note {page 85 in this transcript}

We arrived at the station, which is by the port of ICOMI, whence the manganese is exported by ships. This is called Pôrto Santana, and there is a considerable 'village' of workers nearby, also guest houses, which are on the river front. Macapá itself is a short way off.

The company's public relations officer (Jose Luiz A. Freire, address Caixa Postal 750, Belém) turned out to be a keen amateur mammalogist, and asked to be sent B.A.P. {= Bureau of Animal Population, CSE's base in Oxford} reprints. I could not make out how genuine he was, but he was very pleasant. I was given the best V.I.P. guest room, with all the luxuries but also e.g. Chinese prints on the walls. We drank at the bar, in company with a very drunk engineer who told us that there is a 10 ft. tide at Pôrto Santana, though over 100 miles from the Amazon mouth. Here we were almost exactly on the equator, and it was very comfortable to sleep on. At Serro do Navio the temperature was about 84 °, but it fluctuates between 86 ° and the 70s. It is certainly cooler at night.



River Amazon at Pôrto Santana, Amapá. 27 June 1965. (III-11).

27 June.... Macapá & Belém, Brazil. Got up rather early and walked to the river edge not far from our guest-huts. The Amazon stretched calm and very wide, with palm trees standing up against a pink dawn on the thin clouds. The opposite shore was clearly seen, forest to the edge, but inhabited. I suppose we were actually on a comparatively small side branch, for further down it opened out and one could only just see the other side as a thin low line. There were floating rafts of grass etc. in a stand of tall grass above the shore some tiny birds were eating the seeds. One was black and white on the head, like this:



the others were dun there was also a kiskadee about (*Pitangus sulphuratus*). While sitting at breakfast I saw a beautiful fork-tailed flycatcher (*Muscivora tyrannus*), a wonderful bird with a five-inch body black and grey above with a small yellow crest and pure white below, and an eleven-inch forked tail of black and white. Also a hummingbird that I did not describe. And some black and white swifts.

Instead of going straight to the airport, we made a detour in rather a hurry into the main village to call on a very good local doctor called Damasino, who is a collector and naturalist, and had a remarkable place plastered with health posters about malaria and so on, and a fine collection of mammal skins. We nearly missed our plane, which left at 8.40 a.m. This time there was heavy cloud covering most of the land, though we finally got a good view of the south edge of the big island and of the gleaming white waterfront of Belém.

I don't remember the rest of the day very clearly, but it included calling at the extraordinary curio shop owned by Sr. Jacques, where I purchased an anaconda-skin belt for Rob. Most of the stuff was too ugly or fanciful or bulky to suit my taste. It included stuffed birds, many wooden objects, many combinations of wood, glass, butterfly wings, bits of shell; but not complete shells at all, which I wanted. The shop was open though it was Sunday. The sun blasts down in the streets, and having left my hat behind at Macapá (it would return before I left Belém) I did not walk very far.

We also visited the Lab. In the evening, dinner at the Woodalls' nice house in the suburbs, very lush food and drink and music, organised by Jack's young wife.

Tonight a very small gecko appeared from behind the cistern in my hotel bathroom.

28 June. Belém, Brazil. Today was spent in the local rain-forests, which form part of the estate run by I.A.N. (Instituto Agronômico do Norte) – an agricultural experiment and demonstration area, and under pretty good security. These are said to be untouched original forest, and certainly have many characteristics of this, though H.T. doubts if they have really survived without any interference such as selective cutting. In Wallace's day forest came right up to the edge of the town, and these bits are part of it, only a mile or two outside, and also not far from the Pará River edge. Because of the mist-netting work, we were up at 6.30 for an early breakfast (usually hot rolls and butter and black coffee), and Jack Woodall called with his car at 7.45 and took us to the lab. We went out to the first of the three forest areas, which I will call "I.A.N.", where Humphrey and his crew were putting up 1000 yards of mist-netting in a number of small units, in glades or narrow slashes in the forest. They included one net, newly designed with elaborate pulleys, that could be put at 60 ft. It had already caught a humming-bird at 50 ft. – the rufous-breasted hermit, *Glaucis hirsuta*, bronzy olive green above and whitish below, the tail feathers being mainly green but the lateral ones fawn. In the mist-net I also saw a tiny flycatcher, the helmeted pygmy-tyrant, *Colaptes galeatus*, olive green above and streaky yellowish white below, and with a crest.

My first scrappy impressions of the "I.A.N." bit are amplified in notes I took in the afternoon, so they are combined here. I had asked to be allowed to potter about on my own in a forest, without any help, so J.W. kindly got me taken out again from the lab. in their van, returning with the bird crew later.

There seem to be no botanical details about these forests, and one cannot make out the tree structure from below because the cover is quite thick. There is the usual mixture of a few big buttressed trunks among a lot of smooth-trunked small ones, but many of the latter seem to rise of 80 ft. There is no distinct ground zone or field layer, or for that matter scrub zone, but an indecipherable gradient mostly of woody plants, small or young, plus trunks and tall stems, and mixed with ferns etc. The cover is quite thick but mostly not impenetrable.
Lianas



Discussion in the middle of the I.A.N. rain-forest, Belém, Brazil. L. to R.: Tom Lovejoy, Harold Trapido, Bob Shope, Sirié, Jack Woodall. The cover, plants with laurel-shaped leaves ending in a point. 28 June. (III-19)

28 June. Belém, Brazil.... abound. But nowhere did I see in any of these forests here or elsewhere any stately cathedral-like woods with clear dark ground region free from green plants. The epiphytes other than lianas are rather few (within range of sight upwards) but there are some bromeliads. No bryophytes were seen on the ground, but they were abundant on trunks and lianas. I think I noticed them also growing on leaves of trees. The ground has a very thin 1-2 in. layer of leaves lying on clay and apparently not forming any matted system. In it there seemed to be very few animals, but those that I did disturb had a quick get-away. There was a vast 1 in. black ant (*Dinopomera grandis*) moving about in a leisurely way (one kept C.E. 108) and a cricket. There are termite nests on the base of some trees.

{In margin}: see Note {page 86 in this transcript}

It was at once clear that some dead wood lasts a long time, for one saw big trunks and stumps well covered with epiphytic plants and very hard to dig into. On such fallen logs, but not seen on standing boles or live trees, were a very few very inconspicuous bracket fungi, but I saw no toadstools on the ground. One fallen tree about 1 ft. diam., held 8 ft. off the ground and in a patch of light good enough for photo, had some delicate pink 3 in. diam. brackets, also some small wavy be white ones and some small bromeliads. A 2 ft. diam. hard barkless fallen log known to be two years old, had ragged dead fuzzy brackets with some old insect occupation, and these were seen on another also. A 3 ft. diameter very old log, had 1-2 in. diam. orange bracket fungi, as well as '*Selaginella*' and young Melastomaceae. But I recorded no others, although I looked carefully. I took a photo also of a big log in a glade edge, by which grew a 12 ft. *Heliconia* (this is like a tiny banana leaf on a short stalk with terminal branches: *Heliconia* is a plant, but *Heliconius* is a butterfly).

Adjacent to this forest piece is an abandoned rubber plantation, whose trees by their size must be over ten years old, and had evidently been planted on cut forest (possibly leaving some trees for shade?). There was, in fairly shaded conditions but just photographable, a 9 ft. old butt of a large tree completely covered with green epiphytes.

It sounds silly even to myself to admit I saw practically no invertebrate life either in or at the edge of this riotous jungle of vegetation; but it is an impression I believe to be a true picture of the

28 June. Belém, Brazil.... place, as seen from the ground i.e. with very little knowledge of the high canopy. Apart from butterflies, I noted the big ant, a cricket, a looper caterpillar, one huge spittle bug nymph at c. 3 ft. on a plant like an *Aralia* (kept for John Whittaker) and some water striders on the surface of muddy pools on the track. Two huge metallic blue-black dung-flies. There were very few biting flies. One turned over the good many leaves of different plants, and although some insect damage was visible, one saw no fauna! No leave-suckers like aphids and apparently no honeydew on leaves. No nests visible.

Butterflies attract notice, but are really very scarce in numbers. Saw the following: a small '*Heliconius*'; a swallow-tailed species, brown rather translucent with blue and white spots, but cryptic when settled with wings closed; also a clearwing brown moth.

Birds were also very invisible and on the whole silent. I heard the tintiol (*Lipaugus vociferans*) and some toucanish sounds which ceased when a shower of rain started. Also saw three large toucans (?*Ramphastos cuvieri* or *vitellinus*) about 100 ft., up in the tree tops. Heard a "yaffle" i.e. woodpecker call like our green one, identified by ornithologists as *Xiphorhynchus guttatus*, the buff-throated woodcreeper (i.e. Dendrocolaptidae, a Neotropical family). And a white and black humming-bird with a yellow-green back. The contrast between what one saw and what the mist-netters found is shown on 30 June.

In the morning we also visited the two other forest pieces. In Utinga Forest area the regular trapping mammals is carried on, with 'dead-fall' live-traps, and not far away is the working lab. for this operation, which has skin collections etc. etc. The animals are marked (toe-clipping). One had been caught 98 times!! The actual catch is low, i.e. 20 in a day, from 18 track points, two at each point, on a 200 x 100 metre grid. They are taken to the lab and blade etc., and released next day. There are a few bleeding deaths, less than 10%. The trapping has been done five days a week or three years.... The marsupials include *Monodelphus* (black stripes on bright brown) and *Marmosa*. Marsupials are often trapped up trees (10 trapped sites) but partly feed on the ground. There are also ground marsupials that do not climb. In the ground traps they get (but seldom) two tree rodents (*Rhipidomys*).

We also briefly visited the Mucambo forest patch, which was thick.



Port of Belém on Pará River, with rain-forest island right, developed on mud bank. Taken from a D.C.3, while crossing the Delta. 25 June 1965. (I-24)



Edge of Guamá River near Belém, rain-forest (modified by human occupation). Pale emergent stems of the Aroid (*Montrichardia*) – formerly habitat and staple food of the hoatzin, now gone from this region. 29 June 1965 (III-34)

29 June. Belém, Brazil. Voyage on the 'Amazon'. Today we got up at 5.45 and away at 6.15 after coffee, by car to the Public Health launch on which the Deputy-Director of the P.H. Service, Dr Miguel Azevedo, and a crew of four (steerman, engine-man crew man and cook) visit outlying places. Today was an official holiday in Belém. With me were Jack Woodall, Harold Trapido and Dr Sirié. The launch was about 25 ft. length, and old-fashioned, but with a comfortable awning over the front part of the deck, where there was a table and chairs, and all open at the sides except for some storm blinds. It was named *Servulo Lima*. I have found it rather difficult to remember the exact route we took, as we were out for 10½ hours and went down several different channels, but the first part was on the Guamá River⁵ which bounds Belém on the south-west side, while later on we went down the Pará River below Belém. Started at 8 a.m. and it was bright sun and cloudless blue sky but a very cool wind that made one wear a jacket. The huge river is densely brown and muddy and very wide but one can see quite a lot of detail on either bank. The murky water would seem to make feeding impossible from those fishing birds, and we certainly saw none on the Guamá, nor any dolphins at all today. Patches of water hyacinth *Eichornia cassipes* (of the Pontederiaceae), here not an invader but in its natural region, were floating down; but not many logs or trees.

We coasted along fairly near the banks at some points and had clear views of the high forest edge. The general picture is of a solid forest above which certain trees tower by themselves i.e. they do not touch each other except in the middle-high canopy. One species, a huge tree with an umbrella-shaped canopy, was bare except for large red hanging pods that provide oil. This is the "Muguba".

{In margin}: see Note {page 87-88 in this transcript}

But a great deal of the edge is interrupted by human occupation, usually single homesteads stuck in the forest and with lots of palms, but no doubt with cultivation out of sight from the river, and having a continued influence on the composition of the surviving forest. The vegetation comes right down to the river bank, where it is tidal (but nearly always fresh, I think, where we went). A common and the only regular kind of "reed-swamp" is pure stands of a very tall aroid which has big white flowers and a head of leaves on a long stalk. This seems to be the same *Montrichardia arborescens* that I photographed at Bush

{In margin}: see Note {page 89 in this transcript}

⁵ 'Guano' is the *Inga*, a common rain-forest tree genus



Rain forest on the edge of the Guamá River, above Belém, Brazil. Bare trees are deciduous 'Muguba'. Sailing boat gives scale. 29 June, 1965. 2 patches of *Montrichardia* reed-swamp show white. (III-30)

29 June. Belém, Brazil. Voyage on the 'Amazon'... Bush, and is shown in a photo in the big book on "*The Tropics*". (Bates (1863) and Wallace (1853) both describe this aroid swamp and mention that the hoatzins largely depend on its fruit and leaves, and Wallace on his voyage up the Tocantins noted that the hoatzins' distribution stopped when the aroids did). Along the shore there are also many stranded breeze, mostly bare of bark. At one place (the only one all day, and when within visibility I watched fairly continuously with glasses) there were some 4-5 in. diam. white bracket fungi on a log that had fallen and was awash on the shore. I have a photo of the site of the distance, by H.T.

Black vultures (*Coragyps atratus*) were frequently seen, sometimes just one or two near the village or homestead. Some largeish yellow birds in a high tree. A large light brown bird with trailing tail as long as its body flew across a low-shrubby blade, determined later by Humphreys as the squirrel cuckoo (*Piaya cayana*) – its tail is actually barred black and white. It is not a parasitic species. From time to time migrating yellow butterflies cross the water. But on the whole the scene was of vast waters and massive trees, but almost no animal life.

We stopped at the Nucleo Colonial do Guamá, a large village that had been started with Japanese colonists, of who very few were now left. We clambered ashore across a broad vessel and over a ramshackle wharf to a scattered village with various untidy crop fields and trees. It was blasting hot. Up in a clump of trees was a colony of yellow-rumped caciques (*Cassicus* [= *Cacicus*] *cela*) largeish black orioles with bright yellow wing-patch, rump, hind-wings and beak (named for me later by C. Lehmann). Their nests are long stocking-shaped structures that thrown from the branches. On some yellow-flowering leguminous trees were enormous bumble bees, about twice the size English queen bumbles. A flycatcher of some sort, light brown, streaky, eye-stripe. Lots of other small birds in an abandoned plantation of cocoa, etc.

At 11.30 a.m. we passed a floating dead catfish 3-4 ft. long, yellow in colour. On it, rather tumbling about with the moving water waves we made as we went by, were three black vultures (I have a photo by H.T.). Seen close to, these birds have white nearly at the wing-tips, showing especially in flight. There were a few small vessels from time to time.



Nucleo Colonial do Guamá (“The Japanese Village”), a little way above Belém.
Villagers going to wash clothes. Local sailing boat with earthen pots etc.

29 June, 1965. (III-36).

29 June. Belém, Brazil. Voyage on the 'Amazon'... We had seen one at anchor at the Jap village, whose cargo was partly large earthen pots. We came close to another out in the river, which had a lot of shrimps drying on the sail deck, and one of our men went abroad to sample them and other food cargo such as bananas, but we bought none.

As about 2.30 p.m. we were back on the Pará River below the city and suddenly we found ourselves running aground on a mud bank, and as it was high tide, there was a good deal of activity about getting off, the steerman twisting and turning. We stirred an acre of yellow mud, but eventually got clear into the deep channel again. Here there was a large side channel and probably the two currents meeting had made the bank. Now we began to observe a few large terns flying slowly, circling and diving in mid river, subsequently named by C. Lehmann as the large-billed tern (*Phaetusa simplex*) I had already seen in Trinidad. Two black vultures on a floating dead pig.

A little earlier we had lunch, brought by Woodall, of sandwiches and beer, and once during the day the cook also brought up black coffee. During the afternoon we stopped, up a branch of the river, at an Indian family's thatched house by the river edge at Pôrto Nuovo. Most of the inhabitants seem to live scattered about. There were eight children, and an Amazon parrot in a cage, and the family, though rather shy were very polite. One of their chief occupations was making farinha i.e. cassava for flour, and this was done up in little cylindrical woven baskets, of which our Dr Azevedo bought several full.

At 3.30 we were cruising along a wide river, with several small sailing craft about, though not near, when a terrific squall of rain hit us, and blotted out all visibility for about a quarter of an hour, during which it was impossible to steer properly. Some got rather wet, but I remain dry undercover. When it cleared we found that three little engined boats were in sight. From here we went to a rather romantic place that had once be a big brewery, whose buildings still stood, though very dilapidated in places. We tied up at its wharf and explored the place, which was set in rich gardens of fruit trees etc. The place is called Cafezal and is now inhabited by about one family; but one room is used as a school for the neighbourhood. 2 parrots flew out of a buriti palm. In the fruit gardens were some lovely small birds: a little finch (almost certainly a *tanager*, *Euphonia* spp., probably *violacea* ♂ – see Haverschmidt "*Birds of Surinam*") that was brilliant blue above and dark sulphury yellow below, on the throat and on the forehead; and a thrush with maroon belly darker upper chest, and otherwise brown. A parrot (green, with yellow

~~approaching Parrot I~~ on way
 home 5.15. Another egret
 (probably same sp. but far
 off) on mud edge.
 Same tern again
 solid lumbering laundry
 + canopy, beds below.
 Crew of 4

Ilha dos papagaios

Several parrot groups before
 Passengers 'caique'

lots of thin palms + small
 brush of small fruits below
 crew - ASSAI

~~one with bear?~~

5.45 Getting to sunset &
 approaching Parrot K.
 huge ~~and~~ avoid bridge
 small at cups of coffee
 Beer & things

29 June. Belém, Brazil. Voyage on the 'Amazon'... cheeks – probably *Amazona amazonica* – flew over. Another bird in the gardens was a sort of tanager, brown above and olive green below, with a crest, and about the size of a lark. Inside the rambling huge house we saw a large tarantula. The place was built of small red bricks, and had a wonderful weedy very wide flight of broad outside steps of shallow depth.

As we left here we noticed that a little mangrove (yellow species) was growing here and there. On the mud-flat edge of the river was one of the few egrets we saw today: tall, white, yellow legs (also yellow feet seen in flight), dark beak.

From 5-6 p.m., we proceeded along a broad stretch of river, leaving a grey glassy wake behind us, and beginning to feel a bit sluggish mentally and rather thirsty. Another egret, probably of the same kind, but far off on a flat. The same tern again. Passed a solid lumbering launch with a canopy cover and beds below, and a crew of 4. Lots of thin palms on the shore edge, that have a brush of small fruits below the crown. These are assai palms (*Euterpe oleracea*).

{In margin}: see Note {page 90 in this transcript}

By now we were on our way back, passing a large forested island called Ilha dos Papagaios, because large numbers of parrots go back there to roost at night. We had seen several groups of parrots before getting here. At 5.45 it was approaching sunset as we passed this island, which has a huge fringe of aroid swamps. We drank small cups of black coffee. Hundreds of black vultures had come to roost at dusk in three big trees on the far bank of occupied forest edge. The magic white city was visible ahead, with mirages of boats and islands. As we came past the waterfront at 6.30 to our landing place, hundreds of dark swifts (with shorter wings than ours) were flying over the ships and going to roost under the eaves {sic = eaves} of buildings.

It was one of the most interesting days of my life.

30 June. Belém, Brazil. Though very tired, I had slept little because of the crowding of images in my brain and the moist heat and noise of the air conditioner. Got up at 6.30 a.m., had sleepy breakfast, and went out with Jack Woodall 7.45 to the I.A.N. forest and joined the mist-netting team to watch what they caught. This operation had its

30 June. Belém, Brazil.... HQ in a small thatched 10 ft. square hut whose sides were mesh-screened, making it dark (it was anyway in thick forest) and stuffy. It was hot but fine. There Humphrey sat at a long rough bench, with a small electric light over it, dealing with each bird that the catchers brought in. Each one was in a cloth bag, which H. attached to his belt, so that before long he was bulging with birds. A routine of recording, ringing and the taking of a blood sample from the anaesthetised bird, was done systematically, and required great concentration. The birds flew away when they recovered. Occasionally some difficult query about confusion in the field numbers of specimens had to be sorted out. The forest here has about 160 known species of bird, from their previous work. Son Steve and his friend Dave, and Tom Lovejoy, were slaving all this day, and in the afternoon (when I was not there) Tom had to help with the routine examination because the number of birds was so high – they got about 100 today, quite unusually large. I sat and watched and noted the birds that came in, until 11.45, when I left in the van. I collected a large Pentatomid bug on the forest margin vegetation at 2½ ft. and saw a smallish buzzard soaring high above the forest.

These are the birds I saw “in the hand” as they came through:

1. Black-faced ant-thrush (*Formicarius analis*), darkish brown, flew off with a clucking note.
2. Buff-throated saltator (*Saltator maximus*), a big finch that lives in second growth forest, olive brown, dark grey crown, white gular stripe, very strong black beak and bites; lighter grey below.
3. White-bearded manakin (*Manacus manacus*) family Pipridae, a female: greenish with bright red legs (the male is very black and white). Size of a linnet.
4. Cinnamon-rumped foliage-gleaner (yes!) (*Philydor pyrrhodes*), an oven-bird (Furnariidae). Brown above, dull orange below and tail above & below, faint eye-stripe. Wheatear size.
5. *Oriopelia* (= *Gastrygon*) *montana*, a kind of ground dove. Darkish grey-brown above, fawn chest, red beak, iris and legs. A small creature.
6. Golden-headed manakin (*Pipra erythrocephala*). A small greenish brown bird with pink legs.

30 June. Belém, Brazil....

7. Olive-backed foliage-gleaner (*Automalus infuscatus*). Another oven-bird, rather similar to (4), light below, rusty tail as in the other, no eye-stripe
8. A manakin, (*Pipromorpha oleaginea*).
9. A male and female of the pectoral sparrow (*Arremon taciturnus*), Black above, white below, black head, white eye-stripe, throat and chest band, and wing base yellow.
10. Silver-beaked tanager (*Rhamphocelus carbo*), dark above and dark rusty below, heavy beak. Thrush size. Then another one.
11. Female ant-bird (*Cercomacra* sp. ?*tyrannina*). A brown bird.
12. Barred forest-falcon (*Micraster* {sic = *Micrastur*} *ruficollis*). A magnificent sort of 'sparrowhawk': grey barred belly, wavy line across the tail, bright orange feet, lower mandible yellow. A real beauty.

{In margin}: see Note {page 91 in this transcript}

13. Wedge-billed wood-creeper (*Glyphorhynchus spirurus*) a small tree-creeper-like Dendrocolaptid with stiff pointed tail feathers, brown.
14. Rufous-breasted hermit (*Glaucis hirsuta*), a humming-bird, metallic above, white below, with a rather long curved beak. Humming-birds can't be ringed because they are so small and delicate, and marking is done by cutting certain feathers.
15. Red-stained woodpecker (*Veniliornis affinis*), brown above, barred belly, throat and under tail, red cap. Very small.
16. Blue-black grosbeak (*Cyanocompsa cyanoides*), a solid finch, bright dark brown, blue marks around head, heavy beak.

Thus they dealt with 18 birds belonging to 16 species, in about 3½ hours, though a good many more were actually brought in in that time, and the team worked 14 hours today and called about 100 individual birds, including (in the afternoon, a stray *Rhamphastos cuvieri* from the higher canopy). The absence of any common dominant form is striking and fits the usual tropical picture. Humphrey said there were one or two that had repeated again later, including *Arremon*. On the whole these birds were not very vividly coloured, though all birds look nice close to.

English names out of De Schauensee "*Birds of Columbia*".

30 June. Belém, Brazil.... I returned to the hotel in the lab. van which was taking batches of bird blood to the lab. Each bird blood sample requires 6 white mice for making virus tests, and that would mean 600 mice today, though of course the stuff can be kept on ice until mice and labour are available. This, which is only one of the operations connected with identifying viruses from the field, gives some idea of the overhead organisation required.

After lunch H.T. and I took a taxi to the lab. and walked across to the Belém Zoo, or more precisely Muséu E.A. Goeldi, which combines a museum and a zoological garden. It was founded in 1899, and the present Director, Dr Albuquerque, showed us round after an official introduction by Bob Shope. The Director is a violent nationalist, but Bob had the gift of squaring practically anyone in Belém, so we were tolerated. But one odd thing is that this man speaks English quite well, but would only converse in Portuguese to Harold's Spanish! When I asked him if there were in Belém any relics or memorials or specimens from the early explorers like Wallace, he said curtly that they had taken everything away with them and "left us nothing" though Pará was then a trading town with no scientific repository of any kind.

The zoo is rather pleasant, set in grounds with many big trees, in the canopy of some of which sloths were hanging asleep high up. One huge silk-cotton tree (*Ceiba pentandra*) (source of kapok) with smooth buttressed base to the front had only been planted in 1899. There was a palm garden with many species, and many shallow ponds, some with the enormous *Victoria regia* water lilies. Brazil nut tree, balsa etc. The species of plants and animals here are strictly those from the Amazon basin only, which gives the place a certain coherence. Thus there are anacondas, a manatee, tapirs (the male has a penis over 18 in. long, and it trails this on the ground casually, the end having lateral expansions as if for anchoring in position). An egret that looked like the ones we had seen on the Amazon (but only a picture, no specimen) had yellow legs and black beak and was labelled *Leucophoyx inula*. (Carlos Lehmann thought this might be a snowy egret, given by De Schauensee as *L. thula*.)



Children of mixed races, at the Emancipation Day festival, watching boat-races on the River, Paramaribo, Surinam. 1 July 1965. (IV-14)

30 June. Belém, Brazil.... In the blistering heat it was rather a relief to enter the air-conditioned Herbarium, small but modern. Dr A. announced that insect damage was carefully controlled, as well as the temperature. Unfortunately, when his back was turned, I peeped into one of the plant folders and saw lots of Psocids (book-lice) running about.

In the evening most of us met in the hotel for a final dinner, but I went before the others, Woodall helping me to solve the mysteries of changing money and paying my hotel bill.

1 July. Belém, Brazil to Paramaribo, Surinam. Left by air on Pan-American about 5 a.m., having got up at 3.15, after a few almost sleepless hours (I had then had only 9 hours sleep in the previous 72), packed into a jolting hotel bus, and gone through the cooler night to the airfield, where we found Humphrey, Shope and Woodall waiting. Iron men! They had also come to meet a veteran Colombian biologist, Dr Jorge Boshell, who was returning to the lab, and who is an old comrade of H.T.'s.

We took off just before the tropical dawn over clouds, which came in red and orange. I dozed until Paramaribo airport at 6.20 (local time). Here we were in Dutch-controlled territory; though Surinam now has a modified independence, what Harold called "the Presence" was detectable here and there, and there were a good many young Dutch soldiers. In all these places the airports are far outside the towns, and we had a long taxi ride into the town. Having breakfasted, after a fashion, on the plane, we went straight to the local Museum, which was closed for the day because this was the anniversary of Emancipation (from slavery) and a public holiday. But a courteous Indian (from India) custodian let us in and we saw some very interesting things, that included an anacondas skin 6.6 metres long; Indian work in wood, weapons etc. and 18th-century Dutch four-poster bed complete with bed-clothes and chamber-pot in blue and white china; pictures, and so on. From here we drove to a very posh hotel and had coffee in their cafeteria, and I bought a dark brown-red shallow wood bowl for J. in the gift shop.

The town was very much astir, everyone in their best clothes. I noticed one woman walking along who had the very big legs that come from elephantiasis (filariasis); a bird-shop with yellow orioles in cages; and we tried in one or two shops to buy the cotton stuff from which the remarkable and pretty "caps" worn by the women and girls are made, but concluded most of them must be family heirlooms. The



Estuary of the Orinoco River photographed from jet-plane at c. 30,000 ft. 1 July 1965. (IV-23). (It is now known, 1973, that some of the Caroni Swamp, Trinidad, scarlet ibis migrate to this area to breed).



Strait between Trinidad (southern tip r.) and Venezuela (in distance) – “The Dragon’s Mouth”; south end is “The Serpent’s Mouth). Taken from jet-plane, 1 July 1965. (IV-26).

30 June. Paramaribo, Surinam. flat cap is pleated and sticks out sideways and seems to be held by two stiff pigtailed of hair inside.

We wandered down to the big river, which flows sluggishly and muddy by the town. Here big and very placid, jolly, happy crowds were gathered, watching rather episodic races on the water. There were Indians (from India), Negroes, some Indonesians (I think), Dutch, all together naturally, and a few Chinese. Many children. The races were rowing fours or sixes, and as the morning went on the water got rough enough to sink one rowing boat in mid-river, though no one minded and the boat was recovered as well as the crew. It was mighty hot in the sun and I lurked under trees mostly. On a grassy place there was a negro steel band performing on a lorry, and one or two specially elaborately dressed women dancing near. In a little inlet of marsh, 4 medium-sized white egrets were feeding, that had black beaks and legs and feet. They may have been snowy egrets.

We went the 30 km. ride back to the airport and left on a KLM plane at 2.35 p.m. (actually a Venezuelan line aircraft on loan).

1 July. Paramaribo to Curaçao. Between here and Georgetown, British Guiana, where we stopped, are vast stretches of tropical forest and some big rivers, which I photographed, also some big rice fields near the estuary. About ¼ hr. before reaching Port-of-Spain, Trinidad, we were over a complex estuary of what almost certainly must have been a branch of the huge Orinoco River. Then we saw the Strait between Trinidad and Venezuela, with The Serpent's Mouth and Dragons' mouths (south and north narrows). Then I realised we were passing the Texaco area and I clearly saw the lake opposite the Kerrs' house. After that excellent views of the Caroni mangrove swamp, and finally Port-of-Spain on the foothills. I got very good air photos of all these views. After leaving Port-of-Spain we flew over some excessively desolate and wild hills on the long coast peninsula north of Cumaná, Venezuela; then over a cluster of coral keys with wonderful green underwater reefs around them. Then reached Curaçao, flying past the curious flattened hills to the south end, and the very dry cactus desert at the north end where the airport is. From here a taxi down to Willemstad, the old town in the south central region and the south coast.



Coral reefs and keys between Venezuela and Curaçao (seen from air). 1 July 1965. (IV-34)



Old Dutch-Colonial houses at Curaçao 2 July 1965. (V-4).

1 July. Curaçao, Netherlands Antilles. We got here at 5.55 p.m. and went to the Hotel Intercontinental, which is more posh than I can attempt to record. It was full, and owing to a defect in Cook's agency at Cali, no room had been reserved for me, so we compromised by accepting a double room together. This looked out on the sea, across a terrace and a big open swimming bath, to fortress walls with cannons, for the hotel was built on a fortress site. Curaçao is a free port, and therefore many goods are sold without duty and it makes its living by attracting a lot of tourists, the only other main industry being an oil refinery. It was very hot outside, but a great rest to sleep in a quiet call room and catch up at last.

2 July. Curaçao. Owing to the difficulty in getting planes to fit this route and that would include at any rate some daytime flights over tropical habitats, we had most of the day here. This free-port town is really beautiful, as the old Dutch style houses with bright painted colours and high fronts have been carefully preserved. Along the waterfront are moored a long line of smallish boats that come from Venezuela every day with cargoes of fruit and vegetables, which are displayed on a long line of stalls under sail-awnings. The reason for this is that the island has no water to speak of (it supplies are made from sea-water in a large factory), and therefore no market stuff is grown. It has a desert climate and the occupied and some of the occupied parts are sterile in the extreme, being cactus/scrub/goat desert.

From here I sent home letters written at Belém, as the post is quick and safe from robbery; and a number of Kodak films. The whole atmosphere was so different from the claustrophobic one of Belém city, free and easy and pleasant. Even to finding Chivers strawberry jam on the terraced breakfast table! Among the tropical fruits such as banana, limes and many I do not know, for sale on the waterfront, were some fish and also some big bodies from conch shells. Over the water I counted 8 frigate birds (*Frigata magnificens*) flying and soaring. These 8 were soaring on the wind updraft against a fine fortress across the far side of the harbour. But they also went over the waterfront, and the interesting long pontoon bridge that crosses it.

H.T. spent a very long time in the chief camera shop while I loitered on the front, and bought some extra films there.



Fruit and vegetable stalls on the Waterfront, Curaçao. 2 July, 1965. (V-13)

{reverse side}



Postcard

2 July. Curaçao.... Also bought some small notebooks. We crossed the bridge and explored a more scruffy street of shops, in search of picnic equipment and other things not easily come by in Colombia. There was a pet shop with a lot of parakeets.

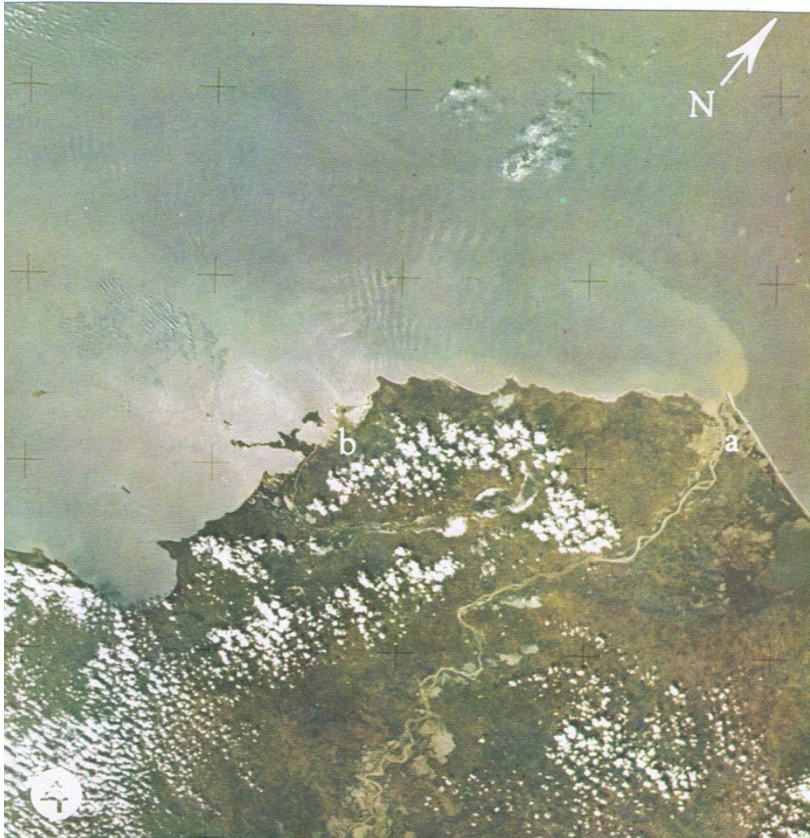
In the afternoon we took a taxi up into the middle part of the island, which, though sparsely inhabited, is mostly great stretches of thin scrub and cactus. One was identified as divi-divi (*Libidibia coriaria*), a source of tannin. There were prickly pears and also flute-shaped *Cereus* cacti. Goats abounded, apparently eating anything however tough. There were also parakeets about.

{In margin}: see NOTE {on page 92 of this transcript}

We dined in a Chinese restaurant and took the taxi to the airport leaving at 10 p.m. on a Dutch Antillean Airline plane (ALM), which was starting late, very hot and stuffy and with passengers mostly with a local look. It stopped at Aruba and reached Baranquilla on the north Colombian coast 1½ hours late, at 1.30 a.m. (local time). I found I had acquired a violent form of “hay fever” that must have been caused by the strong dry wind on our taxi drive that was undoubtedly full of minute fragments of cactus spine – running nose and catarrh. But H.T. did not get this. He appeared to be entirely impervious to hunger, thirst, fatigue, disease, or anxiety, perhaps owing to his Slavonic solid physique (his parents were Lithuanian Jews).

The usual long taxi ride from the airport got us to our hotel about 2.30, as going through customs and passport control had been slow. At the immigration counter we waited while a policeman with a large revolver in his belt held us back. A stout rich-looking Colombian lady then pushed passed us and harangued the officials in a very rapid and unstinted manner, and they finally let her go through, looking rather sheepish. Then Harold (who, as a Rockefeller Foundation man, has diplomatic status in Colombia, and who put on his black jacket to look the part) showed the special stamp in his passport, and was then wafted past, myself tagging behind in my aertex shirt, covered by flowery remarks from H.T. in Spanish about “Professor” etc.

The Hotel del Prado is old-fashioned and grand, with huge palm trees round its garden, and long stone outside balconies onto which the bedrooms open, instead of corridors. Water was under suspicion, so we drank bottled water here. It was still damp and hot, and on the whole I hated Baranquilla, which is a rather dingy huge sea-port.



© **Internal Waves off the
Magdalena Delta**

The Magdalena River pours a muddy plume into the sea off northern Colombia. The plume is carried westward into the western Caribbean Sea under the influence of the southeast trade winds. Revealed for the first time, and still a puzzle to oceanographers, are several fields of giant internal waves presumably caused by tidal excitation of the thermocline—the boundary zone between the warm surface water and deeper cold water. (The lighter spots with accompanying shadows are groups of clouds while the more subdued and regular wave patterns are the internal waves.) An unseen but immense submarine canyon is incised into the submarine portion of the delta immediately off the river mouth. This chasm has been the site of frequent undersea avalanches, mud flows, and turbidity currents, which commonly break submarine telephone cables along their route. The cities of (a) Barranquilla and (b) Cartagena can be vaguely discerned.

Photo taken by skylab 4, 1973-4 Robert S. Dietz (1974) “*The oceans from skylab 4.*” See *Frontiers* 20: 359-63.

2 July. Baranquilla to Cali, Colombia. Taking a taxi into town, we tried to find an Esso map of Colombia (unsuccessfully). It is the best small map. Then drove out to the harbour, near the mouth of the big Magdalena River which runs a long way northwards to the Atlantic between the Eastern and the Central Andes. Small rafts of water hyacinth (*Eichornis*) were floating downstream. Black vultures circled over a big rubbish dump. Large cargo steamers moored.

At 12.30 a.m. we left on an Avianca plane for Cali which we reached about six p.m. Cali lies in the Cauca River Valley, between the Central and the Western Andes, and runs north to join the Magdalena about 225 km. from its mouth. Nearly all the way to Cali the weather was clear and fine and I was able to take photos from the air. We stopped at Cartagena, where there was a cool wind after the Black Hole we had just been in; and then at Medellín, which is several thousand feet up and has a pleasant climate and lies in an impressive circle of high mountains made aircraft manoeuvring looked difficult. In the formal gay airport gardens here, full of bright flowers and shrubs, was a vermilion flycatcher (*Pyrocephalus rubinus*) – brown above, pale rusty orange below, with a bright orange red cap. The people of the province of Antioquia, of which this is the capital, are said to be very cool, efficient and go-ahead, unlike those of Del Valle, where Cali is.

Before getting here we passed over vast swamps into which the lower parts of the Magdalena River partly break up, and these were full of oxbows and greenness. Also in this northern country I photographed the Cauca River near Cacéres, running through cultivated country and with large islands in mid stream. H.T. went forward to the pilots' cabin of this propeller craft and got permission for us to stand behind them and look out and I took some photos from here also. After Medellín one passes over very confused high mountains, in the province of Caldes, through which Cauca R. runs in a gorge, and on the east I had a glimpse of one very high peak among the clouds. Then we came out of this into the head of the huge wide Cauca Valley, all cultivated, and showing a lot of soil erosion on the low hills where grazing goes on among the crop lands around.



Confluence of the Cauca R. (l.) and Magdalena R. (flooded, r., with riparian vegetation) northern Colombia from the air. 3 July 1965. (V-28)



Cauca River in the Cali River plain, with Central Andes (then bandit area) behind. Originally forest, now plain, is agricultural. Big trees by river are *Anacardium excelsum*, 6 July 1965. (V-29)



Lower part of the Cauca River in northern Antioquia. Remains of forest, much land cultivated. 3 July, 1965. (V-29).

3 July. Cali, Colombia.... We were flying quite low over this rich valley, and I could see little flocks of cattle egrets (*Bululcus ibis*) in the pasture fields or flying to roost. On either side of the valley are huge mountain ranges, mostly obscured by cloud now, as it was near dusk when we got into the airport, where Jean Trapido and their son Paul were waiting and drove us back to their house in a rich suburb on the foothill edge of this large city (which by now has some 900,000 souls).

Interlude

I had by now got fairly used to the tropical heat and damp, and to the routine of air travel (11 different flights so far) – the boring waits at terminals, the queues at immigration and customs, the banality of air life with PLEASE FASTEN SEAT BELTS – NO SMOKING, and bits of variable food and drink, and the cushioned life of first-class passengers. Now I had arrived in a country that was equally hot, but was having its dry season with hardly any rain at all, and humidity is often below 50% R.H. In Trinidad the rainy season had just begun; in Belém, if Wallace's notes still apply there, I arrived after the end of the wet season and just when the dry season was about to begin. So I did have three different kinds of seasonal experience, not to speak of some quite different ones while in Colombia, ranging from very dry cactus desert to cloud-mountain-forest and the enormous rainfall of the Pacific Coast forest. On the other hand it should be recorded that in fact I never put on a waterproof raincoat except during heavy rain up on the Paramó of the Central Andes (where the weather is always bad) and for a few minutes in the forest at Belém (though the rain did not get through the canopy). This range of experience is of very great importance to my conclusions about the nature of forest communities, which I have seen (though of course very briefly) under most of their possible seasonal conditions.

One advantage of comfortable air travel is that it gives one time to think, and by now I had begun to form some rather curious ideas about the ecology of forest populations, and especially about their apparent or actual scarcity. My contribution to the R.F.'s own fieldwork so far, apart from being an interested listener, was to suggest the possibility in using field nest-box methods as well as



3 July....

Interlude

live traps. Two of the greatest difficulties surrounding their mammal work were obviously (1) the need to visit traps at exactly regular and specific times, so that the animals would be taken alive without too much interference with their viability (as it is, they are taken in for bleeding and usually released the next day) (2) Practically nothing is known about their nest-sites, their habits, their food, and their nest faunas (except in so far as parasites can be collected from the animals themselves, which gives misleading indices usually).

Nest-boxes, or visiting-stations on the cover, *if they worked*, would probably give information on all these things e.g. small mammals may store fruits and seeds etc., and furthermore it would provide a supply of baby rodents and marsupials, which (as is well established from the virus studies using white mice) are especially good for establishing live virus infections. In Trinidad, Brooke Worth has made a start in domesticating some of the wild rodents, and this would supply youngsters; but there might be valuable information from actual wild ones.

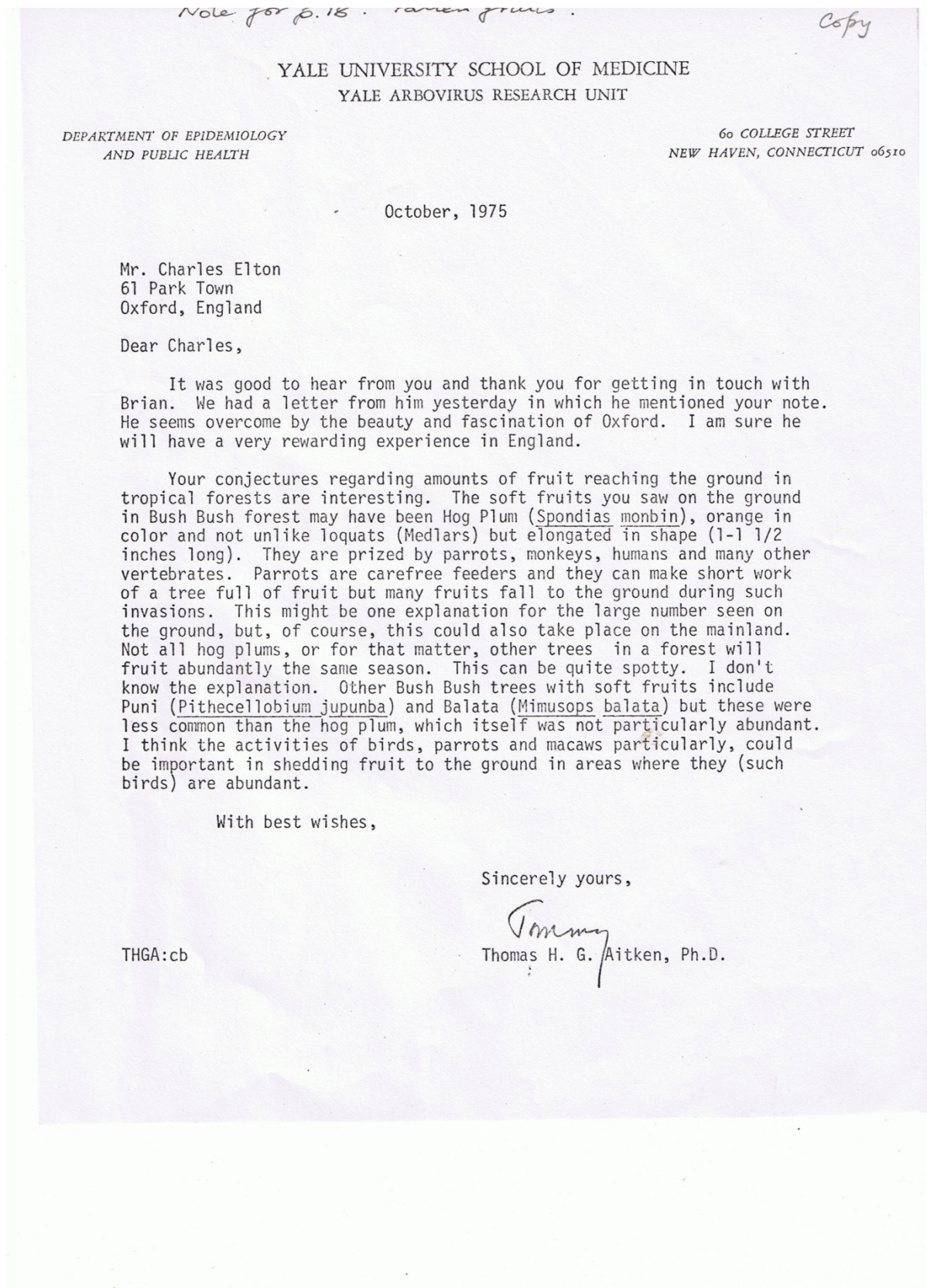
The chief snag in this idea, and a really serious one, is that on the whole nest-box studies have proved difficult, though there are some known successes e.g. Chitty with *Microtus* at Wytham. So it would need a really good young mammalogist to try and study the whole technique in rain-forest with these or similar species, and in cases of failure he would have to run a parallel programme of work or something else to make the risk worth taking. Trinidad's station is too far from base; Cali has not yet got one nearer than the Pacific coast; Belém can't so easily do it without using a Brazilian national (they say), yet there are no suitable ones. Barro Colorado in Panama might be a possible first shot.

As far as I could judge, this idea had not occurred to anyone at the three places involved. But it has to be said that these men are themselves not mammalogists, though they have done a brilliant job in getting the live animals and doing a sort of "para-mammalogy". They admit this themselves.

Note p. 17 on. Navira Swamp, Trinidad.

Papers on Bush Bush by Aitken (1967) and by him and others (1968) give a lot of information. Good maps. Bush Bush only a very small bit of the Swamp, at the south and with the Navira R. draining to the sea from it. The main swamp with plank-walk across a short bit of it has Cascadoux grass (*Leersia*) dominant, and areas of high cane (*Gynerium*) or *Montrichardia*, or giant sedge (*Cyperus giganteus*). Open water in a few places with rich water plants. The swamp forest is mainly Moriche palms (*Mauritia setigera*) and swamp bloodwoods (*Pterocarpus rohrii* and *officialis*), and some other spp., often covered with lianas and epiphytes. Several species of epiphytic Bromeliads. Seasonal levels of water vary and sometimes parts are dry with or even without ground pools. Acid waters. Bush Bush really an island of terra firme 2-3 miles long and mostly <1/4 mile broad, sandy and forested. Map in Aitken *et al.* p. 242, shows the round we made viz. from the base across northern arms and then across duck-broad walk, down and round the swamp and then direct back – omitting circuit of Big Bush Bush that had been intended. Masses of work described, including tree-canopy stations, tick cloth-dragging counts, enormous mosquito studies, etc. There are over 92 mosquito species, 10 at least of sandflies, 10 *Culicoides*, 18 Tabanids, 1 Cuterebrid, 4 lice, 1 flea, 9 ticks and various mites including 15 Trombiculids. Some mosquitoes (and other flies) mainly confined to canopy, or (as with *Haemogogus*) coming to ground level where sunny openings.

Note for p. 18. Fallen fruits



Note p. 27

This savannah seems very like the one described (with excellent photos) by Masayuki Takeuchi (*J. Fac. Sci. Tokyo Univ. Sect. 3 (Botany)*, 7:523-33). He worked in the extreme north-east of Brazil where it meets Venezuela and British Guiana. The open savannah vegetation cover varied from 20-100% (chiefly grasses and sedges at ground/field layer level. *Bulbostylis spadicea* is one of 3 species of this kind of sedge – “the most dominant species is *Bulb. spadicea* which has the filiform leaves in fascicles.” There are 2 good photos of it. Some of the bare ground gets flooded in wet season. Very likely it was in inverse in season to Belém, being north of the equator. Gallery forest occurred in the wetter gullies and palm *Mauritia flexuosa* was dominant (as partly at “Bush bush”). There is a photo of small bracket fungi on a rotten log in this forest. He states that savannah itself is a natural formation-type caused by dry season of several months, but accentuated many places by burning. He had *campo limpo* without trees and *campo cerrado* with scattered low woody trees and shrubs. But the vegetation below was not very different.

Note p. 30

Dinoponera grandis of the Brazilian forest is figured by W.M. Wheeler in "Ants" (1910 p. 233, from Sharp's *Cambridge Natural History, Insecta*). It is the largest of all Ponerine ants (Bates gives it 1¼ in.!). This is the most ancient subfamily of living ants, a bridge back to solitary wasps. They have simple caste and social structure, and are all carnivores. Ponerines are a larger part of tropical and temperate ants, but only dominant in Australia: "Then these ancient insects occupy a position among ants analogous to that of the monotremes and marsupials among mammals, and the Rynchocephalia among reptiles" (Wheeler, p. 227). Bates says "Its colonies consist of a small number of individuals, and are established about the roots of slender trees. It is a stinging species, but the sting is not so severe as in many of the smaller kinds." All ponerines have hefty stings.

September 1971 (Oxford). Prof. Neil A. Weber confirmed that the Latin name above is still the correct one.

Note p. 31A. “Muguba” trees.

For long I failed to trace this tree in any botanical book, as most of the native names are given for Spanish not Portuguese countries. In 1971 I found the answer while re-reading Bates writing of the Pará in 1848. The main street then had an avenue of “Monguba” trees and was called “Estrada das Mongubeiras”: “about a mile long, is a magnificent avenue of silk-cotton trees (*Bombax monguba* and *B. ceiba*), huge trees whose trunks taper rapidly from the ground upwards, and whose flowers before opening look like red balls studding the branches” (p. 5, Everyman edition). On p. 7 he says of the house wren “Its song is more frequently heard in the rainy season, when the Monguba trees shed their leaves”. The spelling differences is evidently explained by the Brazilians turning “o” sounds into “oo”, as has happened with Mocambo Forest, which we always heard pronounced more or less as Mucambo, and I have usually spelt the latter way, although Phil Humphrey says the former is correct. The “n” would be partly elided.

Core says “Ceiba (20 species) occurs in tropical America; *C. pentandra* “which is no doubt the *Bombax ceiba* above), silk-cotton, had seeds covered with silky hairs, yielding kapok.” But kapok is also produced from allied trees in southeast Asia. Hargreaves’ booklet on Caribbean trees says, Ceiba, kapok, silk cotton tree, or cotton trees, is one of the largest Neotropical trees, that the flowers appear just before the leaves, two months after they fall, black oblong seeds 3 in. to 6 in. form, and these capsules have the kapok in. The size of tree certainly corresponds with the Guamá ones, and (from our B.C.I. [= Barro Colorado Island, Panama] observations) the umbrella top.

Humboldt (1810) in his “*Vue des Cordilleras*”, visited country near Cartagena in 1801 and mentions (in the neighbourhood of curious small mud volcanoes) forests at c. 600 m. abounding in “beaumiers de tolú, in *gustavia*” à fleurs de nymphæa” and in *Cavanillesia mocundo* whose “fruits membraneux et transparens ressemblent à des lanternes suspendues à l’extrémité des branches”.

Robin Foster in a letter 19.8.72 got me nearer to the heart of the matter. “Now about *Bombax monguba*. I don’t know if that’s really what you saw near Belém, but it is by far the best bet. The name has been changed to *Pseudobombax monguba* (Mart. and Zucc. (Dugand). The original description is to be found in Martius and Zuccarini – *Nov. Gen. et Sp.* 1:93. We don’t have it at Duke, so I can’t check out the description of the fruit. But it is entirely plausible that the fruit should be filled with oily seeds rather than kapok, especially since you describe the trees as growing along the river. The only Central American bombacaceous tree I know that grows along rivers is a small

Note p. 31A. Mugaba...

tree, *Pachira aquatica* (now *Bombax aquatica*) which has large (but not red) fruits full of oily seeds and no kapok. This kind of seed seems characteristic of flood plain species. Schnell in his new "*Phytogeographie des pays tropicaux*" mentions *B. munguba* as being an American tree with characteristically large buttresses. I would certainly pick the Bombacaceae.

Note p. 31A.

Paul Richards (“*The Tropical Rain Forest*”, 1964, pp. 284-7) cites this plant formation-type, from reports of Huber (1901) and Bouillienne (1930) on Para/Amazon River delta complex. He refers to the *furos* or channels where the water is tidal but more or less fresh. First colonisers are *Montrichardia arborescens* forming pure stands 2-3 in. high, but competing with pure stands of the leguminous shrub *Drepanocarpus (Machaerium) lunatus*. These often alternate every 10 m. or so. Both have floating seeds that germinate very fast – between two tides. A ‘sudd’ of floating grass *Hymanache amplexicaulis* with *Eichornia azurea* and *crassipes* lodged among both of them. Mangrove *Rhizophora racemosa* (not, like most, confined to saline or brackish water) replaces the carr. Sometimes two or three other mangroves instead, also above the salt. Then palms (*Euterpe oleracea* and *Mauritia setigera*) and *Cecropia palmata* and *C. pratensis* establish under and replace the mangroves. This leads to a freshwater swamp or *varzea* forest liable to floods. Huge trees like climax rain-forest in aspect. Similar stages in British Guiana rivers (but says *D. lunatus* succeeds *Montrichardia*), but the chief sudd grass is *Panicum elephantipes*, and *Mora excelsa* (absent on Amazon) forms first tree zone (it is dominant = 50% of trees, but up on higher ground mixed with rain-forest as usual).

Note p. 34

G. Bonder (1964), “*Palmieras do Brasil.*” Boletim No. 2, Inst. Bot. San Paulo.

Euterpe oleracea “conhecida como Açaí”, occurs in Para. There are 10 *Euterpe* spp. in Brazil and 43 in the tropics. Photo of *E. vinifera* (different native name) looks like *asssai* – tall, thin stem with small brush at the top.

Note p. 36

The *Dictionary of Birds* says the falcons have three subfamilies, all of which I have now met with:

- 1) Neotropical, primitive falcons, living in tropical forest and hunting birds
– *Micraster* {sic = *Micrastur*} at Belém.
- 2) Mainly Neotropical, cara-caras, clumsier and more buzzard-like.
- 3) Ordinary falcons e.g. kestrel.

Note p. 41 Cacti on Curaçao

C.Rodgers and Peter Evans took “*Oxford Botanical Expedition to Curaçao and Bonaire, 1980*”. Report in the O.U.E.C.Bull {Oxford University Expedition Club Bulletin} New Series, Vol. 5 1982. The dominant columnar cacti on Curaçao are *Subpilocereus repandus* and *Stenocereus griseus*, with *Pilocerces lanuginosus*, less abundant *Opuntia wentiana* common prickly pear. A lower cactus *Melocactus macranthus* (the flowers are on top, says Clore) was main object of study, because of its great genetic variability. They discovered that the flowers are visited and probably pollinated by humming-birds, *Chlorostilbon caniveti carabeus*, the flowers opening in the afternoon. (De Schauensee gives 5 different species for Columbia, apparently all small and mainly green, the genus are called “Emeralds”).