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Yours sincerely
H W Bates

10





ADVENTURE WITH CURL-CRESTED TOUCANS.

Frontispiece to Vol. I.

THE
NATURALIST ON THE RIVER
AMAZONS,

A RECORD OF ADVENTURES, HABITS OF ANIMALS, SKETCHES OF
BRAZILIAN AND INDIAN LIFE, AND ASPECTS OF NATURE UNDER
THE EQUATOR, DURING ELEVEN YEARS OF TRAVEL.

BY HENRY WALTER BATES.



Saüba Ant.—Female.

IN TWO VOLUMES.—VOL. I.

LONDON:
JOHN MURRAY, ALBEMARLE STREET.

1863.

[*The Right of Translation is Reserved.*]

PREFACE.

IN the autumn of 1847 Mr. A. R. Wallace, who has since acquired wide fame in connection with the Darwinian theory of Natural Selection, proposed to me a joint expedition to the river Amazons, for the purpose of exploring the Natural History of its banks; the plan being to make for ourselves a collection of objects, dispose of the duplicates in London to pay expenses, and gather facts, as Mr. Wallace expressed it in one of his letters, "towards solving the problem of the origin of species," a subject on which we had conversed and corresponded much together. We met in London, early in the following year, to study South American animals and plants at the principal collections; and in the month of April, as related in the following narrative, commenced our journey.

My companion left the country at the end of four years; and, on arriving in England, published a narrative of his voyage, under the title of "Travels on the Amazons and Rio Negro." I remained seven years longer, returning home in July, 1859; and having taken,

after the first two years, a different route from that of my friend, an account of my separate travels and experiences seems not an inappropriate offering to the public.

When I first arrived in England, being much depressed in health and spirits after eleven years' residence within four degrees of the equator, the last three of which were spent in the wild country 1400 miles from the sea-coast, I saw little prospect of ever giving my narrative to the world; and indeed, after two years had elapsed, had almost abandoned the intention of doing so. At that date I became acquainted with Mr. Darwin, who, having formed a flattering opinion of my ability for the task, strongly urged me to write a book, and reminded me of it months afterwards, when, after having made a commencement, my half-formed resolution began to give way. Under this encouragement the arduous task is at length accomplished. It seems necessary to make this statement, as it explains why so long a time has intervened between my arrival in England and the publication of my book.

The collections that I made during the whole eleven years were sent, at intervals of a few months, to London for distribution, except a set of species reserved for my own study, which remained with me, and always accompanied me in my longer excursions. With the exception of a few living plants and specimens in illustration of

Economical and Medicinal Botany, these collections embraced only the Zoological productions of the region. The following is an approximative enumeration of the total number of species of the various classes which I obtained :—

Mammals	52
Birds	360
Reptiles	140
Fishes	120
Insects	14,000
Mollusks	35
Zoophytes	5
	<hr/>
	14,712

The part of the Amazons region where I resided longest being unexplored country to the Naturalist, no less than 8000 of the species here enumerated were *new to science*, and these are now occupying the busy pens of a number of learned men in different parts of Europe to describe them. The few new mammals have been named by Dr. Gray; the birds by Dr. Sclater; the zoophytes by Dr. Bowerbank; and the more numerous novelties in reptiles and fishes are now in course of publication by Dr. Günther.

A word will perhaps be here in place with reference to what has become of these large collections. It will be an occasion for regret to many Naturalists to learn that a complete set of the species has nowhere been preserved, seeing that this would have formed a fair

illustration of the Fauna of a region not likely to be explored again for the same purpose in our time. The limited means of a private traveller do not admit of his keeping, for a purely scientific end, a large collection. A considerable number, from many of the consignments which arrived in London from time to time, were chosen for the British Museum, so that the largest set next to my own is contained in our National Collection; but this probably comprises less than half the total number of species obtained. My very complete private collection of insects of nearly all the orders, which was especially valuable as containing the various connecting varieties, ticketed with their exact localities for the purpose of illustrating the formation of races, does not now exist in its entirety, a few large groups having passed into private hands in different parts of Europe.

With regard to the illustrations with which my book is adorned, it requires to be mentioned that the Natural History subjects have been drawn chiefly from specimens obtained by me, and the others by able artists partly from my own slight sketches. Messrs. Wolf and Zwecker have furnished most of the larger ones, which give an accurate idea of the objects and scenes they represent: for the smaller ones, many of which, for example the fishes, reptiles, and insects, are drawn with extreme care, I am indebted to Mr. E. W. Robinson.

Leicester, January, 1863.

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THE
NATURALIST ON THE AMAZONS.

CHAPTER I.

PARÁ.

Arrival—Aspect of the Country—The Pará River—First walk in the Suburbs of Pará—Free Negroes—Birds, Lizards, and Insects of the Suburbs—Leaf-carrying Ant—Sketch of the climate, history, and present condition of Pará.

I EMBARKED at Liverpool, with Mr. Wallace, in a small trading vessel, on the 26th of April, 1848; and, after a swift passage from the Irish Channel to the equator, arrived, on the 26th of May, off Salinas. This is the pilot-station for vessels bound to Pará, the only port of entry to the vast region watered by the Amazons. It is a small village, formerly a missionary settlement of the Jesuits, situated a few miles to the eastward of the Pará river. Here the ship anchored in the open sea, at a distance of six miles from the shore, the shallowness of the water far out around the mouth of the great river not permitting in safety a nearer approach; and the signal was hoisted for a pilot. It was with deep interest that my

companion and myself, both now about to see and examine the beauties of a tropical country for the first time, gazed on the land, where I, at least, eventually spent eleven of the best years of my life. To the eastward the country was not remarkable in appearance, being slightly undulating, with bare sand-hills and scattered trees; but to the westward, stretching towards the mouth of the river, we could see through the captain's glass a long line of forest, rising apparently out of the water; a densely-packed mass of tall trees, broken into groups, and finally into single trees, as it dwindled away in the distance. This was the frontier, in this direction, of the great primæval forest characteristic of this region, which contains so many wonders in its recesses, and clothes the whole surface of the country for two thousand miles from this point to the foot of the Andes.

On the following day and night we sailed, with a light wind, partly aided by the tide, up the Pará river. Towards evening we passed Vigia and Colares, two fishing villages, and saw many native canoes, which seemed like toys beneath the lofty walls of dark forest. The air was excessively close, the sky overcast, and sheet lightning played almost incessantly around the horizon, an appropriate greeting on the threshold of a country lying close under the equator! The evening was calm, this being the season when the winds are not strong, so we glided along in a noiseless manner, which contrasted pleasantly with the unceasing turmoil to which we had been lately accustomed on the Atlantic. The immensity of the river struck us greatly, for

although sailing sometimes at a distance of eight or nine miles from the eastern bank, the opposite shore was at no time visible. Indeed, the Pará river is 36 miles in breadth at its mouth ; and at the city of Pará, nearly 70 miles from the sea, it is 20 miles wide ; but at that point a series of islands commences which contracts the river view in front of the city.

It will be well to explain here that the Pará river is not, strictly speaking, one of the mouths of the Amazons. It is made to appear so on many of the maps in common use, because the channels which connect it with the main river are there given much broader than they are in reality, conveying the impression that a large body of water finds an outlet from the main river into the Pará. It is doubtful, however, if there be any considerable stream of water flowing constantly downward through these channels. The whole of the district traversed by them consists of a complex group of low islands formed of river deposit, between which is an intricate net-work of deep and narrow channels. The land probably lies somewhat lower here than it does on the sea coast, and the tides meet about the middle of the channels ; but the ebb and flow are so complicated that it is difficult to ascertain whether there is a constant line of current in one direction. A flow down one of the channels is in some cases diverted into an ebb through other ramifications. In travelling from the Pará to the main Amazons, I have always followed the most easterly channel, and there the flow of the tide always causes a strong upward current ; it is said that this is not so perceptible in other channels, and

that the flow never overpowers the stream of water coming from the main river ; this would seem to favour the opinion of those geographers who believe the Pará to be one of the mouths of the King of Rivers.

The channels of which we are speaking, at least those straighter ones which trading vessels follow in the voyage from Pará to the Amazons, are about 80 miles in length ; but for many miles of their course they are not more than 100 yards in breadth. They are of great depth, and in many places are so straight and regular that they appear like artificial canals. The great river steamers which now run regularly to the interior, in some places brush the overhanging trees with their paddle-boxes on each side as they pass. The whole of the region is one vast wilderness of the most luxuriant tropical vegetation, the strangest forms of palm trees of some score of different species forming a great proportion of the mass. I shall, however, have to allude again to the wonderful beauty of these romantic channels, when I arrive at that part of my narrative.

The Pará river, on this view, may be looked upon as the common fresh-water estuary of the numerous rivers which flow into it from the south ; the chief of which is the Tocantins, a stream 1600 miles in length, and about 10 miles in breadth at its mouth. The estuary forms, then, a magnificent body of water 160 miles in length, and eight miles in breadth at its abrupt commencement, where it receives the channels just described. There is a great contrast in general appearance between the Pará and the main Amazons. In the former the flow of the tide always creates a strong current upwards,

whilst in the Amazons the turbid flow of the mighty stream overpowers all tides, and produces a constant downward current. The colour of the water is different, that of the Pará being of a dingy orange-brown, whilst the Amazons has an ochreous or yellowish clay tint. The forests on their banks have a different aspect. On the Pará the infinitely diversified trees seem to rise directly out of the water ; the forest frontage is covered with greenery, and wears a placid aspect, whilst the shores of the main Amazons are encumbered with fallen trunks, and are fringed with a belt of broad-leaved grasses. The difference is partly owing to the currents, which on the main river tear away the banks, and float out to sea an almost continuous line of dead trees and other debris of its shores.

We may, however, regard the combined mouths of the Pará and the Amazons with their archipelago of islands as forming one immense river delta, each side of which measures 180 miles—an area about equal to the southern half of England and Wales. In the middle of it lies the island of Marajo, which is as large as Sicily. The land is low and flat, but it does not consist entirely of alluvium or river deposit ; in many parts the surface is rocky ; rocks also form reefs in the middle of the Pará river. The immense volumes of fresh water which are poured through these broad embouchures, the united contributions of innumerable streams, fed by drenching tropical rains, prevent them from becoming salt-water estuaries. The water is only occasionally a little brackish near Pará, at high spring tides. Indeed, the fresh water tinges the sea along the shores of Guiana

to a distance of nearly 200 miles from the mouth of the river.

On the morning of the 28th of May we arrived at Pará. The appearance of the city at sunrise was pleasing in the highest degree. It is built on a low tract of land, having only one small rocky elevation at its southern extremity; it therefore affords no amphitheatral view from the river; but the white buildings roofed with red tiles, the numerous towers and cupolas of churches and convents, the crowns of palm trees reared above the buildings, all sharply defined against the clear blue sky, give an appearance of lightness and cheerfulness which is most exhilarating. The perpetual forest hems the city in on all sides landwards; and towards the suburbs, picturesque country houses are seen scattered about, half buried in luxuriant foliage. The port was full of native canoes and other vessels, large and small; and the ringing of bells and firing of rockets, announcing the dawn of some Roman Catholic festival day, showed that the population was astir at that early hour.

We went ashore in due time, and were kindly received by Mr. Miller, the consignee of the vessel, who invited us to make his house our home until we could obtain a suitable residence. On landing, the hot moist mouldy air, which seemed to strike from the ground and walls, reminded me of the atmosphere of tropical stoves at Kew. In the course of the afternoon a heavy shower fell, and in the evening, the atmosphere having been cooled by the rain, we walked about a mile out of town to the residence of an American gentleman to whom our host wished to introduce us.

The impressions received during this first walk can never wholly fade from my mind. After traversing the few streets of tall, gloomy, convent-looking buildings near the port, inhabited chiefly by merchants and shopkeepers, along which idle soldiers, dressed in shabby uniforms, carrying their muskets carelessly over their arms, priests, negresses with red water-jars on their heads, sad-looking Indian women carrying their naked children astride on their hips, and other samples of the motley life of the place, were seen, we passed down a long narrow street leading to the suburbs. Beyond this, our road lay across a grassy common into a picturesque lane leading to the virgin forest. The long street was inhabited by the poorer class of the population. The houses were of one story only, and had an irregular and mean appearance. The windows were without glass, having, instead, projecting lattice casements. The street was unpaved and inches deep in loose sand. Groups of people were cooling themselves outside their doors: people of all shades in colour of skin, European, Negro and Indian, but chiefly an uncertain mixture of the three. Amongst them were several handsome women, dressed in a slovenly manner, barefoot or shod in loose slippers; but wearing richly-decorated ear-rings, and around their necks strings of very large gold beads. They had dark expressive eyes, and remarkably rich heads of hair. It was a mere fancy, but I thought the mingled squalor, luxuriance and beauty of these women were pointedly in harmony with the rest of the scene; so striking, in the view, was the mixture of natural riches and human poverty. The houses were

mostly in a dilapidated condition, and signs of indolence and neglect were everywhere visible. The wooden palings which surrounded the weed-grown gardens were strewn about, broken; and hogs, goats and ill-fed poultry, wandered in and out through the gaps. But amidst all, and compensating every defect, rose the overpowering beauty of the vegetation. The massive dark crowns of shady mangos were seen everywhere amongst the dwellings, amidst fragrant blossoming orange, lemon, and many other tropical fruit trees; some in flower, others in fruit, at varying stages of ripeness. Here and there, shooting above the more dome-like and sombre trees, were the smooth columnar stems of palms, bearing aloft their magnificent crowns of finely-cut fronds. Amongst the latter the slim assai-palm was especially noticeable; growing in groups of four or five; its smooth, gently-curving stem, twenty to thirty feet high, terminating in a head of feathery foliage, inexpressibly light and elegant in outline. On the boughs of the taller and more ordinary-looking trees sat tufts of curiously-leaved parasites. Slender woody lianas hung in festoons from the branches, or were suspended in the form of cords and ribbons; whilst luxuriant creeping plants overran alike tree-trunks, roofs and walls, or toppled over palings in copious profusion of foliage. The superb banana (*Musa paradisiaca*), of which I had always read as forming one of the charms of tropical vegetation, here grew with great luxuriance: its glossy velvety-green leaves, twelve feet in length, curving over the roofs of verandahs in the rear of every house. The

shape of the leaves, the varying shades of green which they present when lightly moved by the wind, and especially the contrast they afford in colour and form to the more sombre hues and more rounded outline of the other trees, are quite sufficient to account for the charm of this glorious tree. Strange forms of vegetation drew our attention at almost every step. Amongst them were the different kinds of Bromelia, or pine-apple plants, with their long, rigid, sword-shaped leaves, in some species jagged or toothed along their edges. Then there was the bread-fruit tree—an importation, it is true ; but remarkable from its large, glossy, dark green, strongly digitated foliage, and its interesting history. Many other trees and plants, curious in leaf, stem, or manner of growth, grew on the borders of the thickets along which lay our road ; they were all attractive to new comers, whose last country ramble of quite recent date was over the bleak moors of Derbyshire on a sleety morning in April.

As we continued our walk the brief twilight commenced, and the sounds of multifarious life came from the vegetation around. The whirring of cicadas ; the shrill stridulation of a vast number and variety of field crickets and grasshoppers,—each species sounding its peculiar note ; the plaintive hooting of tree frogs—all blended together in one continuous ringing sound,—the audible expression of the teeming profusion of Nature. As night came on, many species of frogs and toads in the marshy places joined in the chorus : their croaking and drumming, far louder than anything I had before

heard in the same line, being added to the other noises, created an almost deafening din. This uproar of life, I afterwards found, never wholly ceased, night or day: in course of time I became, like other residents, accustomed to it. It is, however, one of the peculiarities of a tropical—at least, a Brazilian—climate which is most likely to surprise a stranger. After my return to England the death-like stillness of summer days in the country appeared to me as strange as the ringing uproar did on my first arrival at Pará. The object of our visit being accomplished, we returned to the city. The fire flies were then out in great numbers, flitting about the sombre woods, and even the frequented streets. We turned into our hammocks, well pleased with what we had seen, and full of anticipation with regard to the wealth of natural objects we had come to explore.

During the first few days, we were employed in landing our baggage and arranging our extensive apparatus. We then accepted the invitation of Mr. Miller to make use of his *rocinha*, or country-house in the suburbs, until we finally decided on a residence. Upon this we made our first essay in housekeeping. We bought cotton hammocks, the universal substitute for beds in this country, cooking utensils and crockery, and then engaged a free negro, named Isidoro, as cook and servant-of-all-work. Isidoro had served Englishmen in this capacity before, and, although he had not picked up two words of English, he thought he had a great talent for understanding and making himself under-

stood ; in his efforts to do which he was very amusing. Having no other medium through which we could make known our wants, we progressed rapidly in learning Portuguese. I was quite surprised to find little or no trace in Isidoro of that baseness of character which I had read of as being the rule amongst negroes in a slave country. Isidoro was an old man, with an anxious, lugubrious expression of countenance, and exhibited signs of having been overworked in his younger days, which I understood had been passed in slavery. The first traits I perceived in him were a certain degree of self-respect and a spirit of independence : these I found afterwards to be by no means rare qualities among the free negroes. Some time after he had entered our service, I scolded him one morning about some delay in getting breakfast. It happened that it was not his fault, for he had been detained, much against his will, at the shambles. He resented the scolding, not in an insolent way, but in a quiet, respectful manner, and told me how the thing had occurred ; that I must not expect the same regularity in Brazil which is found in England, and that “*paciencia*” was a necessary accomplishment to a Brazilian traveller. There was nothing ridiculous about Isidoro ; there was a gravity of demeanour and sense of propriety about him which would have been considered becoming in a serving-man in any country. This spirit of self-respect is, I think, attributable partly to the lenient treatment which slaves have generally received from their white masters in this part of Brazil, and partly to the almost total absence of prejudice against coloured people amongst the inhabitants. This

latter is a very hopeful state of things. It seems to be encouraged by the governing class in Brazil ; and, by drawing together the races and classes of the heterogeneous population, will doubtless lead to the most happy results. I had afterwards, as I shall have to relate in the course of my narrative, to number free negroes amongst my most esteemed friends : men of temperate, quiet habits, desirous of mental and moral improvement, observant of the minor courtesies of life, and quite as trustworthy, in more important matters, as the whites and half-castes of the province. Isidoro was not, perhaps, scrupulously honest in small matters : scrupulous honesty is a rare quality in casual servants anywhere. He took pains to show that he knew he had made a contract to perform certain duties, and he tried, evidently, to perform them to the best of his ability.

Our first walks were in the immediate suburbs of Pará. The city lies on a corner of land formed by the junction of the river Guamá with the Pará. As I have said before, the forest, which covers the whole country, extends close up to the city streets ; indeed, the town is built on a tract of cleared land, and is kept free from the jungle only by the constant care of the Government. The surface, though everywhere low, is slightly undulating, so that areas of dry land alternate throughout with areas of swampy ground, the vegetation and animal tenants of the two being widely different. Our residence lay on the side of the city nearest the Guamá, on the borders of one of the low and swampy areas which here extend over a portion of the suburbs. The tract of land is intersected by well-macadamized

suburban roads, the chief of which, the Estrada das Mongubeiras (the Monguba road), 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. This fine road was constructed under the governorship of the Count dos Arcos, about the year 1812. At right angles to it run a number of narrow green lanes, and the whole district is drained by a system of small canals or trenches through which the tide ebbs and flows, showing the lowness of the site. Before I left the country, other enterprising presidents had formed a number of avenues lined with cocoa-nut palms, almond and other trees, in continuation of the Monguba road, over the more elevated and drier ground to the north-east of the city. On the high ground the vegetation has an aspect quite different from that which it presents in the swampy parts. Indeed, with the exception of the palm trees, the suburbs here have an aspect like that of a village green at home. The soil is sandy, and the open commons are covered with a short grassy and shrubby vegetation. Beyond this, the land again descends to a marshy tract, where, at the bottom of the moist hollows, the public wells are situated. Here all the linen of the city is washed by hosts of noisy negroes, and here also the water-carts are filled—painted hogsheads on wheels, drawn by bullocks. In early morning, when the sun sometimes shines through a light mist, and everything is dripping with moisture, this part of the city is full of life: vociferous negroes and wrangling

Gallegos,* the proprietors of the water-carts, are gathered about, jabbering continually, and taking their morning drams in dirty wine-shops at the street corners.

Along these beautiful roads we found much to interest us during the first few days. Suburbs of towns, and open, sunny, cultivated places in Brazil, are tenanted by species of animals and plants which are mostly different from those of the dense primeval forests. I will, therefore, give an account of what we observed of the animal world during our explorations in the immediate neighbourhood of Pará.

The number and beauty of the birds and insects did not at first equal our expectations. The majority of the birds we saw were small and obscurely coloured; they were indeed similar, in general appearance, to such as are met with in country places in England. Occasionally a flock of small parroquets, green, with a patch of yellow on the forehead, would come at early morning to the trees near the Estrada. They would feed quietly, sometimes chattering in subdued tones, but setting up a harsh scream, and flying off, on being disturbed. Humming-birds we did not see at this time, although I afterwards found them by hundreds when certain trees were in flower. Vultures we only saw at a distance, sweeping round at a great height, over the public slaughter-houses. Several flycatchers, finches, ant-thrushes, a tribe of plainly-coloured birds, intermediate in structure between flycatchers and thrushes, some of which startle the new-comer by their extra-

* Natives of Galicia, in Spain, who follow this occupation in Lisbon and Oporto, as well as at Pará.

ordinary notes emitted from their places of concealment in the dense thickets ; and also tanagers, and other small birds, inhabited the neighbourhood. None of these had a pleasing song, except a little brown wren (*Troglodytes furvus*), whose voice and melody resemble those of our English robin. It is often seen hopping and climbing about the walls and roofs of houses and on trees in their vicinity. Its song is more frequently heard in the rainy season, when the *Monguba* trees shed their leaves. At those times the *Estrada das Mongubeiras* has an appearance quite unusual in a tropical country. The tree is one of the few in the *Amazons* region which sheds all its foliage before any of the new leaf-buds expand. The naked branches, the soddened ground matted with dead leaves, the grey mist veiling the surrounding vegetation, and the cool atmosphere soon after sunrise, all combine to remind one of autumnal mornings in England. Whilst loitering about at such times, in a half-oblivious mood, thinking of home, the song of this bird would create for the moment a perfect illusion. Numbers of tanagers frequented the fruit and other trees in our garden. The two principal kinds which attracted our attention were the *Rhamphocœlus Jacapa* and the *Tanagra Episcopus*. The females of both are dull in colour. The male of *Jacapa* has a beautiful velvety purple and black plumage, the beak being partly white. The same sex in *Episcopus* is of a pale blue colour, with white spots on the wings. In their habits they both resemble the common house-sparrow of Europe, which does not exist in South America, its place being in some measure filled by these familiar tanagers. They are

just as lively, restless, bold, and wary; their notes are very similar; chirping and inharmonious, and they seem to be almost as fond of the neighbourhood of man. They do not, however, build their nests on houses.

Another interesting and common bird was the Japím, a species of *Cassicus* (*C. icteronotus*). It belongs to the same family of birds as our starling, magpie and rook. It has a rich yellow and black plumage, remarkably compact and velvety in texture. The shape of its head and its physiognomy are very similar to those of the magpie; it has light gray eyes, which give it the same knowing expression. It is social in its habits; and builds its nest, like the English rook, on trees in the neighbourhood of habitations. But the nests are quite differently constructed, being shaped like purses, two feet in length, and suspended from the slender branches all round the tree, some of them very near the ground. The entrance is on the side near the bottom of the nest. This bird is a great favourite with the Brazilians of Pará: it is a noisy, stirring, babbling creature, passing constantly to and fro, chattering to its comrades, and is very ready at imitating other birds, especially the domestic poultry of the vicinity. There was at one time a weekly newspaper published at Pará, called "The Japim;" the name being chosen, I suppose, on account of the babbling propensities of the bird. Its eggs are nearly round, and of a bluish-white colour, speckled with brown.

Of other vertebrate animals we saw very little except of the lizards. These are sure to attract the attention of the new comer from Northern Europe, by reason of

their strange appearance, great numbers, and variety. The species which are seen crawling over the walls of buildings in the city, are different from those found in the forest or in the interior of houses. They are unpleasant-looking animals, with colours assimilated to those of the dilapidated stone and mud walls on which they are seen. The house lizards belong to a peculiar family, the Geckos. They are found even in the best-kept houses, most frequently on the walls and ceilings : they are generally motionless by day, being active only at night. They are of speckled gray, or ashy colours. The structure of their feet is beautifully adapted for clinging to and running over smooth surfaces ; the underside of their toes being expanded into cushions, beneath which folds of skin form a series of flexible plates. By means of this apparatus they can walk or run across a smooth ceiling with their backs downwards, the plated soles, by quick muscular action, exhausting and admitting air alternately. These Geckos are very repulsive in appearance. The Brazilians give them the name of *Osgas*, and firmly believe them to be poisonous ; they are, however, harmless creatures. The species found in houses are small ; I have seen others of great size, in crevices of tree trunks in the forest. Sometimes Geckos are found with forked tails ; this results from the budding of a rudimentary tail at the side, from an injury done to the member. A slight rap will cause their tails to snap off ; the loss being afterwards partially repaired by a new growth. The tails of lizards seem to be almost useless appendages to the animals. I used often to amuse myself in the suburbs, whilst

resting in the verandah of our house during the heat of midday, by watching the variegated green, brown, and yellow ground-lizards. They would come nimbly forward, and commence grubbing with their fore feet and snouts around the roots of herbage, searching for insect larvæ. On the slightest alarm they would scamper off; their tails cocked up in the air as they waddled awkwardly away, evidently an incumbrance to them in their flight.

Next to the birds and lizards, the insects of the suburbs of Pará deserve a few remarks. The species observed in the weedy and open places, as already remarked, were generally different from those which dwell in the shades of the forest. It is worthy of notice that those species which have the widest distribution in America, and which have the closest affinity to those of the tropics of the old world, are such as occur in open sunny places near towns. The general appearance of the insects and birds belonging to such situations is very similar to that of European species. This resemblance, however, is, in many cases, one of analogy only; that is, the species are similar in size, form, and colours, but belong to widely different genera. Thus, all the small carnivorous beetles seen running along sandy pathways, look precisely like the *Amaræ*, those oval coppery beetles which are seen in similar situations in England. But they belong to quite another genus—namely, *Selenophorus*, the genus *Amara* being unknown in Tropical America. In butterflies, again, we saw a small species of *Erycinidæ* flying about low shrubs in grassy places, which was extremely similar in colours to

the European *Nemeobius Lucina*. The Pará insect, however, belongs to a genus far removed in all essential points of structure from *Nemeobius*; namely, to *Leimonias*, being the *L. epulus*. It is worthy of note that all the old-world representatives, both tropical and temperate, of this beautiful family of butterflies belong to the same group as the English *Nemeobius Lucina*; whilst the few species inhabiting North America belong wholly to South American types.

Facts of this kind, and there are many of them, would seem to show that it is not wholly the external conditions of light, heat, moisture, and so forth, which determine the general aspect of the animals of a country. It is a notion generally entertained that the superior size and beauty of tropical insects and birds are immediately due to the physical conditions of a tropical climate, or are in some way directly connected with them. I think this notion is an incorrect one, and that there are other causes more powerful than climatal conditions which affect the dress of species. To test this we ought to compare the members of those genera which are common to two regions; say, to Northern Europe and equinoctial America, and ascertain which climate produces the largest and most beautifully-coloured species. We should thus see the supposed effects of climate on nearly-allied congeners, that is, creatures very similarly organised. In the first family of the order Coleoptera, for instance, the tiger-beetles (*Cicindelidæ*), there is one genus, *Cicindela*, common to the two regions. The species found in the Amazons Valley have precisely the same

habits as their English brethren, running and flying over sandy soils in the bright sunshine. About the same number is found in each of the two countries : but all the Amazonian species are far smaller in size and more obscure in colour than those inhabiting Northern Europe ; none being at all equal in these respects to the common English *Cicindela campestris*, the handsome light-green tiger-beetle, spotted with white, which is familiar to country residents of Natural History tastes in most parts of England. In butterflies I find there are eight genera common to the two regions we are thus pitting against each other. Of these, three only (*Papilio*, *Pieris* and *Thecla*) are represented by handsomer species in Amazonia than in Northern Europe. Three others (*Lycæna*, *Melitæa* and *Apatura*) yield far more beautiful and larger forms in England than in the Amazonian plains ; as to the remaining two (*Pamphila* and *Pyrgus*) there is scarcely any difference. There is another and hitherto neglected fact which I would strongly press upon those who are interested in these subjects. This is, that it is almost always the *males only* which are beautiful in colours. The brilliant dress is rarely worn by both sexes of the same species: if climate has any direct influence in this matter, why have not both sexes felt its effects, and why are the males of genera living under our gloomy English skies adorned with bright colours ?

The tropics, it is true, have a vastly greater total number of handsome butterflies than the temperate zones ; but it must be borne in mind that they contain a far greater number of genera and species altogether.

It holds good in all families that the two sexes of the more brilliantly-coloured kinds are seldom equally beautiful; the females being often quite obscure in dress. There is a very large number of dull-coloured species in tropical countries. The tropics have also species in which the contrast between the sexes is greater than in any species of temperate zones; in some cases the males have been put in one genus and the females in another, so great is the difference between them. There are species of larger size, but at the same time there are others of smaller size in the same families in tropical than in temperate latitudes. If we reflect on all these facts, we must come to the conclusion, that climate, to which we are naturally at first sight inclined to attribute much, has little or no direct influence in the matter. Mr. Darwin was led to the same conclusion many years ago, when comparing the birds, plants, and insects of the Galapagos islands, situated under the equator, with those of Patagonia and Tropical America. The abundance of food, the high temperature, absence of seasons of extreme cold and dearth, and the variety of stations, all probably operate in favouring the existence of a greater number and variety of species in tropical than in temperate latitudes. This, perhaps, is all we can say with regard to the influence of climatal conditions. The causes which have produced the great beauty that astonishes us, if we really wish to investigate them, must be sought in other directions. I think that the facts above mentioned are calculated to guide us in the search. They show, for instance, that beauty of form and colour is

not peculiar to one zone, but is producible under any climate where a number of species of a given genus lead a flourishing existence. The ornamental dress is generally the property of one sex to the exclusion of the other, and the cases of widest contrast between the two are exhibited in those regions where life is generally more active and prolific. All this points to the mutual relations of the species, and especially to those between the sexes, as having far more to do in the matter than climate.

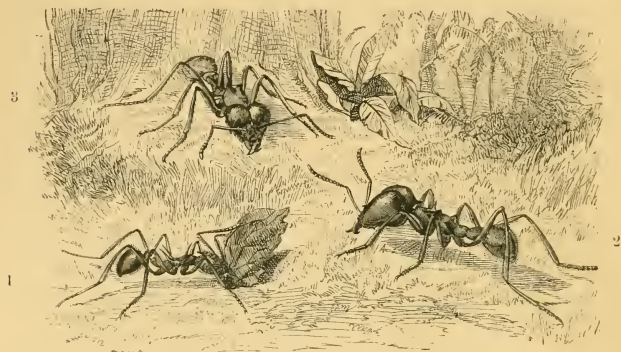
In the gardens, numbers of fine showy butterflies were seen. There were two swallow-tailed species, similar in colours to the English *Papilio Machaon*; a white *Pieris* (*P. Monuste*), and two or three species of brimstone and orange coloured butterflies, which do not belong, however, to the same genus as our English species. In weedy places a beautiful butterfly, with eye-like spots on its wings, was common, the *Junonia Lavinia*, the only Amazonian species which is at all nearly related to our *Vanessas*, the *Admiral* and *Peacock* butterflies. One day we made our first acquaintance with two of the most beautiful productions of nature in this department; namely the *Helicopsis Cupido* and *Endymion*. A little beyond our house, one of the narrow green lanes which I have already mentioned diverged from the *Monguba* avenue, and led, between enclosures overrun with a profusion of creeping plants and glorious flowers, down to a moist hollow, where there was a public well in a picturesque nook, buried in a grove of *Mucajá* palm-trees. On the tree-trunks, walls, and palings, grew a great quantity of climbing

Pothos plants, with large glossy heart-shaped leaves. These plants were the resort of these two exquisite species, and we captured a great number of specimens. They are of extremely delicate texture. The wings are cream-coloured; the hind pair have several tail-like appendages, and are spangled beneath as if with silver. Their flight is very slow and feeble; they seek the protected under-surface of the leaves, and in repose close their wings over the back, so as to expose the brilliantly spotted under-surface.

I will pass over the many other orders and families of insects, and proceed at once to the ants. These were in great numbers everywhere, but I will mention here only two kinds. We were amazed at seeing ants an inch and a quarter in length, and stout in proportion, marching in single file through the thickets. These belonged to the species called *Dinoponera grandis*. 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. There was nothing peculiar or attractive in the habits of this giant among the ants. Another far more interesting species was the *Saüba* (*Ecodoma cephalotes*). This ant is seen everywhere about the suburbs, marching to and fro in broad columns. From its habit of despoiling the most valuable cultivated trees of their foliage, it is a great scourge to the Brazilians. In some districts it is so abundant that agriculture is almost impossible, and everywhere complaints are heard of the terrible pest.

The workers of this species are of three orders, and

vary in size from two to seven lines ; some idea of them may be obtained from the accompanying wood-cut. The true working-class of a colony is formed by the small-



Saúba or Leaf-carrying ant.—1, Worker-minor ; 2, Worker-major ; 3, Subterranean worker.

sized order of workers, the worker-minors as they are called (Fig. 1). The two other kinds, whose functions, as we shall see, are not yet properly understood, have enormously swollen and massive heads ; in one (Fig. 2), the head is highly polished ; in the other (Fig. 3), it is opaque and hairy. The worker-minors vary greatly in size, some being double the bulk of others. The entire body is of very solid consistence, and of a pale reddish-brown colour. The thorax or middle segment is armed with three pairs of sharp spines ; the head, also, has a pair of similar spines proceeding from the cheeks behind.

In our first walks we were puzzled to account for large mounds of earth, of a different colour from the surrounding soil, which were thrown up in the plantations and woods. Some of them were very extensive, being forty yards in circumference, but not more than

two feet in height. We soon ascertained that these were the work of the Saübas, being the outworks, or domes, which overlie and protect the entrances to their vast subterranean galleries. On close examination, I found the earth of which they are composed to consist of very minute granules, agglomerated without cement, and forming many rows of little ridges and turrets. The difference in colour from the superficial soil of the vicinity is owing to their being formed of the undersoil, brought up from a considerable depth. It is very rarely that the ants are seen at work on these mounds; the entrances seem to be generally closed; only now and then, when some particular work is going on, are the galleries opened. The entrances are small and numerous; in the larger hillocks it would require a great amount of excavation to get at the main galleries; but I succeeded in removing portions of the dome in smaller hillocks, and then I found that the minor entrances converged, at the depth of about two feet, to one broad elaborately-worked gallery or mine, which was four or five inches in diameter.

This habit in the Saüba ant of clipping and carrying away immense quantities of leaves has long been recorded in books on natural history. When employed on this work, their processions look like a multitude of animated leaves on the march. In some places I found an accumulation of such leaves, all circular pieces, about the size of a sixpence, lying on the pathway, unattended by ants, and at some distance from any colony. Such heaps are always found to be removed when the place is revisited the next day. In course of time I had

plenty of opportunities of seeing them at work. They mount the tree in multitudes, the individuals being all worker-minors. Each one places itself on the surface of a leaf, and cuts with its sharp scissor-like jaws a nearly semicircular incision on the upper side; it then takes the edge between its jaws, and by a sharp jerk detaches the piece. Sometimes they let the leaf drop to the ground, where a little heap accumulates, until carried off by another relay of workers; but, generally, each marches off with the piece it has operated upon, and as all take the same road to their colony, the path they follow becomes in a short time smooth and bare, looking like the impression of a cart-wheel through the herbage.

It is a most interesting sight to see the vast host of busy diminutive labourers occupied on this work. Unfortunately they choose cultivated trees for their purpose. This ant is quite peculiar to Tropical America, as is the entire genus to which it belongs; it sometimes despoils the young trees of species growing wild in its native forests; but it seems to prefer, when within reach, plants imported from other countries, such as the coffee and orange trees. It has not hitherto been shown satisfactorily to what use it applies the leaves. I discovered it only after much time spent in investigation. The leaves are used to thatch the domes which cover the entrances to their subterranean dwellings, thereby protecting from the deluging rains the young broods in the nests beneath. The larger mounds, already described, are so extensive that few persons would attempt to remove them for the purpose of examining

their interior ; but smaller hillocks, covering other entrances to the same system of tunnels and chambers may be found in sheltered places, and these are always thatched with leaves, mingled with granules of earth. The heavily-laden workers, each carrying its segment of leaf vertically, the lower edge secured in its mandibles, troop up and cast their burthens on the hillock ; another relay of labourers place the leaves in position, covering them with a layer of earthy granules, which are brought one by one from the soil beneath.

The underground abodes of this wonderful ant are known to be very extensive. The Rev. Hamlet Clark has related that the *Saüba* of Rio de Janeiro, a species closely allied to ours, has excavated a tunnel under the bed of the river *Parahyba*, at a place where it is as broad as the Thames at London Bridge. At the Magoary rice mills, near *Pará*, these ants once pierced the embankment of a large reservoir : the great body of water which it contained escaped before the damage could be repaired. In the Botanic Gardens, at *Pará*, an enterprising French gardener tried all he could think of to extirpate the *Saüba*. With this object he made fires over some of the main entrances to their colonies, and blew the fumes of sulphur down the galleries by means of bellows. I saw the smoke issue from a great number of outlets, one of which was 70 yards distant from the place where the bellows were used. This shows how extensively the underground galleries are ramified.

Besides injuring and destroying young trees by despoiling them of their foliage, the *Saüba* ant is troublesome to the inhabitants from its habit of plundering the

stores of provisions in houses at night, for it is even more active by night than in the day-time. At first I was inclined to discredit the stories of their entering habitations and carrying off grain by grain the farinha or mandioca meal, the bread of the poorer classes of Brazil. At length, whilst residing at an Indian village on the Tapajos, I had ample proof of the fact. One night my servant woke me three or four hours before sunrise by calling out that the rats were robbing the farinha baskets. The article at that time was scarce and dear. I got up, listened, and found the noise was very unlike that made by rats. So I took the light and went into the store-room, which was close to my sleeping-place. I there found a broad column of Saüba ants, consisting of thousands of individuals, as busy as possible, passing to and fro between the door and my precious baskets. Most of those passing outwards were laden each with a grain of farinha, which was, in some cases, larger and many times heavier than the bodies of the carriers. Farinha consists of grains of similar size and appearance to the tapioca of our shops; both are products of the same root, tapioca being the pure starch, and farinha the starch mixed with woody fibre, the latter ingredient giving it a yellowish colour. It was amusing to see some of the dwarfs, the smallest members of their family, staggering along, completely hidden under their load. The baskets, which were on a high table, were entirely covered with ants, many hundreds of whom were employed in snipping the dry leaves which served as lining. This produced the rustling sound which had at first disturbed us. My

servant told me that they would carry off the whole contents of the two baskets (about two bushels) in the course of the night, if they were not driven off; so we tried to exterminate them by killing them with our wooden clogs. It was impossible, however, to prevent fresh hosts coming in as fast as we killed their companions. They returned the next night; and I was then obliged to lay trains of gunpowder along their line, and blow them up. This, repeated many times, at last seemed to intimidate them, for we were free from their visits during the remainder of my residence at the place. What they did with the hard dry grains of mandioca I was never able to ascertain, and cannot even conjecture. The meal contains no gluten, and therefore would be useless as cement. It contains only a small relative portion of starch, and, when mixed with water, it separates and falls away like so much earthy matter. It may serve as food for the subterranean workers. But the young or larvæ of ants are usually fed by juices secreted by the worker nurses.

Ants, it is scarcely necessary to observe, consist, in each species, of three sets of individuals, or, as some express it, of three sexes—namely, males, females, and workers; the last-mentioned being undeveloped females. The perfect sexes are winged on their first attaining the adult state; they alone propagate their kind, flying away, previous to the act of reproduction, from the nest in which they have been reared. This winged state of the perfect males and females, and the habit of flying abroad before pairing, are very important points in the economy of ants; for they are thus enabled to

intercross with members of distant colonies which swarm at the same time, and thereby increase the vigour of the race, a proceeding essential to the prosperity of any species. In many ants, especially those of tropical climates, the workers, again, are of two classes, whose structure and functions are widely different. In some species they are wonderfully unlike each other, and constitute two well-defined forms of workers. In others, there is a gradation of individuals between the two extremes. The curious differences in structure and habits between these two classes form an interesting, but very difficult, study. It is one of the great peculiarities of the Saüba ant to possess *three* classes of workers. My investigations regarding them were far from complete; I will relate, however, what I have observed on the subject.

When engaged in leaf-cutting, plundering farinha, and other operations, two classes of workers are always seen (Figs. 1 and 2, page 24). They are not, it is true, very sharply defined in structure, for individuals of intermediate grades occur. All the work, however, is done by the individuals which have small heads (Fig. 1), whilst those which have enormously large heads, the worker-majors (Fig. 2), are observed to be simply walking about. I could never satisfy myself as to the function of these worker-majors. They are not the soldiers or defenders of the working portion of the community, like the armed class in the Termites, or white ants; for they never fight. The species has no sting, and does not display active resistance when interfered with. I once imagined they exercised a sort of super-

intendence over the others ; but this function is entirely unnecessary in a community where all work with a precision and regularity resembling the subordinate parts of a piece of machinery. I came to the conclusion, at last, that they have no very precisely defined function. They cannot, however, be entirely useless to the community, for the sustenance of an idle class of such bulky individuals would be too heavy a charge for the species to sustain. I think they serve, in some sort, as passive instruments of protection to the real workers. Their enormously large, hard, and indestructible heads may be of use in protecting them against the attacks of insectivorous animals. They would be, on this view, a kind of "pièces de resistance," serving as a foil against onslaughts made on the main body of workers.

The third order of workers is the most curious of all. If the top of a small, fresh hillock, one in which the thatching process is going on, be taken off, a broad cylindrical shaft is disclosed, at a depth of about two feet from the surface. If this be probed with a stick, which may be done to the extent of three or four feet without touching bottom, a small number of colossal fellows (Fig. 3) will slowly begin to make their way up the smooth sides of the mine. Their heads are of the same size as those of the class fig. 2 ; but the front is clothed with hairs, instead of being polished, and they have in the middle of the forehead a twin ocellus, or simple eye, of quite different structure from the ordinary compound eyes, on the sides of the head. This frontal eye is totally wanting in the other workers, and is not

known in any other kind of ant. The apparition of these strange creatures from the cavernous depths of the mine reminded me, when I first observed them, of the Cyclopes of Homeric fable. They were not very pugnacious, as I feared they would be, and I had no difficulty in securing a few with my fingers. I never saw them under any other circumstances than those here related, and what their special functions may be I cannot divine.

The whole arrangement of a Formicarium, or ant-colony, and all the varied activity of ant-life, are directed to one main purpose:—the perpetuation and dissemination of the species. Most of the labour which we see performed by the workers has for its end the sustenance and welfare of the young brood, which are helpless grubs. The true females are incapable of attending to the wants of their offspring; and it is on the poor sterile workers, who are denied all the other pleasures of maternity, that the entire care devolves. What a wonderfully-organised community is that of the ant! The workers are also the chief agents in carrying out the different migrations of the colonies, which are of vast importance to the dispersal and consequent prosperity of the species. The successful *début* of the winged males and females depends likewise on the workers. It is amusing to see the activity and excitement which reign in an ant's nest when the exodus of the winged individuals is taking place. The workers clear the roads of exit, and show the most lively interest in their departure, although it is highly improbable that any of them will return to the same colony. The

swarming or exodus of the winged males and females of the Saüba ant takes place in January and February, that is, at the commencement of the rainy season. They come out in the evening in vast numbers, causing quite a commotion in the streets and lanes. They are of very large size, the female measuring no less than



Saüba Ant.—Female.

two-and-a-quarter inches in expanse of wing; the male is not much more than half this size. They are so eagerly preyed upon by insectivorous animals that on the morning after their flight not an individual is to be seen, a few impregnated females alone escaping the slaughter to found new colonies.

At the time of our arrival, Pará had not quite recovered from the effects of a series of revolutions, brought about by the hatred which existed between the native Brazilians and the Portuguese; the former, in the end, calling to their aid the Indian and mixed coloured population. The number of inhabitants of the city had decreased, in consequence of these disorders, from 24,500 in 1819, to 15,000 in 1848. Although the

public peace had not been broken for twelve years before the date of our visit, confidence was not yet completely restored, and the Portuguese merchants and tradesmen would not trust themselves to live at their beautiful country-houses or rocinhas which lie embosomed in the luxuriant shady gardens around the city. No progress had been made in clearing the second-growth forest which had grown over the once cultivated grounds and now reached the end of all the suburban streets. The place had the aspect of one which had seen better days ; the public buildings, including the palaces of the President and Bishop, the cathedral, the principal churches and convents, all seemed constructed on a scale of grandeur far beyond the present requirements of the city. Streets full of extensive private residences built in the Italian style of architecture, were in a neglected condition, weeds and flourishing young trees growing from large cracks in the masonry. The large public squares were over-grown with weeds and impassable on account of the swampy places which occupied portions of their areas. Commerce, however, was now beginning to revive, and before I left the country I saw great improvements, as I shall have to relate towards the conclusion of this narrative.

The province of which Pará is the capital, was, at the time I allude to, the most extensive in the Brazilian empire, being about 1560 miles in length from east to west, and about 600 in breadth. Since that date—namely in 1853—it has been divided into two by the separation of the Upper Amazons as a

distinct province. It formerly constituted a section, capitania, or governorship of the Portuguese colony. Originally it was well peopled by Indians, varying much in social condition according to their tribe, but all exhibiting the same general physical characters, which are those of the American red man, somewhat modified by long residence in an equatorial forest country. Most of the tribes are now extinct or forgotten, at least those which originally peopled the banks of the main river, their descendants having amalgamated with the white and negro immigrants :* many still exist, however, in their original state on the Upper Amazons and most of the branch rivers. On this account Indians in this province are far more numerous than elsewhere in Brazil, and the Indian element may be said to prevail in the mongrel population, the negro proportion being much smaller than in South Brazil.

The city is built on the best available site for a port of entry to the Amazons region, and must in time become a vast emporium ; for the northern shore of the main river, where alone a rival capital could be founded, is much more difficult of access to vessels,

* The mixed breeds which now form, probably, the greater part of the population, have each a distinguishing name. Mameluco denotes the offspring of White with Indian ; Mulatto, that of White with Negro ; Cafuzo, the mixture of the Indian and Negro ; Curiboco, the cross between the Cafuzo and the Indian ; Xibaro, that between the Cafuzo and Negro. These are seldom, however, well-demarcated, and all shades of colour exist ; the names are generally applied only approximatively. The term Creolo is confined to negroes born in the country. The civilised Indian is called Tapuyo or Caboclo.

and is besides extremely unhealthy. Although lying so near the equator ($1^{\circ} 28'$ S. lat.) the climate is not excessively hot. The temperature during three years only once reached 95° of Fahrenheit. The greatest heat of the day, about 2 p.m., ranges generally between 89° and 94° ; but on the other hand, the air is never cooler than 73° , so that a uniformly high temperature exists, and the mean of the year is 81° . North American residents say that the heat is not so oppressive as it is in summer in New York and Philadelphia. The humidity is, of course, excessive, but the rains are not so heavy and continuous in the wet season as in many other tropical climates. The country had for a long time a reputation for extreme salubrity. Since the small-pox in 1819, which attacked chiefly the Indians, no serious epidemic had visited the province. We were agreeably surprised to find no danger from exposure to the night air or residence in the low swampy lands. A few English residents, who had been established here for twenty or thirty years, looked almost as fresh in colour as if they had never left their native country. The native women, too, seemed to preserve their good looks and plump condition until late in life. I nowhere observed that early decay of appearance in Brazilian ladies, which is said to be so general in the women of North America. Up to 1848 the salubrity of Pará was quite remarkable for a city lying in the delta of a great river in the middle of the tropics and half surrounded by swamps. It did not much longer enjoy its immunity from epidemics. In 1850 the yellow fever visited the province for the first time, and carried off in a few

weeks more than four per cent. of the population.* One disease after another succeeded, until in 1855 the cholera swept through the country and caused fearful havoc. Since then, the healthfulness of the climate has been gradually restored, and it is now fast recovering its former good reputation. Pará is free from serious endemic disorders, and was once a resort of invalids from New York and Massachusetts. The equable temperature, the perpetual verdure, the coolness of the dry season when the sun's heat is tempered by the strong sea-breezes and the moderation of the periodical rains, make the climate one of the most enjoyable on the face of the earth.

The province is governed, like all others in the empire, by a President, as chief civil authority. At the time of our arrival he held also, exceptionally, the chief military command. This functionary, together with the head of the police administration and the judges, is nominated by the central Government at Rio Janeiro. The municipal and internal affairs are managed by a provincial assembly elected by the people. Every villa or borough throughout the province also possesses its municipal council, and in thinly-populated districts, the inhabitants choose every four years a justice of the peace who adjudicates in small disputes between neighbours. A system of popular education exists, and every village has its school of first letters, the master being paid by the

* Relatorio of the President, Jeronymo Francisco Coelho, 1850. From January 1 to July 31, 1850, 12,000 persons, in the city of Pará alone, fell ill out of a population of 16,000, but only 506 died.

government, the salary amounting to about 70*l.*, or the same sum as the priests receive. Besides common schools a well-endowed classical seminary is maintained at Pará, to which the sons of most of the planters and traders in the interior are sent to complete their education. The province returns its quota of members every four years to the lower and upper houses of the imperial parliament. Every householder has a vote. Trial by jury has been established, the jurymen being selected from householders, no matter what their race or colour; and I have seen the white merchant, the negro husbandman, the *mameluco*, the mulatto and the Indian, all sitting side by side on the same bench. Altogether the constitution of government in Brazil seems to combine happily the principles of local self-government and centralisation, and only requires a proper degree of virtue and intelligence in the people to lead the nation to great prosperity.

The province of Pará, or, as we may now say, the two provinces of Pará and the Amazons contain an area of 800,000 square miles; the population of which is only about 230,000, or in the ratio of one person to four square miles. The country is covered with forests, and the soil fertile in the extreme even for a tropical country. It is intersected throughout by broad and deep navigable rivers. It is the pride of the *Paraenses* to call the Amazons the Mediterranean of South America. It perhaps deserves the name, for not only have the main river and its principal tributaries an immense expanse of water bathing the shores of extensive and varied regions, but there is also throughout a system of back-

channels, connected with the main rivers by narrow outlets and linking together a series of lakes, some of which are fifteen, twenty, and thirty miles in length. The whole Amazons valley is thus covered by a network of navigable waters, forming a vast inland freshwater sea with endless ramifications rather than a river.

The city of Pará was founded in 1615, and was a place of considerable importance towards the latter half of the eighteenth century, under the government of the brother of Pombal, the famous Portuguese statesman. The province was the last in Brazil to declare its independence of the mother country and acknowledge the authority of the first emperor, Don Pedro. This was owing to the great numbers and influence of the Portuguese, and the rage of the native party was so great in consequence, that immediately after independence was proclaimed in 1823, a counter revolution broke out, during which many hundred lives were lost and much hatred engendered. The antagonism continued for many years, partial insurrections taking place when the populace thought that the immigrants from Portugal were favoured by the governors sent from the capital of the empire. At length, in 1835, a serious revolt took place which in a short time involved the entire province. It began by the assassination of the President and the leading members of the government; the struggle was severe, and the native party in an evil hour called to their aid the ignorant and fanatic mongrel and Indian population. The cry of death to the Portuguese was soon changed to death to the free-masons, then a powerfully-organised society embracing

the greater part of the male white inhabitants. The victorious native party endeavoured to establish a government of their own. After this state of things had endured six months, they accepted a new President sent from Rio Janeiro, who, however, again irritated them by imprisoning their favourite leader, Vinagre. The revenge which followed was frightful. A vast host of half-savage coloured people assembled in the retired creeks behind Pará, and on a day fixed, after Vinagre's brother had sent a message three times to the President demanding, in vain, the release of their leader, the whole body poured into the city through the gloomy pathways of the forest which encircles it. A cruel battle, lasting nine days, was fought in the streets; an English, French, and Portuguese man-of-war, from the side of the river, assisting the legal authorities. All the latter, however, together with every friend of peace and order, were finally obliged to retire to an island a few miles distant. The city and province were given up to anarchy; the coloured people, elated with victory, proclaimed the slaughter of all whites, except the English, French, and American residents. The mistaken principals, who had first aroused all this hatred of races, were obliged now to make their escape. In the interior the supporters of lawful authority, including, it must be stated, whole tribes of friendly Indians and numbers of the better disposed negroes and mulattos, concentrated themselves in certain strong positions and defended themselves, until the reconquest of the capital and large towns of the interior, in 1836, by a force sent from Rio Janeiro, after ten months of anarchy.

Years of conciliatory government, the lesson learnt by the native party and the moderation of the Portuguese, aided by the natural indolence and passive goodness of the Paraenses of all classes and colours, were only beginning to produce their good effects about the time I am speaking of. Life, however, was now and had been for some time quite safe throughout the country. Some few of the worst characters had been transported or imprisoned, and the remainder after being pardoned were converted once more into quiet and peaceable citizens.

I resided at Pará nearly a year and a half altogether, returning thither and making a stay of a few months after each of my shorter excursions into the interior,* until the 6th of November, 1851, when I started on my long voyage to the Tapajos and the Upper Amazons, which occupied me seven years and a half. I became during this time tolerably familiar with the capital of the Amazons region, and its inhabitants. Compared with other Brazilian seaport towns, I was always told, Pará shone to great advantage. It was cleaner, the suburbs were fresher, more rural and much pleasanter on account of their verdure, shade, and magnificent vegetation. The people were simpler, more peaceable and friendly in their manners and dispositions, and assassinations, which give the southern provinces so ill a reputation, were almost unknown. At the same time

* The following were the excursions alluded to:—Aug. 26 to Sept. 30, 1848, I went to the Arroyos cataracts on the Tocantins. Dec. 8, 1848, to Feb. 11, 1849, I visited Caripí on the Bahia of Marajo. June 8 to July 21, 1849, I visited Cameté and the lower part of the Tocantins. Lastly, from Sept. 22, 1849, to April 19, 1851, I made a preliminary voyage to Obydos, the Rio Negro, and Ega.

the Pará people were much inferior to Southern Brazilians in energy and industry. Provisions and house rents being cheap and the wants of the people few—for they were content with food and lodging of a quality which would be spurned by paupers in England—they spent the greater part of their time in sensual indulgences and in amusements which the government and wealthier citizens provided for them gratis. The trade, wholesale and retail, was in the hands of the Portuguese, of whom there were about 2500 in the place. Many handicrafts were exercised by coloured people, mulattos, mamelucos, free negroes and Indians. The better sort of Brazilians dislike the petty details of shopkeeping, and if they cannot be wholesale merchants prefer the life of planters in the country however small may be the estate and the gains. The negroes constituted the class of field-labourers and porters; Indians were universally the watermen, and formed the crews of the numberless canoes of all sizes and shapes which traded between Pará and the interior. The educated Brazilians, not many of whom are of pure Caucasian descent—for the immigration of Portuguese, for many years, has been almost exclusively of the male sex—are courteous, lively, and intelligent people. They were gradually weaning themselves of the ignorant, bigoted notions which they inherited from their Portuguese ancestors, especially those entertained with regard to the treatment of women. Formerly the Portuguese would not allow their wives to go into society, or their daughters to learn reading and writing. In 1848, Brazilian ladies were only just beginning to emerge from this inferior

position, and Brazilian fathers were opening their eyes to the advantages of education for their daughters. Reforms of this kind are slow. It is, perhaps, in part owing to the degrading position always held by women, that the relations between the sexes were and are still on so unsatisfactory a footing, and private morality at so low an ebb in Brazil. In Pará I believe that an improvement is now taking place, but formerly promiscuous intercourse seemed to be the general rule amongst all classes, and intrigues and love-making the serious business of the greater part of the population. That this state of things is a necessity depending on the climate and institutions I do not believe, as I have resided at small towns in the interior, where the habits, and the general standard of morality of the inhabitants, were as pure as they are in similar places in England.

CHAPTER II.



PARÁ—*continued.*

The swampy forests of Pará—A Portuguese landed proprietor—Country house at Nazareth—Life of a Naturalist under the equator—The drier virgin forests—Magoary—Retired creeks—Aborigines.

AFTER having resided about a fortnight at Mr. Miller's rocinha we heard of another similar country-house to be let, much better situated for our purpose, in the village of Nazareth, a mile and a half from the city and close to the forest. The owner was an old Portuguese gentleman named Danin, who lived at his tile manufactory at the mouth of the Una, a small river lying two miles below Pará. We resolved to walk to his place through the forest, a distance of three miles, although the road was said to be scarcely passable at this season of the year, and the Una much more easily accessible by boat. We were glad, however, of this early opportunity of traversing the rich swampy forest which we had admired so much from the deck of the ship; so, about eleven o'clock one sunny morning, after procuring the necessary information about the road, we set off in that direction. This part of the forest afterwards became one of my best hunting-grounds. I will narrate the incidents of the walk, giving my first impressions and

some remarks on the wonderful vegetation. The forest is very similar on most of the low lands, and therefore one description will do for all.

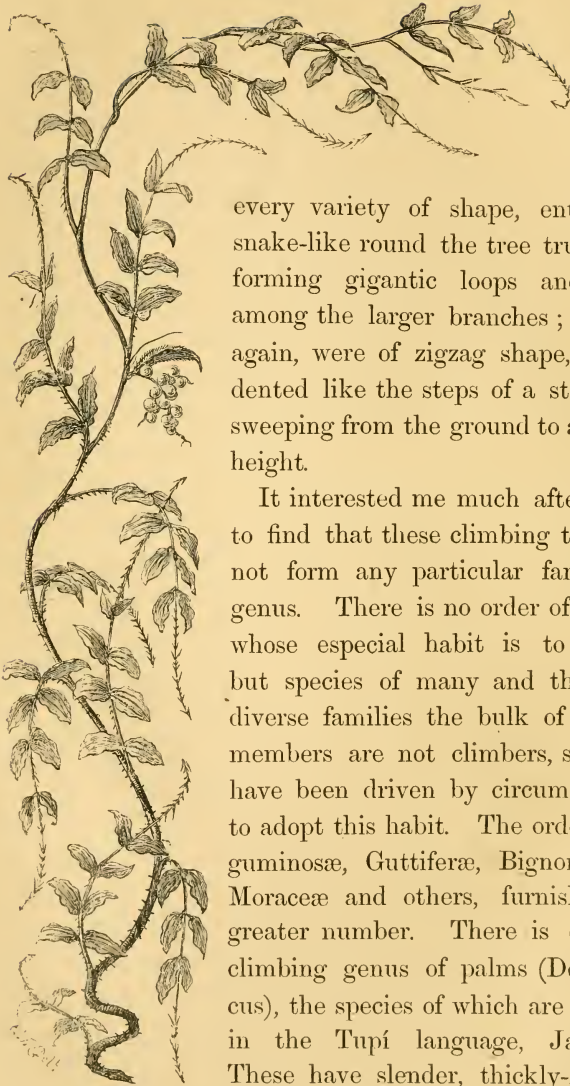
On leaving the town we walked along a straight, suburban road constructed above the level of the surrounding land. It had low swampy ground on each side, built upon, however, and containing several spacious rocinhas which were embowered in magnificent foliage. Leaving the last of these, we arrived at a part where the lofty forest towered up like a wall five or six yards from the edge of the path to the height of, probably, 100 feet. The tree trunks were only seen partially here and there, nearly the whole frontage from ground to summit being covered with a diversified drapery of creeping plants, all of the most vivid shades of green; scarcely a flower to be seen, except in some places a solitary scarlet passion-flower set in the green mantle like a star. The low ground on the borders between the forest wall and the road, was encumbered with a tangled mass of bushy and shrubby vegetation, amongst which prickly mimosas were very numerous covering the other bushes in the same way as brambles do in England. Other dwarf mimosas trailed along the ground close to the edge of the road, shrinking at the slightest touch of the feet as we passed by. Cassia trees, with their elegant pinnate foliage and conspicuous yellow flowers, formed a great proportion of the lower trees, and arborescent arums grew in groups around the swampy hollows. Over the whole fluttered a larger number of brilliantly-coloured butterflies than we had yet seen; some wholly orange or yellow (*Callidryas*), others with excessively elongated

wings, sailing horizontally through the air, coloured black, and varied with blue, red, and yellow (*Heliconii*). One magnificent grassy-green species (*Colænis Dido*) especially attracted our attention. Near the ground hovered many other smaller species very similar in appearance to those found at home, attracted by the flowers of numerous leguminous and other shrubs. Besides butterflies, there were few other insects except dragonflies, which were in great numbers, similar in shape to English species, but some of them looking conspicuously different on account of their fiery red colours.

After stopping repeatedly to examine and admire we at length walked onward. The road then ascended slightly, and the soil and vegetation became suddenly altered in character. The shrubs here were grasses, *Cyperaceæ* and other plants, smaller in foliage than those growing in moist grounds. The forest was second growth, low, consisting of trees which had the general aspect of laurels and other evergreens in our gardens at home: the leaves glossy and dark green. Some of them were elegantly veined and hairy (*Melastomæ*), whilst many, scattered amongst the rest, had smaller foliage (*Myrtles*), but these were not sufficient to subtract much from the general character of the whole.

The sun, now, for we had loitered long on the road, was exceedingly powerful. The day was most brilliant; the sky without a cloud. In fact, it was one of those glorious days which announce the commencement of the dry season. The radiation of heat from the sandy ground was visible by the quivering motion of the air above it. We saw or heard no mammals or birds; a

few cattle belonging to an estate down a shady lane were congregated, panting, under a cluster of wide-spreading trees. The very soil was hot to our feet, and we hastened onward to the shade of the forest which we could see not far ahead. At length, on entering it, what a relief! We found ourselves in a moderately broad pathway or alley, where the branches of the trees crossed overhead and produced a delightful shade. The woods were at first of second growth, dense, and utterly impenetrable; the ground, instead of being clothed with grass and shrubs as in the woods of Europe, was everywhere carpeted with *Lycopodiums* (*Selaginellæ*). Gradually the scene became changed. We descended slightly from an elevated, dry, and sandy area to a low and swampy one; a cool air breathed on our faces, and a mouldy smell of rotting vegetation greeted us. The trees were now taller, the underwood less dense, and we could obtain glimpses into the wilderness on all sides. The leafy crowns of the trees, scarcely two of which could be seen together of the same kind, were now far away above us, in another world as it were. We could only see at times, where there was a break above, the tracery of the foliage against the clear blue sky. Sometimes the leaves were palmate, or of the shape of large outstretched hands; at others, finely cut or feathery like the leaves of *Mimosæ*. Below, the tree trunks were everywhere linked together by *sipós*; the woody, flexible stems of climbing and creeping trees, whose foliage is far away above, mingled with that of the taller independent trees. Some were twisted in strands like cables, others had thick stems contorted in



Climbing Palm (*Desmoncus*). and flexuous stems, which twine

every variety of shape, entwining snake-like round the tree trunks or forming gigantic loops and coils among the larger branches; others, again, were of zigzag shape, or indented like the steps of a staircase, sweeping from the ground to a giddy height.

It interested me much afterwards to find that these climbing trees do not form any particular family or genus. There is no order of plants whose especial habit is to climb, but species of many and the most diverse families the bulk of whose members are not climbers, seem to have been driven by circumstances to adopt this habit. The orders Leguminosæ, Guttiferæ, Bignoniaceæ, Moraceæ and others, furnish the greater number. There is even a climbing genus of palms (*Desmoncus*), the species of which are called, in the Tupí language, *Jacitára*. These have slender, thickly-spined,

about the taller trees from one to the other, and grow to an incredible length. The leaves, which have the ordinary pinnate shape characteristic of the family, are emitted from the stems at long intervals, instead of being collected into a dense crown, and have at their tips a number of long recurved spines. These structures are excellent contrivances to enable the trees to secure themselves by in climbing, but they are a great nuisance to the traveller, for they sometimes hang over the pathway and catch the hat or clothes, dragging off the one or tearing the other as he passes. The number and variety of climbing trees in the Amazons forests are interesting, taken in connection with the fact of the very general tendency of the animals, also, to become climbers.

All the Amazonian, and in fact all South American, monkeys are climbers. There is no group answering to the baboons of the Old World, which live on the ground. The Gallinaceous birds of the country, the representatives of the fowls and pheasants of Asia and Africa, are all adapted by the position of the toes to perch on trees, and it is only on trees, at a great height, that they are to be seen. A genus of Plantigrade Carnivora, allied to the bears (*Cercopithecus*), found only in the Amazonian forests, is entirely arboreal, and has a long flexible tail like that of certain monkeys. Many other similar instances could be enumerated, but I will mention only the Geodephaga, or carnivorous ground beetles, a great proportion of whose genera and species in these forest regions are, by the structure of their feet, fitted to live exclusively on the branches and leaves of trees.

Many of the woody lianas suspended from trees are not climbers but the air-roots of epiphytous plants (Aroideæ), which sit on the stronger boughs of the trees above, and hang down straight as plumb-lines. Some are suspended singly, others in leashes; some reach halfway to the ground and others touch it, striking their rootlets into the earth. The underwood in this part of the forest was composed partly of younger trees of the same species as their taller neighbours, and partly of palms of many species, some of them twenty to thirty feet in height, others small and delicate, with stems no thicker than a finger. These latter (different kinds of *Bactris*) bore small bunches of fruit, red or black, often containing a sweet grape-like juice.

Further on the ground became more swampy, and we had some difficulty in picking our way. The wild banana (*Urania Amazonica*) here began to appear, and, as it grew in masses, imparted a new aspect to the scene. The leaves of this beautiful plant are like broad sword-blades, eight feet in length and a foot broad; they rise straight upwards, alternately, from the top of a stem five or six feet high. Numerous kinds of plants with leaves similar in shape to these but smaller, clothed the ground. Amongst them were species of *Marantaceæ*, some of which had broad glossy leaves, with long leaf-stalks radiating from joints in a reed-like stem. The trunks of the trees were clothed with climbing ferns, and *Pothos* plants with large, fleshy, heart-shaped leaves. Bamboos and other tall grass and reed-like plants arched over the pathway. The appearance of this part of the forest was strange in the extreme; description

can convey no adequate idea of it. The reader who has visited Kew may form some notion by conceiving a vegetation like that in the great palm-house spread over a large tract of swampy ground, but he must fancy it mingled with large exogenous trees similar to our oaks and elms covered with creepers and parasites, and figure to himself the ground encumbered with fallen and rotting trunks, branches, and leaves; the whole illuminated by a glowing vertical sun, and reeking with moisture.

In these swampy shades we were afraid at each step of treading on some venomous reptile. On this first visit, however, we saw none, although I afterwards found serpents common here. We perceived no signs of the larger animals and saw very few birds. Insects were more numerous, especially butterflies. The most conspicuous species was a large, glossy, blue and black *Morpho* (*M. Achilles*, of Linnæus), which measures six inches or more in expanse of wings. It came along the alley at a rapid rate and with an undulating flight, but diverged into the thicket before reaching the spot where we stood. Another was the very handsome *Papilio Sesostris*, velvety black in colour, with a large silky green patch on its wings. It is the male only which is so coloured; the female being plainer, and so utterly unlike its partner, that it was always held to be a different species until proved to be the same. Several other kinds allied to this inhabit almost exclusively these moist shades. In all of them the males are brilliantly coloured and widely different from the females. Such are *P. Æneas*, *P. Vertumnus*, and *P.*

Lysander, all velvety black, with patches of green and crimson on their wings. The females of these species do not court the company of the males, but are found slowly flying in places where the shade is less dense. In the moist parts great numbers of males are seen, often four species together, threading the mazes of the forest, and occasionally rising to settle on the scarlet flowers of climbers near the tops of the trees. Occasionally a stray one is seen in the localities which the females frequent. In the swampiest parts, we saw numbers of the *Epicalia ancea*, one of the most richly-coloured of the whole tribe of butterflies, being black, decorated with broad stripes of pale blue and orange. It delighted to settle on the broad leaves of the *Uranie* and similar plants where a ray of sunlight shone, but it was excessively wary, darting off with lightning speed when approached.

To obtain a fair notion of the number and variety of the animal tenants of these forests, it is necessary to follow up the research month after month and explore them in different directions and at all seasons. During several months I used to visit this district two or three days every week, and never failed to obtain some species new to me, of bird, reptile, or insect. It seemed to be an epitome of all that the humid portions of the Par  forests could produce. This endless diversity, the coolness of the air, the varied and strange forms of vegetation, the entire freedom from mosquitos and other pests, and even the solemn gloom and silence, combined to make my rambles through it always pleasant as well as profitable. Such places are paradises to a naturalist, and if he be of a contemplative turn

there is no situation more favourable for his indulging the tendency. There is something in a tropical forest akin to the ocean in its effects on the mind. Man feels so completely his insignificance there, and the vastness of nature. A naturalist cannot help reflecting on the vegetable forces manifested on so grand a scale around him. A German traveller, Burmeister, has said that the contemplation of a Brazilian forest produced on him a painful impression, on account of the vegetation displaying a spirit of restless selfishness, eager emulation, and craftiness. He thought the softness, earnestness, and repose of European woodland scenery were far more pleasing, and that these formed one of the causes of the superior moral character of European nations.

In these tropical forests each plant and tree seems to be striving to outvie its fellow, struggling upwards towards light and air—branch, and leaf, and stem—regardless of its neighbours. Parasitic plants are seen fastening with firm grip on others, making use of them with reckless indifference as instruments for their own advancement. Live and let live is clearly not the maxim taught in these wildernesses. There is one kind of parasitic tree, very common near Pará, which exhibits this feature in a very prominent manner. It is called the Sipó Matador, or the Murderer Liana. It belongs to the fig order, and has been described and figured by Von Martius in the Atlas to Spix and Martius's Travels. I observed many specimens. The base of its stem would be unable to bear the weight of the upper growth; it is obliged, therefore, to support itself on a tree of another species. In this it is not essentially different from

other climbing trees and plants, but the way the matador sets about it is peculiar, and produces certainly a disagreeable impression. It springs up close to the tree on which it intends to fix itself, and the wood of its stem grows by spreading itself like a plastic mould over one side of the trunk of its supporter. It then puts forth, from each side, an arm-like branch, which grows rapidly, and looks as though a stream of sap were flowing and hardening as it went. This adheres closely to the trunk of the victim and the two arms meet on the opposite side and blend together. These arms are put forth at somewhat regular intervals in mounting upwards, and the victim, when its strangler is full-grown, becomes tightly clasped by a number of inflexible rings. These rings gradually grow larger as the Murderer flourishes, rearing its crown of foliage to the sky mingled with that of its neighbour, and in course of time they kill it by stopping the flow of its sap. The strange spectacle then remains of the selfish parasite clasping in its arms the lifeless and decaying body of its victim, which had been a help to its own growth. Its ends have been served—it has flowered and fruited, reproduced and disseminated its kind; and now, when the dead trunk moulders away, its own end approaches; its support is gone, and itself also falls.

The Murderer Sipó merely exhibits, in a more conspicuous manner than usual, the struggle which necessarily exists amongst vegetable forms in these crowded forests, where individual is competing with individual and species with species, all striving to reach light and air in order to unfold their leaves and perfect their

organs of fructification. All species entail in their successful struggles the injury or destruction of many of their neighbours or supporters, but the process is not in others so speaking to the eye as it is in the case of the Matador. The efforts to spread their roots are as strenuous in some plants and trees, as the struggle to mount upwards is in others. From these apparent strivings result the buttressed stems, the dangling air roots, and other similar phenomena. The competition amongst organised beings has been prominently brought forth in Darwin's "Origin of Species;" it is a fact which must be always kept in view in studying these subjects. It exists everywhere, in every zone, in both the animal and vegetable kingdoms. It is doubtless most severe, on the whole, in tropical countries, but its display in vegetable forms in the forest is no exceptional phenomenon. It is only more conspicuously exhibited, owing perhaps to its affecting principally the vegetative organs—root, stem, and leaf—whose growth is also stimulated by the intense light, the warmth, and the humidity. The competition exists also in temperate countries, but it is there concealed under the external appearance of repose which vegetation wears. It affects, in this case, perhaps more the reproductive than the vegetative organs, especially the flowers, which it is probable are far more general decorations in the woodlands of high latitudes than in tropical forests. This, however, is a difficult subject, and one which requires much further investigation.

I think there is plenty, in tropical nature, to counteract any unpleasant impression which the reckless

energy of the vegetation might produce. There is the incomparable beauty and variety of the foliage, the vivid colours, the richness and exuberance everywhere displayed, which make, in my opinion, the richest woodland scenery in Northern Europe a sterile desert in comparison. But it is especially the enjoyment of life manifested by individual existences which compensates for the destruction and pain caused by the inevitable competition. Although this competition is nowhere more active, and the dangers to which each individual is exposed nowhere more numerous, yet nowhere is this enjoyment more vividly displayed. If vegetation had feeling, its vigorous and rapid growth, uninterrupted by the cold sleep of winter, would, one would think, be productive of pleasure to its individuals. In animals, the mutual competition may be greater, the predacious species more constantly on the alert, than in temperate climates ; but there is at the same time no severe periodical struggle with inclement seasons. In sunny nooks, and at certain seasons, the trees and the air are gay with birds and insects, all in the full enjoyment of existence ; the warmth, the sunlight, and the abundance of food producing their results in the animation and sportiveness of the beings congregated together. We ought not to leave out of sight, too, the sexual decorations—the brilliant colours and ornamentation of the males, which, although existing in the fauna of all climates, reach a higher degree of perfection in the tropics than elsewhere. This seems to point to the pleasures of the pairing seasons. I think it is a childish notion that the beauty of birds, insects, and other

creatures is given to please the human eye. A little observation and reflection show that this cannot be the case, else why should one sex only be richly ornamented, the other clad in plain drab and gray? Surely, rich plumage and song, like all the other endowments of species, are given them for their own pleasure and advantage. This, if true, ought to enlarge our ideas of the inner life and mutual relations of our humbler fellow creatures!

We at length emerged from the forest, on the banks of the Una, near its mouth. It was here about one hundred yards wide. The residence of Senhor Danin stood on the opposite shore; a large building, white-washed and red-tiled as usual, raised on wooden piles above the humid ground. The second story was the part occupied by the family, and along it was an open verandah where people, male and female, were at work. Below were several negroes employed carrying clay on their heads. We called out for a boat, and one of them crossed over to fetch us. Senhor Danin received us with the usual formal politeness of the Portuguese; he spoke English very well, and after we had arranged our business we remained conversing with him on various topics connected with the country. Like all employers in this province he was full of one topic—the scarcity of hands. It appeared that he had made great exertions to introduce white labour but had failed, after having brought numbers of men from Portugal and other countries under engagement to work for him. They all left him one by one soon after their arrival. The abundance of unoccupied land, the liberty that

exists, a state of things produced by the half-wild canoe-life of the people, and the ease with which a mere subsistence can be obtained with moderate work, tempt even the best-disposed to quit regular labour as soon as they can. He complained also of the dearness of slaves, owing to the prohibition of the African traffic, telling us that formerly a slave could be bought for 120 dollars, whereas they are now difficult to procure at 400 dollars.

Mr. Danin told us that he had travelled in England and the United States, and that he had now two sons completing their education in those countries. I afterwards met with many enterprising persons of Mr. Danin's order, both Brazilians and Portuguese; their great ambition is to make a voyage to Europe or North America, and to send their sons to be educated there. The land on which his establishment is built, he told us, was an artificial embankment on the swamp; the end of the house was built on a projecting point overlooking the river, so that a good view was obtained, from the sitting rooms, of the city and the shipping. We learnt there was formerly a large and flourishing cattle estate on this spot, with an open grassy space like a park. On Sundays gay parties of 40 or 50 persons used to come by land and water, in carriages and gay galliots, to spend the day with the hospitable owner. Since the political disorders which I have already mentioned, decay had come upon this as on most other large establishments in the country. The cultivated grounds, and the roads leading to them, were now entirely overgrown with dense forest. When we were ready to depart, Senhor Danin lent a canoe and two

negroes to take us to the city, where we arrived in the evening after a day rich in new experiences.

Shortly afterwards we took possession of our new residence. The house was a square building, consisting of four equal-sized rooms; the tiled roof projected all round, so as to form a broad verandah, cool and pleasant to sit and work in. The cultivated ground, which appeared as if newly cleared from the forest, was planted with fruit trees and small plots of coffee and mandioca. The entrance to the grounds was by an iron-grille gateway from a grassy square, around which were built the few houses and palm-thatched huts which then constituted the village. The most important building was the chapel of our Lady of Nazareth, which stood opposite our place. The saint here enshrined was a great favourite with all orthodox Paraenses, who attributed to her the performance of many miracles. The image was to be seen on the altar, a handsome doll about four feet high, wearing a silver crown and a garment of blue silk, studded with golden stars. In and about the chapel were the offerings that had been made to her, proofs of the miracles which she had performed. There were models of legs, arms, breasts, and so forth, which she had cured. But most curious of all was a ship's boat, deposited here by the crew of a Portuguese vessel which had foundered, a year or two before our arrival, in a squall off Cayenne; part of them having been saved in the boat, after invoking the protection of the saint here enshrined. The annual festival in honour of our Lady of Nazareth is the greatest of the Pará holidays; many

persons come to it from the neighbouring city of Maranh, 300 miles distant. Once the president ordered the mail steamer to be delayed two days at Pará for the convenience of these visitors. The popularity of the festa is partly owing to the beautiful weather that prevails when it takes place, namely, in the middle of the fine season, on the ten days preceding the full moon in October or November. Pará is then seen at its best. The weather is not too dry, for three weeks never follow in succession without a shower ; so that all the glory of verdure and flowers can be enjoyed with clear skies. The moonlit nights are then especially beautiful ; the atmosphere is transparently clear, and the light sea-breeze produces an agreeable coolness.

We now settled ourselves for a few months' regular work. We had the forest on three sides of us ; it was the end of the wet season ; most species of birds had finished moulting, and every day the insects increased in number and variety. Behind the rocinha, after several days' exploration, I found a series of pathways through the woods, which led to the Una road ; about half way was the house in which the celebrated travellers Spix and Martius resided during their stay at Pará, in 1819. It was now in a neglected condition, and the plantations were overgrown with bushes. The paths hereabout were very productive of insects, and being entirely under shade were very pleasant for strolling. Close to our doors began the main forest road. It was broad enough for two horsemen abreast, and branched off in three directions ; the main line going to the village of Ourem, a distance of 50 miles. This road formerly

extended to Maranham, but it had been long in disuse and was now grown up, being scarcely passable between Pará and Ourem.

Our researches were made in various directions along these paths, and every day produced us a number of new and interesting species. Collecting, preparing our specimens, and making notes, kept us well occupied. One day was so much like another, that a general description of the diurnal round of incidents, including the sequence of natural phenomena, will be sufficient to give an idea of how days pass to naturalists under the equator.

We used to rise soon after dawn, when Isidoro would go down to the city, after supplying us with a cup of coffee, to purchase the fresh provisions for the day. The two hours before breakfast were devoted to ornithology. At that early period of the day the sky was invariably cloudless (the thermometer marking 72° or 73° Fahr.); the heavy dew or the previous night's rain, which lay on the moist foliage, becoming quickly dissipated by the glowing sun, which rising straight out of the east, mounted rapidly towards the zenith. All nature was fresh, new leaf and flower-buds expanding rapidly. Some mornings a single tree would appear in flower amidst what was the preceding evening a uniform green mass of forest—a dome of blossom suddenly created as if by magic. The birds were all active; from the wild-fruit trees, not far off, we often heard the shrill yelping of the Toucans (*Rhamphastos vitellinus*). Small flocks of parrots flew over on most mornings, at a great height, appearing in distinct relief against the blue sky, always

two by two chattering to each other, the pairs being separated by regular intervals ; their bright colours, however, were not apparent at that height. After breakfast we devoted the hours from 10 a.m. to 2 or 3 p.m. to entomology ; the best time for insects in the forest being a little before the greatest heat of the day. We did not find them at all numerous, although of great variety as to species. The only kinds that appeared in great numbers of individuals were ants, termites, and certain species of social wasps ; in the open grounds dragon-flies were also amongst the most abundant kinds of insects. Beetles were certainly much lower in the proportion of individuals to species than they are in England, and this led us to the conclusion that the ants and termites here must perform many of the functions in nature which in temperate climates are the office of Coleoptera. As to butterflies, I extract the following note from many similar ones in my journal. " On Tuesday, collected 46 specimens, of 39 species. On Wednesday, 37 specimens, of 33 species, 27 of which are different from those taken on the preceding day." The number of specimens would be increased if I had reckoned all the commonest species seen, but still the fact is well established, that there is a great paucity of individuals compared with species in both Lepidoptera and Coleoptera. We rarely saw caterpillars. After several years' observation, I came to the conclusion that the increase of these creatures was checked by the close persecution of insectivorous animals, which are excessively numerous in this country. The check operates at all periods of life—on the eggs, the larvæ, and the perfect insects.

The heat increased rapidly towards two o'clock (92° and 93° Fahr.), by which time every voice of bird or mammal was hushed; only in the trees was heard at intervals the harsh whirr of a cicada. The leaves, which were so moist and fresh in early morning, now became lax and drooping; the flowers shed their petals. Our neighbours the Indian and Mulatto inhabitants of the open palm-thatched huts, as we returned home fatigued with our ramble, were either asleep in their hammocks or seated on mats in the shade, too languid even to talk. On most days in June and July a heavy shower would fall some time in the afternoon, producing a most welcome coolness. The approach of the rain-clouds was after a uniform fashion very interesting to observe. First, the cool sea-breeze, which commenced to blow about 10 o'clock, and which had increased in force with the increasing power of the sun, would flag and finally die away. The heat and electric tension of the atmosphere would then become almost insupportable. Languor and uneasiness would seize on every one; even the denizens of the forest betraying it by their motions. White clouds would appear in the east and gather into cumuli, with an increasing blackness along their lower portions. The whole eastern horizon would become almost suddenly black, and this would spread upwards, the sun at length becoming obscured. Then the rush of a mighty wind is heard through the forest, swaying the tree-tops; a vivid flash of lightning bursts forth, then a crash of thunder, and down streams the deluging rain. Such storms soon cease, leaving bluish-black motionless clouds in the sky until night. Meantime all

nature is refreshed ; but heaps of flower-petals and fallen leaves are seen under the trees. Towards evening life revives again, and the ringing uproar is resumed from bush and tree. The following morning the sun again rises in a cloudless sky, and so the cycle is completed ; spring, summer, and autumn, as it were, in one tropical day. The days are more or less like this throughout the year in this country. A little difference exists between the dry and wet seasons ; but generally, the dry season, which lasts from July to December, is varied with showers, and the wet, from January to June, with sunny days. It results from this, that the periodical phenomena of plants and animals do not take place at about the same time in all species, or in the individuals of any given species, as they do in temperate countries. Of course there is no hybernation ; nor, as the dry season is not excessive, is there any æstivation as in some tropical countries. Plants do not flower or shed their leaves, nor do birds moult, pair, or breed simultaneously. In Europe, a woodland scene has its spring, its summer, its autumnal, and its winter aspects. In the equatorial forests the aspect is the same or nearly so every day in the year : budding, flowering, fruiting, and leaf shedding are always going on in one species or other. The activity of birds and insects proceeds without interruption, each species having its own separate times ; the colonies of wasps, for instance, do not die off annually, leaving only the queens, as in cold climates ; but the succession of generations and colonies goes on incessantly. It is never either spring, summer, or autumn, but each day is a combination of all three. With the

day and night always of equal length, the atmospheric disturbances of each day neutralising themselves before each succeeding morn; with the sun in its course proceeding mid-way across the sky and the daily temperature the same within two or three degrees throughout the year—how grand in its perfect equilibrium and simplicity is the march of Nature under the equator!

Our evenings were generally fully employed preserving our collections, and making notes. We dined at four, and took tea about seven o'clock. Sometimes we walked to the city to see Brazilian life or enjoy the pleasures of European and American society. And so the time passed away from June 15th to August 26th. During this period we made two excursions of greater length to the rice and saw-mills of Magoary, an establishment owned by an American gentleman, Mr. Upton, situated on the banks of a creek in the heart of the forest, about 12 miles from Pará. I will narrate some of the incidents of these excursions, and give an account of the more interesting observations made on the Natural History and inhabitants of these interior creeks and forests.

Our first trip to the mills was by land. The creek on whose banks they stand, the Iritirí, communicates with the river Pará, through another larger creek, the Magoary; so that there is a passage by water; but this is about 20 miles round. We started at sunrise, taking Isidoro with us. The road plunged at once into the forest after leaving Nazareth, so that in a few minutes we were enveloped in shade. For some distance the woods

were of second growth, the original forest near the town having been formerly cleared or thinned. They were dense and impenetrable on account of the close growth of the young trees and the mass of thorny shrubs and creepers. These thickets swarmed with ants and ant-thrushes ; they were also frequented by a species of puff-throated manikin, a little bird which flies occasionally across the road, emitting a strange noise, made, I believe, with its wings, and resembling the clatter of a small wooden rattle.

A mile or a mile and a half further on, the character of the woods began to change, and we then found ourselves in the primæval forest. The appearance was greatly different from that of the swampy tract I have already described. The land was rather more elevated and undulating ; the many swamp plants with their long and broad leaves were wanting, and there was less underwood, although the trees were wider apart. Through this wilderness the road continued for seven or eight miles. The same unbroken forest extends all the way to Maranhã and in other directions, as we were told, a distance of about 300 miles southward and eastward of Pará. In almost every hollow part the road was crossed by a brook, whose cold, dark, leaf-stained waters were bridged over by tree trunks. The ground was carpeted, as usual, by Lycopodiums, but it was also encumbered with masses of vegetable *débris* and a thick coating of dead leaves. Fruits of many kinds were scattered about, amongst which were many sorts of beans, some of the pods a foot long, flat and leathery in texture, others hard as stone. In one

place there was a quantity of large empty wooden vessels, which Isidoro told us fell from the Sapucaya tree. They are called Monkey's drinking-cups (Cuyas de Macaco), and are the capsules which contain the nuts sold under the name just mentioned, in Covent Garden Market. At the top of the vessel is a circular hole, in which a natural lid fits neatly. When the nuts are ripe this lid becomes loosened, and the heavy cup falls with a crash, scattering the nuts over the ground. The tree which yields the nut (*Lecythis ollaria*), is of immense height. It is closely allied to the Brazil-nut tree (*Bertholletia excelsa*), whose seeds are also enclosed in large woody vessels; but these have no lid, and fall entire to the ground. This is the reason why the one kind of nut is so much dearer than the other. The Sapucaya is not less abundant, probably, than the *Bertholletia*, but its nuts in falling are scattered about and eaten by wild animals; whilst the full capsules of Brazil-nuts are collected entire by the natives.

What attracted us chiefly were the colossal trees. The general run of trees had not remarkably thick stems; the great and uniform height to which they grow without emitting a branch, was a much more noticeable feature than their thickness; but at intervals of a furlong or so a veritable giant towered up. Only one of these monstrous trees can grow within a given space; it monopolises the domain, and none but individuals of much inferior size can find a footing near it. The cylindrical trunks of these larger trees were generally about 20 to 25 feet in circumference. Von Martius mentions having measured trees in the Pará dis-

trict belonging to various species (*Symphonia coccinea*, *Lecythis* sp. and *Cratæva Tapia*), which were 50 to 60 feet in girth at the point where they become cylindrical. The height of the vast column-like stems could not be less than 100 feet from the ground to their lowest branch. Mr. Leavens, at the saw-mills, told me they frequently squared logs for sawing 100 feet long, of the Pao d'Arco and the Massaranduba. The total height of these trees, stem and crown together, may be estimated at from 180 to 200 feet: where one of them stands, the vast dome of foliage rises above the other forest trees as a domed cathedral does above the other buildings in a city.

A very remarkable feature in these trees is the growth of buttress-shaped projections around the lower part of their stems. The spaces between these buttresses, which are generally thin walls of wood, form spacious chambers, and may be compared to stalls in a stable: some of them are large enough to hold half-a-dozen persons. The purpose of these structures is as obvious, at the first glance, as that of the similar props of brickwork which support a high wall. They are not peculiar to one species, but are common to most of the larger forest trees. Their nature and manner of growth are explained when a series of young trees of different ages is examined. It is then seen that they are the roots which have raised themselves ridge-like out of the earth; growing gradually upwards as the increasing height of the tree required augmented support. Thus they are plainly intended to sustain the massive crown and trunk in these crowded forests, where lateral growth

of the roots in the earth is rendered difficult by the multitude of competitors.

The other grand forest trees whose native names we learnt, were the Moira-tinga (the White or King-tree), probably the same as, or allied to, the *Mora excelsa*, which Sir Robert Schomburgk discovered in British Guiana; the Samaüma (*Eriodendron Samauma*) and the Massaranduba, or Cow-tree. The last-mentioned is the most remarkable. We had already heard a good deal about this tree, and about its producing from its bark a copious supply of milk as pleasant to drink as that of the cow. We had also eaten its fruit in Pará, where it is sold in the streets by negro market women; and had heard a good deal of the durability in water of its timber. We were glad, therefore, to see this wonderful tree growing in its native wilds. It is one of the largest of the forest monarchs, and is peculiar in appearance on account of its deeply-scored reddish and ragged bark. A decoction of the bark, I was told, is used as a red dye for cloth. A few days afterwards we tasted its milk, which was drawn from dry logs that had been standing many days in the hot sun, at the saw-mills. It was pleasant with coffee, but had a slight rankness when drunk pure; it soon thickens to a glue, which is excessively tenacious, and is often used to cement broken crockery. I was told that it was not safe to drink much of it, for a slave had recently nearly lost his life through taking it too freely.

In some parts of the road ferns were conspicuous objects. But I afterwards found them much more numerous on the Maranham-road, especially in one

place where the whole forest glade formed a vast fernery; the ground was covered with terrestrial species, and the tree trunks clothed with climbing and epiphytous kinds. I saw no tree ferns in the Pará district; they belong to hilly regions; some occur, however, on the Upper Amazons.

Such were the principal features in the vegetation of the wilderness; but where were the flowers? To our great disappointment we saw none, or only such as were insignificant in appearance. Orchids are very rare in the dense forests of the low lands. I believe it is now tolerably well ascertained that the majority of forest trees in equatorial Brazil have small and inconspicuous flowers. Flower-frequenting insects are also rare in the forest. Of course they would not be found where their favourite food was wanting, but I always noticed that even where flowers occurred in the forest, few or no insects were seen upon them. In the open country or campos of Santarem on the Lower Amazons, flowering trees and bushes are more abundant, and there a large number of floral insects are attracted. The forest bees of South America belonging to the genera *Melipona* and *Euglossa* are more frequently seen feeding on the sweet sap which exudes from the trees, or on the excrement of birds on leaves, than on flowers.

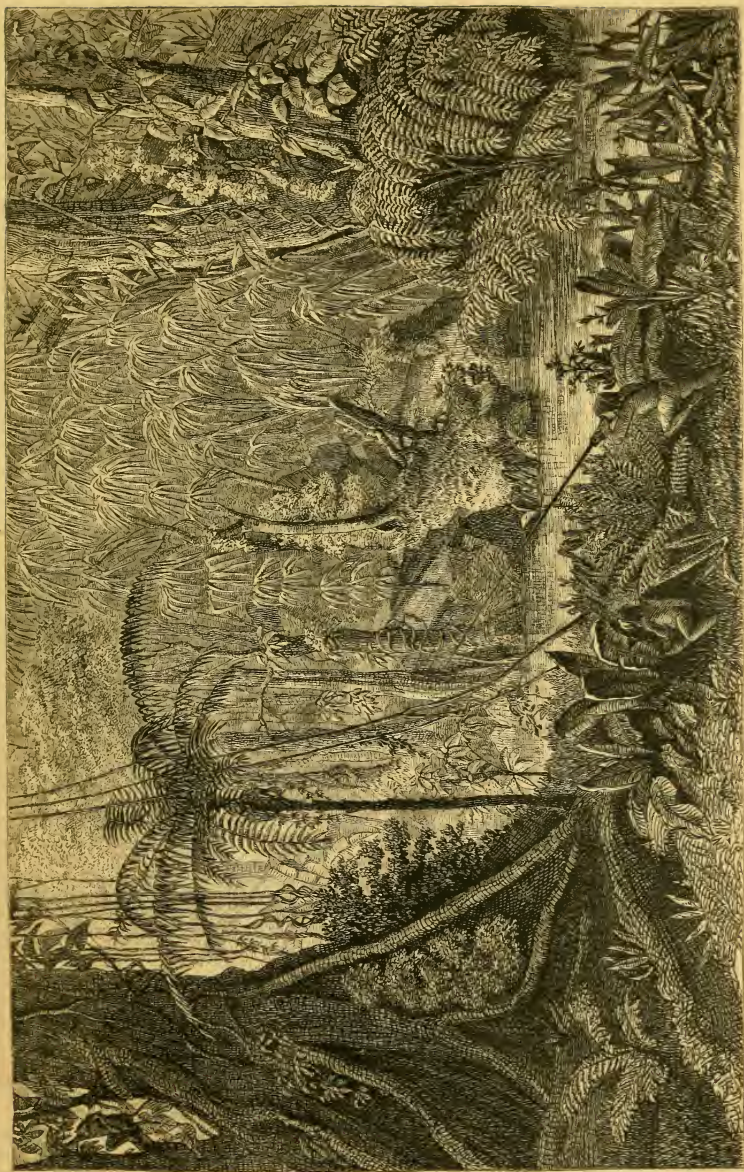
We were disappointed also in not meeting with any of the larger animals in the forest. There was no tumultuous movement, or sound of life. We did not see or hear monkeys, and no tapir or jaguar crossed our path. Birds, also, appeared to be exceedingly scarce. We heard, however, occasionally, the long-

drawn, wailing note of the Inambú, a kind of partridge (*Crypturus cinereus* ?) ; and, also, in the hollows on the banks of the rivulets, the noisy notes of another bird, which seemed to go in pairs, amongst the tree-tops, calling to each other as they went. These notes resounded through the solitude. Another solitary bird had a most sweet and melancholy song ; it consisted simply of a few notes, uttered in a plaintive key, commencing high, and descending by harmonic intervals. It was probably a species of warbler of the genus *Trichas*. All these notes of birds are very striking and characteristic of the forest.

I afterwards saw reason to modify my opinion, founded on these first impressions, with regard to the amount and variety of animal life in this and other parts of the Amazonian forests. There is, in fact, a great variety of mammals, birds, and reptiles, but they are widely scattered, and all excessively shy of man. The region is so extensive, and uniform in the forest clothing of its surface, that it is only at long intervals that animals are seen in abundance when some particular spot is found which is more attractive than others. Brazil, moreover, is throughout poor in terrestrial mammals, and the species are of small size ; they do not, therefore, form a conspicuous feature in its forests. The huntsman would be disappointed who expected to find here flocks of animals similar to the buffalo herds of North America, or the swarms of antelopes and herds of ponderous pachyderms of Southern Africa. The largest and most interesting portion of the Brazilian mammal fauna is arboreal in its habits ; this feature of the animal denizens

of these forests I have already alluded to. The most *intensely* arboreal animals in the world are the South American monkeys of the family Cebidæ, many of which have a fifth hand for climbing in their prehensile tails, adapted for this function by their strong muscular development, and the naked palms under their tips. This seems to teach us that the South American fauna has been slowly adapted to a forest life, and, therefore, that extensive forests must have always existed since the region was first peopled by mammalia. But to this subject, and to the natural history of the monkeys, of which thirty-eight species inhabit the Amazon region, I shall have to return.

We often read, in books of travels, of the silence and gloom of the Brazilian forests. They are realities, and the impression deepens on a longer acquaintance. The few sounds of birds are of that pensive or mysterious character which intensifies the feeling of solitude rather than imparts a sense of life and cheerfulness. Sometimes, in the midst of the stillness, a sudden yell or scream will startle one ; this comes from some defenceless fruit-eating animal, which is pounced upon by a tiger-cat or stealthy boa-constrictor. Morning and evening the howling monkeys make a most fearful and harrowing noise, under which it is difficult to keep up one's buoyancy of spirit. The feeling of inhospitable wildness which the forest is calculated to inspire, is increased tenfold under this fearful uproar. Often, even in the still hours of midday, a sudden crash will be heard resounding afar through the wilderness, as some great bough or entire tree falls to the ground. There



INTERIOR OF PRIMEVAL FOREST ON THE AMAZONS.



are, besides, many sounds which it is impossible to account for. I found the natives generally as much at a loss in this respect as myself. Sometimes a sound is heard like the clang of an iron bar against a hard, hollow tree, or a piercing cry rends the air; these are not repeated, and the succeeding silence tends to heighten the unpleasant impression which they make on the mind. With the natives it is always the Curupíra, the wild man or spirit of the forest, which produces all noises they are unable to explain. Myths are the rude theories which mankind, in the infancy of knowledge, invent to explain natural phenomena. The Curupíra is a mysterious being, whose attributes are uncertain, for they vary according to locality. Sometimes he is described as a kind of orang-otang, being covered with long, shaggy hair, and living in trees. At others he is said to have cloven feet, and a bright red face. He has a wife and children, and sometimes comes down to the roças to steal the mandioca. At one time I had a Mameluco youth in my service, whose head was full of the legends and superstitions of the country. He always went with me into the forest; in fact, I could not get him to go alone, and whenever we heard any of the strange noises mentioned above, he used to tremble with fear. He would crouch down behind me, and beg of me to turn back. He became easy only after he had made a charm to protect us from the Curupíra. For this purpose he took a young palm leaf, plaited it, and formed it into a ring, which he hung to a branch on our track. /

At length, after a six hours' walk, we arrived at our

destination, the last mile or two having been again through second-growth forest. The mills formed a large pile of buildings, pleasantly situated in a cleared tract of land, many acres in extent, and everywhere surrounded by the perpetual forest. We were received in the kindest manner by the overseer, Mr. Leavens, who showed us all that was interesting about the place, and took us to the best spots in the neighbourhood for birds and insects. The mills were built a long time ago by a wealthy Brazilian. They had belonged to Mr. Upton for many years. I was told that when the dark-skinned revolutionists were preparing for their attack on Pará, they occupied the place, but not the slightest injury was done to the machinery or building, for the leaders said it was against the Portuguese and their party that they were at war, not against the other foreigners.

The creek Iritirí at the mills is only a few yards wide ; it winds about between two lofty walls of forest for some distance, then becomes much broader, and finally joins the Magoary. There are many other ramifications, creeks or channels, which lead to retired hamlets and scattered houses, inhabited by people of mixed white, Indian, and negro descent. Many of them did business with Mr. Leavens, bringing for sale their little harvests of rice, or a few logs of timber. It was interesting to see them in their little, heavily-laden montarias. Sometimes the boats were managed by handsome, healthy young lads, loosely clad in straw hat, white shirt, and dark blue trousers, turned up to the knee. They steered, paddled, and managed the varejaõ (the boating pole), with much grace and dexterity.

We made many excursions down the Iritirí, and saw much of these creeks; besides, our second visit to the mills was by water. The Magoary is a magnificent channel; the different branches form quite a labyrinth, and the land is everywhere of little elevation. All these smaller rivers, throughout the Pará estuary, are of the nature of creeks. The land is so level, that the short local rivers have no sources and downward currents like rivers as we generally understand them. They serve the purpose of draining the land, but instead of having a constant current one way, they have a regular ebb and flow with the tide. The natives call them, in the Tupí language, Igarapés, or canoe-paths. The igarapés and furos or channels, which are infinite in number in this great river delta, are characteristic of the country. The land is everywhere covered with impenetrable forests; the houses and villages are all on the waterside, and nearly all communication is by water. This semi-aquatic life of the people is one of the most interesting features of the country. For short excursions, and for fishing in still waters, a small boat, called *montaria*, is universally used. It is made of five planks; a broad one for the bottom, bent into the proper shape by the action of heat, two narrow ones for the sides, and two small triangular pieces for stem and stern. It has no rudder; the paddle serves for both steering and propelling. The *montaria* takes here the place of the horse, mule, or camel of other regions. Besides one or more *montarias*, almost every family has a larger canoe, called *Igarité*. This is fitted with two masts, a rudder, and keel, and has

an arched awning or cabin near the stern, made of a framework of tough lianas, thatched with palm leaves. In the *igarité* they will cross stormy rivers fifteen or twenty miles broad. The natives are all boat-builders. It is often remarked, by white residents, that an Indian is a carpenter and shipwright by intuition. It is astonishing to see in what crazy vessels these people will risk themselves. I have seen Indians cross rivers in a leaky *montaria*, when it required the nicest equilibrium to keep the leak just above water; a movement of a hair's breadth would send all to the bottom, but they managed to cross in safety. They are especially careful when they have strangers under their charge, and it is the custom of Brazilian and Portuguese travellers to leave the whole management to them. When they are alone they are more reckless, and often have to swim for their lives. When a squall overtakes them as they are crossing in a heavily-laden canoe, they all jump overboard and swim about until the heavy sea subsides, when they re-embark.

A few words on the aboriginal population of the Pará estuary will here not be out of place. The banks of the Pará were originally inhabited by a number of distinct tribes, who, in their habits, resembled very much the natives of the sea-coast from Maranham to Bahia. It is related that one large tribe, the Tupinambas, migrated from Pernambuco to the Amazons. One fact seems to be well-established, namely, that all the coast tribes were far more advanced in civilisation, and milder in their manners, than the savages who inhabited the

interior lands of Brazil. They were settled in villages, and addicted to agriculture. They navigated the rivers in large canoes, called *ubás*, made of immense hollowed-out tree trunks; in these they used to go on war expeditions, carrying in the prows their trophies and calabash rattles, whose clatter was meant to intimidate their enemies. They were gentle in disposition, and received the early Portuguese settlers with great friendliness. The inland savages, on the other hand, led a wandering life, as they do at the present time, only coming down occasionally to rob the plantations of the coast tribes, who always entertained the greatest enmity towards them.

The original Indian tribes of the district are now either civilised, or have amalgamated with the white and negro immigrants. Their distinguishing tribal names have long been forgotten, and the race bears now the general appellation of *Tapuyo*, which seems to have been one of the names of the ancient *Tupinambas*. The Indians of the interior, still remaining in the savage state, are called by the Brazilians *Indios*, or *Gentios* (Heathens). All the semi-civilised *Tapuyos* of the villages, and in fact the inhabitants of retired places generally, speak the *Lingoa geral*, a language adapted by the Jesuit missionaries from the original idiom of the *Tupinambas*. The language of the *Guaranis*, a nation living on the banks of the Paraguay, is a dialect of it, and hence it is called by philologists the *Tupi-Guarani* language; printed grammars of it are always on sale at the shops of the *Pará* booksellers. The fact of one language having been spoken over so wide an extent of country as that from the *Amazons* to Paraguay, is quite an isolated

one in this country, and points to considerable migrations of the Indian tribes in former times. At present the languages spoken by neighbouring tribes on the banks of the interior rivers are totally distinct ; on the Juruá, even scattered hordes belonging to the same tribe are not able to understand each other.

The civilised Tapuyo of Pará, differs in no essential point, in physical or moral qualities, from the Indian of the interior. He is more stoutly built, being better fed than some of them ; but in this respect there are great differences amongst the tribes themselves. He presents all the chief characteristics of the American red man. The skin of a coppery brown colour, the features of the face broad, and the hair black, thick, and straight. He is generally about the middle height, thick-set, has a broad muscular chest, well-shaped but somewhat thick legs and arms, and small hands and feet. The cheek bones are not generally prominent ; the eyes are black, and seldom oblique like those of the Tartar races of Eastern Asia, which are supposed to have sprung from the same original stock as the American red man. The features exhibit scarcely any mobility of expression ; this is connected with the excessively apathetic and undemonstrative character of the race. They never betray, in fact they do not feel keenly, the emotions of joy, grief, wonder, fear, and so forth. They can never be excited to enthusiasm ; but they have strong affections, especially those connected with family. It is commonly stated by the whites and negroes that the Tapuyo is ungrateful. Brazilian mistresses of households, who have much experience of Indians, have always a long

list of instances to relate to the stranger, showing their base ingratitude. They certainly do not appear to remember or think of repaying benefits, but this is probably because they did not require, and do not value such benefits as their would-be masters confer upon them. I have known instances of attachment and fidelity on the part of Indians towards their masters, but these are exceptional cases. All the actions of the Indian show that his ruling desire is to be let alone ; he is attached to his home, his quiet monotonous forest and river life ; he likes to go to towns occasionally, to see the wonders introduced by the white man, but he has a great repugnance to living in the midst of the crowd ; he prefers handicraft to field labour, and especially dislikes binding himself to regular labour for hire. He is shy and uneasy before strangers, but if they visit his abode, he treats them well, for he has a rooted appreciation of the duty of hospitality ; there is a pride about him, and being naturally formal and polite, he acts the host with great dignity. He withdraws from towns as soon as the stir of civilisation begins to make itself felt. When we first arrived at Pará many Indian families resided there, for the mode of living at that time was more like that of a large village than a city ; as soon as river steamers and more business activity were introduced, they all gradually took themselves away.

These characteristics of the Pará Indians are applicable, of course, to some extent, to the Mamelucos, which now constitute a great proportion of the population. The inflexibility of character of the Indian, and his

total inability to accommodate himself to new arrangements, will infallibly lead to his extinction, as immigrants, endowed with more supple organisations, increase, and civilisation advances in the Amazon region. But, as the different races amalgamate readily, and the offspring of white and Indian often become distinguished Brazilian citizens, there is little reason to regret the fate of the race. Formerly the Indian was harshly treated, and even now he is so in many parts of the interior. But, according to the laws of Brazil, he is a free citizen, having equal privileges with the whites; and there are very strong enactments providing against the enslaving and ill-treatment of the Indians. The residents of the interior, who have no higher principles to counteract instinctive selfishness or antipathy of race, cannot comprehend why they are not allowed to compel Indians to work for them, seeing that they will not do it of their own accord. The inevitable result of the conflict of interests between a European and a weaker indigenous race, when the two come in contact, is the sacrifice of the latter. In the Pará district, the Indians are no longer enslaved, but they are deprived of their lands, and this they feel bitterly, as one of them, an industrious and worthy man, related to me. Is not a similar state of things now exhibited in New Zealand, between the Maoris and the English colonists? It is interesting to read of the bitter contests that were carried on from the year 1570 to 1759, between the Portuguese immigrants in Brazil, and the Jesuit and other missionaries. They were similar to those which have recently taken place in South Africa, between the Boers and the Eng-

lish missionaries, but they were on a much larger scale. The Jesuits, as far as I could glean from tradition and history, were actuated by the same motives as our missionaries ; and they seemed like them to have been, in great measure, successful in teaching the pure and elevated Christian morality to the simple natives. But the attempt was vain to protect the weaker race from the inevitable ruin which awaited it in the natural struggle with the stronger one ; which, although calling itself Christian, seemed to have stood in need of missionary instruction quite as much as the natives themselves. In 1759, the white colonists finally prevailed, the Jesuits were forced to leave the country, and the 51 happy mission villages went to ruin. Since then, the aboriginal race has gone on decreasing in numbers under the treatment which it has received ; it is now, as I have already stated, protected by the laws of the central government.

On our second visit to the mills, we stayed ten days. There is a large reservoir and also a natural lake near the place both containing aquatic plants, whose leaves rest on the surface like our water lilies, but they are not so elegant as our nymphæa, either in leaf or flower. On the banks of these pools grow quantities of a species of fan-leaved palm-tree, the Caraná, whose stems are surrounded by whorls of strong spines. I sometimes took a montaria, and paddled myself alone down the creek. One day I got upset, and had to land on a grassy slope leading to an old plantation, where I ran about naked whilst my clothes were being dried on a bush. The creek Iritirí is not so picturesque as many others which I

subsequently explored. Towards the Magoary the banks at the edge of the water are clothed with mangrove bushes, and beneath them the muddy banks into which the long roots that hang down from the fruit before it leaves the branches strike their fibres, swarm with crabs. On the lower branches the beautiful bird, *Ardea helias* is found. This is a small heron of exquisitely graceful shape and mien; its plumage is minutely variegated with bars and spots of many colours, like the wings of certain kinds of moths. It is difficult to see the bird in the woods, on account of its sombre colours, and the shadiness of its dwelling-places; but its note, a soft long-drawn whistle, often betrays its hiding-place. I was told by the Indians that it builds in trees, and that the nest, which is made of clay, is beautifully constructed. It is a favourite pet-bird of the Brazilians, who call it *Pavaõ* (pronounced *Pavaong*), or peacock. I often had opportunities of observing its habits. It soon becomes tame, and walks about the floors of houses picking-up scraps of food, or catching insects, which it secures by walking gently to the place where they settle, and spearing them with its long, slender beak. It allows itself to be handled by children, and will answer to its name "*Pavaõ! Pavaõ!*" walking up with a dainty, circumspect gait, and taking a fly or beetle from the hand.

We made several shorter excursions in the neighbourhood. There was a favourite young negro slave named *Hilario* (anglicised to *Larry*), who took an interest in our pursuit. He paddled me one day over the lake, where we shot a small alligator and several *Piosocas*

(Parra Jacana), a waterfowl having very long legs and toes, which give it the appearance of walking on stilts, as it stalks about, striding from one water-lily leaf to another. I was surprised to find no coleopterous insects on the aquatic plants. The situation appeared to be as favourable for them as possibly could be. In England such a richly-mantled pool would have yielded an abundance of *Donaciæ*, *Chrysomelæ*, *Cassidæ*, and other beetles; here I could not find a single specimen. Neither could I find any water-beetles; the only exception was a species of *Gyrinus*, about the same size as *G. natator*, the little shining whirligig-beetle of Europe, which was seen in small groups in shady corners, spinning round on the surface of the water precisely as its congener does in England. The absence of leaf-eating beetles on the water plants, I afterwards found was general throughout the country. A few are found on large grasses, and Marantaceous plants in some places, but these are generally concealed in the sharp folds of the leaves, and are almost all very flat in shape.* I, therefore, conclude that the aquatic plants in open places in this country are too much exposed to the sun's heat to admit of the existence of leaf-eating beetles.

Larry told me the Indian names, and enumerated the properties of a number of the forest trees. One of these was very interesting—viz., the *Jutahí*, which yields the gum copal, called by the natives *Jutahí-síca*. There are several species of it, as appears at once from

* The species belong to the families *Hispidæ* and *Cassidiadæ*, and to the genera *Cephaloleia*, *Arescus*, *Himatidium*, *Homalispæ*. Carnivorous beetles, also flat in shape, sometimes accompany them.

the nature of the fruit. They belong to the order Leguminosæ: the pods are woody and excessively hard; inside they contain a number of beans, enveloped in a sweet yellowish floury substance, which is eaten by the inhabitants. The shell burns with a clear flame. Some of the species have large pods, others small oval ones, containing only one bean. The trees are amongst the largest in the forest, growing from 150 to 180 feet in height: the bark is similar to that of our oak. The leaves are in pairs, whence arises the botanical name of the genus, *Hymenæa*. The resin which the various species produce exudes from wounds or gashes made in the bark: but I was told that the trees secrete it also spontaneously from the base of the trunk within, and that large lumps are found in the earth amongst the roots when a tree is uprooted by storms. In the resin, ants and other insects are sometimes embedded, precisely as they are in amber, which substance the *Jutahí-síca* often resembles, at least in colour and transparency.

During these rambles by land and water we increased our collections considerably. Before we left the mills we arranged a joint excursion to the Tocantins. Mr. Leavens wished to ascend that river to ascertain if the reports were true, that cedar grew abundantly between the lowermost cataract and the mouth of the Araguaya, and we agreed to accompany him. Whilst we were at the mills, a Portuguese trader arrived with a quantity of worm-eaten logs of this cedar, which he had gathered from the floating timber in the current of the main Amazons. The tree producing this wood,

which is named cedar on account of the similarity of its aroma to that of the true cedars, is not, of course, a coniferous tree, as no member of that class is found in equatorial America, at least in the Amazons region. It is, according to Von Martius, the *Cedrela odorata*, an exogen belonging to the same order as the mahogany tree. The wood is light, and the tree is therefore, on falling into the water, floated down with the river currents. It must grow in great quantities somewhere in the interior, to judge from the number of uprooted trees annually carried to the sea, and as the wood is much esteemed for cabinet work and canoe building, it is of some importance to learn where a regular supply can be obtained. We were glad, of course, to arrange with Mr. Leavens, who was familiar with the language, and an adept in river-navigation; so we returned to Pará to ship our collections for England, and prepare for the journey to a new region.

CHAPTER III.

PARÁ—*concluded.*

Religious holidays—Marmoset monkeys—Serpents—Insects of the forest—Relations of the Fauna of the Pará district.

BEFORE leaving the subject of Pará, where I resided, as already stated, in all eighteen months, it will be necessary to give a more detailed account of several matters connected with the customs of the people and the Natural History of the neighbourhood, which have hitherto been only briefly mentioned. I reserve an account of the trade and improved condition of Pará in 1859 for the end of this narrative.

During the first few weeks of our stay many of those religious festivals took place, which occupied so large a share of the time and thoughts of the people. These were splendid affairs, wherein artistically-planned processions through the streets, accompanied by thousands of people; military displays; the clatter of fireworks, and the clang of military music, were superadded to pompous religious services in the churches. To those who had witnessed similar ceremonies in the Southern countries of Europe, there would be nothing remarkable perhaps in these doings, except their taking place

amidst the splendours of tropical nature ; but to me they were full of novelty, and were besides interesting as exhibiting much that was peculiar in the manners of the people. The festivals celebrate either the anniversaries of events concerning saints, or those of the more important transactions in the life of Christ. To them have been added, since the Independence, many gala days connected with events in the Brazilian national history ; but these have all a semi-religious character. The holidays had become so numerous, and interfered so much with trade and industry towards the year 1852, that the Brazilian Government were obliged to reduce them ; obtaining the necessary permission from Rome to abolish several which were of minor importance. Many of those which have been retained are declining in importance since the introduction of railways and steam boats, and the increased devotion of the people to commerce ; at the time of our arrival, however, they were in full glory. The way they were managed was in this fashion. A general manager or "Juiz" for each festa was elected by lot every year in the vestry of the church, and to him were handed over all the paraphernalia pertaining to the particular festival which he was chosen to manage ; the image of the saint, the banners, silver crowns and so forth. He then employed a number of people to go the round of the parish and collect alms, towards defraying the expenses. It was considered that the greater the amount of money spent in wax candles, fireworks, music and feasting, the greater the honour done to the saint. If the Juiz was a rich man, he seldom

sent out alms-gatherers, but celebrated the whole affair at his own expense, which was sometimes to the extent of several hundred pounds. Each festival lasted nine days (a *novena*), and in many cases refreshments for the public were provided every evening. In the smaller towns a ball took place two or three evenings during the *novena*, and on the last day there was a grand dinner. The priest, of course, had to be paid very liberally, especially for the sermon delivered on the Saint's-day or termination of the festival, sermons being extra duty in Brazil.

There was much difference as to the accessories of these festivals between the interior towns and villages and the capital; but little or no work was done anywhere whilst they lasted, and they tended much to demoralise the people. It is soon perceived that religion is rather the amusement of the Paraenses than their serious exercise. The ideas of the majority evidently do not reach beyond the belief that all the proceedings are, in each case, in honour of the particular wooden image enshrined at the church. The uneducated Portuguese immigrants seemed to me to have very degrading notions of religion. I have often travelled in the company of these shining examples of European enlightenment. They generally carry with them, wherever they go, a small image of some favourite saint in their trunks, and when a squall or any other danger arises, their first impulse is to rush to the cabin, take out the image and clasp it to their lips, whilst uttering a prayer for protection. The negroes and mulattos are similar in this respect to the low Portu-

guese, but I think they show a purer devotional feeling ; and in conversation I have always found them to be more rational in religious views than the lower orders of Portuguese. As to the Indians ; with the exception of the more civilized families residing near the large towns, they exhibit no religious sentiment at all. They have their own patron saint, St. Thomé, and celebrate his anniversary in the orthodox way, for they are fond of observing all the formalities ; but they think the feasting to be of equal importance with the church ceremonies. At some of the festivals, masquerading forms a large part of the proceedings, and then the Indians really shine. They get up capital imitations of wild animals, dress themselves to represent the Caypór and other fabulous creatures of the forest, and act their parts throughout with great cleverness. When St. Thomé's festival takes place, every employer of Indians knows that all his men will get drunk. The Indian, generally too shy to ask directly for *cashaça* (rum), is then very bold ; he asks for a *frasco* at once (two-and-a-half bottles), and says, if interrogated, that he is going to fuddle in honour of St. Thomé.

In the city of Pará, the provincial government assists to augment the splendour of the religious holidays. The processions which traverse the principal streets consist, in the first place, of the image of the saint, and those of several other subordinate ones belonging to the same church ; these are borne on the shoulders of respectable householders, who volunteer for the purpose : sometimes you will see your neighbour the grocer or the carpenter groaning under the load. The priest and his

crowd of attendants precede the images, arrayed in embroidered robes, and protected by magnificent sunshades—no useless ornament here, for the heat is very great when the sun is not obscured. On each side of the long line the citizens walk, clad in crimson silk cloaks, and holding each a large lighted wax candle. Behind follows a regiment or two of foot soldiers with their bands of music, and last of all the crowd: the coloured people being cleanly dressed and preserving a grave demeanour. The women are always in great force, their luxuriant black hair decorated with jasmynes, white orchids and other tropical flowers. They are dressed in their usual holiday attire, gauze chemises and black silk petticoats; their necks are adorned with links of gold beads, which when they are slaves are generally the property of their mistresses, who love thus to display their wealth.

At night, when festivals are going on in the grassy squares around the suburban churches, there is really much to admire. A great deal that is peculiar in the land and the life of its inhabitants can be seen best at those times. The cheerful white church is brilliantly lighted up, and the music, not of a very solemn description, peals forth from the open windows and doors. Numbers of young gaudily-dressed negresses line the path to the church doors with stands of liqueurs, sweetmeats, and cigarettes, which they sell to the outsiders. A short distance off is heard the rattle of dice-boxes and roulette at the open-air gambling-stalls. When the festival happens on moonlit nights, the whole scene is very striking to a new-comer. Around the square are groups of tall palm

trees, and beyond it, over the illuminated houses, appear the thick groves of mangoes near the suburban avenues, from which comes the perpetual ringing din of insect life. The soft tropical moonlight lends a wonderful charm to the whole. The inhabitants are all out, dressed in their best. The upper classes, who come to enjoy the fine evening and the general cheerfulness, are seated on chairs around the doors of friendly houses. There is no boisterous conviviality, but a quiet enjoyment seems to be felt everywhere, and a gentle courtesy rules amongst all classes and colours. I have seen a splendidly-dressed colonel, from the President's palace, walk up to a mulatto, and politely ask his permission to take a light from his cigar. When the service is over, the church bells are set ringing, a shower of rockets mounts upwards, the bands strike up, and parties of coloured people in the booths begin their dances. About ten o'clock the Brazilian national air is played, and all disperse quietly and soberly to their homes.

At the festival of Corpus Christi there was a very pretty arrangement. The large green square of the Trinitade was lighted up all round with bonfires. On one side a fine pavilion was erected, the upright posts consisting of real fan-leaved palm trees—the *Mauritia flexuosa*, which had been brought from the forest, stems and heads entire, and fixed in the ground. The booth was illuminated with coloured lamps, and lined with red and white cloth. In it were seated the ladies, not all of pure Caucasian blood, but presenting a fine sample of Pará beauty and fashion.

The grandest of all these festivals is that held in

honour of Our Lady of Nazareth: it is, I believe, peculiar to Pará. As I have said before, it falls in the second quarter of the moon, about the middle of the dry season—that is, in October or November—and lasts, like the others, nine days. On the first day a very extensive procession takes place, starting from the Cathedral, whither the image of the saint had been conveyed some days previous, and terminating at the chapel or hermitage, as it is called, of the saint at Nazareth, a distance of more than two miles. The whole population turns out on this occasion. All the soldiers, both of the line and the National Guard, take part in it, each battalion accompanied by its band of music. The civil authorities, also, with the President at their head, and the principal citizens, including many of the foreign residents, join in the line. The boat of the shipwrecked Portuguese vessel is carried after the saint on the shoulders of officers or men of the Brazilian navy, and along with it are borne the other symbols of the miracles which Our Lady is supposed to have performed. The procession starts soon after the sun's heat begins to moderate—that is, about half-past four o'clock in the afternoon. When the image is deposited in the chapel the festival is considered to be inaugurated, and the village every evening becomes the resort of the pleasure-loving population, the holiday portion of the programme being preceded, of course, by a religious service in the chapel. The aspect of the place is then that of a fair, without the humour and fun, but, at the same time, without the noise and coarseness of similar holidays in England. Large rooms are set apart for

panoramic and other exhibitions, to which the public is admitted gratis. In the course of each evening, large displays of fireworks take place, all arranged according to a published programme of the festival.

The various ceremonies which take place during Lent seemed to me the most impressive, and some of them were exceedingly well-arranged. The people, both performers and spectators, conduct themselves with more gravity on these occasions, and there is no holiday-making. Performances, representing the last events in the life of Christ, are enacted in the churches or streets, in such a way as to remind one of the old miracle plays or mysteries. A few days before Good Friday, a torch-light procession takes place by night from one church to another, in which is carried a large wooden image of Christ bent under the weight of the cross. The chief members of the Government assist, and the whole slowly moves to the sounds of muffled drums. A double procession is managed a few days afterwards. The image of St. Mary is carried in one direction, and that of the Saviour in another. Both meet in the middle of one of the most beautiful of the churches, which is previously filled to excess with the multitudes anxious to witness the affecting meeting of mother and son a few days before the crucifixion. The two images are brought face to face in the middle of the church, the crowd falls prostrate, and a lachrymose sermon is delivered from the pulpit. The whole thing, as well as many other spectacles arranged during the few succeeding days, is highly theatrical, and well calculated to excite the religious emotions of the people, although, perhaps, only

temporarily. On Good Friday the bells do not ring, all musical sounds are interdicted, and the hours, night and day, are announced by the dismal noise of wooden clappers, wielded by negroes stationed near the different churches. A sermon is delivered in each church. In the middle of it, a scroll is suddenly unfolded from the pulpit, on which is an exaggerated picture of the bleeding Christ. This act is accompanied by loud groans, which come from stout-lunged individuals concealed in the vestry and engaged for the purpose. The priest becomes greatly excited, and actually sheds tears. On one of these occasions I squeezed myself into the crowd, and watched the effect of the spectacle on the audience. Old Portuguese men and Brazilian women seemed very much affected—sobbing, beating their breasts, and telling their beads. The negroes behaved themselves with great propriety, but seemed moved more particularly by the pomp, the gilding, the dresses, and the general display. Young Brazilians laughed. Several aborigines were there, coolly looking on. One old Indian, who was standing near me, said, in a derisive manner, when the sermon was over, “It’s all very good; better it could not be” (*Está todo bom; melhor naõ pude ser*).

The negroes of Pará are very devout. They have built, by slow degrees, a fine church, as I was told, by their own unaided exertions. It is called *Nossa Senhora do Rosario*, or Our Lady of the Rosary. During the first weeks of our residence at Pará, I frequently observed a line of negroes and negresses, late at night, marching along the streets, singing a chorus. Each carried on his or her head a quantity of building

materials—stones, bricks, mortar, or planks. I found they were chiefly slaves, who, after their hard day's work, were contributing a little towards the construction of their church. The materials had all been purchased by their own savings. The interior was finished about a year afterwards, and is decorated, I thought, quite as superbly as the other churches which were constructed, with far larger means, by the old religious orders more than a century ago. Annually, the negroes celebrate the festival of Nossa Senhora do Rosario, and generally make it a complete success.

I will now add a few more notes which I have accumulated on the subject of the natural history, and then we shall have done, for the present, with Pará and its neighbourhood.

I have already mentioned that monkeys were rare in the immediate vicinity of Pará. I met with three species only in the forest near the city; they are shy animals, and avoid the neighbourhood of towns, where they are subject to much persecution by the inhabitants, who kill them for food. The only kind which I saw frequently was the little *Midas ursulus*, one of the Marmosets, a family peculiar to tropical America, and differing in many essential points of structure and habits from all other apes. They are small in size, and more like squirrels than true monkeys in their manner of climbing. The nails, except those of the hind thumbs, are long and claw-shaped like those of squirrels, and the thumbs of the fore extremities, or hands, are

not opposable to the other fingers. I do not mean to convey that they have a near relationship to squirrels, which belong to the Rodents, an inferior order of mammals; their resemblance to those animals is merely a superficial one. They have two molar teeth less in each jaw than the Cebidæ, the other family of American monkeys; they agree with them, however, in the sideway position of the nostrils, a character which distinguishes both from all the monkeys of the old world. The body is long and slender, clothed with soft hairs, and the tail, which is nearly twice the length of the trunk, is not prehensile. The hind limbs are much larger in volume than the anterior pair. The Midas ursulus is never seen in large flocks; three or four is the greatest number observed together. It seems to be less afraid of the neighbourhood of man than any other monkey. I sometimes saw it in the woods which border the suburban streets, and once I espied two individuals in a thicket behind the English consul's house at Nazareth. Its mode of progression along the main boughs of the lofty trees is like that of squirrels; it does not ascend to the slender branches, or take those wonderful flying leaps which the Cebidæ do, whose prehensile tails and flexible hands fit them for such headlong travelling. It confines itself to the larger boughs and trunks of trees, the long nails being of great assistance to the creature, enabling it to cling securely to the bark; and it is often seen passing rapidly round the perpendicular cylindrical trunks. It is a quick, restless, timid little creature, and has a great share of curiosity, for when a person passes by under the trees along which a flock is running, they

always stop for a few moments to have a stare at the intruder. In Pará, *Midas ursulus* is often seen in a tame state in the houses of the inhabitants. When full grown it is about nine inches long, independently of the tail, which measures fifteen inches. The fur is thick, and black in colour, with the exception of a reddish-brown streak down the middle of the back. When first taken, or when kept tied up, it is very timid and irritable. It will not allow itself to be approached, but keeps retreating backwards when any one attempts to coax it. It is always in a querulous humour, uttering a twittering, complaining noise ; its dark, watchful eyes, expressive of distrust, observant of every movement which takes place near it. When treated kindly, however, as it generally is in the houses of the natives, it becomes very tame and familiar. I once saw one as playful as a kitten, running about the house after the negro children, who fondled it to their heart's content. It acted somewhat differently towards strangers, and seemed not to like them to sit in the hammock which was slung in the room, leaping up, trying to bite, and otherwise annoying them. It is generally fed on sweet fruits, such as the banana ; but it is also fond of insects, especially soft-bodied spiders and grasshoppers, which it will snap up with eagerness when within reach. The expression of countenance in these small monkeys is intelligent and pleasing. This is partly owing to the open facial angle, which is given as one of 60° ; but the quick movements of the head, and the way they have of inclining it to one side when their curiosity is excited, contribute very much to give them a knowing expres-

sion. Anatomists who have dissected species of Midas tell us that the brain is of a very low type, as far as the absence of convolutions goes, the surface being as smooth as that of a squirrel's. I should conclude, at once, that this character is an unsafe guide in judging on the mental qualities of these animals ; in mobility of expression of countenance, intelligence, and general manners, these small monkeys resemble the higher apes far more than they do any Rodent animal with which I am acquainted.

On the Upper Amazons I once saw a tame individual of the Midas leoninus, a species first described by Humboldt, which was still more playful and intelligent than the one just described. This rare and beautiful little monkey is only seven inches in length, exclusive of the tail. It is named leoninus on account of the long brown mane which depends from the neck, and which gives it very much the appearance of a diminutive lion. In the house where it was kept, it was familiar with every one ; its greatest pleasure seemed to be to climb about the bodies of different persons who entered. The first time I went in, it ran across the room straightway to the chair on which I had sat down, and climbed up to my shoulder ; arrived there, it turned round and looked into my face, showing its little teeth, and chattering, as though it would say, "Well, and how do *you* do?" It showed more affection towards its master than towards strangers, and would climb up to his head a dozen times in the course of an hour, making a great show every time of searching there for certain animalcula. Isidore Geoffroy St. Hilaire relates

of a species of this genus, that it distinguished between different objects depicted on an engraving. M. Audouin showed it the portraits of a cat and a wasp; at these it became much terrified: whereas, at the sight of a figure of a grasshopper or beetle, it precipitated itself on the picture, as if to seize the objects there represented.

Although monkeys are now rare in a wild state near Pará, a great number may be seen semi-domesticated in the city. The Brazilians are fond of pet animals. Monkeys, however, have not been known to breed in captivity in this country. I counted, in a short time, thirteen different species, whilst walking about the Pará streets, either at the doors or windows of houses, or in the native canoes. Two of them I did not meet with afterwards in any other part of the country. One of these was the well-known *Hapale Jacchus*, a little creature resembling a kitten, banded with black and gray all over the body and tail, and having a fringe of long white hairs surrounding the ears. It was seated on the shoulder of a young mulatto girl, as she was walking along the street, and I was told had been captured in the island of Marajo. The other was a species of *Cebus*, with a remarkably large head. It had ruddy-brown fur, paler on the face, but presenting a blackish tuft on the top of the forehead.

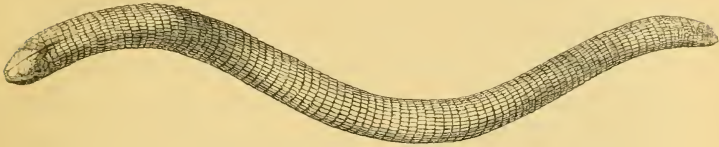
In the wet season serpents are common in the neighbourhood of Pará. One morning, in April, 1849, after a night of deluging rain, the lamplighter, on his rounds to extinguish the lamps, knocked me up to show me a boa-constrictor he had just killed in the Rua St. Antonio,

not far from my door. He had cut it nearly in two with a large knife, as it was making its way down the sandy street. Sometimes the native hunters capture boa-constrictors alive in the forest near the city. We bought one which had been taken in this way, and kept it for some time in a large box under our verandah. This is not, however, the largest or most formidable serpent found in the Amazons region. It is far inferior, in these respects, to the hideous Sucurujú, or Water Boa (*Eunectes murinus*), which sometimes attacks man ; but of this I shall have to give an account in a subsequent chapter.

It frequently happened, in passing through the thickets, that a snake would fall from the boughs close to me. Once I got for a few moments completely entangled in the folds of one, a wonderfully slender kind, being nearly six feet in length, and not more than half an inch in diameter at its broadest part. It was a species of *Dryophis*. The majority of the snakes seen were innocuous. One day, however, I trod on the tail of a young serpent belonging to a very poisonous kind, the Jararaca (*Craspedocephalus atrox*). It turned round and bit my trousers ; and a young Indian lad, who was behind me, dexterously cut it through with his knife before it had time to free itself. In some seasons snakes are very abundant, and it often struck me as strange that accidents did not occur more frequently than was the case.

Amongst the most curious snakes found here were the *Amphisbænæ*, a genus allied to the slow-worm of Europe. Several species occur at Pará. Those brought

to me were generally not much more than a foot in length. They are of cylindrical shape, having, properly speaking, no neck, and the blunt tail which is only about an inch in length, is of the same shape as the head.



Amphisbæna.

This peculiar form added to their habit of wriggling backwards as well as forwards, has given rise to the fable that they have two heads, one at each extremity. They are extremely sluggish in their motions, and are clothed with scales that have the form of small imbedded plates arranged in rings round the body. The eye is so small as to be scarcely perceptible. They live habitually in the subterranean chambers of the Saüba ant; only coming out of their abodes occasionally in the night time. The natives call the Amphisbæna the "Mai das Saübas," or Mother of the Saübas, and believe it to be poisonous, although it is perfectly harmless. It is one of the many curious animals which have become the subject of mythical stories with the natives. They say the ants treat it with great affection, and that, if the snake be taken away from a nest, the Saübas will forsake the spot. I once took one quite whole out of the body of a young Jararaca, the poisonous species already alluded to, whose body was so distended with its contents that the skin was stretched out to a film over the contained Amphis-

bæna. I was, unfortunately, not able to ascertain the exact relation which subsists between these curious snakes and the Saüba ants. I believe, however, they feed upon the Saübas, for I once found remains of ants in the stomach of one of them. Their motions are quite peculiar; the undilatable jaws, small eyes and curious plated integument also distinguish them from other snakes. These properties have evidently some relation to their residence in the subterranean abodes of ants. It is now well ascertained by naturalists, that some of the most anomalous forms amongst Coleopterous insects are those which live solely in the nests of ants, and it is curious that an abnormal form of snakes should also be found in the society of these insects.

The neighbourhood of Pará is rich in insects. I do not speak of the quantity of individuals, which is probably less than one meets with, excepting ants and Termites, in summer days in temperate latitudes; but the variety, or in other words, the number of species is very great. It will convey some idea of the diversity of butterflies when I mention that about 700 species of that tribe are found within an hour's walk of the town; whilst the total number found in the British Islands does not exceed 66, and the whole of Europe supports only 390. Some of the most showy species, such as the swallow-tailed kinds, *Papilio Polycaon*, *Thoas*, *Torquatus*, and others, are seen flying about the streets and gardens; sometimes they come through the open windows, attracted by flowers in the apartments. Those species of *Papilio* which are most characteristic of the country, so conspicuous in their velvety-black, green, and rose-coloured

hues, which Linnæus, in pursuance of his elegant system of nomenclature,—naming the different kinds after the heroes of Greek mythology,—called Trojans, never leave the shades of the forest. The splendid metallic blue Morphos, some of which measure seven inches in expanse, are generally confined to the shady alleys of the forest. They sometimes come forth into the broad sunlight. When we first went to look at our new residence in Nazareth, a Morpho Menelaus, one of the most beautiful kinds, was seen flapping its huge wings like a bird along the verandah. This species, however, although much admired, looks dull in colour by the side of its congener, the Morpho Rhetenor, whose wings, on the upper face, are of quite a dazzling lustre. Rhetenor usually prefers the broad sunny roads in the forest, and is an almost unattainable prize, on account of its lofty flight; for it very rarely descends nearer the ground than about twenty feet. When it comes sailing along, it occasionally flaps its wings, and then the blue surface flashes in the sunlight, so that it is visible a quarter of a mile off. There is another species of this genus, of a satiny-white hue, the Morpho Eugenia; this is equally difficult to obtain; the male only has the satiny lustre, the female being of a pale-lavender colour. It is in the height of the dry season that the greatest number and variety of butterflies are found in the woods; especially when a shower falls at intervals of a few days. An infinite number of curious and rare species may then be taken, most diversified in habits, mode of flight, colours, and markings: some yellow, others bright red, green, purple, and blue, and

many bordered or spangled with metallic lines and spots of a silvery or golden lustre. Some have wings transparent as glass; one of these clear wings is especially beautiful, namely, the *Hetaira Esmeralda*; it has one spot only of opaque colouring on its wings, which is of a violet and rose hue; this is the only part visible when the insect is flying low over dead leaves in the gloomy shades where alone it is found, and it then looks like a wandering petal of a flower.

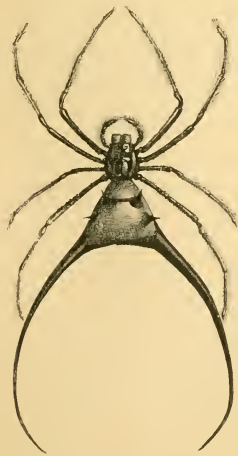
Moths also are of great variety at Pará; but most of them are diurnal in their time of flight and keep company with the butterflies. I never succeeded in finding many moths at night. In situations such as gardens and wood sides, where so many are to be seen in England, scarcely a single individual is to be found. I attribute this scarcity of nocturnal moths to the multitude of night-flying insectivorous animals, chiefly bats and goat-suckers, which perpetually haunt the places where they would be found. On the open commons a moth is seen flying about in broad daylight which is scarcely distinguishable from the common English *Plusia Gamma*. Several times I found the *Erebus strix* expanded over the trunks of trees, to the bark of which it is assimilated in colour. This is one of the largest moths known, some specimens measuring nearly a foot in expanse. Along the narrow paths in the forests, an immense number of clear-winged moths are found in the day-time; mostly coloured like wasps, bees, ichneumon flies, and other Hymenopterous insects. Some species of the same family have opaque wings, and

wear the livery of different species of beetles ; these hold their wings in repose, in a closed position over their bodies, so that they look like the wing-cases of the beetles they deceptively imitate.

The Libellulidæ, or Dragonflies, are almost equally conspicuous with the butterflies in open, sunny places. More than a hundred different kinds are found near Pará ; the numerous ditches and pools being, doubtless, favourable to their increase, for the adolescent states of the dragonfly are passed in an element different from that in which the adult exists. The species are not all confined to open, sunny places. Some are adapted to live only in the darkest shades of the forest, and these are, perhaps, the most beautiful, being brightly coloured and more delicate in structure than the others. One of them, the *Chalcopteryx rutilans*, is seen only near the shady rivulets which cross the solitary Magoary road. Its fore-wings are quite transparent, whilst the hind-wings have a dark ground-colour, which glitters with a violet and golden refulgence. All the kinds of dragonflies wage an unceasing war with day-flying winged insects, and I am inclined to think that they commit as much destruction in this way as birds do. I have often observed them chasing butterflies. They are not always successful in capturing them, for some of their intended victims, by a dodging manner of flight, contrive to escape their clutches. When a dragonfly seizes its prey, he retires to a tree, and there, seated on a branch, devours the body at his leisure. The different species consume great quantities of small flies, especially during the brief twilight, when large flocks of

the hawk-like creatures congregate to chase them over the swamps and about the tree-tops.

Bees and wasps are not especially numerous near Pará, and I will reserve an account of their habits for a future chapter. Many species of *Mygale*, those monstrous hairy spiders, half a foot in expanse, which attract the attention so much in museums, are found in sandy places at Nazareth. The different kinds have the most diversified habits. Some construct, amongst the tiles or thatch of houses, dens of closely-woven web, which, in texture, very much resembles fine muslin; these are often seen crawling over the walls of apartments. Others build similar nests in trees, and are known to attack birds. One very robust fellow, the *Mygale Blondii*, burrows into the earth, forming a broad, slanting



Acrosoma arcuatum.

gallery, about two feet long, the sides of which he lines beautifully with silk. He is nocturnal in his habits. Just before sunset he may be seen keeping watch within the mouth of his tunnel, disappearing suddenly when he hears a heavy foot-tread near his hiding-place. The number of spiders ornamented with showy colours was somewhat remarkable. Some double themselves up at the base of leaf-stalks, so as to resemble flower-buds, and thus deceive the

insects on which they prey. The most extraordinary-looking spider was a species of *Acrosoma*, which had two

curved bronze-coloured spines, an inch and a half in length, proceeding from the tip of its abdomen. It spins a large web, the monstrous appendages being apparently no impediment to it in its work; but what their use can be I am unable to divine.

Coleoptera, or beetles, at first seemed to be very scarce. This apparent scarcity has been noticed in other equatorial countries and arises, probably, from the great heat of the sun not permitting them to exist in exposed situations, where they form such conspicuous objects in Europe. Many hundred species of the different families can be found, when they are patiently searched for in the shady places to which they are confined. It is vain to look for the *Geodephaga*, or carnivorous beetles, under stones, or anywhere, indeed, in open, sunny places. The terrestrial forms of this interesting family, which abound in England and temperate countries generally, are scarce in the neighbourhood of Pará, in fact, I met with only four or five species; on the other hand the purely arboreal kinds were rather numerous. The contrary of this happens in northern latitudes, where the great majority of the species and genera are exclusively terrestrial. The arboreal forms are distinguished by the structure of the feet, which have broad spongy soles and toothed claws enabling them to climb over and cling to branches and leaves. The remarkable scarcity of ground beetles is, doubtless, attributable to the number of ants and Termites which people every inch of surface in all shady places, and which would most likely destroy the larvæ of Coleoptera. These active creatures have the same functions

as Coleoptera, and thus render their existence unnecessary. The large proportion of climbing forms of carnivorous beetles is an interesting fact, because it affords another instance of the arboreal character which animal forms tend to assume in equinoctial America, a circumstance which points to the slow adaptation of the Fauna to a forest-clad country throughout an immense lapse of geological time.

The large collections which I made of the animal productions of Pará, especially of insects, enabled me to arrive at some conclusions regarding the relations of the Fauna of the south side of the Amazons Delta to those of neighbouring regions. It is generally allowed that Guiana and Brazil, to the north and south of the Pará district, form two distinct provinces, as regards their animal and vegetable inhabitants. By this it is meant that the two regions have a very large number of forms peculiar to themselves, and which are supposed not to have been derived from other quarters during modern geological times. Each may be considered as a centre of distribution in the latest process of dissemination of species over the surface of tropical America. Pará lies midway between the two centres, each of which has a nucleus of elevated table-land, whilst the intermediate river-valley forms a wide extent of low-lying country. It is, therefore, interesting to ascertain from which the latter received its population, or whether it contains so large a number of endemic species as would warrant the conclusion that it is itself an independent province. To assist in deciding such questions

as these, we must compare closely the species found in the district with those of the other contiguous regions, and endeavour to ascertain whether they are identical, or only slightly modified, or whether they are highly peculiar.

Von Martius, when he visited this part of Brazil forty years ago, coming from the south, was much struck with the dissimilarity of the animal and vegetable productions to those of other parts of Brazil. In fact, the Fauna of Pará, and the lower part of the Amazons, has no close relationship with that of Brazil proper; but it has a very great affinity with that of the coast region of Guiana, from Cayenne to Demerara. If we may judge from the results afforded by the study of certain families of insects, no peculiar Brazilian forms are found in the Pará district; whilst more than one-half the total number are essentially Guiana species, being found nowhere else but in Guiana and Amazonia. Many of them, however, are modified from the Guiana type, and about one-seventh seem to be restricted to Pará. These endemic species are not highly peculiar, and they may be yet found over a great part of Northern Brazil when the country is better explored. They do not warrant us in concluding that the district forms an independent province, although they show that its Fauna is not wholly derivative, and that the land is probably not entirely a new formation. From all these facts, I think we must conclude that the Pará district belongs to the Guiana province, and that, if it is newer land than Guiana, it must have received the great bulk of its animal population from that region. I am informed by Dr. Selater

that similar results are derivable from the comparison of the birds of these countries.

The interesting problem, how has the Amazons Delta been formed? receives light through this comparison of Faunas. Although the portion of Guiana in question is considerably nearer Pará than are the middle and southern parts of Brazil, yet it is separated from it by two wide expanses of water, which must serve as a barrier to migration in many cases. On the contrary, the land of Brazil proper is quite continuous from Rio Janeiro and Bahia up to Pará; and there are no signs of a barrier ever having existed between these places within recent geological epochs. Some of the species common to Pará and Guiana are not found higher up the river where it is narrower, so they could not have passed round in that direction. The question here arises, has the mouth of the Amazons always existed as a barrier to migration since the present species of the contiguous regions came into existence? It is difficult to decide the question; but the existing evidence goes far to show that it has not. If the mouth of the great river, which, for a long distance, is 170 miles broad, had been originally a wide gulf, and had become gradually filled up by islands formed of sediment brought down by the stream, we should have to decide that an effectual barrier had indeed existed. But the delta of the Amazons is not an alluvial formation like those of the Mississippi and the Nile. The islands in its midst and the margins of both shores have a foundation of rocks, which lie either bare or very near the surface of the soil. This is especially the case towards the sea-coast. In ascending the

river southward and south-westward, a great extent of country is traversed which seems to have been made up wholly of river deposit, and here the land lies somewhat lower than it does on the sea-coast. The rocky and sandy country of Marajo and other islands of the delta towards the sea, is so similar in its physical configuration to the opposite mainland of Guiana that Von Martius concluded the whole might have been formerly connected, and that the Amazons had forced a way to the Atlantic through what was, perhaps, a close series of islands, or a continuous line of low country.

CHAPTER IV.

THE TOCANTINS AND CAMETÁ.

Preparations for the journey—The bay of Goajará—Grove of fan-leaved palms—The lower Tocantins—Sketch of the river—Vista alegre—Baiaõ—Rapids—Boat journey to the Guariba falls—Native life on the Tocantins—Second journey to Cametá.

August 26th, 1848.—Mr. Wallace and I started to-day on the excursion which I have already mentioned as having been planned with Mr. Leavens, up the river Tocantins, whose mouth lies about forty-five miles in a straight line, but eighty miles following the bends of the river channels, to the south-west of Pará. This river, as before stated, has a course of 1600 miles, and stands third in rank amongst the streams which form the Amazons system. The preparations for the journey took a great deal of time and trouble. We had first to hire a proper vessel, a two-masted *vigilinga* twenty-seven feet long, with a flat prow and great breadth of beam and fitted to live in heavy seas; for, although our voyage was only a river trip, there were vast sea-like expanses of water to traverse. It was not decked over, but had two arched awnings formed of strong wicker-work, and thatched with palm leaves. We had then to store it with provisions for three months, the time

we at first intended to be away ; procure the necessary passports ; and, lastly, engage a crew. Mr. Leavens, having had much experience in the country, managed all these matters. He brought two Indians from the rice-mills, and these induced another to enrol himself. We, on our parts, took our cook Isidoro, and a young Indian lad, named Antonio, who had attached himself to us in the course of our residence at Nazareth. Our principal man was Alexandro, one of Mr. Leavens's Indians. He was an intelligent and well-disposed young Tapuyo, an expert sailor, and an indefatigable hunter. To his fidelity we were indebted for being enabled to carry out any of the objects of our voyage. Being a native of a district near the capital, Alexandro was a civilized Tapuyo, a citizen as free as his white neighbours. He spoke only Portuguese. He was a spare-built man, rather under the middle height, with fine regular features, and, what was unusual in Indians, the upper lip decorated with a moustache. Three years afterwards I saw him at Pará in the uniform of the National Guard, and he called on me often to talk about old times. I esteemed him as a quiet, sensible, manly young fellow.

We set sail in the evening, after waiting several hours in vain for one of our crew. It was soon dark, the wind blew stiffly, and the tide rushed along with great rapidity, carrying us swiftly past the crowd of vessels which were anchored in the port. The canoe rolled a good deal. After we had made five or six miles of way the tide turned, and we were obliged to cast anchor. Not long after, we lay ourselves down

all three together on the mat, which was spread over the floor of our cabin, and soon fell asleep.

On awaking at sunrise the next morning, we found ourselves gliding upwards with the tide, along the Bahia or Bay, as it is called, of Goajará. This is a broad channel lying between the mainland and a line of islands which extends some distance beyond the city. Into it three large rivers discharge their waters, namely, the Guamá, the Acará, and the Mojú; so that it forms a kind of sub-estuary within the grand estuary of Pará. It is nearly four miles broad. The left bank, along which we were now sailing, was beautiful in the extreme; not an inch of soil was to be seen; the water frontage presented a compact wall of rich and varied forest, resting on the surface of the stream. It seemed to form a finished border to the water scene, where the dome-like, rounded shapes of exogenous trees which constituted the mass formed the groundwork, and the endless diversity of broad-leaved *Heliconiæ* and Palms—each kind differing in stem, crown, and fronds—the rich embroidery. The morning was calm and cloudless; and the slanting beams of the early sun, striking full on the front of the forest, lighted up the whole most gloriously. The only sound of life which reached us was the call of the *Serracúra* (*Galinula Cayennensis*), a kind of wild-fowl; all else was so still that the voices of boatmen could be plainly heard from canoes passing a mile or two distant from us. The sun soon gains great power on the water, but with it the sea-breeze increases in strength, moderating the heat, which would otherwise be almost insup-

portable. We reached the end of the Gojará about midday, and then entered the narrower channel of the Mojú. Up this we travelled, partly rowing and partly sailing between the same unbroken walls of forest, until the morning of the 28th.

August 29th.—The Mojú, a stream little inferior to the Thames in size, is connected about 20 miles from its mouth by means of a short artificial canal with a small stream, the Igarapé-mirim, which flows the opposite way into the water-system of the Tocantins. Small vessels like ours take this route in preference to the stormy passage by way of the main river, although the distance is considerably greater. We passed through the canal yesterday, and to-day have been threading our way through a labyrinth of narrow channels; their banks all clothed with the same magnificent forest; but agreeably varied by houses of planters and settlers. We passed many quite large establishments, besides one pretty little village, called Santa Anna. All these channels are washed through by the tides,—the ebb, contrary to what takes place in the short canal, setting towards the Tocantins. The water is almost tepid (77° Fahr.), and the rank vegetation all around seems reeking with moisture. The country however, as we were told, is perfectly healthy. Some of the houses are built on wooden piles driven into the mud of the swamp.

In the afternoon we reached the end of the last channel, called the Anapú, which runs for several miles between two unbroken lines of fan-leaved palms, forming with their straight stems colossal palisades.

On rounding a point of land we came in full view of the Tocantins. The event was announced by one of our Indians, who was on the look-out at the prow, shouting, "La está o Paraná-uassú!" "Behold, the great river!" It was a grand sight—a broad expanse of dark waters dancing merrily to the breeze; the opposite shore, a narrow blue line, miles away.

We went ashore on an island covered with palm-trees, to make a fire and boil our kettle for tea. I wandered a short way inland, and was astounded at the prospect. The land lay below the upper level of the daily tides, so that there was no underwood, and the ground was bare. The trees were almost all of one species of Palm, the gigantic fan-leaved *Mauritia flexuosa*; on the borders only was there a small number of a second kind, the equally remarkable *Ubussú* palm, *Manicaria saccifera*. The *Ubussú* has erect, uncut leaves, twenty-five feet long, and six feet wide, all arranged round the top of a four-feet high stem, so as to form a figure like that of a colossal shuttlecock. The fan-leaved palms, which clothed nearly the entire islet, had huge cylindrical smooth stems, three feet in diameter, and about a hundred feet high. The crowns were formed of enormous clusters of fan-shaped leaves, the stalks alone of which measured seven to ten feet in length. Nothing in the vegetable world could be more imposing than this grove of palms. There was no underwood to obstruct the view of the long perspective of towering columns. The crowns, which were densely packed together at an immense height overhead, shut out the rays of the

SUN ; and the gloomy solitude beneath, through which the sound of our voices seemed to reverberate, could be compared to nothing so well as a solemn temple. The fruits of the two palms were scattered over the ground ; those of the *Ubussú* adhere together by twos and threes, and have a rough, brown-coloured shell ; the fruit of the *Mauritia*, on the contrary, is of a bright red hue, and the skin is impressed with deep crossing lines, which give it a resemblance to a quilted cricket-ball.

About midnight, the tide being favourable and the breeze strong, we crossed the river, taking it in a slanting direction, a distance of sixteen miles, and arrived at eight o'clock the following morning at Cametá. This is a town of some importance, pleasantly situated on the somewhat high terra firma of the left bank of the Tocantins. I will defer giving an account of the place till the end of this narrative of our Tocantins voyage. We lost here another of our men, who got drinking with some old companions ashore, and were obliged to start on the difficult journey up the river with two hands only, and they in a very dissatisfied humour with the prospect.

The river view from Cametá is magnificent. The town is situated, as already mentioned, on a high bank, which forms quite a considerable elevation for this flat country, and the broad expanse of dark-green waters is studded with low, palm-clad islands, the prospect down river, however, being clear, or bounded only by a sea-like horizon of water and sky. The shores are washed by the breeze-tossed waters into little bays and creeks, fringed with sandy beaches. The Tocantins has

been likened, by Prince Adalbert of Prussia, who crossed its mouth in 1846, to the Ganges. It is upwards of ten miles in breadth at its mouth ; opposite Cameté it is five miles broad. Mr. Burchell, the well-known English traveller, descended the river from the mining provinces of interior Brazil some years before our visit. Unfortunately, the utility of this fine stream is impaired by the numerous obstructions to its navigation in the shape of cataracts and rapids, which commence, in ascending, at about 120 miles above Cameté, as will be seen in the sequel.

Aug. 30th.—Arrived, in company with Senhor Laroque, an intelligent Portuguese merchant, at Vista Alegre, fifteen miles above Cameté. This was the residence of Senhor Antonio Ferreira Gomez, and was a fair sample of a Brazilian planter's establishment in this part of the country. The buildings covered a wide space, the dwelling-house being separated from the place of business, and as both were built on low, flooded ground, the communication between the two was by means of a long wooden bridge. From the office and visitors' apartments a wooden pier extended into the river. The whole was raised on piles above high-water mark. There was a rude mill for grinding sugar-cane, worked by bullocks, but *cashaca*, or rum, was the only article manufactured from the juice. Behind the buildings was a small piece of ground cleared from the forest, and planted with fruit-trees, orange, lemon, genipapa, goyava, and others ; and beyond this, a broad path through a neglected plantation of coffee and cacao, led to several large sheds, where the *farinha*, or mandiocca meal, was manufactured.

The plantations of mandioca are always scattered about in the forest, some of them being on islands in the middle of the river. Land being plentiful, and the plough, as well as, indeed, nearly all other agricultural implements, unknown, the same ground is not planted three years together; but a new piece of forest is cleared every alternate year, and the old clearing suffered to relapse into jungle.

We stayed here two days, sleeping ashore in the apartment devoted to strangers. As usual in Brazilian houses of the middle class, we were not introduced to the female members of the family, and, indeed, saw nothing of them except at a distance. In the forest and thickets about the place we were tolerably successful in collecting, finding a number of birds and insects which do not occur at Pará. I saw here, for the first time, the sky-blue Chatterer (*Ampelis cotinga*). It was on the topmost bough of a very lofty tree, and completely out of the reach of an ordinary fowling-piece. The beautiful light-blue colour of its plumage was plainly discernible at that distance. It is a dull, quiet bird. A much commoner species was the Cigana or Gipsy (*Opisthocomus cristatus*), a bird belonging to the same order, Gallinacea, as our domestic fowl. It is about the size of a pheasant; the plumage is dark brown, varied with reddish, and the head is adorned with a crest of long feathers. It is a remarkable bird in many respects. The hind toe is not placed high above the level of the other toes, as it is in the fowl-order generally, but lies on the same plane with them; the shape of the foot becomes thus suited to the purely arboreal habits of the bird, en-

abling it to grasp firmly the branches of trees. This is a distinguishing character of all the birds in equinoctial America which represent the fowl and pheasant tribes of the old world, and affords another proof of the adaptation of the Fauna to a forest region. The Cigana lives in considerable flocks on the lower trees and bushes bordering the streams and lagoons, and feeds on various wild fruits, especially the sour Goyava (*Psidium* sp.). The natives say it devours the fruit of arborescent Arums (*Caladium arborescens*), which grow in crowded masses around the swampy banks of lagoons. Its voice is a harsh, grating hiss; it makes the noise when alarmed, all the individuals sibilating as they fly heavily away from tree to tree, when disturbed by passing canoes. It is polygamous, like other members of the same order. It is never, however, by any chance, seen on the ground, and is nowhere domesticated. The flesh has an unpleasant odour of musk combined with wet hides—a smell called by the Brazilians *catinga*; it is, therefore, uneatable. If it be as unpalatable to carnivorous animals as it is to man, the immunity from persecution which it would thereby enjoy would account for its existing in such great numbers throughout the country.

A great number of the insects which we found here were different from those of Pará. Species characteristic of the one locality were replaced by allied species in the other, a fact which would tend to the conclusion that the Tocantins serves, to some extent, as a barrier to migration. This was especially the case with the *Papilios* of the group which wear a livery of black,

green, and red. *P. Echelus* of this group, which is so common at Pará, was here absent, and its place supplied by the closely related *P. Æneides*. Both have the same habits, and seem to fill similar spheres in the natural economy of the two districts. Another handsome butterfly taken here was a member of the *Erycinidæ* family, the *Alesa Prema*, which is of a dazzling emerald-green colour chequered with black. I caught here a young Iguana; Iguanas, however, are extremely common everywhere throughout the country. They are especially numerous in the neighbourhood of villages, where they climb about fruit-trees overrun with creepers. The eggs, which are oblong, and about an inch and a half in length, are laid in hollow trees, and are very pleasant eating taken raw and mixed with farinha. The colour of the skin in the Iguana changes like that of the chameleon; in fact, it is called chameleon by the Portuguese. It grows to a length of five feet, and becomes enormously fat. This lizard is interesting to English readers on account of its relationship to the colossal fossil reptile of the Wealden, the *Iguanodon*. The Iguana is one of the stupidest animals I ever met with. The one I caught dropped helplessly from a tree just ahead of me; it turned round for a moment to have an idiotic stare at the intruder, and then set off running along the pathway. I ran after it, and it then stopped as a timid dog would do, crouching down, and permitting me to seize it by the neck and carry it off.

We lost here another of our crew; and thus, at the commencement of our voyage, had before us the prospect

of being forced to return, from sheer want of hands to manage the canoe. Senhor Gomez, to whom we had brought letters of introduction from Senhor João Augusto Correia, a Brazilian gentleman of high standing at Pará, tried what he could do to induce the canoe-men of his neighbourhood to engage with us, but it was a vain endeavour. The people of these parts seemed to be above working for wages. They are naturally indolent, and besides, have all some little business or plantation of their own, which gives them a livelihood with independence. It is difficult to obtain hands under any circumstances, but it was particularly so in our case, from being foreigners, and suspected, as was natural amongst ignorant people, of being strange in our habits. At length, our host lent us two of his slaves to help us on another stage, namely, to the village of Baiaõ, where we had great hopes of having this, our urgent want, supplied by the military commandant of the district.

Sept. 2nd.—The distance from Vista Alegre to Baiaõ is about twenty-five miles. We had but little wind, and our men were therefore obliged to row the greater part of the way. The oars used in such canoes as ours are made by tying a stout paddle to the end of a long pole by means of woody lianas. The men take their stand on a raised deck, formed by a few rough planks placed over the arched covering in the fore part of the vessel, and pull with their back to the stern. We started at 6 a.m., and about sunset reached a point where the west channel of the river, along which we had been travelling since we left Cameté, joined a broader middle one, and

formed with it a great expanse of water. The islands here seem to form two pretty regular lines, dividing the great river into three channels. As we progressed slowly, we took the montaria, and went ashore, from time to time, to the houses, which were numerous on the river banks as well as on the larger islands. In low situations they had a very unfinished appearance, being mere frameworks raised high on wooden piles, and thatched with the leaves of the Ubussú palm. In their construction another palm-tree is made much use of, viz., the Assai (*Euterpe oleracea*). The outer part of the stem of this species is hard and tough as horn; it is split into narrow planks, and these form a great portion of the walls and flooring. The residents told us that the western channel becomes nearly dry in the middle of the fine season, but that at high water, in April



Assai Palm (*Euterpe oleracea*).

and May, the river rises to the level of the house-floors. The river bottom is everywhere sandy, and the country perfectly healthy. The people seemed to be all contented and happy, but idleness and poverty were exhibited by many unmistakable signs. As to the flooding of their island abodes, they did not seem to care about that at all. They seem to be almost amphibious, or as much at home on the water as on land. It was really alarming to see men and women and children, in little leaky canoes laden to the water-level with bag and baggage, crossing broad reaches of river. Most of them have houses also on the terra firma, and reside in the cool palm-swamps of the Ygapó islands, as they are called, only in the hot and dry season. They live chiefly on fish, shellfish (amongst which were large *Ampullariæ*, whose flesh I found, on trial, to be a very tough morsel), the never-failing farinha, and the fruits of the forest. Amongst the latter the fruits of palm-trees occupied the chief place. The Assai is the most in use, but this forms a universal article of diet in all parts of the country. The fruit, which is perfectly round, and about the size of a cherry, contains but a small portion of pulp lying between the skin and the hard kernel. This is made, with the addition of water, into a thick, violet-coloured beverage, which stains the lips like blackberries. The fruit of the Mirití is also a common article of food, although the pulp is sour and unpalatable, at least to European tastes. It is boiled, and then eaten with farinha. The Tucumá (*Astrocaryum tucuma*), and the Mucujá (*Acrocomia lasiospatha*), grow only on the main land. Their fruits yield

a yellowish, fibrous pulp, which the natives eat in the same way as the Mirití. They contain so much fatty matter, that vultures and dogs devour them greedily.

Early on the morning of September 3rd we reached the right or eastern bank, which is here from forty to sixty feet high. The houses were more substantially built than those we had hitherto seen. We succeeded in buying a small turtle ; most of the inhabitants had a few of these animals, which they kept in little inclosures made with stakes. The people were of the same class everywheré, Mamelucos. They were very civil ; we were not able, however, to purchase much fresh food from them. I think this was owing to their really not having more than was absolutely required to satisfy their own needs. In these districts, where the people depend for animal food solely on fishing, there is a period of the year when they suffer hunger, so that they are disposed to prize highly a small stock when they have it. They generally answered in the negative when we asked, money in hand, whether they had fowls, turtles, or eggs to sell. “Naõ ha, sinto que naõ posso lhe ser bom ;” or, “Naõ ha, meu coracaõ.” “We have none ; I am sorry I cannot oblige you ;” or, “There is none, my heart.”

Sept. 3rd to 7th.—At half-past eight a.m. we arrived at Baiaõ, which is built on a very high bank, and contains about 400 inhabitants. We had to climb to the village up a ladder, which is fixed against the bank, and, on arriving at the top, took possession of a room, which Senhor Seixas had given orders to be prepared for us. He himself was away at his sitio, and

would not be here until the next day. We were now quite dependent on him for men to enable us to continue our voyage, and so had no remedy but to wait his leisure. The situation of the place, and the nature of the woods around it, promised well for novelties in birds and insects; so we had no reason to be vexed at the delay, but brought our apparatus and store-boxes up from the canoe, and set to work.

The easy, lounging life of the people amused us very much. I afterwards had plenty of time to become used to tropical village life. There is a free, familiar, pro bono publico style of living in these small places, which requires some time for a European to fall into. No sooner were we established in our rooms, than a number of lazy young fellows came to look on and make remarks, and we had to answer all sorts of questions. The houses have their doors and windows open to the street, and people walk in and out as they please; there is always, however, a more secluded apartment, where the female members of the families reside. In their familiarity there is nothing intentionally offensive, and it is practised simply in the desire to be civil and sociable. A young Mameluco, named Soares, an *Escrivaõ*, or public clerk, took me into his house to show me his library. I was rather surprised to see a number of well-thumbed Latin classics, Virgil, Terence, Cicero's Epistles, and Livy. I was not familiar enough, at this early period of my residence in the country, with Portuguese to converse freely with Senhor Soares, or ascertain what use he made of these books; it was an unexpected

sight, a classical library in a mud-plastered and palm-thatched hut on the banks of the Tocantins.

The prospect from the village was magnificent, over the green wooded islands, far away to the grey line of forest on the opposite shore of the Tocantins. We were now well out of the low alluvial country of the Amazons proper, and the climate was evidently much drier than it is near Pará. They had had no rain here for many weeks, and the atmosphere was hazy around the horizon ; so much so that the sun, before setting, glared like a blood-red globe. At Pará this never happens ; the stars and sun are as clear and sharply defined when they peep above the distant tree-tops as they are at the zenith. This beautiful transparency of the air arises, doubtless, from the equal distribution through it of invisible vapour. I shall ever remember, in one of my voyages along the Pará river, the grand spectacle that was once presented at sunrise. Our vessel was a large schooner, and we were bounding along before a spanking breeze which tossed the waters into foam, when the day dawned. So clear was the air, that the lower rim of the full moon remained sharply defined until it touched the western horizon, whilst, at the same time, the sun rose in the east. The two great orbs were visible at the same time, and the passage from the moonlit night to day was so gentle, that it seemed to be only the brightening of dull weather. The woods around Baiaõ were of second growth, the ground having been formerly cultivated. A great number of coffee and cotton trees grew amongst the thickets. A fine woodland pathway extends for miles over the high, undulating bank, leading from

one house to another along the edge of the cliff. I went into several of them, and talked to their inmates. They were all poor people. The men were out fishing, some far away, a distance of many days' journey; the women plant mandiocca, make the farinha, spin and weave cotton, manufacture soap of burnt cacao shells and andiroba oil, and follow various other domestic employments. I asked why they allowed their plantations to run to waste. They said that it was useless trying to plant anything hereabout; the Saüba ant devoured the young coffee-trees, and every one who attempted to contend against this universal ravager was sure to be defeated. The country, for many miles along the banks of the river, seemed to be well peopled. The inhabitants were nearly all of the tawny-white Mameluco class. I saw a good many mulattos, but very few negroes and Indians, and none that could be called pure whites.

When Senhor Seixas arrived, he acted very kindly. He provided us at once with two men, killed an ox in our honour, and treated us altogether with great consideration. We were not, however, introduced to his family. I caught a glimpse once of his wife, a pretty little Mameluco woman, as she was tripping with a young girl, whom I supposed to be her daughter, across the back yard. Both wore long dressing-gowns, made of bright-coloured calico print, and had long wooden tobacco-pipes in their mouths. The room in which we slept and worked had formerly served as a storeroom for cacao, and at night I was kept awake for hours by rats and cockroaches, which swarm in all such places. The latter were running about all over the walls;

now and then one would come suddenly with a whirr full at my face, and get under my shirt if I attempted to jerk it off. As to the rats, they were chasing one another by dozens all night long, over the floor, up and down the edges of the doors, and along the rafters of the open roof.

September 7th.—We started from Baiaõ at an early hour. One of our new men was a good-humoured, willing young mulatto, named José; the other was a sulky Indian called Manoel, who seemed to have been pressed into our service against his will. Senhor Seixas, on parting, sent a quantity of fresh provisions on board. A few miles above Baiaõ the channel became very shallow; we got aground several times, and the men had to disembark and shove the vessel off. Alexandro here shot several fine fish, with bow and arrow. It was the first time I had seen fish captured in this way. The arrow is a reed, with a steel barbed point, which is fixed in a hole at the end, and secured by fine twine made from the fibres of pine-apple leaves. It is only in the clearest water that fish can be thus shot; and the only skill required is to make, in taking aim, the proper allowance for refraction.

The next day before sunrise a fine breeze sprung up, and the men awoke and set the sails. We glided all day through channels between islands with long, white, sandy beaches, over which, now and then, aquatic and wading birds were seen running. The forest was low, and had a harsh, dry aspect. Several palm trees grew here which we had not before seen. On low bushes, near the water, pretty, red-headed tanagers (*Tanagra*

gularis) were numerous, flitting about and chirping like sparrows. About half-past four p.m., we brought to at the mouth of a creek or channel, where there was a great extent of sandy beach. The sand had been blown by the wind into ridges and undulations, and over the moister parts large flocks of sandpipers were running about. Alexandro and I had a long ramble over the rolling plain, which came as an agreeable change after the monotonous forest scenery amid which we had been so long travelling. He pointed out to me the tracks of a huge jaguar on the sand. We found here, also, our first turtle's nest, and obtained 120 eggs from it, which were laid at a depth of nearly two feet from the surface, the mother first excavating a hole, and afterwards covering it up with sand. The place is discoverable only by following the tracks of the turtle from the water. I saw here an alligator for the first time, which reared its head and shoulders above the water just after I had taken a bath near the spot. The night was calm and cloudless, and we employed the hours before bed-time in angling by moonlight.

On the 10th we reached a small settlement called Patos, consisting of about a dozen houses, and built on a high, rocky bank, on the eastern shore. The rock is the same nodular conglomerate which is found at so many places, from the sea-coast to a distance of 600 miles up the Amazons. Mr. Leavens made a last attempt here to engage men to accompany us to the Araguaya; but it was in vain; not a soul could be induced by any amount of wages to go on such an expedition. The reports as to the existence of cedar

were very vague. All said that the tree was plentiful somewhere, but no one could fix on the precise locality. I believe that the cedar grows, like all other forest trees, in a scattered way, and not in masses anywhere. The fact of its being the principal tree observed floating down with the current of the Amazons is to be explained by its wood being much lighter than that of the majority of trees. When the banks are washed away by currents, trees of all species fall into the river; but the heavier ones, which are the most numerous, sink, and the lighter, such as the cedar, alone float down to the sea.

Mr. Leavens was told that there were cedar trees at Trocará, on the opposite side of the river, near some fine rounded hills covered with forest, visible from Patos; so there we went. We found here several families encamped in a delightful spot. The shore sloped gradually down to the water, and was shaded by a few wide-spreading trees. There was no underwood. A great number of hammocks were seen slung between the tree-trunks, and the litter of a numerous household lay scattered about. Women, old and young, some of the latter very good-looking, and a large number of children, besides pet animals, enlivened the encampment. They were all half-breeds, simple, well-disposed people, and explained to us that they were inhabitants of Cametá, who had come thus far, eighty miles, to spend the summer months. The only motive they could give for coming was, that "it was so hot in the town in the veraõ (summer), and they were all so fond of fresh fish." Thus these simple folks think nothing of leaving home

and business to come on a three months' pic-nic. It is the annual custom of this class of people throughout the province to spend a few months of the fine season in the wilder parts of the country. They carry with them all the farinha they can scrape together, this being the only article of food necessary to provide. The men hunt and fish for the day's wants, and sometimes collect a little India-rubber, sarsaparilla, or copaiba oil, to sell to traders on their return; the women assist in paddling the canoes, do the cooking, and sometimes fish with rod and line. The weather is enjoyable the whole time, and so days and weeks pass happily away.

One of the men volunteered to walk with us into the forest, and show us a few cedar-trees. We passed through a mile or two of spiny thickets, and at length came upon the banks of the rivulet Trocará, which flows over a stony bed, and, about a mile above its mouth, falls over a ledge of rocks, thus forming a very pretty cascade. In the neighbourhood, we found a number of specimens of a curious land-shell, a large flat *Helix*, with a labyrinthine mouth (*Anastoma*). We learnt afterwards that it was a species which had been discovered a few years previously by Dr. Gardner, the botanist, on the upper part of the Tocantins.

At Patos we stayed three days. In the woods, we found a number of conspicuous insects new to us. Three species of *Pieris* were the most remarkable. We afterwards learnt that they occurred also in Venezuela and in the south of Brazil; but they are quite unknown in the alluvial plains of the Amazons. We saw, for the

first time, the splendid Hyacinthine macaw (*Macrocerus hyacinthinus*, Lath., the Araruna of the natives), one of the finest and rarest species of the Parrot family. It only occurs in the interior of Brazil, from 16° S. lat. to the southern border of the Amazons valley. It is three feet long from the beak to the tip of the tail, and is entirely of a soft hyacinthine blue colour, except round the eyes, where the skin is naked and white. It flies in pairs, and feeds on the hard nuts of several palms, but especially of the Mucujá (*Acrocomia lasiospatha*). These nuts, which are so hard as to be difficult to break with a heavy hammer, are crushed to a pulp by the powerful beak of this macaw.

Mr. Leavens was thoroughly disgusted with the people of Patos. Two men had come from below with the intention, I believe, of engaging with us, but they now declined. The inspector, constable, or governor of the place appeared to be a very slippery customer, and I fancy discouraged the men from going, whilst making a great show of forwarding our views. These outlying settlements are the resort of a number of idle worthless characters. There was a kind of festival going on, and the people fuddled themselves with caxiri, an intoxicating drink invented by the Indians. It is made by soaking mandioca cakes in water until fermentation takes place, and tastes like new beer.

Being unable to obtain men, Mr. Leavens now gave up his project of ascending the river as far as the Araguaya. He assented to our request, however, to ascend to the cataracts near Arroyos. We started therefore from Patos with a more definite aim before

us than we had hitherto had. The river became more picturesque as we advanced. The water was very low, it being now the height of the dry season; the islands were smaller than those further down, and some of them were high and rocky. Bold wooded bluffs projected into the stream, and all the shores were fringed with beaches of glistening white sand. On one side of the river there was an extensive grassy plain or campo with isolated patches of trees scattered over it. On the 14th and following day we stopped several times to ramble ashore. Our longest excursion was to a large shallow lagoon, choked up with aquatic plants, which lay about two miles across the campo. At a place called Juquerapuá we engaged a pilot to conduct us to Arroyos, and a few miles above the pilot's house, arrived at a point where it was not possible to advance further in our large canoe on account of the rapids.

September 16th. Embarked at six a.m. in a large montaria which had been lent to us for this part of our voyage by Senhor Seixas, leaving the vigilinga anchored close to a rocky islet, named Santa Anna, to await our return. Isidoro was left in charge, and we were sorry to be obliged to leave behind also our mulatto José, who had fallen ill since leaving Baiaõ. We had then remaining only Alexandro, Manoel, and the pilot, a sturdy Tapuyo named Joaquim; scarcely a sufficient crew to paddle against the strong currents.

At ten a.m. we arrived at the first rapids, which are called Tapaiunaquára. The river, which was here about a mile wide, was choked up with rocks, a broken ridge passing completely across it. Between these

confused piles of stone the currents were fearfully strong and formed numerous eddies and whirlpools. We were obliged to get out occasionally and walk from rock to rock, whilst the men dragged the canoe over the obstacles. Beyond Tapaiunaquára, the stream became again broad and deep, and the river scenery was beautiful in the extreme. The water was clear and of a bluish-green colour. On both sides of the stream stretched ranges of wooded hills, and in the middle picturesque islets rested on the smooth water, whose brilliant green woods fringed with palms formed charming bits of foreground to the perspective of sombre hills fading into grey in the distance. Joaquim pointed out to us grove after grove of Brazil nut trees (*Bertholletia excelsa*) on the mainland. This is one of the chief collecting grounds for this nut. The tree is one of the loftiest in the forest, towering far above its fellows; we could see the woody fruits, large and round as cannon-balls, dotted over the branches. The currents were very strong in some places, so that during the greater part of the way the men preferred to travel near the shore, and propel the boat by means of long poles.

We arrived at Arroyos about four o'clock in the afternoon, after ten hours' hard pull. The place consists simply of a few houses built on a high bank, and forms a station where canoe-men from the mining countries of the interior of Brazil stop to rest themselves before or after surmounting the dreaded falls and rapids of Guaribas, situated a couple of miles further up. We dined ashore, and in the evening again embarked to

visit the falls. The vigorous and successful way in which our men battled with the terrific currents excited our astonishment. The bed of the river, here about a mile wide, is strewn with blocks of various sizes, which lie in the most irregular manner, and between them rush currents of more or less rapidity. With an accurate knowledge of the place and skilful management, the falls can be approached in small canoes by threading the less dangerous channels. The main fall is about a quarter of a mile wide ; we climbed to an elevation overlooking it, and had a good view of the cataract. A body of water rushes with terrific force down a steep slope, and boils up with deafening roar around the boulders which obstruct its course. The wildness of the whole scene was very impressive. As far as the eye could reach, stretched range after range of wooded hills, scores of miles of beautiful wilderness, inhabited only by scanty tribes of wild Indians. In the midst of such a solitude the roar of the cataract seemed fitting music.

September 17th. We commenced early in the morning our downward voyage. Arroyos is situated in about $4^{\circ} 10'$ S. lat ; and lies, therefore, about 130 miles from the mouth of the Tocantins. Fifteen miles above Guaribas another similar cataract called Tabocas lies across the river. We were told that there were in all fifteen of these obstructions to navigation between Arroyos and the mouth of the Araguaya. The worst was the Inferno, the Guaribas standing second to it in evil reputation. Many canoes and lives have been lost here, most of the accidents arising through the

vessels being hurled against an enormous cubical mass of rock called the Guaribinha, which we, on our trip to the falls in the small canoe, passed round with the greatest ease about a quarter of a mile below the main falls. This, however, was the dry season; in the time of full waters a tremendous current sets against it. We descended the river rapidly, and found it excellent fun shooting the rapids. The men seemed to delight in choosing the swiftest parts of the current; they sang and yelled in the greatest excitement, working the paddles with great force, and throwing clouds of spray above us as we bounded downwards. We stopped to rest at the mouth of a rivulet named Caganxa. The pilot told us that gold has been found in the bed of this brook; so we had the curiosity to wade several hundred yards through the icy cold waters in search of it. Mr. Leavens seemed very much interested in the matter; he picked up all the shining stones he could espy in the pebbly bottom, in hopes of finding diamonds also. There is, in fact, no reason why both gold and diamonds should not be found here, the hills being a continuation of those of the mining countries of interior Brazil, and the brooks flowing through the narrow valleys between them.

On arriving at the place where we had left our canoe, we found poor José the mulatto much worse, so we hastened on to Juquerapuá to procure aid. An old half-caste woman took charge of him; she made poultices of the pulp of a wild fruit, administered cooling draughts made from herbs which grew near the house, and in fact acted the part of nurse admirably.

We stayed at this place all night and part of the following day, and I had a stroll along a delightful pathway, which led over hill and dale, two or three miles through the forest. I was surprised at the number and variety of brilliantly-coloured butterflies; they were all of small size, and started forth at every step I took, from the low bushes which bordered the road. I first heard here the notes of a trogon; it was seated alone on a branch, at no great elevation; a beautiful bird, with glossy-green back and rose-coloured breast (probably *Trogon melanurus*). At intervals it uttered, in a complaining tone, a sound resembling the words "quá, quá." It is a dull inactive bird, and not very ready to take flight when approached. In this respect, however, the trogons are not equal to the jacamars, whose stupidity in remaining at their posts, seated on low branches in the gloomiest shades of the forest, is somewhat remarkable in a country where all other birds are exceedingly wary. One species of jacamar was not uncommon here (*Galbula viridis*); I sometimes saw two or three together seated on a slender branch silent and motionless with the exception of a slight movement of the head; when an insect flew past within a short distance, one of the birds would dart off, seize it, and return again to its sitting place. The trogons are found in the tropics of both hemispheres; the jacamars, which are clothed in plumage of the most beautiful golden-bronze and steel colours, are peculiar to tropical America.

September 18th. We stayed only twenty-four hours at Juquerapuá, and then resumed our downward journey.

I was sorry to be obliged to leave this beautiful, though almost uninhabited, country so soon, our journey through it having been a mere tourist's gallop. Its vegetable and animal productions, of which we had obtained merely a glimpse, so to speak, were evidently different from those of the alluvial plains of the Amazons. The time we had spent, however, was too short for making a sufficient collection of specimens and facts to illustrate the amount and nature of the difference between the two faunas: a subject of no small importance as being calculated to throw light on the migrations of species across the equator in South America. In the rocky pools near Juquerapuá we found many species of fresh-water shells, and each of us, Mr. Leavens included, made a large collection of them. One was a turret-shaped univalve, a species of *Melania*, every specimen of which was worn at the apex; we tried in vain to get a perfect specimen. In the crystal waters the fishes could be seen as plainly as in an aquarium. One kind especially attracted our attention, a species of *Diodon*, which was not more than three inches long and of a pretty green colour banded with black; the natives call it Mamayacú. It is easily caught, and when in the hand distends itself, becoming as round as a ball. This fish amuses the people very much; when a person gets corpulent, they tell him he is as fat as a Mamayacú.

At night I slept ashore as a change from the confinement of the canoe, having obtained permission from Senhor Joaquim to sling my hammock under his roof. The house, like all others in these out-of-

the-way parts of the country, was a large, open, palm-thatched shed, having one end inclosed by means of partitions also made of palm-leaves, so as to form a private apartment. Under the shed were placed all the household utensils; earthenware jars, pots, and kettles, hunting and fishing implements, paddles, bows and arrows, harpoons, and so forth. One or two common wooden chests serve to contain the holiday clothing of the females; there is no other furniture except a few stools and the hammock which answers the purposes of chair and sofa. When a visitor enters he is asked to sit down in a hammock; persons who are on intimate terms with each other recline together in the same hammock, one at each end; this is a very convenient arrangement for friendly conversation. There are neither tables nor chairs; the cloth for meals is spread on a mat, and the guests squat round in any position they choose. There is no cordiality of manners, but the treatment of the guests shows a keen sense of the duties of hospitality on the part of the host. There is a good deal of formality in the intercourse of these half-wild *mamelucos* which, I believe, has been chiefly derived from their Indian forefathers, although a little of it may have been copied from the Portuguese.

A little distance from the house were the open sheds under which the *farinha* for the use of the establishment was manufactured. In the centre of each shed stood the shallow pans, made of clay and built over ovens, where the meal is roasted. A long flexible cylinder made of the peel of a marantaceous plant,

plaited into the proper form, hung suspended from a beam ; it is in this that the pulp of the mandioca is pressed, and from it the juice, which is of a highly poisonous nature, although the pulp is wholesome food, runs into pans placed beneath to receive it. A wooden trough, such as is used in all these places for receiving the pulp before the poisonous matter is extracted, stood on the ground, and from the posts hung the long wicker-work baskets, or *aturás*, in which the women carry the roots from the *roça* or clearing ; a broad ribbon made from the inner bark of the *monguba* tree is attached to the rims of the baskets, and is passed round the forehead of the carriers, to relieve their backs in supporting the heavy load. Around the shed were planted a number of banana and other fruit trees ; amongst them were the never-failing capsicum-pepper bushes brilliant as holly-trees at Christmas time with their fiery red fruit, and lemon trees ; the one supplying the pungent the other the acid for sauce to the perpetual meal of fish. There is never in such places any appearance of careful cultivation, no garden or orchard ; the useful trees are surrounded by weeds and bushes, and close behind rises the everlasting forest.

There were other strangers under *Senhor Joaquim's* roof besides myself ; mulattos, *mamelucos*, and Indians, so we formed altogether a large party. Houses occur at rare intervals in this wild country, and hospitality is freely given to the few passing travellers. After a frugal supper, a large wood fire was lighted in the middle of the shed, and all turned into their hammocks and began to converse. A few of the party soon dropped

asleep; others, however, kept awake until a very late hour telling stories. Some related adventures which had happened to them whilst hunting or fishing; others recounted myths about the Curupíra, and other demons or spirits of the forest. They were all very appropriate to the time and place, for now and then a yell or a shriek resounded through the gloomy wilderness around the shed. One old parchment-faced fellow, with a skin the colour of mahogany, seemed to be a capital storyteller; but I was sorry I did not know enough of the language to follow him in all the details which he gave. Amongst other things he related an adventure he had once had with a jaguar. He got up from his hammock in the course of the narrative to give it the greater effect by means of gestures; he seized a bow and a large taquará arrow to show how he slew the beast, imitated its hoarse growl, and danced about the fire like a demon.

In descending the river we landed frequently, and Mr. Wallace and I lost no chance of adding to our collections; so that before the end of our journey we had got together a very considerable number of birds, insects, and shells chiefly taken, however, in the low country. Leaving Baiaõ we took our last farewell of the limpid waters and varied scenery of the upper river, and found ourselves again in the humid flat region of the Amazons valley. We sailed down this lower part of the river by a different channel from the one we travelled along in ascending, and frequently went ashore on the low islands in mid-river. As already stated, these are covered with water in the wet season;

but at this time, there having been three months of fine weather, they were dry throughout, and by the subsidence of the waters placed four or five feet above the level of the river. They are covered with a most luxuriant forest, comprising a large number of india-rubber trees. We found several people encamped here, who were engaged in collecting and preparing the rubber, and thus had an opportunity of observing the process.

The tree which yields this valuable sap is the *Siphonia elastica*, a member of the Euphorbiaceous order; it belongs, therefore, to a group of plants quite different from that which furnishes the caoutchouc of the East Indies and Africa. This latter is the product of different species of *Ficus*, and is considered, I believe, in commerce an inferior article to the india-rubber of Pará. The *Siphonia elastica* grows only on the lowlands in the Amazons region; hitherto the rubber has been collected chiefly in the islands and swampy parts of the mainland within a distance of fifty to a hundred miles to the west of Pará; but there are plenty of untapped trees still growing in the wilds of the Tapajos, Madeira, Juruá, and Jaurí, as far as 1800 miles from the Atlantic coast. The tree is not remarkable in appearance; in bark and foliage it is not unlike the European ash; but the trunk, like that of all forest trees, shoots up to an immense height before throwing off branches. The trees seem to be no man's property hereabout. The people we met with told us they came every year to collect rubber on these islands, as soon as the waters had subsided, namely, in August,

and remained till January or February. The process is very simple. Every morning each person, man or woman, to whom is allotted a certain number of trees, goes the round of the whole and collects in a large vessel the milky sap which trickles from gashes made in the bark on the preceding evening, and which is received in little clay cups, or in ampullaria shells stuck beneath the wounds. The sap, which at first is of the consistence of cream, soon thickens; the collectors are provided with a great number of wooden moulds of the shape in which the rubber is wanted, and when they return to the camp they dip them into the liquid, laying on, in the course of several days, one coat after another. When this is done the substance is white and hard; the proper colour and consistency are given by passing it repeatedly through a thick black smoke obtained by burning the nuts of certain palm trees,* after which process the article is ready for sale. India-rubber is known throughout the province only by the name of *seringa*, the Portuguese word for syringe; it owes this appellation to the circumstance that it was in this form only that the first Portuguese settlers noticed it to be employed by the aborigines. It is said that the Indians were first taught to make syringes of rubber by seeing natural tubes formed by it when the spontaneously-flowing sap gathered round projecting twigs. Brazilians of all classes still use it extensively in the form of syringes, for injections form a great feature in the popular system of cures; the rubber for this

* The species I have seen used for this purpose are *Maximiliana regia*; *Attalea excelsa*; and *Astrocaryum murumurum*.

purpose is made into a pear-shaped bottle, and a quill fixed in the long neck.*

September 24th.—Opposite Cameté the islands are all planted with cacao, the tree which yields the chocolate nut. The forest is not cleared for the purpose, but the cacao plants are stuck in here and there almost at random amongst the trees. There are many houses on the banks of the river, all elevated above the swampy soil on wooden piles, and furnished with broad ladders by which to mount to the ground floor. As we passed by in our canoe we could see the people at their occupations in the open verandahs, and in one place saw a ball going on in broad daylight; there were fiddles and guitars hard at work, and a number of lads in white shirts and trousers dancing with brown damsels clad in showy print dresses. The cacao tree produces a curious impression on account of the flowers and fruit growing directly out of the trunk and branches. There is a whole group of wild fruit trees which have the same habit in this country. In the wildernesses where the cacao is planted, the collecting of the fruit is dangerous from the number of poisonous snakes which inhabit the places. One day, when we were running our montaria to a landing-place, we saw a large serpent on the trees overhead, as we were about to brush past; the boat was stopped just in the nick of time, and

* India-rubber is now one of the chief articles of export from Pará, and the government derives a considerable revenue from it. In value it amounts to one-third the total sum of exports. Thus in 1857 the amount was £139,000, the total exports being £450,720. In 1858, the rubber exported amounted to £123,000 and the total exports to £356,000.

Mr. Leavens brought the reptile down with a charge of shot.

September 26th.—At length we got clear of the islands, and saw once more before us the sea-like expanse of waters which forms the mouth of the Tocantins. The river had now sunk to its lowest point, and numbers of fresh-water dolphins were rolling about in shoaly places. There are here two species, one of which was new to science when I sent specimens to England; it is called the Tucuxí (*Steno tucuxi* of Gray). When it comes to the surface to breathe, it rises horizontally, showing first its back fin; draws an inspiration, and then dives gently down, head foremost. This mode of proceeding distinguishes the Tucuxí at once from the other species, which is called Bouto or porpoise by the natives (*Inia Geoffroyi* of Desmarest). When this rises the top of the head is the part first seen; it then blows, and immediately afterwards dips head downwards, its back curving over, exposing successively the whole dorsal ridge with its fin. It seems thus to pitch heels over head, but does not show the tail fin. Besides this peculiar motion, it is distinguished from the Tucuxí by its habit of generally going in pairs. Both species are exceedingly numerous throughout the Amazons and its larger tributaries, but they are nowhere more plentiful than in the shoaly water at the mouth of the Tocantins, especially in the dry season. In the Upper Amazons a third pale flesh-coloured species is also abundant (the *Delphinus pallidus* of Gervais). With the exception of a species found in the Ganges, all other varieties

of dolphin inhabit exclusively the sea. In the broader parts of the Amazons, from its mouth to a distance of fifteen hundred miles in the interior, one or other of the three kinds here mentioned are always heard rolling, blowing, and snorting, especially at night, and these noises contribute much to the impression of sea-wide vastness and desolation which haunts the traveller. Besides dolphins in the water, frigate birds in the air are characteristic of this lower part of the Tocantins. Flocks of them were seen the last two or three days of our journey, hovering above at an immense height. Towards night we were obliged to cast anchor over a shoal in the middle of the river to await the ebb tide. The wind blew very strongly, and this, together with the incoming flow, caused such a heavy sea that it was impossible to sleep. The vessel rolled and pitched until every bone in our bodies ached with the bumps we received, and we were all more or less sea-sick. On the following day we entered the Anapu, and on the 30th September, after threading again the labyrinth of channels communicating between the Tocantins and the Moju, arrived at Pará.

I will now give a short account of Cametá, the principal town on the banks of the Tocantins, which I visited for the second time, in June, 1849; Mr. Wallace, in the same month, departing from Pará to explore the rivers Guamá and Capim. I embarked as passenger in a Cametá trading vessel, the *St. John*, a small schooner of thirty tons burthen. I had learnt by this time that the only way to attain the objects for which I had

come to this country was to accustom myself to the ways of life of the humbler classes of the inhabitants. A traveller on the Amazons gains little by being furnished with letters of recommendation to persons of note, for in the great interior wildernesses of forest and river the canoe-men have pretty much their own way; the authorities cannot force them to grant passages or to hire themselves to travellers, and therefore a stranger is obliged to ingratiate himself with them in order to get conveyed from place to place. I thoroughly enjoyed the journey to Cameté; the weather was again beautiful in the extreme. We started from Pará at sunrise on the 8th of June, and on the 10th emerged from the narrow channels of the Anapú into the broad Tocantins. The vessel was so full of cargo, that there was no room to sleep in the cabin; so we passed the nights on deck. The captain or supercargo, called in Portuguese *cabó*, was a mameluco, named Manoel, a quiet, good-humoured person, who treated me with the most unaffected civility during the three days' journey. The pilot was also a mameluco, named John Mendez, a handsome young fellow, full of life and spirit. He had on board a wire guitar or viola, as it is here called; and in the bright moonlight nights, as we lay at anchor hour after hour waiting for the tide, he enlivened us all with songs and music. He was on the best of terms with the cabó, both sleeping in the same hammock slung between the masts. I passed the nights wrapped in an old sail outside the roof of the cabin. The crew, five in number, were Indians and half-breeds, all of whom

treated their two superiors with the most amusing familiarity, yet I never sailed in a better managed vessel than the *St. John*.

In crossing to Cametá we had to await the flood-tide in a channel called *Entre-as-Ilhas*, which lies between two islands in mid-river, and John Mendez, being in good tune, gave us an extempore song, consisting of a great number of verses. The crew lay about the deck listening, and all joined in the chorus. Some stanzas related to me, telling how I had come all the way from "Inglaterra" to skin monkeys and birds and catch insects; the last-mentioned employment of course giving ample scope for fun. He passed from this to the subject of political parties in Cametá; and then, as all the hearers were Cametaenses and understood the hits, there were roars of laughter, some of them rolling over and over on the deck, so much were they tickled. Party spirit runs high at Cametá, not merely in connection with local politics, but in relation to affairs of general concern, such as the election of members to the Imperial Parliament, and so forth. This political strife is partly attributable to the circumstance that a native of Cametá, Dr. Angelo Custodio Correia, had been in almost every election one of the candidates for the representation of the province. I fancied these shrewd but unsophisticated canoe-men saw through the absurdities attending these local contests, and hence their inclination to satirise them; they were, however, evidently partisans of Dr. Angelo. The brother of Dr. Angelo, João Augusto Correia, a distinguished merchant, was an active canvasser. The party of the Correias was the

Liberal, or, as it is called throughout Brazil, the Santa Luzia faction; the opposite side, at the head of which was one Pedro Moraes, was the Conservative, or Saquarema party. I preserved one of the stanzas of the song, which, however, does not contain much point; it ran thus:—

Ora paná, tana paná, paná taná,
 João Augusto hé bonito e homem pimpaõ,
 Mas Pedro hé feio e hum grande ladraõ,
 (Chorus) Ora paná, &c.

John Augustus is handsome and as a man ought to be,
 But Peter is ugly and a great thief.
 (Chorus) Ora paná, &c.

The canoe-men of the Amazons have many songs and choruses, with which they are in the habit of relieving the monotony of their slow voyages, and which are known all over the interior. The choruses consist of a simple strain, repeated almost to weariness, and sung generally in unison, but sometimes with an attempt at harmony. There is a wildness and sadness about the tunes which harmonise well with, and in fact are born of, the circumstances of the canoe-man's life; the echoing channels, the endless gloomy forests, the solemn nights, and the desolate scenes of broad and stormy waters and falling banks. Whether they were invented by the Indians or introduced by the Portuguese it is hard to decide, as many of the customs of the lower classes of Portuguese are so similar to those of the Indians that they have become blended with them. One of the commonest songs is very wild and pretty. It has for refrain the words "Mai, Mai,"

galley to make tea of an acid herb, called *erva cidreira*, a quantity of which they had gathered at the last landing-place, and the flames sparkled cheerily upwards. It is at such times as these that Amazon travelling is enjoyable, and one no longer wonders at the love which many, both natives and strangers, have for this wandering life. The little schooner sped rapidly on with booms bent and sails stretched to the utmost. Just as day dawned, we ran with scarcely slackened speed into the port of Cameté, and cast anchor.

I stayed at Cameté until the 16th of July, and made a considerable collection of the natural productions of the neighbourhood. The town in 1849 was estimated to contain about 5000 inhabitants, but the municipal district of which Cameté is the capital numbered 20,000 ; this, however, comprised the whole of the lower part of the Tocantins, which is the most thickly populated part of the province of Pará. The productions of the district are cacao, india-rubber, and Brazil nuts. The most remarkable feature in the social aspect of the place is the hybrid nature of the whole population, the amalgamation of the white and Indian races being here complete. The aborigines were originally very numerous on the western bank of the Tocantins, the principal tribe having been the Camútas, from which the city takes its name. They were a superior nation, settled, and attached to agriculture, and received with open arms the white immigrants who were attracted to the district by its fertility, natural beauty, and the healthfulness of the climate. The Portuguese settlers were nearly all

males, the Indian women were good-looking, and made excellent wives ; so the natural result has been, in the course of two centuries, a complete blending of the two races. There is now, however, a considerable infusion of negro blood in the mixture, several hundred African slaves having been introduced during the last seventy years. The few whites are chiefly Portuguese, but there are also two or three Brazilian families of pure European descent. The town consists of three long streets, running parallel to the river, with a few shorter ones crossing them at right angles. The houses are very plain, being built, as usual in this country, simply of a strong framework, filled up with mud, and coated with white plaster. A few of them are of two or three storeys. There are three churches, and also a small theatre, where a company of native actors at the time of my visit were representing light Portuguese plays with considerable taste and ability. The people have a reputation all over the province for energy and perseverance ; and it is often said, that they are as keen in trade as the Portuguese. The lower classes are as indolent and sensual here as in other parts of the province, a moral condition not to be wondered at in a country where perpetual summer reigns, and where the necessaries of life are so easily obtained. But they are light-hearted, quick-witted, communicative, and hospitable. I found here a native poet, who had written some pretty verses, showing an appreciation of the natural beauties of the country, and was told that the Archbishop of Bahia, the primate of Brazil, was a native of Cametá. It is interesting to find the mamelucos

displaying talent and enterprise, for it shows that degeneracy does not necessarily result from the mixture of white and Indian blood. The Cametaenses boast, as they have a right to do, of theirs being the only large town which resisted successfully the anarchists in the great rebellion of 1835-6. Whilst the whites of Pará were submitting to the rule of half-savage revolutionists, the mamelucos of Cametá placed themselves under the leadership of a courageous priest, named Prudencio; armed themselves, fortified the place, and repulsed the large forces which the insurgents of Pará sent to attack the place. The town not only became the refuge for all loyal subjects, but was a centre whence large parties of volunteers sallied forth repeatedly to attack the anarchists in their various strongholds.

The forest behind Cametá is traversed by several broad roads, which lead over undulating ground many miles into the interior. They pass generally under shade, and part of the way through groves of coffee and orange trees, fragrant plantations of cacao, and tracts of second-growth woods. The narrow brook-watered valleys, with which the land is intersected, alone have remained clothed with primæval forest, at least near the town. The houses along these beautiful roads belong chiefly to mameluco, mulatto, and Indian families, each of which has its own small plantation. There are only a few planters with larger establishments and these have seldom more than a dozen slaves. Besides the main roads, there are endless bye-paths which thread the forest, and communicate with isolated houses. Along these the traveller may wander day after day without

leaving the shade, and everywhere meet with cheerful, simple, and hospitable people.

Soon after landing I was introduced to the most distinguished citizen of the place, Dr. Angelo Custodio Correia, whom I have already mentioned. This excellent man was a favourable specimen of the highest class of native Brazilians. He had been educated in Europe, was now a member of the Brazilian Parliament, and had been twice President of his native province. His manners were less formal, and his goodness more thoroughly genuine, perhaps, than is the rule generally with Brazilians. He was admired and loved, as I had ample opportunity of observing, throughout all Amazonia. He sacrificed his life in 1855, for the good of his fellow-townsmen, when Cametá was devastated by the cholera; having stayed behind with a few heroic spirits to succour invalids and direct the burying of the dead, when nearly all the chief citizens had fled from the place. After he had done what he could, he embarked for Pará, but was himself then attacked with cholera and died on board the steamer before he reached the capital. Dr. Angelo received me with the usual kindness which he showed to all strangers. He procured me, unsolicited, a charming country house, free of rent, hired a mulatto servant for me, and thus relieved me of the many annoyances and delays attendant on a first arrival in a country town where even the name of an inn is unknown. The rocinha thus given up for my residence belonged to a friend of his, Senhor José Raimundo Furtado, a stout florid-complexioned gentleman, such a one as might be met with any day in a country

town in England. To him also I was indebted for many acts of kindness.

The rocinha was situated near a broad grassy road bordered by lofty woods, which leads from Cameté to the Aldeia, a village two miles distant. My first walks were along this road. From it branches another similar, but still more picturesque road, which runs to Curimá and Pacajá, two small settlements, several miles distant, in the heart of the forest. The Curimá road is beautiful in the extreme. About half a mile from the house where I lived it crosses a brook flowing through a deep dell, by means of a long rustic wooden bridge. The virgin forest is here left untouched; numerous groups of slender palms, mingled with lofty trees overrun with creepers and parasites, fill the shady glen and arch over the bridge, forming one of the most picturesque scenes imaginable. On the sunny slopes near this place, I found a great number of new and curious insects. A little beyond the bridge there was an extensive grove of orange and other trees, which also yielded me a rich harvest. The Aldeia road runs parallel to the river, the land from the border of the road to the indented shore of the Tocantins forming a long slope, which was also richly wooded; this slope was threaded by numerous shady paths and abounded in beautiful insects and birds. At the opposite or southern end of the town there was a broad road called the Estrada da Vacaria; this ran along the banks of the Tocantins at some distance from the river, and continued over hill and dale, through bamboo thickets and palm swamps, for about fifteen miles.

I found at Cameté an American, named Bean, who had been so long in the country that he had almost forgotten his mother tongue. He knew the neighbourhood well, and willingly accompanied me as guide in many long excursions. I was astonished in my walks with him at the universal friendliness of the people. We were obliged, when rambling along the intricate pathways through the woods, occasionally to pass the houses of settlers. The good people, most of whom knew Bean, always invited us to stop. The master of the house would step out first and insist on our walking in to take some refreshment; at the same moment I generally espied the female members of the family hurrying to the fireplace to prepare the inevitable cup of coffee. After conversing a little with the good folks we would take our leave, and then came the parting present—a bunch of bananas, a few eggs, or fruits of one kind or other. It would have been cruel to refuse these presents, but they were sometimes so inconvenient to us that we used to pitch them into the thickets as soon as we were out of sight of the donors.

One day we embarked in a montaria to visit a widow lady, named Dona Paulina, to whom Bean was going to be married, and who lived on one of the islands in mid-river, about ten miles above Cameté. The little boat had a mast and sail, the latter of which was of very curious construction. It was of the shape which sailors call shoulder-of-mutton sail, and was formed of laths of pith split from the leaf stalks of the Jupatí palm (*Raphia tædigera*). The laths were strung together so as to form a mat, and the sail was hoisted or

lowered by means of a rope attached to the top. The same material serves for many purposes; partitions and even the external walls of houses of the poorer classes are often made of it. It fell to my charge to manage the sail during our voyage, whilst Bean steered, but when in the middle of the broad river the halyard broke, and in endeavouring to mend it we nearly upset the boat, for the wind blew strongly and the waves ran high. We fortunately met, soon afterwards, a negro who was descending in a similar boat to ours, and who, seeing our distress, steered towards us and kindly supplied us with a new rope. We stayed a day and night on the island. The house was of a similar description to those I have already described as common on the low islands of the Tocantins. The cacaoal which surrounded it consisted of about 10,000 trees, which I was astonished to hear produced altogether only 100 arrobas or 3200 pounds of the chocolate nut per annum. I had seen trees on the main land, which having been properly attended to, produced yearly thirty-two pounds each, or 100 times as much as those of Dona Paulina's cacaoal; the average yield in plantations on the Amazons near Santarem is 700 arrobas to 10,000 trees. Agriculture was evidently in a very low condition hereabout; the value of a cacao estate was very trifling, each tree being worth only forty reis or one penny, this including the land on which the plantation stands. A square league of country planted with cacao could thus be bought for 40*l.* or 50*l.* sterling. The selling price of cacao is very fluctuating; 3,500 reis, or about eight shillings

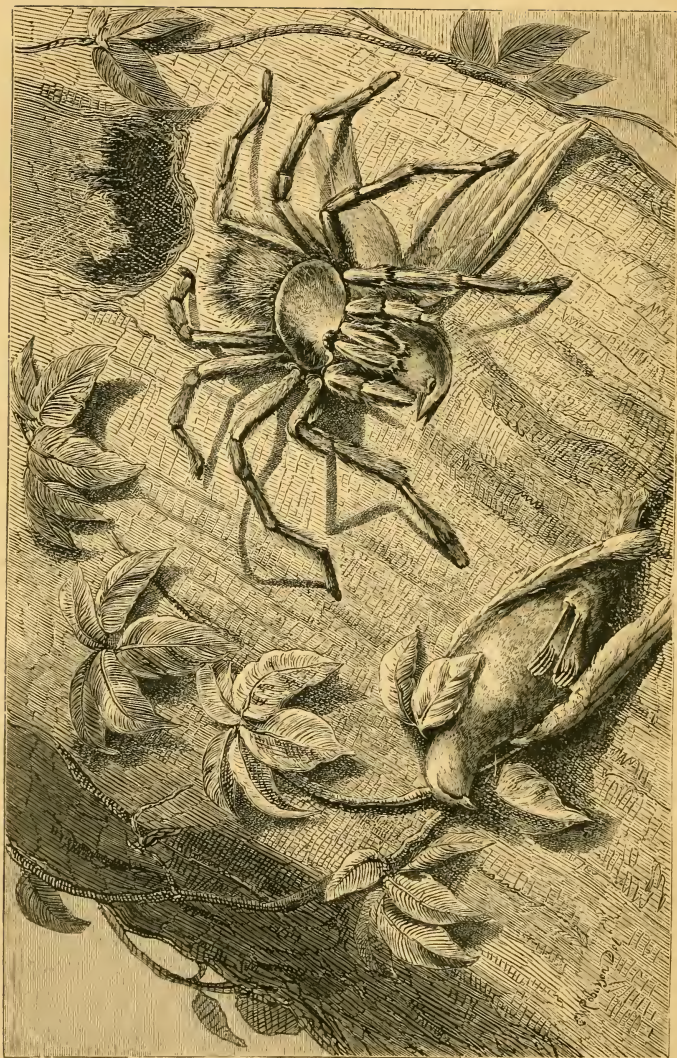
the arroba of 32lbs., may be taken as the average. The management of a plantation requires very few hands; the tree yields three crops a-year, namely, one each in March, June, and September; but the June crop often fails, and those of the other months are very precarious. In the intervals between harvest-times the plantations require weeding; the principal difficulty is to keep the trees free from woody creepers and epiphytes, but especially from parasitic plants of the Loranthaceæ group, the same family to which our miseltoe belongs, and which are called "pés de passarinho," or "little birds' feet," from their pretty orange and red flowers resembling in shape and arrangement the three toes of birds. When the fruit is ready for gathering, neighbours help each other, and so each family is able to manage its own little plantation without requiring slaves. It appeared to me that cacao-growing would be an employment well suited to the habits and constitutions of European immigrants. All the work is done under shade; but it would yield a poor livelihood unless a better style of cultivation and preparation were introduced than that now prevailing here. The fruit is of oblong shape, and six to eight inches in length; the seeds are enveloped in a mass of white pulp which makes a delicious lemonade when mixed with water, and when boiled down produces an excellent jelly.

I found many interesting insects in the cacaoal; the most handsome was the *Salamis jucunda*, a magnificent butterfly with sickle-shaped wings, which flies with great rapidity, but is readily taken when quietly feeding

on decaying cacao fruits. The island was three or four miles long and about a mile broad, and was situated in the central part of the river. The view from Dona Paulina's house was limited by the western row of islets, this middle channel being about a mile broad; not a glimpse was obtainable of the main land on either side, and each island was a mass of greenery, towering to a great height, and seeming to repose on the surface of the water. The house was in a very dilapidated condition; but Dona Paulina, who was a simple, good-natured little woman, with her slaves, tried to make us as comfortable as the circumstances permitted. At night it rained heavily, and the water poured through the broken tiles on to my hammock, so I was obliged to get up and shift my quarters; but this is a common incident in Brazilian houses.

The next day we crossed the river to the main land, to the house of Dona Paulina's father, where we slept, and on the following morning started to walk to Cameté through the forest, a distance of nine miles. The road was sometimes tolerably good, at others it was a mere track, and twice we had to wade through swamps which crossed the path. We started at six a.m., but did not reach Cameté until nine at night.

In the course of our walk I chanced to verify a fact relating to the habits of a large hairy spider of the genus *Mygale*, in a manner worth recording. The species was *M. avicularia*, or one very closely allied to it; the individual was nearly two inches in length of body, but the legs expanded seven inches, and the entire body and legs were covered with coarse grey and reddish hairs.



BIRD-KILLING SPIDER (MYGALE AVICULARIA) ATTACKING FINCHES.

I was attracted by a movement of the monster on a tree-trunk ; it was close beneath a deep crevice in the tree, across which was stretched a dense white web. The lower part of the web was broken, and two small birds, finches, were entangled in the pieces ; they were about the size of the English siskin, and I judged the two to be male and female. One of them was quite dead, the other lay under the body of the spider not quite dead, and was smeared with the filthy liquor or saliva exuded by the monster. I drove away the spider and took the birds, but the second one soon died. The fact of species of *Mygale* sallying forth at night, mounting trees, and sucking the eggs and young of humming-birds, has been recorded long ago by Madame Merian and Palisot de Beauvois ; but, in the absence of any confirmation, it has come to be discredited. From the way the fact has been related it would appear that it had been merely derived from the report of natives, and had not been witnessed by the narrators. Count Langsdorff, in his " Expedition into the Interior of Brazil," states that he totally disbelieved the story. I found the circumstance to be quite a novelty to the residents hereabout. The *Mygales* are quite common insects : some species make their cells under stones, others form artistical tunnels in the earth, and some build their dens in the thatch of houses. The natives call them *Aranhas caranguejeiras*, or crab-spiders. The hairs with which they are clothed come off when touched, and cause a peculiar and almost maddening irritation. The first specimen that I killed and prepared was handled incautiously, and I suffered terribly for three days afterwards. I think this is not owing to

any poisonous quality residing in the hairs, but to their being short and hard, and thus getting into the fine creases of the skin. Some Mygales are of immense size. One day I saw the children belonging to an Indian family who collected for me with one of these monsters secured by a cord round its waist, by which they were leading it about the house as they would a dog.

The only monkeys I observed at Cameté were the Couxio (*Pithecia Satanus*), a large species, clothed with long brownish-black hair, and the tiny *Midas argentatus*. The Couxio has a thick bushy tail; the hair of the head sits on it like a cap, and looks as if it had been carefully combed. It inhabits only the most retired parts of the forest, on the terra firma, and I observed nothing of its habits. The little *Midas argentatus* is one of the rarest of the American monkeys. I have not heard of its being found anywhere except near Cameté. I once saw three individuals together running along a branch in a cacao grove near Cameté; they looked like white kittens: in their motions they resembled precisely the *Midas ursulus* already described. I saw afterwards a pet animal of this species, and heard that there were many so kept, and that they were esteemed as choice treasures. The one I saw was full-grown, but it measured only seven inches in length of body. It was covered with long, white, silky hairs, the tail was blackish, and the face nearly naked and flesh-coloured. It was a most timid and sensitive little thing. The woman who owned it carried it constantly in her bosom, and no money would induce her to part with her pet. She called it Mico. It fed from

her mouth and allowed her to fondle it freely, but the nervous little creature would not permit strangers to touch it. If any one attempted to do so it shrank back, the whole body trembling with fear, and its teeth chattered, whilst it uttered its tremulous frightened tones. The expression of its features was like that of its more robust brother *Midas ursulus*; the eyes, which were black, were full of curiosity and mistrust, and it always kept them fixed on the person who attempted to advance towards it.

In the orange groves and other parts humming-birds were plentiful, but I did not notice more than three species. I saw a little pigmy belonging to the genus *Phaethornis* one day in the act of washing itself in a brook. It was perched on a thin branch, whose end was under water. It dipped itself, then fluttered its wings and pruned its feathers, and seemed thoroughly to enjoy itself alone in the shady nook which it had chosen—a place overshadowed by broad leaves of ferns and *Heliconiæ*. I thought as I watched it that there was no need for poets to invent elves and gnomes whilst Nature furnishes us with such marvellous little sprites ready to hand.

My return journey to Pará afforded many incidents characteristic of Amazonian travelling. I left Cameté on the 16th of July. My luggage was embarked in the morning in the *Santa Rosa*, a vessel of the kind called *cuberta*, or covered canoe. The *cuberta* is very much used on these rivers. It is not decked, but the sides forward are raised and arched over so as to

admit of cargo being piled high above the water-line. At the stern is a neat square cabin, also raised, and between the cabin and covered fore part is a narrow piece decked over, on which are placed the cooking arrangements. This is called the *tombadilha* or quarter-deck, and when the canoe is heavily laden it goes under water as the vessel heels over to the wind. There are two masts, rigged with fore and aft sails. The foremast has often besides a main and top sail. The fore part is planked over at the top, and on this raised deck the crew work the vessel, pulling it along when there is no wind, by means of the long oars already described.

As I have just said, my luggage was embarked in the morning. I was informed that we should start with the ebb-tide in the afternoon, so I thought I should have time to pay my respects to Dr. Angelo and other friends, whose extreme courtesy and goodness had made my residence at Cameté so agreeable. After dinner the guests, according to custom at the house of the Correias, walked into the cool verandah which overlooks the river, and there we saw the *Santa Rosa*, a mere speck in the offing miles away, tacking down river with a fine breeze. I was now in a fix, for it would be useless attempting to overtake the *cuberta*, and besides the sea ran too high for any *montaria*. I was then told, that I ought to have been aboard hours before the time fixed for starting, because when a breeze springs up, vessels start before the tide turns; the last hour of the flood not being very strong. All my precious collections, my clothes, and other necessaries, were on board, and it was indispensable that I should be at

Pará when the things were disembarked. I tried to hire a montaria and men, but was told that it would be madness to cross the river in a small boat with this breeze. On going to Senhor Laroque, another of my Cameté friends, I was relieved of my embarrassment; I found there an English gentleman, Mr. Patchett of Pernambuco, who was visiting Pará and its neighbourhood on his way to England, and who, as he was going back to Pará in a small boat with four paddles, which would start at midnight, kindly offered me a passage. The evening from seven to ten o'clock was very stormy. About seven, the night became intensely dark, and a terrific squall of wind burst forth, which made the loose tiles fly over the house tops; to this succeeded lightning and stupendous claps of thunder, both nearly simultaneous. We had had several of these short and sharp storms during the past month. At midnight when we embarked, all was as calm as though a ruffle had never disturbed air, forest or river. The boat sped along like an arrow to the rhythmic paddling of the four stout youths we had with us, who enlivened the passage with their wild songs. Mr. Patchett and I tried to get a little sleep, but the cabin was so small and encumbered with boxes placed at all sorts of angles, that we found sleep impossible. I was just dozing when the day dawned, and, on awaking, the first object I saw was the Santa Rosa, at anchor under a green island in mid-river. I preferred to make the remainder of the voyage in the company of my collections, so bade Mr. Patchett good-day. The owner of

the Santa Rosa, Senhor Jacinto Machado, whom I had not seen before, received me aboard, and apologised for having started without me. He was a white man, a planter, and was now taking his year's produce of cacao, about twenty tons, to Pará. The canoe was very heavily laden, and I was rather alarmed to see that it was leaking at all points. The crew were all in the water diving about to feel for the holes, which they stopped with pieces of rag and clay, and an old negro was baling the water out of the hold. This was a pleasant prospect for a three days' voyage! Senhor Machado treated it as the most ordinary incident possible. "It was always likely to leak, for it was an old vessel that had been left as worthless high and dry on the beach, and he had bought it very cheap."

When the leaks were stopped, we proceeded on our journey, and at night reached the mouth of the Anapú. I wrapped myself up in an old sail, and fell asleep on the raised deck. The next day we threaded the Igarapé-mirim, and on the 19th descended the Mojú. Senhor Machado and I by this time had become very good friends. At every interesting spot on the banks of the Mojú, he manned the small boat and took me ashore. There are many large houses on this river belonging to what were formerly large and flourishing plantations. Since the revolution of 1835-6, they had been suffered to go to decay. Two of the largest buildings were constructed by the Jesuits in the early part of the last century. We were told that there were formerly eleven large sugar-mills on the banks of the Mojú, but now there are only three. At Burujúba, there is a large

monastery in a state of decay; part of the edifice, however, was inhabited by a Brazilian family. The walls are four feet in thickness. The long dark corridors and gloomy cloisters struck me as very inappropriate in the midst of this young and radiant nature. They would be more in place on some barren moor in northern Europe, than here in the midst of perpetual summer. The next turn in the river below Burujúba brought the city of Pará into view. The wind was now against us, and we were obliged to tack about. Towards evening it began to blow stiffly, the vessel heeled over very much, and Senhor Machado, for the first time, trembled for the safety of his cargo; the leaks burst out afresh, when we were yet two miles from the shore. He ordered another sail to be hoisted, in order to run more quickly into port, but soon afterwards an extra puff of wind came, and the old boat lurched alarmingly, the rigging gave way, and down fell boom and sail with a crash, encumbering us with the wreck. We were then obliged to have recourse to oars, and as soon as we were near the land, I begged Senhor Machado to send me ashore in the boat, with the more precious portion of my collections.

CHAPTER V.

CARIPÍ AND THE BAY OF MARAJÓ.

River Pará and Bay of Marajó—Journey to Caripí—Negro observance of Christmas—A German Family—Bats—Ant-eaters—Humming-birds—Excursion to the Murucupí—Domestic Life of the Inhabitants—Hunting Excursion with Indians—Natural History of the Paca and Cutia—Insects.

THAT part of the Pará river which lies in front of the city, as I have already explained, forms a narrow channel; being separated from the main waters of the estuary by a cluster of islands. This channel is about two miles broad, and constitutes part of the minor estuary of Goajará, into which the three rivers Guamá, Mojú, and Acará discharge their waters. The main channel of the Pará lies 10 miles away from the city, directly across the river; at that point, after getting clear of the islands, a great expanse of water is beheld, 10 to 12 miles in width; the opposite shore—the island of Marajó—being visible only in clear weather as a line of tree tops dotting the horizon. A little further upwards, that is to the south-west, the main land on the right or eastern shore appears, this is called Carnapijó; it is rocky, covered with the never-ending forest, and the coast which is fringed with broad sandy

beaches, describes a gentle curve inwards. The broad reach of the Pará in front of this coast is called the Bahia, or bay of Marajó. The coast and the interior of the land are peopled by civilised Indians and Mamelucos, with a mixture of free negroes and mulattos. They are poor, for the waters are not abundant in fish, and they are dependent for a livelihood solely on their small plantations, and the scanty supply of game found in the woods. The district was originally peopled by various tribes of Indians, of whom the principal were the Tupinambás and Nhengahíbas. Like all the coast tribes, whether inhabiting the banks of the Amazons or the sea-shore between Pará and Bahia, they were far more advanced in civilisation than the hordes scattered through the interior of the country, some of which still remain in the wild state, between the Amazons and the Plata. There are three villages on the coast of Carnapijó, and several planters' houses, formerly the centres of flourishing estates, which have now relapsed into forest in consequence of the scarcity of labour and diminished enterprise. One of the largest of these establishments is called Caripí: at the time of which I am speaking it belonged to a Scotch gentleman, Mr. Campbell, who had married the daughter of a large Brazilian proprietor. Most of the occasional English and American visitors to Pará had made some stay at Caripí, and it had obtained quite a reputation for the number and beauty of the birds and insects found there; I therefore applied for and obtained permission to spend two or three months at the place. The distance from Pará was about 23 miles, round by the

northern end of the Ilha das onças (Isle of Tigers), which faces the city. I bargained for a passage thither with the cabo of a small trading vessel, which was going past the place, and started on the 7th of December, 1848.

We were 13 persons aboard; the cabo, his pretty mulatto mistress, the pilot and five Indian canoemen, three young mamelucos, tailor-apprentices who were taking a holiday trip to Cametá, a runaway slave heavily chained, and myself. The young mamelucos were pleasant, gentle fellows: they could read and write, and amused themselves on the voyage with a book containing descriptions and statistics of foreign countries, in which they seemed to take great interest; one reading whilst the others listened. At Uirapiranga, a small island behind the Ilha das onças, we had to stop a short time to embark several pipes of cashaça at a sugar estate. The cabo took the montaria and two men; the pipes were rolled into the water and floated to the canoe, the men passing cables round and towing them through a rough sea. Here we slept, and the following morning, continuing our voyage, entered a narrow channel which intersects the land of Carnapijó. At 2 p.m. we emerged from this channel, which is called the Aititúba, or Arrozal, into the broad Bahia, and then saw, two or three miles away to the left, the red-tiled mansion of Caripí, embosomed in woods on the shores of a charming little bay.

The water is very shallow near the shore, and when the wind blows there is a heavy ground swell. A few years previously an English gentleman, Mr. Graham, an

amateur naturalist, was capsized here and drowned with his wife and child, whilst passing in a heavily-laden montaria to his large canoe. Remembering their fate, I was rather alarmed to see that I should be obliged to take all my luggage ashore in one trip in a leaky little boat. The pile of chests with two Indians and myself sank the montaria almost to the level of the water. I was kept busy baling all the way. The Indians manage canoes in this condition with admirable skill. They preserve the nicest equilibrium, and paddle so gently that not the slightest oscillation is perceptible. On landing, an old negress named Florinda, the feitora or manageress of the establishment which was kept only as a poultry farm and hospital for sick slaves, gave me the keys, and I forthwith took possession of the rooms I required.

I remained here nine weeks, or until the 12th of February, 1849. The house was very large and most substantially built, but consisted of only one story. I was told it was built by the Jesuits more than a century ago. The front had no verandah, the doors opening on a slightly elevated terrace about a hundred yards distant from the broad sandy beach. Around the residence the ground had been cleared to the extent of two or three acres, and was planted with fruit trees. Well-trodden pathways through the forest led to little colonies of the natives on the banks of retired creeks and rivulets in the interior. I led here a solitary but not unpleasant life ; there was a great charm in the loneliness of the place. The swell of the river beating on the sloping beach caused an unceasing murmur, which lulled me to sleep at night, and seemed appropriate

music in those midday hours when all nature was pausing breathless under the rays of a vertical sun. Here I spent my first Christmas-day in a foreign land. The festival was celebrated by the negroes of their own free will and in a very pleasing manner. The room next to the one I had chosen was the capella, or chapel. It had a little altar which was neatly arranged, and the room was furnished with a magnificent brass chandelier. Men, women, and children were busy in the chapel all day on the 24th of December decorating the altar with flowers and strewing the floor with orange-leaves. They invited some of their neighbours to the evening prayers, and when the simple ceremony began an hour before midnight, the chapel was crowded. They were obliged to dispense with the mass, for they had no priest; the service therefore consisted merely of a long litany and a few hymns. There was placed on the altar a small image of the infant Christ, the "Menino Deus" as they called it, or the child-god, which had a long ribbon depending from its waist. An old white-haired negro led off the litany, and the rest of the people joined in the responses. After the service was over they all went up to the altar, one by one, and kissed the end of the ribbon. The gravity and earnestness shown throughout the proceedings were remarkable. Some of the hymns were very simple and beautiful, especially one beginning "Virgem soberana," a trace of whose melody springs to my recollection whenever I think on the dreamy solitude of Caripí.

The next day after I arrived two blue-eyed and red-

haired boys came up and spoke to me in English, and presently their father made his appearance. They proved to be a German family named Petzell, who were living in the woods, Indian fashion, about a mile from Caripí. Petzell explained to me how he came here. He said that thirteen years ago he came to Brazil with a number of other Germans under engagement to serve in the Brazilian army. When his time had expired he came to Pará to see the country, but after a few months' rambling left the place to establish himself in the United States. There he married, went to Illinois, and settled as farmer near St. Louis. He remained on his farm seven or eight years, and had a family of five children. He could never forget, however, the free river life and perpetual summer of the banks of the Amazons, so he persuaded his wife to consent to break up their home in North America, and migrate to Pará. No one can imagine the difficulties the poor fellow had to go through before reaching the land of his choice. He first descended the Mississippi, feeling sure that a passage to Pará could be got at New Orleans. He was there told that the only port in North America he could start from was New York, so away he sailed for New York ; but there was no chance of a vessel sailing thence to Pará, so he took a passage to Demerara, as bringing him, at any rate, near to the desired land. There is no communication whatever between Demerara and Pará, and he was forced to remain here with his family four or five months, during which they all caught the yellow fever, and one of his children died. At length he heard of a small coasting vessel going to Cayenne, so he embarked and

got thereby another stage nearer the end of his journey. A short time after reaching Cayenne he shipped in a schooner that was going to Pará, or rather the island of Marajó, for a cargo of cattle. He had now fixed himself, after all his wanderings, in a healthy and fertile little nook on the banks of a rivulet near Caripí, built himself a log hut, and planted a large patch of mandioca and Indian corn. He seemed to be quite happy, but his wife complained much of the want of wholesome food, meat and wheaten bread. I asked the children whether they liked the country; they shook their heads, and said they would rather be in Illinois. Petzell told me that his Indian neighbours treated him very kindly; one or other of them called almost every day to see how he was getting on, and they had helped him in many ways. He had a high opinion of the Tapuyos, and said, "If you treat them well, they will go through fire to serve you."

Petzell and his family were expert insect collectors, so I employed them at this work during my stay at Caripí. The daily occurrences here were after a uniform fashion. I rose with the dawn, took a cup of coffee, and then sallied forth after birds. At ten I breakfasted, and devoted the hours from ten until three to entomology. The evening was occupied in preserving and storing my captures. Petzell and I sometimes undertook long excursions, occupying the whole day. Our neighbours used to bring me all the quadrupeds, birds, reptiles, and shells they met with, and so altogether I was enabled to acquire a good collection of the productions of the district.

The first few nights I was much troubled by bats. The room where I slept had not been used for many months, and the roof was open to the tiles and rafters. The first night I slept soundly and did not perceive anything unusual, but on the next I was aroused about midnight by the rushing noise made by vast hosts of bats sweeping about the room. The air was alive with them; they had put out the lamp, and when I relighted it the place appeared blackened with the impish multitudes that were whirling round and round. After I had laid about well with a stick for a few minutes they disappeared amongst the tiles, but when all was still again they returned, and once more extinguished the light. I took no further notice of them, and went to sleep. The next night several got into my hammock; I seized them as they were crawling over me, and dashed them against the wall. The next morning I found a wound, evidently caused by a bat, on my hip. This was rather unpleasant, so I set to work with the negroes, and tried to exterminate them. I shot a great many as they hung from the rafters, and the negroes having mounted with ladders to the roof outside, routed out from beneath the eaves many hundreds of them, including young broods. There were altogether four species, two belonging to the genus *Dysopes*, one to *Phyllostoma*, and the fourth to *Glossophaga*. By far the greater number belonged to the *Dysopes perotis*, a species having very large ears, and measuring two feet from tip to tip of the wings. The *Phyllostoma* was a small kind, of a dark gray colour, streaked with white down the back, and having a leaf-shaped fleshy expansion on the tip of the nose.

I was never attacked by bats except on this occasion. The fact of their sucking the blood of persons sleeping, from wounds which they make in the toes, is now well established ; but it is only a few persons who are subject to this blood-letting. According to the negroes, the *Phyllostoma* is the only kind which attacks man. Those which I caught crawling over me were *Dysopes*, and I am inclined to think many different kinds of bat have this propensity.

One day I was occupied searching for insects in the bark of a fallen tree, when I saw a large cat-like animal advancing towards the spot. It came within a dozen yards before perceiving me. I had no weapon with me but an old chisel, and was getting ready to defend myself if it should make a spring, when it turned round hastily and trotted off. I did not obtain a very distinct view of it, but I could see its colour was that of the *Puma*, or American Lion, although it was much too small for that species. The *Puma* is not a common animal in the Amazons forests. I did not see altogether more than a dozen skins in the possession of the natives. The fur is of a fawn colour. On account of its hue resembling that of a deer common in the forests, the natives call it the *Sassú-arána*,* or the false deer ; that is, an animal which deceives one at first sight by its superficial resemblance to a deer. The hunters are not at all afraid of it, and speak always in disparaging terms of

* The old zoologist Maregrave, called the *Puma* the *Cuguacuarana*, probably (the c's being soft) a misspelling of *Sassú-arána* ; hence the name *Cougouar* employed by French zoologists, and copied in most works on natural history.



ANT-EATER GRAPPLING WITH DOG.

its courage. Of the Jaguar they give a very different account.

The only species of monkey I met with at Caripí was the same dark-coloured little Midas already mentioned as found near Pará. The great Ant-eater, Tamanduá of the natives (*Myrmecophaga jubata*), was not uncommon here. After the first few weeks of residence I ran short of fresh provisions. The people of the neighbourhood had sold me all the fowls they could spare ; I had not yet learnt to eat the stale and stringy salt-fish which is the staple food in these places, and for several days I had lived on rice-porridge, roasted bananas, and farinha. Florinda asked me whether I could eat Tamanduá. I told her almost anything in the shape of flesh would be acceptable, so the same day she went with an old negro named Antonio and the dogs, and in the evening brought one of the animals. The meat was stewed and turned out very good, something like goose in flavour. The people at Caripí would not touch a morsel, saying it was not considered fit to eat in these parts ; I had read, however, that it was an article of food in other countries of South America. During the next two or three weeks, when we were short of fresh meat, Antonio was always ready, for a small reward, to get me a Tamanduá. But ^{*}one day he came to me in great distress with the news that his favourite dog, Atrevido, had been caught in the grip of an ant-eater, and was killed. We hastened to the place, and found the dog was not dead, but severely torn by the claws of the animal, which itself was mortally wounded, and was now relaxing its grasp.

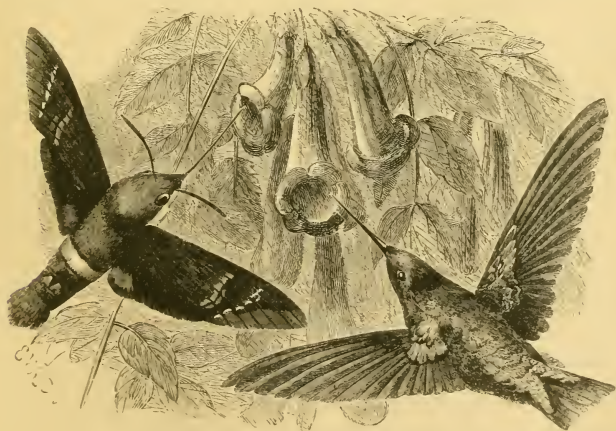
The habits of the *Myrmecophaga jubata* are now pretty well known. It is not uncommon in the drier forests of the Amazons valley, but is not found, I believe, in the Ygapó, or flooded lands. The Brazilians call the species the Tamanduá bandeira, or the Banner Ant-eater, the term banner being applied in allusion to the curious colouration of the animal, each side of the body having a broad oblique stripe half-gray and half-black, which gives it some resemblance to a heraldic banner. It has an excessively long slender muzzle, and a worm-like extensile tongue. Its jaws are destitute of teeth. The claws are much elongated, and its gait is very awkward. It lives on the ground, and feeds on termites, or white ants, the long claws being employed to pull in pieces the solid hillocks made by the insects, and the long flexible tongue to lick them up from the crevices. All the other species of this singular genus are arboreal. I met with four species altogether. One was the *Myrmecophaga tetradactyla*; the two others, more curious and less known, were very small kinds, called Tamanduá-i. Both are similar in size—ten inches in length, exclusive of the tail—and in the number of the claws, having two of unequal length to the anterior feet, and four to the hind feet. One species is clothed with grayish-yellow silky hair; this is of rare occurrence. The other has a fur of a dingy brown colour, without silky lustre. One was brought to me alive at Caripí, having been caught by an Indian clinging motionless inside a hollow tree. I kept it in the house about twenty-four hours. It had a moderately long snout, curved downwards, and extremely small eyes. It remained nearly all the time

without motion, except when irritated, in which case it reared itself on its hind legs from the back of a chair to which it clung, and clawed out with its fore paws like a cat. Its manner of clinging with its claws, and the sluggishness of its motions, gave it a great resemblance to a sloth. It uttered no sound, and remained all night on the spot where I had placed it in the morning. The next day I put it on a tree in the open air, and at night it escaped. These small Tamanduás are nocturnal in their habits, and feed on those species of termites which construct earthy nests, that look like ugly excrescences on the trunks and branches of trees. The different kinds of ant-eaters are thus adapted to various modes of life, terrestrial and arboreal. Those which live on trees are again either diurnal or nocturnal, for *Myrmecophaga tetradactyla* is seen moving along the main branches in the daytime. The allied group of the Sloths, which are still more exclusively South American forms than ant-eaters are, at the present time furnish arboreal species only, but formerly terrestrial forms of sloths existed, as the *Megatherium*, whose mode of life was a puzzle, seeing that it was of too colossal a size to live on trees, until Owen showed how it might have obtained its food from the ground.

In January the orange-trees became covered with blossom—at least to a greater extent than usual, for they flower more or less in this country all the year round—and the flowers attracted a great number of humming-birds. Every day, in the cooler hours of the morning, and in the evening from four o'clock till six, they were to be seen whirring about the trees by scores. Their

motions are unlike those of all other birds. They dart to and fro so swiftly that the eye can scarcely follow them, and when they stop before a flower it is only for a few moments. They poise themselves in an unsteady manner, their wings moving with inconceivable rapidity, probe the flower, and then shoot off to another part of the tree. They do not proceed in that methodical manner which bees follow, taking the flowers seriatim, but skip about from one part of the tree to another in the most capricious way. Sometimes two males close with each other and fight, mounting upwards in the struggle as insects are often seen to do when similarly engaged, and then separating hastily and darting back to their work. Now and then they stop to rest, perching on leafless twigs, when they may be sometimes seen probing, from the place where they sit, the flowers within their reach. The brilliant colours with which they are adorned cannot be seen whilst they are fluttering about, nor can the different species be distinguished unless they have a deal of white hue in their plumage, such as *Heliothrix auritus*, which is wholly white underneath although of a glittering green colour above, and the white-tailed *Florisuga mellivora*. There is not a great variety of humming-birds in the Amazons region, the number of species being far smaller in these uniform forest plains than in the diversified valleys of the Andes, under the same parallels of latitude. The family is divisible into two groups contrasted in form and habits, one containing species which live entirely in the shade of the forest, and the other comprising those which prefer open sunny places. The

forest species (*Phaethorninæ*) are seldom seen at flowers, flowers being, in the shady places where they abide, of rare occurrence; but they search for insects on leaves, threading the bushes and passing above and beneath each leaf with wonderful rapidity. The other group (*Trochilinæ*) are not quite confined to cleared places, as they come into the forest wherever a tree is in blossom, and descend into sunny openings where flowers are to be found. But it is only where the woods are less dense than usual that this is the case; in the lofty forests and twilight shades of the low lands and islands they are scarcely ever seen. I searched well at Caripí, expecting to find the *Lophornis Gouldii*, which I was told had been obtained in the locality. This is one of the most beautiful of all humming-birds, having round its neck a frill of long white feathers tipped with golden green. I was not, however, so fortunate as to meet with it. Several times I shot by mistake a humming-



Humming-bird and Humming-bird Hawk-moth.

bird hawk-moth instead of a bird. This moth (*Macroglossa Titan*) is somewhat smaller than humming-birds generally are, but its manner of flight, and the way it poises itself before a flower whilst probing it with its proboscis are precisely like the same actions of humming-birds. It was only after many days' experience that I learnt to distinguish one from the other when on the wing. This resemblance has attracted the notice of the natives, all of whom, even educated whites, firmly believe that one is transmutable into the other. They have observed the metamorphosis of caterpillars into butterflies, and think it not at all more wonderful that a moth should change into a humming-bird. The resemblance between this hawk-moth and a humming-bird is certainly very curious, and strikes one even when both are examined in the hand. Holding them sideways, the shape of the head and position of the eyes in the moth are seen to be nearly the same as in the bird, the extended proboscis representing the long beak. At the tip of the moth's body there is a brush of long hair-scales resembling feathers, which, being expanded, looks very much like a bird's tail. But, of course, all these points of resemblance are merely superficial. The negroes and Indians tried to convince me that the two were of the same species. "Look at their feathers," they said; "their eyes are the same, and so are their tails." This belief is so deeply rooted that it was useless to reason with them on the subject. The *Macroglossa* moths are found in most countries, and have everywhere the same habits; one well-known species is found in England.

Mr. Gould relates that he once had a stormy altercation with an English gentleman, who affirmed that humming-birds were found in England, for he had seen one flying in Devonshire, meaning thereby the moth *Macroglossa stellatarum*. The analogy between the two creatures has been brought about, probably, by the similarity of their habits, there being no indication of the one having been adapted in outward appearance with reference to the other.

It has been observed that humming-birds are unlike other birds in their mental qualities, resembling in this respect insects rather than warm-blooded vertebrate animals. The want of expression in their eyes, the small degree of versatility in their actions, the quickness and precision of their movements, are all so many points of resemblance between them and insects. In walking along the alleys of the forest a *Phaethornis* frequently crosses one's path, often stopping suddenly and remaining poised in mid-air, a few feet distant from the face of the intruder. The *Phaethorninæ* are certainly more numerous in individuals in the Amazons region than the *Trochilinæ*. They build their nests, which are made of fine vegetable fibres and lichens, densely woven together and thickly lined with silk-cotton from the fruit of the *samaüma* tree (*Eriodendron samaüma*), on the inner sides of the tips of palm fronds. They are long and purse-shaped. The young when first hatched have very much shorter bills than their parents. The only species of *Trochilinæ* which I found at Caripí were the little brassy-green *Polytmus viridissimus*, the Sapphire and emerald (*Thalurania*

furcata), and the large falcate-winged *Campylopterus obscurus*.

Snakes were very numerous at Caripí ; many harmless species were found near the house, and these sometimes came into the rooms. I was wandering one day amongst the green bushes of Guajará, a tree which yields a grape-like berry (*Chrysobalanus Icaco*) and grows along all these sandy shores, when I was startled by what appeared to be the flexuous stem of a creeping plant endowed with life and threading its way amongst the leaves and branches. This animated liana turned out to be a pale-green snake, the *Dryophis fulgida*. Its whole body is of the same green hue, and it is thus rendered undistinguishable amidst the foliage of the Guajará bushes, where it prowls in search of its prey, tree-frogs and lizards. The forepart of its head is prolonged into a slender pointed beak, and the total length of the reptile was six feet. There was another kind found amongst bushes on the borders of the forest closely allied to this, but much more slender, viz., the *Dryophis acuminata*. This grows to a length of 4 feet 8 inches, the tail alone being 22 inches ; but the diameter of the thickest part of the body is little more than a quarter of an inch. It is of light brown colour, with iridescent shades variegated with obscurer markings, and looks like a piece of whipcord. One individual which I caught of this species had a protuberance near the middle of the body. On opening it I found a half-digested lizard which was much more bulky than the snake itself. Another kind of serpent found here, a species of *Helicops*, was amphibious in its habits.

I saw several of this in wet weather on the beach, which, on being approached, always made straightway for the water, where they swam with much grace and dexterity. Florinda one day caught a *Helicops* whilst angling for fish, it having swallowed the fish-hook with the bait. She and others told me these water-snakes lived on small fishes, but I did not meet with any proof of the fact. In the woods, snakes were constantly occurring : it was not often, however, that I saw poisonous species. There were many arboreal kinds besides the two just mentioned ; and it was rather alarming, in entomologising about the trunks of trees, to suddenly encounter, on turning round, as sometimes happened, a pair of glittering eyes and a forked tongue within a few inches of one's head. The last kind I shall mention is the Coral-snake, which is a most beautiful object when seen coiled up on black soil in the woods. The one I saw here was banded with black and vermilion, the black bands having each two clear white rings. The state of specimens preserved in spirits can give no idea of the brilliant colours which adorn the Coral-snake in life.

Petzell and I, as already mentioned, made many excursions of long extent in the neighbouring forest. We sometimes went to Murucupí, a creek which passes through the forest about four miles behind Caripí, the banks of which are inhabited by Indians and half-breeds who have lived there for many generations in perfect seclusion from the rest of the world, the place being little known or frequented. A path from Caripí leads

to it through a gloomy tract of virgin forest, where the trees are so closely packed together that the ground beneath is thrown into the deepest shade, under which nothing but fetid fungi and rotting vegetable débris is to be seen. On emerging from this unfriendly solitude near the banks of the Murucupí, a charming contrast is presented. A glorious vegetation, piled up to an immense height, clothes the banks of the creek, which traverses a broad tract of semi-cultivated ground, and the varied masses of greenery are lighted up with the sunny glow. Open palm-thatched huts peep forth here and there from amidst groves of banana, mango, cotton, and papaw trees and palms. On our first excursion, we struck the banks of the river in front of a house of somewhat more substantial architecture than the rest, having finished mud walls, plastered and white-washed, and a covering of red tiles. It seemed to be full of children, and the aspect of the household was improved by a number of good-looking mameluco women, who were busily employed washing, spinning, and making farinha. Two of them, seated on a mat in the open verandah, were engaged sewing dresses, for a festival was going to take place a few days hence at Balcarem, a village eight miles distant from Murucupí, and they intended to be present to hear mass and show their finery. One of the children, a naked boy about seven years of age, crossed over with the montaria to fetch us. We were made welcome at once, and asked to stay for dinner. On our accepting the invitation a couple of fowls were killed, and a wholesome stew of seasoned rice and fowls soon put in preparation. It is not often that the female

members of a family in these retired places are familiar with strangers ; but these people had lived a long time in the capital, and therefore were more civilised than their neighbours. Their father had been a prosperous tradesman, and had given them the best education the place afforded. After his death the widow with several daughters, married and unmarried, retired to this secluded spot, which had been their sitio, farm or country house, for many years. One of the daughters was married to a handsome young mulatto, who was present and sang us some pretty songs, accompanying himself on the guitar.

After dinner I expressed a wish to see more of the creek, so a lively and polite old man, whom I took to be one of the neighbours, volunteered as guide. We embarked in a little montaria, and paddled some three or four miles up and down the stream. Although I had now become familiarised with beautiful vegetation, all the glow of fresh admiration came again to me in this place. The creek was about 100 yards wide, but narrower in some places. Both banks were masked by lofty walls of green drapery, here and there a break occurring through which, under over-arching trees, glimpses were obtained of the palm-thatched huts of settlers. The projecting boughs of lofty trees, which in some places stretched half-way across the creek, were hung with natural garlands and festoons, and an endless variety of creeping plants clothed the water frontage, some of which, especially the Bignonias, were ornamented with large gaily-coloured flowers. Art could not have assorted together beautiful vegetable forms so

harmoniously as was here done by Nature. Palms, as usual, formed a large proportion of the lower trees; some of them, however, shot up their slim stems to a height of sixty feet or more, and waved their bunches of nodding plumes between us and the sky. One kind of palm, the Pashiúba (*Iriartea exorrhiza*), which grows here in greater abundance than elsewhere, was especially attractive. It is not one of the tallest kinds, for when full-grown its height is not more, perhaps, than forty feet; the leaves are somewhat less drooping, and the leaflets much broader than in other species, so that they have not that feathery appearance which those of some palms have, but still they possess their own peculiar beauty. My guide put me ashore in one place to show me the roots of the Pashiúba. These grow above ground, radiating from the trunk many feet above the surface, so that the tree looks as if supported on stilts; and a person can, in old trees, stand upright amongst the roots with the perpendicular stem wholly above his head. It adds to the singularity of their appearance, that these roots, which have the form of straight rods, are studded with stout thorns, whilst the trunk of the tree is quite smooth. The purpose of this curious arrangement is, perhaps, similar to that of the buttress roots already described; namely, to recompense the tree by root-growth above the soil for its inability, in consequence of the competition of neighbouring roots, to extend it underground. The great amount of moisture and nutriment contained in the atmosphere, may also favour these growths.

On returning to the house, I found Petzell had been

well occupied during the hot hours of the day collecting insects in a neighbouring clearing. He had obtained no less than six species new to me of the beautiful family of Longicornes belonging to the order Coleoptera. Our kind hosts gave us a cup of coffee about five o'clock, and we then started for home. The last mile of our walk was performed in the dark. The forest in this part is obscure even in broad daylight, but I was scarcely prepared for the intense opacity of darkness which reigned here on this night, and which prevented us from seeing each other, although walking side by side. Nothing occurred of a nature to alarm us, except that now and then a sudden rush was heard amongst the trees, and once a dismal shriek startled us. Petzell tripped at one place and fell all his length into the thicket. With this exception, we kept well to the pathway, and in due time arrived safely at Caripí.

One of my neighbours at Murucupí was a hunter of reputation in these parts. He was a civilised Indian, married and settled, named Raimundo, whose habit was to sally forth at intervals to certain productive hunting grounds, whose situation he kept secret, and procure fresh provisions for his family. I had found out by this time, that animal food was as much a necessary of life in this exhausting climate as it is in the North of Europe. An attempt which I made to live on vegetable food was quite a failure, and I could not eat the execrable salt fish which Brazilians use. I had been many days without meat of any kind, and nothing more was to be found near Caripí, so I asked as a

favour of Senhor Raimundo, permission to accompany him on one of his hunting trips, and shoot a little game for my own use. He consented, and appointed a day on which I was to come over to his house to sleep, so as to be ready for starting with the ebb-tide shortly after midnight.

The locality we were to visit was situated near the extreme point of the land of Carnapijó, where it projects northwardly into the middle of the Pará estuary and is broken into a number of islands. On the afternoon of January 11th, 1849, I walked through the woods to Raimundo's house, taking nothing with me but a double-barrelled gun, a supply of ammunition and a box for the reception of any insects I might capture. Raimundo was a carpenter, and seemed to be a very industrious man; he had two apprentices, Indians like himself, one a young lad, and the other apparently about twenty years of age. His wife was of the same race. The Indian women are not always of a taciturn disposition like their husbands. Senhora Dominga was very talkative; there was another old squaw at the house on a visit, and the tongues of the two were going at a great rate the whole evening, using only the Tupí language. Raimundo and his apprentices were employed building a canoe. Notwithstanding his industry, he seemed to be very poor, and this was the condition of most of the residents on the banks of the Murucupí. They have, nevertheless, considerable plantations of mandioca and Indian corn, besides small plots of cotton, coffee, and sugar cane; the soil is very fertile, they have no rent to pay, and no direct taxes. There is, more-

over, always a market in Pará, twenty miles distant, for their surplus produce, and a ready communication with it by water.

Their poverty seemed to be owing chiefly to two causes. The first is, the prevalence amongst them of a kind of communistic mode of regarding property. The Indian and mameluco country people have a fixed notion that their neighbours have no right to be better off than themselves. If any of them have no food, canoe, or weapons, they beg or borrow without scruple of those who are better provided, and it is the custom not to refuse the gift or the loan. There is no inducement, therefore, for one family to strive or attempt to raise itself above the others. There is always a number of lazy people who prefer to live at the cost of their too good-natured neighbours. The other cause is, the entire dependence of the settlers on the precarious yields of hunting and fishing for their supply of animal food ; which is here, as already mentioned, as indispensable an article of diet as in cold climates. The young and strong who are able and willing to hunt and fish, are few. Raimundo, like all other hard-working men in these parts, had to neglect his regular labour every four or five days, and devote a day and a night to hunting or fishing. It does not seem to occur to these people, that they could secure a constant supply of meat by keeping cattle, sheep, or hogs, and feeding them with the produce of their plantations. This touches, however, on a fundamental defect of character which has been inherited from their Indian ancestors. The Brazilian aborigines had no notion of domesticating animals for use ; and such is the inflexibility

of organisation in the red man, and by inheritance from Indians also in half-breeds, that the habit seems impossible to be acquired by them, although they show great aptitude in other respects for civilised life. Is this attributable fundamentally to the absence in South America of indigenous animals suitable for domestication? It would appear so; and this is a great deficiency in a land otherwise so richly endowed by nature. This, however, is a difficult question, and involves many other considerations. The presence or absence of domesticable animals in a country, no doubt, has a very great influence on the character and culture of races. The North American Indians, especially those of Florida, offered many points of similarity in character and social condition to the Indians of the Amazons region; and they were, like them, condemned, probably from the same cause, to depend for existence chiefly on the produce of the chase or fishing. On the other hand, the Indians of Peru, whose more favoured home contained the Llama, were enabled to reach a high degree of civilisation, a great help thereto being this priceless animal, which served as a beast of burthen, and yielded wool for clothing, and milk, cheese, and flesh for nourishment. In the plains of Tropical America there exists no animal comparable to the ox, the horse, the sheep, or the hog. Of the last-mentioned, indeed, there are two wild species; but they are not closely allied to the European domestic hog. Of the other three animals, which have been such important helps to incipient civilisation in Asia and Europe, the genera even are unknown in South America. There

is no lack in the Amazonian forests of tameable animals fit for human food ; the tapir, the paca, the cutía, and the curassow turkeys, are often kept in houses and become quite as tame as the domesticated animals of the old world ; but they are useless from not breeding in confinement. Curassow birds are often seen in the houses of Indians ; one fine species, the *Mitu tuberosa*, becoming so familiar that it follows children about wherever they go ; it will not propagate, however, in captivity. It is shown to be not wholly the fault of the natives in this case, by their valuing the common fowl, which has been imported from Europe and adopted everywhere, even by remote tribes on rivers rarely visited by white men. It is, however, treated with little attention, and increases very slowly. The Indians do not show themselves so sensible of the advantages derivable from the ox, sheep, and hog, all of which have been introduced into their country. They seem unable to acquire a taste for their flesh, and the management of the animals in a domesticated state is evidently unsuited to their confirmed habits. The inferiority of the native animals compared with those of the old world in regard to capability of breeding in confinement, to which, according to this view, is originally owing the defect in the Indian character regarding the domestication of animals, has been brought about, probably, in some way not easily explicable, by the domination of the forest. It has been lately advanced by ethnologists, that where dense forests clothe the surface of a country, the native races of man cannot make any progress in civilisation.

It might be added, that vast and monotonous naked plains produce the same result. The animals which have been so useful in the infancy of human civilisation are such as roamed originally over open or scantily wooded plains, probably of limited extent. The fact of many delicious wild fruits existing in the forest which they have never learnt to cultivate seems to show, contrary to the view here advanced, that it is innate stupidity rather than want of materials, that has deprived the Indians of these helps to civilization. There is a kind of rice, growing wild on the banks of many of the tributaries of the Amazons, which they have never reclaimed, although they have adopted the plant introduced into the country by Europeans.*

In the evening we had more visitors. The sounds of pipe and tabor were heard, and presently a procession of villagers emerged from a pathway through the mandioca fields. They were on a begging expedition for St. Thomé, the patron saint of Indians and Mamelucos. One carried a banner, on which was rudely painted the figure of St. Thomé with a glory round his head. The pipe and tabor were of the simplest description. The pipe was a reed pierced with four holes, by means of

* Many useful vegetable products have been reclaimed, and it is to the credit of the Indians that they have discovered the use of the Mandioca plant, which is highly poisonous in the raw state, and requires a long preparation to fit it for use. It is cultivated throughout the whole of Tropical America, including Mexico and the West India Islands, but only in the plains, not being seen, according to Humboldt, higher than 600 to 800 metres, at which elevation it grows, on the Mexican Andes. I believe it is not known in what region the plant originated; it is not found wild in the Amazons valley.

which a few unmusical notes were produced, and the tabor was a broad hoop with a skin stretched over each end. A deformed young man played both the instruments. Senhor Raimundo received them with the quiet politeness, which comes so naturally to the Indian when occupying the position of host. The visitors, who had come from the Villa de Condé, five miles through the forest, were invited to rest. Raimundo then took the image of St. Thomé from one of the party, and placed it by the side of Nossa Senhora in his own oratorio, a little decorated box in which every family keeps its household gods ; finally lighting a couple of wax candles before it. Shortly afterwards a cloth was laid on a mat, and all the guests were invited to supper. The fare was very scanty ; a boiled fowl with rice, a slice of roasted pirarucú, farinha, and bananas. Each one partook very sparingly, some of the young men contenting themselves with a plateful of rice. One of the apprentices stood behind with a bowl of water and a towel, with which each guest washed his fingers and rinsed his mouth after the meal. They stayed all night : the large open shed was filled with hammocks, which were slung from pole to pole ; and on retiring, Raimundo gave orders for their breakfast in the morning.

Raimundo called me at two o'clock, when we embarked, he, his older apprentice Joaquim, and myself, in a shady place where it was so dark that I could see neither canoe nor water, taking with us five dogs. We glided down a winding creek where huge trunks of trees slanted across close overhead, and presently emerged into the Murucupí. A few yards further on we entered

the broader channel of the Aititúba. This we crossed, and entered another narrow creek on the opposite side. Here the ebb tide was against us, and we had great difficulty in making progress. After we had struggled against the powerful current a distance of two miles, we came to a part where the ebb tide ran in the opposite direction, showing that we had crossed the water-shed. The tide flows into this channel or creek at both ends simultaneously, and meets in the middle, although there is apparently no difference of level, and the breadth of the water is the same. The tides are extremely intricate throughout all the infinite channels and creeks which intersect the lands of the Amazons delta. The moon now broke forth and lighted up the trunks of colossal trees, the leaves of monstrous Jupatí palms which arched over the creek, and revealed groups of arborescent arums standing like rows of spectres on its banks. We had a glimpse now and then into the black depths of the forest, where all was silent except the shrill stridulation of wood-cricket. Now and then a sudden plunge in the water ahead would startle us, caused by heavy fruit or some nocturnal animal dropping from the trees. The two Indians here rested on their paddles and allowed the canoe to drift with the tide. A pleasant perfume came from the forest, which Raimundo said proceeded from a cane-field. He told me that all this land was owned by large proprietors at Pará, who had received grants from time to time from the Government for political services. Raimundo was quite in a talkative humour; he related to me many incidents of the time of the "Cabanagem," as the revo-

lutionary days of 1835-6 are popularly called. He said he had been much suspected himself of being a rebel ; but declared that the suspicion was unfounded. The only complaint he had to make against the white man was, that he monopolised the land without having any intention or prospect of cultivating it. He had been turned out of one place where he had squatted and cleared a large piece of forest. I believe the law of Brazil at this time was that the new lands should become the property of those who cleared and cultivated them, if their right was not disputed within a given term of years by some one who claimed the proprietorship. This land-law has since been repealed, and a new one adopted founded on that of the United States. Raimundo spoke of his race as the red-skins, "pelle vermelho ;" they meant well to the whites, and only begged to be let alone. "God," he said, "had given room enough for us all." It was pleasant to hear the shrewd good-natured fellow talk in this strain. Our companion, Joaquim, had fallen asleep ; the night air was cool, and the moonlight lit up the features of Raimundo, revealing a more animated expression than is usually observable in Indian countenances. I always noticed that Indians were more cheerful on a voyage, especially in the cool hours of night and morning, than when ashore. There is something in their constitution of body which makes them feel excessively depressed in the hot hours of the day, especially inside their houses. Their skin is always hot to the touch. They certainly do not endure the heat of their own climate so well as the whites. The negroes are totally different in this

respect ; the heat of midday has very little effect on them, and they dislike the cold nights on the river.

We arrived at our hunting-ground about half-past four. The channel was here broader and presented several ramifications. It yet wanted an hour and a half to day-break, so Raimundo recommended me to have a nap. We both stretched ourselves on the benches of the canoe and fell asleep, letting the boat drift with the tide, which was now slack. I slept well considering the hardness of our bed, and when I awoke in the middle of a dream about home-scenes the day was beginning to dawn. My clothes were quite wet with the dew. The birds were astir, the cicadas had begun their music, and the *Urania Leilus*, a strange and beautiful tailed and gilded moth, whose habits are those of a butterfly, commenced to fly in flocks over the tree tops. Raimundo exclaimed " *Clareia o dia !*" "The day brightens !" The change was rapid : the sky in the east assumed suddenly the loveliest azure colour, across which streaks of thin, white clouds were painted. It is at such moments as this when one feels how beautiful our earth truly is ! The channel on whose waters our little boat was floating was about 200 yards wide ; others branched off right and left, surrounding the group of lonely islands which terminate the land of Carnapijó. The forest on all sides formed a lofty hedge without a break : below, it was fringed with mangrove bushes, whose small foliage contrasted with the large glossy leaves of the taller trees, or the feather and fan-shaped fronds of palms.

Being now arrived at our destination, Raimundo turned

up his trousers and shirt-sleeves, took his long hunting-knife, and leapt ashore with the dogs. He had to cut a gap in order to enter the forest. We expected to find Pacas and Cutías ; and the method adopted to secure them was this : at the present early hour they would be seen feeding on fallen fruits, but would quickly, on hearing a noise, betake themselves to their burrows : Raimundo was then to turn them out by means of the dogs, and Joaquim and I were to remain in the boat with our guns ready to shoot all that came to the edge of the stream, the habit of both animals, when hard-pressed, being to take to the water. We had not long to wait. The first arrival was a Paca, a reddish, nearly tailless Rodent, spotted with white on the sides, and intermediate in size and appearance between a hog and a hare. My first shot did not take effect ; the animal dived into the water and did not re-appear. A second was brought down by my companion as it was rambling about under the mangrove bushes. A Cutía next appeared : this is also a Rodent, about one-third the size of the Paca : it swims, but does not dive, and I was fortunate enough to shoot it. We obtained in this way two more Pacas and another Cutía. All the time the dogs were yelping in the forest. Shortly afterwards Raimundo made his appearance, and told us to paddle to the other side of the island. Arrived there, we landed and prepared for breakfast. It was a pretty spot ; a clean, white, sandy beach beneath the shade of wide-spreading trees. Joaquim made a fire. He first scraped fine shavings from the midrib of a Bacaba palm-leaf ; these he piled into a little heap in a dry place, and then struck a light

in his bamboo tinder-box with a piece of an old file and a flint, the tinder being a felt-like soft substance manufactured by an ant (*Polyrhachis bispinosus*). By gentle blowing, the shavings ignited, dry sticks were piled on them, and a good fire soon resulted. He then singed and prepared the *cutía*, finishing by running a spit through the body and fixing one end in the ground in a slanting position over the fire. We had brought with us a bag of *farinha* and a cup containing a lemon, a dozen or two of fiery red peppers, and a few spoonful of salt. We breakfasted heartily when our *cutía* was roasted, and washed the meal down with a calabash full of the pure water of the river.

After breakfast the dogs found another *cutía*, which was hidden in its burrow two or three feet beneath the roots of a large tree, and took Raimundo nearly an hour to disinter it. Soon afterwards we left this place, crossed the channel, and, paddling past two islands, obtained a glimpse of the broad river between them, with a long sandy spit, on which stood several scarlet ibises and snowy-white egrets. One of the islands was low and sandy, and half of it was covered with gigantic arum-trees, the often-mentioned *Caladium arborescens*, which presented a strange sight. Most people are acquainted with the little British species, *Arum maculatum*, which grows in hedge bottoms, and many, doubtless, have admired the larger kinds grown in hot-houses; they can therefore form some idea of a forest of arums. On this islet the woody stems of the plants near the bottom were 8 to 10 inches in diameter, and the trees were 12 to 15 feet high; all growing together in such a manner

that there was just room for a man to walk freely between them. There was a canoe inshore, with a man and a woman : the man, who was hooting with all his might, told us in passing that his son was lost in the "aningal" (arum-grove). He had strayed whilst walking ashore, and the father had now been an hour waiting for him in vain.

About one o'clock we again stopped at the mouth of a little creek. It was now intensely hot. Raimundo said deer were found here, so he borrowed my gun, as being a more effective weapon than the wretched arms called Lazarinos, which he, in common with all the native hunters, used, and which sell at Pará for seven or eight shillings apiece. Raimundo and Joaquim now stripped themselves quite naked, and started off in different directions through the forest, going naked in order to move with less noise over the carpet of dead leaves, amongst which they stepped so stealthily that not the slightest rustle could be heard. The dogs remained in the canoe, in the neighbourhood of which I employed myself two hours entomologising. At the end of that time my two companions returned, having met with no game whatever.

We now embarked on our return voyage. Raimundo cut two slender poles, one for a mast and the other for a sprit : to these he rigged a sail we had brought in the boat, for we were to return by the open river, and expected a good wind to carry us to Caripí. As soon as we got out of the channel we began to feel the wind—the sea-breeze, which here makes a clean sweep from the Atlantic. Our boat was very small and heavily

laden, and when, after rounding a point, I saw the great breadth we had to traverse, seven miles, I thought the attempt to cross in such a slight vessel foolhardy in the extreme. The waves ran very high : there was no rudder ; Raimundo steered with a paddle, and all we had to rely upon to save us from falling into the trough of the sea and being instantly swamped were his nerve and skill. There was just room in the boat for our three selves, the dogs, and the game we had killed, and whenever we fell in the hollow of a sea our instant destruction seemed inevitable ; as it was, we shipped a little water now and then. Joaquim assisted with his paddle to steady the boat : my time was fully occupied in baling out the water and watching the dogs, which were crowded together in the prow, yelling with fear ; one or other of them occasionally falling over the side and causing great commotion in scrambling in again. Off the point was a ridge of rocks, over which the surge raged furiously. Raimundo sat at the stern, rigid and silent ; his eye steadily watching the prow of the boat. It was almost worth the risk and discomfort of the passage to witness the seamanlike ability displayed by Indians on the water. The little boat rode beautifully, rising well with each wave, and in the course of an hour and a half we arrived at Caripí, thoroughly tired and wet through to the skin.

I will here make a few observations regarding the Paca and the Cutía, although there is little to relate of their habits in addition to what is contained in natural history books. The Paca is the *Cœlogenys Paca* of zoologists, and the Cutía the *Dasyprocta Aguti*, or a

local variety of that species. Both differ much from our hare and rabbit, which belong to the same order of animals, their fur being coarse and bristly, and their ears short and broad. Their flesh is widely different in taste from that of our English Rodents. The meat of the Paca, in colour, grain, and flavour, resembles young pork; it is much drier, however, and less palatable than pork. The skin is thick, and boils down to a jelly, when it makes a capital soup with rice. Both animals live exclusively in the forests, both dry and moist, being found, perhaps, most abundantly in the ygapós and islands. When these are flooded in the wet season, they escape to the drier lands by swimming across the intervening channels. At Murucupí I saw several semi-domesticated individuals of both species, which had been caught when young, and were suffered to run freely about the houses. The Paca was not so familiar as the Cutía, which generally makes use of a hole or a box in a corner for a hiding-place, and comes out readily to be fed by children. I once saw a tame Cutía running about the woods nibbling the fruits fallen from the Inajá palm-tree (*Maximiliana regia*), and when I tried to catch it, instead of betaking itself to the thicket, it ran off to the house of its owners, which was about two hundred yards off. When feeding, this species sometimes sits upright, and takes its food in the fore paws like a squirrel.

The Paca and the Cutía belong to a peculiar family of the Rodent order which is confined to South America, and which connects the Rodents to the Pachydermata, the order to which the elephant, horse, and hog belong.

One of the principal points of distinction from other families is the strong, blunt form of the claws, which in one of the forms (the *Capybara*) are very broad, and approximate in shape to the hoofs of the *Pachydermata*. On this account the family is named by some authors *Subungulati*; the great division of mammalian animals to which the *Pachydermata* belong being called, in the classifications of the best authors, *Ungulata*, after the hoofed feet, which are considered their leading character. It is an interesting fact that the pachydermatous animal most nearly allied to the Rodents is also American, although found only in the fossil state, namely, the *Toxodon*, which Professor Owen states resembled the *Rodentia* in its dentition. The *Toxodon*, on the other hand, was nearly related to the Elephant, of which the same distinguished zoologist says, "Several particulars in its organization indicate an affinity to the *Rodentia*." These facts impart a high degree of interest to these semi-hoofed American Rodents, because they make it probable that these animals are the living representatives, albeit somewhat modified, of a group which existed at a former distant epoch in the world's history, and which possessed a structure partaking of the characters of the two great orders, *Rodentia* and *Pachydermata*, now so widely distinct in the majority of their forms. I believe that no remains of the order *Toxodontia*, or of the Rodent family *Subungulati*, have been found fossil in any other part of the world besides America. In this sort of question it is very unsafe to found generalizations on negative evidence; but does not this tend to show that

the great section of mammals to which the Pachydermata belong had its origin on that part of the earth's surface where South America now stands ?

On the 16th of January the dry season came abruptly to an end. The sea breezes, which had been increasing in force for some days, suddenly ceased, and the atmosphere became misty ; at length heavy clouds collected where a uniform blue sky had for many weeks prevailed, and down came a succession of heavy showers, the first of which lasted a whole day and night. This seemed to give a new stimulus to animal life. On the first night there was a tremendous uproar—tree-frogs, crickets, goat-suckers, and owls, all joining to perform a deafening concert. One kind of goat-sucker kept repeating at intervals throughout the night a phrase similar to the Portuguese words, "Joaõ corta pau," "John, cut wood ;" a phrase which forms the Brazilian name of the bird. An owl in one of the Genipapa trees muttered now and then a succession of syllables resembling the word "Murucututú." Sometimes the croaking and hooting of frogs and toads were so loud that we could not hear one another's voices within doors. Swarms of dragon-flies appeared in the daytime about the pools of water created by the rain, and ants and termites came forth in the winged state in vast numbers. I noticed that the winged termites, or white ants, which came by hundreds to the lamps at night, when alighting on the table, often jerked off their wings by a voluntary movement. On examination I found that the wings were

not shed by the roots, for a small portion of the stumps remained attached to the thorax. The edge of the fracture was in all cases straight, not ruptured: there is, in fact, a natural seam crossing the member towards its root, and at this point the long wing naturally drops or is jerked off when the insect has no further use for it. The white ant is endowed with wings simply for the purpose of flying away from the colony peopled by its wingless companions, to pair with individuals of the same or other colonies, and thus propagate and disseminate its kind. The winged individuals are males and females, whilst the great bulk of their wingless fraternity are of no sex, and are restricted to the functions of building the nests, nursing and defending the young brood. The two sexes mate whilst on the ground after the wings are shed, and then the married couples, if they escape the numerous enemies which lie in wait for them, proceed to the task of founding new colonies. Ants and white ants have much that is analogous in their modes of life: they belong, however, to two widely different orders of insects, strongly contrasted in their structure and manner of growth. In some respects the termites are more wonderful than the ants, but I shall reserve an account of them for another chapter.

I amassed at Caripí a very large collection of beautiful and curious insects, amounting altogether to about twelve hundred species. The number of Coleoptera was remarkable, seeing that this order is so poorly represented near Pará. I attributed their abundance to the number of new clearings made in the virgin forest by the native settlers. The felled timber attracts ligni-

vorous insects, and these draw in their train the predacious species of various families. As a general rule the species were smaller and much less brilliant in colours than those of Mexico and South Brazil. The species too, although numerous, were not represented by great numbers of individuals; they were also extremely nimble, and therefore much less easy of capture than insects of the same order in temperate climates. On the sandy beach I found two species of *Tetracha*, a genus of tiger-beetles, which have remarkably large heads, and are found only in hot climates. They come forth at night, in the daytime remaining hid in their burrows several inches deep in the light soil. Their powers of running exceed everything I witnessed in this style of insect locomotion. They run in a serpentine course over the smooth sand, and when closely pursued by the fingers in the endeavour to seize them, are apt to turn suddenly back, and thus baffle the most practised hand and eye. I afterwards became much interested in these insects on several accounts, one of which was that they afforded an illustration of a curious problem in natural history. One of the Caripí species (*T. nocturna* of Dejean) was of a pallid hue like the sand over which it ran; the other was a brilliant copper-coloured kind (*T. pallipes* of Klug). Many insects whose abode is the sandy beaches are white in colour; I found a large earwig and a mole-cricket of this hue very common in these localities. Now it has been often said, when insects, lizards, snakes, and other animals, are coloured so as to resemble the objects on which they live, that such is a provision of nature, the assimilation of colours being

given in order to conceal the creatures from the keen eyes of insectivorous birds and other animals. This is no doubt the right view, but some authors have found a difficulty in the explanation on account of this assimilation of colours being exhibited by some kinds and not by others living in company with them ; the dress of some species being in striking contrast to the colours of their dwelling-place. One of our *Tetrachas* is coloured to resemble the sand, whilst its sister species is a conspicuous object on the sand ; the white species, it may be mentioned, being much more swift of foot than the copper-coloured one. The margins of these sandy beaches are frequented throughout the fine season by flocks of sandpipers, who search for insects on moonlit nights as well as by day. If one species of insect obtains immunity from their onslaughts by its deceptive resemblance to the sandy surface on which it runs, why is not its sister species endowed in the same way ? The answer is, that the dark-coloured kind has means of protection of quite a different nature, and therefore does not need the peculiar mode of disguise enjoyed by its companion. When handled it emits a strong, offensive, putrid and musky odour, a property which the pale kind does not exhibit. Thus we see that the fact of some species not exhibiting the same adaptation of colours to dwelling-places as their companion species does not throw doubt on the explanation given of the adaptation, but is rather confirmatory of it.

The carnivorous beetles at Caripí were, like those of Pará, chiefly arboreal. Some were found under the bark

of trees (*Coptodera*, *Goniotropis*, *Morio*, &c.), others running over the slender twigs, branches, and leaves (*Ctenostoma*, *Lebia*, *Calophæna*, *Lia*, &c.), and many were concealed in the folds of leaves (*Calleida*, *Agra*, &c.). Most of them exhibited a beautiful contrivance for enabling them to cling to and run over smooth or flexible surfaces, such as leaves. Their tarsi or feet are broad, and furnished beneath with a brush of short stiff hairs, whilst their claws are toothed in the form of a comb, adapting them for clinging to the smooth edges of leaves, the joint of the foot which precedes the claw being cleft so as to allow free play to the claw in grasping. The common dung-beetles at Caripí, which flew about in the evening like the *Geotrupes*, the familiar "shard-borne beetle with his drowsy hum" of our English lanes, were of colossal size and beautiful colours. One kind had a long spear-shaped horn projecting from the crown of its head (*Phanæus lancifer*). A blow from this fellow, as he came heavily flying along, was never very pleasant. All the tribes of beetles which feed on vegetable substances, fresh or decayed, were very numerous. The most beautiful of these, but not the most common, were the Longicornes; very graceful insects, having slender bodies and long antennæ, often ornamented with fringes and tufts of hair. They were found on flowers, on trunks of trees, or flying about the new clearings. One small species (*Coremia hirtipes*) has a tuft of hairs on its hind legs, whilst many of its sister species have a similar ornament on the antennæ. It suggests curious reflections when we see an ornament like the feather of a grenadier's cap situated on one part of the

body in one species, and in a totally different part in nearly allied ones. I tried in vain to discover the use of these curious brush-like decorations. On the trunk of a living leguminous tree, Petzell found a number of a very rare and handsome species, the *Platysternus hebræus*, which is of a broad shape, coloured ochreous, but spotted and striped with black, so as to resemble a domino. On the felled trunks of trees, swarms of gilded-green *Longicornes* occurred, of small size (*Chrysoprasis*), which looked like miniature musk-beetles, and, indeed, are closely allied to those well-known European insects.

I was interested in the many small kinds of lignivorous or wood-eating insects found at Caripí, a few observations on which may be given in conclusion. It is curious to observe how some small groups of insects exhibit the most diversified forms and habits—one set of species being adapted by their structure for one set of functions in nature, and another set, very closely allied, for an opposite sphere of action. Thus the *Histeridæ*—small black beetles well known to English entomologists, most of whose species are short and thick in shape and live in the dung of animals—are most diversified in structure and habits in the Amazons region; nevertheless, all the forms preserve in a remarkable degree the essential characters of the family. One set of species live in dung; most of these are somewhat cubical in shape, the head being retractable within the breastplate, as in the tortoise. Another group of *Histeridæ* are much flatter in form, and live in the moist interior of palm-tree stems; one

of these is a veritable colossus, the *Hister maximus* of Linnæus. A third group (*Hololeptæ*) are found only under the bark of trees ; their heads are not retractable within the breast, and their bodies are excessively depressed, to fit them for living in narrow crevices, some kinds being literally as thin as a wafer. A fourth set of species (*Trypanæus*) form a perfect contrast to these, being cylindrical in shape. They drill holes into solid wood, and look like tiny animated gimlets when seen at work, their pointed heads being fixed in the wood whilst their smooth glossy bodies work rapidly round, so as to create little streams of sawdust from the holes. Several families of insects show similar diversities of adaptation amongst their species, but none, I think, to the same extent as the *Histeridæ*, considering the narrow limits of the group. The facts presented by such groups in the animal kingdom must be taken into account in any explanation of the way the almost infinite diversity of the forms of life has been brought about on this wonderful earth.

At length, on the 12th of February, I left Caripí, my Negro and Indian neighbours bidding me a warm "adeos." I had passed a delightful time, notwithstanding the many privations undergone in the way of food. The wet season had now set in ; the low lands and islands would soon become flooded daily at high water, and the difficulty of obtaining fresh provisions would increase. I intended, therefore, to spend the next three months at Pará, in whose neighbourhood there was still much to be done in the intervals of fine weather, and then start off on another excursion into the interior.

CHAPTER VI.

THE LOWER AMAZONS—PARÁ TO OBYDOS.

Modes of Travelling on the Amazons—Historical Sketch of the early Explorations of the River—Preparations for Voyage—Life on board a large Trading-vessel—The narrow Channels joining the Pará to the Amazons—First Sight of the great River—Gurupá—The Great Shoal—Flat-topped Mountains—Contraction of the River Valley—Santarem—Obydos—Natural History of Obydos—Origin of Species by Segregation of Local Varieties.

AT the time of my first voyage up the Amazons—namely, in 1849—nearly all communication with the interior was by means of small sailing vessels, owned by traders residing in the remote towns and villages, who seldom came to Pará themselves, but entrusted vessels and cargoes to the care of half-breeds or Portuguese cabos. Sometimes, indeed, they risked all in the hands of the Indian crew, making the pilot, who was also steersman, do duty as supercargo. Now and then, Portuguese and Brazilian merchants at Pará furnished young Portuguese with merchandise, and despatched them to the interior to exchange the goods for produce amongst the scattered population. The means of communication, in fact, with the upper parts of the Amazons had been on the decrease for some time, on account of the augmented difficulty of obtaining hands

to navigate vessels. Formerly, when the Government wished to send any important functionary, such as a judge or a military commandant, into the interior, they equipped a swift-sailing galliota, manned with ten or a dozen Indians. These could travel, on the average, in one day further than the ordinary sailing craft could in three. Indian paddlers were now, however, almost impossible to be obtained, and Government officers were obliged to travel as passengers in trading vessels. The voyage made in this way was tedious in the extreme. When the regular east wind blew—the “vento geral,” or trade wind, of the Amazons—sailing vessels could get along very well; but when this failed they were obliged to remain, sometimes many days together, anchored near the shore, or progress laboriously by means of the “*espia*.” This latter mode of travelling was as follows. The *montaria*, with twenty or thirty fathoms of cable, one end of which was attached to the foremast, was sent ahead with a couple of hands, who secured the other end of the rope to some strong bough or tree trunk; the crew then hauled the vessel up to the point, after which the men in the boat re-embarked the cable, and paddled forwards to repeat the process. In the dry season, from August to December, when the trade-wind is strong and the currents slack, a schooner could reach the mouth of the Rio Negro, a thousand miles from Pará, in about forty days; but in the wet season, from January to July, when the east wind no longer blows and the Amazons pours forth its full volume of water, flooding the banks and producing a tearing current, it took three months to

travel the same distance. It was a great blessing to the inhabitants when, in 1853, a line of steamers was established, and this same journey could be accomplished with ease and comfort, at all seasons, in eight days!

It is, perhaps, not generally known that the Portuguese, as early as 1710, had a fair knowledge of the Amazons; but the information gathered by their government from various expeditions undertaken on a grand scale, was long withheld from the rest of the world, through the jealous policy which ruled in their colonial affairs. From the foundation of Pará by Caldeira, in 1615, to the settlement of the boundary line between the Spanish and Portuguese possessions, Peru and Brazil, in 1781-91, numbers of these expeditions were in succession undertaken. The largest was the one commanded by Pedro Texeira in 1637-9, who ascended the river to Quito, by way of the Napo, a distance of about 2800 miles, with 45 canoes and 900 men, and returned to Pará without any great misadventure by the same route. The success of this remarkable undertaking amply proved, at that early date, the facility of the river navigation, the practicability of the country, and the good disposition of the aboriginal inhabitants. The river, however, was first discovered by the Spaniards, the mouth having been visited by Pinzon in 1500, and nearly the whole course of the river navigated by Orellana in 1541-2. The voyage of the latter was one of the most remarkable on record. Orellana was a lieutenant of Gonzalo Pizarro, governor of Quito, and accompanied the latter in an adventurous journey

which he undertook across the easternmost chain of the Andes, down into the sweltering valley of the Napo, in search of the land of El Dorado, or the Gilded King. They started with 300 soldiers and 4000 Indian porters ; but, arrived on the banks of one of the tributaries of the Napo, their followers were so greatly decreased in number by disease and hunger, and the remainder so much weakened, that Pizarro was obliged to despatch Orellana with fifty men, in a vessel they had built, to the Napo, in search of provisions. It can be imagined by those acquainted with the Amazons country how fruitless this errand would be in the wilderness of forest where Orellana and his followers found themselves when they reached the Napo, and how strong their disinclination would be to return against the currents and rapids which they had descended. The idea then seized them to commit themselves to the chances of the stream, although ignorant whither it would lead. So onward they went. From the Napo they emerged into the main Amazons, and, after many and various adventures with the Indians on its banks, reached the Atlantic eight months from the date of their entering the great river.*

Another remarkable voyage was accomplished, in a similar manner, by a Spaniard named Lopez d'Aguires, from Cusco, in Peru, down the Ucayali, a branch of the Amazons flowing from the south, and therefore from an

* It was during this voyage that the nation of female warriors was said to have been met with ; a report which gave rise to the Portuguese name of the river, Amazonas. It is now pretty well known that this is a mere fable, originating in the love of the marvellous which distinguished the early Spanish adventurers, and impaired the credibility of their narratives.

opposite direction to that of the Napo. An account of this journey was sent by D'Aguires, in a letter to the King of Spain, from which Humboldt has given an extract in his narrative. As it is a good specimen of the quaintness of style and looseness of statement exhibited by these early narrators of adventures in South America, I will give a translation of it. "We constructed rafts, and, leaving behind our horses and baggage, sailed down the river (the Ucayali) with great risk, until we found ourselves in a gulf of fresh water. In this river Marañon we continued more than ten months and a half, down to its mouth, where it falls into the sea. We made one hundred days' journey, and travelled 1500 leagues. It is a great and fearful stream, has 80 leagues of fresh water at its mouth, vast shoals, and 800 leagues of wilderness without any kind of inhabitants,* as your Majesty will see from the true and correct narrative of the journey which we have made. It has more than 6000 islands. God knows how we came out of this fearful sea." Many expeditions were undertaken in the course of the eighteenth century; in fact, the crossing of the continent from the Pacific to the Atlantic, by way of the Amazons, seems to have become by this time a common occurrence. The only voyage, however, which yielded much scientific information to the European public was that of the French astronomer, La Condamine, in 1743-4. The most complete account

* This account disagrees with that of Acunna, the historiographer of Texeira's expedition, who accompanied him, in 1639, on his return voyage from Quito. Acunna speaks of a very numerous population on the banks of the Amazons.

yet published of the river is that given by Von Martius in the third volume of Spix and Martius' Travels. These most accomplished travellers were eleven months in the country—namely, from July, 1819, to June, 1820, and ascended the river to the frontiers of the Brazilian territory. Their accounts of the geography, ethnology, botany, history, and statistics of the Amazons region are the most complete that have ever been given to the world. Their narrative was not published until 1831, and was unfortunately inaccessible to me during the time I travelled in the same country.

Whilst preparing for my voyage it happened fortunately that the half-brother of Dr. Angelo Custodio, a young mestizo named Joaõ da Cunha Correia, was about starting for the Amazons on a trading expedition in his own vessel, a schooner of about forty tons burthen. A passage for me was soon arranged with him through the intervention of Dr. Angelo, and we started on the 5th of September, 1849. I intended to stop at some village on the northern shore of the Lower Amazons, where it would be interesting to make collections, in order to show the relations of the fauna to those of Pará and the coast region of Guiana. As I should have to hire a house or hut wherever I stayed, I took all the materials for housekeeping—cooking utensils, crockery, and so forth. To these were added a stock of such provisions as were difficult to obtain in the interior; also ammunition, chests, store boxes, a small library of natural history books, and a hundredweight of copper money. I engaged, after some trouble, a Mameluco

youth to accompany me as servant—a short, fat, yellow-faced boy named Luco, whom I had already employed at Pará in collecting. We weighed anchor at night, and on the following day found ourselves gliding along the dark-brown waters of the Mojú.

Joaõ da Cunha, like most of his fellow-countrymen, took matters very easily. He was going to be absent in the interior several years, and therefore intended to diverge from his route to visit his native place, Cametá, and spend a few days with his friends. It seemed not to matter to him that he had a cargo of merchandise, vessel, and crew of twelve persons, which required an economical use of time; “pleasure first and business afterwards” appeared to be his maxim. We stayed at Cametá twelve days. The chief motive for prolonging the stay to this extent was a festival at the Aldeia, two miles below Cametá, which was to commence on the 21st, and which my friend wished to take part in. On the day of the festival the schooner was sent down to anchor off the Aldeia, and master and men gave themselves up to revelry. In the evening a strong breeze sprang up, and orders were given to embark. We scrambled down in the dark through the thickets of cacao, orange, and coffee trees which clothed the high bank, and, after running great risk of being swamped by the heavy sea in the crowded montaria, got all aboard by nine o’clock. We made all sail amidst the “adeos” shouted to us by Indian and mulatto sweethearts from the top of the bank, and, tide and wind being favourable, were soon miles away.

Our crew consisted, as already mentioned, of twelve

persons. One was a young Portuguese from the province of Traz os Montes, a pretty sample of the kind of emigrants which Portugal sends to Brazil. He was two or three and twenty years of age, and had been about two years in the country, dressing and living like the Indians, to whom he was certainly inferior in manners. He could not read and write, whereas one at least of our Tapuyos had both accomplishments. He had a little wooden image of Nossa Senhora in his rough wooden clothes chest, and to this he always had recourse when any squall arose, or when we got aground on a shoal. Another of our sailors was a tawny white of Cameté; the rest were Indians, except the cook, who was a Cafuzo, or half-breed between the Indian and negro. It is often said that this class of mestizos is the most evilly-disposed of all the numerous crosses between the races inhabiting Brazil; but Luiz was a simple, good-hearted fellow, always ready to do one a service. The pilot was an old Tapuyo of Pará, with regular oval face and well-shaped features. I was astonished at his endurance. He never quitted the helm night or day, except for two or three hours in the morning. The other Indians used to bring him his coffee and meals, and after breakfast one of them relieved him for a time, when he used to lie down on the quarter-deck and get his two hours' nap. The Indians forward had things pretty much their own way. No system of watches was followed; when any one was so disposed, he lay down on the deck and went to sleep; but a feeling of good fellowship seemed always to exist amongst them. One of them was a fine specimen of the Indian race: a man very little short of six feet

high, with remarkable breadth of shoulder and full muscular chest. His comrades called him the commandant, on account of his having been one of the rebel leaders when the Indians and others took Santarem in 1835. They related of him that, when the legal authorities arrived with an armed flotilla to recapture the town, he was one of the last to quit, remaining in the little fortress which commands the place to make a show of loading the guns, although the ammunition had given out long ago. Such were our travelling companions. We lived almost the same as on board ship. Our meals were cooked in the galley; but, where practicable, and during our numerous stoppages, the men went in the montaria to fish near the shore, so that our breakfasts and dinners of salt pirarucu were sometimes varied with fresh food.

Sept. 24th.—We passed Entre-as-Ilhas with the morning tide yesterday, and then made across to the eastern shore—the starting-point for all canoes which have to traverse the broad mouth of the Tocantins going west. Early this morning we commenced the passage. The navigation is attended with danger on account of the extensive shoals in the middle of the river, which are covered only by a small depth of water at this season of the year. The wind was fresh, and the schooner rolled and pitched like a ship at sea. The distance was about fifteen miles. In the middle, the river view was very imposing. Towards the north-east there was a long sweep of horizon clear of land, and on the south-west stretched a similar boundless expanse, but varied with islets clothed with fan-leaved

palms, which, however, were visible only as isolated groups of columns, tufted at the top, rising here and there amidst the waste of waters. In the afternoon we rounded the westernmost point ; the land, which is not terra firma, but simply a group of large islands forming a portion of the Tocantins delta, was then about three miles distant.

On the following day (25th) we sailed towards the west, along the upper portion of the Pará estuary, which extends seventy miles beyond the mouth of the Tocantins. It varies in width from three to five miles, but broadens rapidly near its termination, where it is eight or nine miles wide. The northern shore is formed by the island of Marajó, and is slightly elevated and rocky in some parts. A series of islands conceals the southern shore from view most part of the way. The whole country, mainland and islands is covered with forest. We had a good wind all day, and about 7 p.m. entered the narrow river of Breves, which commences abruptly the extensive labyrinth of channels that connect the Pará with the Amazons. The sudden termination of the Pará at a point where it expands to so great a breadth is remarkable ; the water, however, is very shallow over the greater portion of the expanse. I noticed, both on this and on the three subsequent occasions of passing this place in ascending and descending the river, that the flow of the tide from the east along the estuary, as well as up the Breves, was very strong. This seems sufficient to prove that no considerable volume of water passes by this medium from the Amazons to the Pará, and that the opinion of those geographers is an

incorrect one, who believe the Pará to be one of the mouths of the great river. There is, however, another channel connecting the two rivers, which enters the Pará six miles to the south of the Breves. The lower part of its course for eighteen miles is formed by the Uanapú, a large and independent river flowing from the south. The tidal flow is said by the natives to produce little or no current up this river; a fact which seems to afford a little support to the view just stated.

We passed the village of Breves at 3 p.m. on the 26th. It consists of about forty houses, most of which are occupied by Portuguese shopkeepers. A few Indian families reside here, who occupy themselves with the manufacture of ornamental pottery and painted cuyas, which they sell to traders or passing travellers. The cuyas—drinking-cups made from gourds—are sometimes very tastefully painted. The rich black ground-colour is produced by a dye made from the bark of a tree called Comateü, the gummy nature of which imparts a fine polish. The yellow tints are made with the Tabatinga clay; the red with the seeds of the Urucú, or anatto plant; and the blue with indigo, which is planted round the huts. The art is indigenous with the Amazonian Indians, but it is only the settled agricultural tribes belonging to the Tupí stock who practise it.

Sept. 27th-30th.—After passing Breves we continued our way slowly along a channel, or series of channels, of variable width. On the morning of the 27th we had a fair wind, the breadth of the stream varying from about 150 to 400 yards. The forest was not remarkable in

appearance; the banks were muddy, and in low marshy places groups of *Caladiums* fringed the edge of the water. About midday we passed, on the western side, the mouth of the *Aturiazal*, through which, on account of its swifter current, vessels pass in descending from the *Amazons* to *Pará*. Shortly afterwards we entered the narrow channel of the *Jaburú*, which lies twenty miles above the mouth of the *Breves*. Here commences the peculiar scenery of this remarkable region. We found ourselves in a narrow and nearly straight canal, not more than eighty to a hundred yards in width, and hemmed in by two walls of forest, which rose quite perpendicularly from the water to a height of seventy or eighty feet. The water was of great and uniform depth, even close to the banks. We seemed to be in a deep gorge, and the strange impression the place produced was augmented by the dull echoes produced by the voices of our Indians and the splash of their paddles. The forest was excessively varied. Some of the trees, the dome-topped giants of the *Leguminous* and *Bombaceous* orders, reared their heads far above the average height of the green walls. The fan-leaved *Mirití* palm was scattered in some numbers amidst the rest, a few solitary specimens shooting up their smooth columns above the other trees. The graceful *Assai* palm grew in little groups, forming feathery pictures set in the rounder foliage of the mass. The *Ubussú*, lower in height, showed only its shuttlecock-shaped crowns of huge undivided fronds, which, being of a vivid pale green, contrasted forcibly against the sombre hues of the surrounding foliage. The *Ubussú* grew here in great

numbers ; the equally remarkable Jupatí palm (*Rhaphia tædigera*), which, like the Ubussú, is peculiar to this district, occurred more sparsely, throwing its long shaggy leaves, forty to fifty feet in length, in broad arches over the canal. An infinite diversity of smaller-sized palms decorated the water's edge, such as the Marajá-i (*Bac-tris*, many species), the Ubim (*Geonoma*), and a few stately Bacábas (*Ænocarpus Bacaba*). The shape of this last is exceedingly elegant, the size of the crown being in proper proportion to the straight smooth stem. The leaves, down even to the bases of the glossy petioles, are of a rich dark-green colour, and free from spines. "The forest wall"—I am extracting from my journal—"under which we are now moving consists, besides palms, of a great variety of ordinary forest-trees. From the highest branches of these down to the water sweep ribbons of climbing plants of the most diverse and ornamental foliage possible. Creeping convolvuli and others have made use of the slender lianas and hanging air-roots as ladders to climb by. Now and then appears a *Mimosa* or other tree having similar fine pinnate foliage, and thick masses of Ingá border the water, from whose branches hang long bean-pods, of different shape and size according to the species, some of them a yard in length. Flowers there are very few. I see, now and then, a gorgeous crimson blossom on long spikes ornamenting the sombre foliage towards the summits of the forest. I suppose it to belong to a climber of the Combretaceous order. There are also a few yellow and violet Trumpet-flowers (*Bignoniæ*). The blossoms of the Ingás, although not conspicuous,

are delicately beautiful. The forest all along offers so dense a front that one never obtains a glimpse into the interior of the wilderness."

The length of the Jaburú channel is about 35 miles, allowing for the numerous abrupt bends which occur between the middle and the northern end of its course. We were three days and a half accomplishing the passage. The banks on each side seemed to be composed of hard river mud with a thick covering of vegetable mould, so that I should imagine this whole district originated in a gradual accumulation of alluvium, through which the endless labyrinths of channels have worked their deep and narrow beds. The flood tide as we travelled northward became gradually of less assistance to us, as it caused only a feeble current upwards. The pressure of the waters from the Amazons here makes itself felt; as this is not the case lower down, I suppose the currents are diverted through some of the numerous channels which we passed on our right, and which traverse, in their course towards the sea, the north-western part of Marajó. In the evening of the 29th we arrived at a point where another channel joins the Jaburú from the north-east. Up this the tide was flowing; we turned westward, and thus met the flood coming from the Amazons. This point is the object of a strange superstitious observance on the part of the canoemen. It is said to be haunted by a Pajé, or Indian wizard, whom it is necessary to propitiate by depositing some article on the spot, if the voyager wishes to secure a safe return from the "sertaô," as the interior of the country is called. The trees were

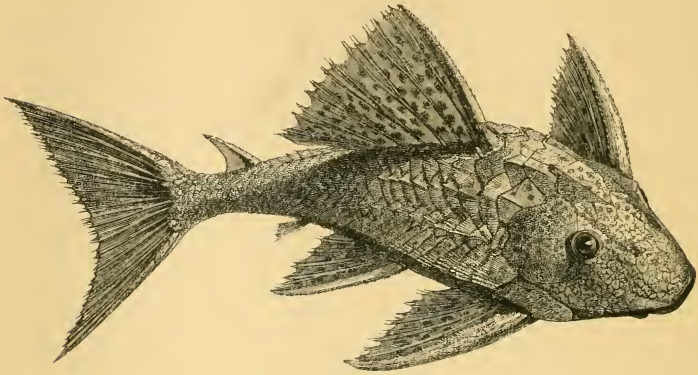
all hung with rags, shirts, straw hats, bunches of fruit, and so forth. Although the superstition doubtless originated with the aborigines, yet I observed, in both my voyages, that it was only the Portuguese and uneducated Brazilians who deposited anything. The pure Indians gave nothing, and treated the whole affair as a humbug; but they were all civilised Tapuyos.

On the 30th, at 9 p.m., we reached a broad channel called Macaco, and now left the dark, echoing Jaburú. The Macaco sends off branches towards the north-west coast of Marajó. Whilst waiting for the tide I went ashore in the montaria with Joaõ da Cunha. The forest was gloomy and forbidding in the extreme, the densely-packed trees producing a deep shade, under which all was dark and cold. There was no animal life visible—vertebrate, articulate, or molluscous. At its commencement the Macaco is about half a mile wide, and runs from S.S.W. to N.N.E.; towards the north it expands to a breadth of two or three miles. It is merely a passage amongst a cluster of islands, between which a glimpse is occasionally obtained of the broad waters of the main Amazons. A brisk wind carried us rapidly past its monotonous scenery, and early in the morning of the 1st of October we reached the entrance of the Uituquára, or the Wind-hole, which is 15 miles distant from the end of the Jaburú. This is also a winding channel, 35 miles in length, threading a group of islands, but it is much narrower than the Macaco.

On emerging from the Uituquára on the 2nd, we all

went ashore : the men to fish in a small creek ; Joaõ da Cunha and I, to shoot birds. We saw a flock of scarlet and blue macaws (*Macrocerus Macao*) feeding on the fruits of a Bacaba palm, and looking like a cluster of flaunting banners beneath its dark-green crown. We landed about fifty yards from the place, and crept cautiously through the forest, but before we reached them they flew off with loud harsh screams. At a wild-fruit tree we were more successful, as my companion shot an anacá (*Derotypus coronatus*), one of the most beautiful of the parrot family. It is of a green colour, and has a hood of feathers, red bordered with blue, at the back of its head, which it can elevate or depress at pleasure. The anacá is the only new-world parrot which nearly resembles the cockatoo of Australia. It is found in all the low lands throughout the Amazons region, but is not a common bird anywhere. Few persons succeed in taming it, and I never saw one that had been taught to speak. The natives are very fond of the bird nevertheless, and keep it in their houses for the sake of seeing the irascible creature expand its beautiful frill of feathers, which it readily does when excited. The men returned with a large quantity of fish. I was surprised at the great variety of species ; the prevailing kind was a species of *Loricaria*, a foot in length, and wholly encased in bony armour. It abounds at certain seasons in shallow water. The flesh is dry, but very palatable. They brought also a small alligator, which they called *Jacarécúria*, and said it was a kind found only in shallow creeks. It was not more than two feet in length,

although full grown according to the statement of the Indians, who said it was a "mai d'ovos," or mother of



Acari Fish (*Loricaria duodecimalis*).

eggs, as they had pillaged the nest, which they had found near the edge of the water. The eggs were rather larger than a hen's, and regularly oval in shape, presenting a rough hard surface of shell. Unfortunately the alligator was cut up ready for cooking when we returned to the schooner, and I could not therefore make a note of its peculiarities. The pieces were skewered and roasted over the fire, each man being his own cook. I never saw this species of alligator afterwards.

October 3rd.—About midnight the wind, for which we had long been waiting, sprang up, the men weighed anchor, and we were soon fairly embarked on the Amazons. I rose long before sunrise to see the great river by moonlight. There was a spanking breeze, and the vessel was bounding gaily over the waters. The channel

along which we were sailing was only a narrow arm of the river, about two miles in width : the total breadth at this point is more than 20 miles, but the stream is divided into three parts by a series of large islands. The river, notwithstanding this limitation of its breadth, had a most majestic appearance. It did not present that lake-like aspect which the waters of the Pará and Tocantins affect, but had all the swing, so to speak, of a vast flowing stream. The ochre-coloured turbid waters offered also a great contrast to the rivers belonging to the Pará system. The channel formed a splendid reach, sweeping from south-west to north-east, with a horizon of water and sky both up stream and down. At 11 a.m. we arrived at Gurupá, a small village situated on a rocky bank 30 or 40 feet high. Here we landed, and I had an opportunity of rambling in the neighbouring woods, which are intersected by numerous pathways, and carpeted with Lycopodia growing to a height of 8 or 10 inches, and enlivened by numbers of glossy blue butterflies of the Theclidæ, or hair-streak family. The land on which Gurupá is built appears an isolated rocky area, for the rest of the country round about lies low, and is subject to inundation in the rainy season. At 5 p.m. we were again under way. Soon after sunset, as we were crossing the mouth of the Xingú, the first of the great tributaries of the Amazons, 1200 miles in length, a black cloud arose suddenly in the north-east. Joaõ da Cunha ordered all sails to be taken in, and immediately afterwards a furious squall burst forth, tearing the waters into foam, and producing a frightful uproar in the neighbouring forests. A drenching rain fol-

lowed : but in half an hour all was again calm, and the full moon appeared sailing in a cloudless sky.

From the mouth of the Xingú the route followed by vessels leads straight across the river, here 10 miles broad. Towards midnight the wind failed us, when we were close to a large shoal called the Baixo Grande. We lay here becalmed in the sickening heat for two days, and when the trade wind recommenced with the rising moon at 10 p.m. on the 6th, we found ourselves on a lee-shore. Notwithstanding all the efforts of our pilot to avoid it, we ran aground. Fortunately the bottom consisted only of soft mud, so that, by casting anchor to windward and hauling in with the whole strength of crew and passengers, we got off after spending an uncomfortable night. We rounded the point of the shoal in two fathoms water ; the head of the vessel was then put westward, and by sunrise we were bounding forward before a steady breeze, all sail set and everybody in good humour.

The weather was now delightful for several days in succession : the air transparently clear, and the breeze cool and invigorating. At daylight, on the 6th, a chain of blue hills, the Serra de Almeirim, appeared in the distance on the north bank of the river. The sight was most exhilarating after so long a sojourn in a flat country. We kept to the southern shore, passing in the course of the day the mouths of the Urucuricáya and the Aquiquí, two channels which communicate with the Xingú. The whole of this southern coast, hence to near Santarem, a distance of 130 miles, is low land and quite uninhabited. It is intersected by short

arms or back waters of the Amazons, which are called in the Tupí language *Paraná-mirims* or little rivers. By keeping to these, small canoes can travel great part of the distance without being much exposed to the heavy seas of the main river. The coast throughout has a most desolate aspect : the forest is not so varied as on the higher land ; and the water frontage, which is destitute of the green mantle of climbing plants that form so rich a decoration in other parts, is encumbered at every step with piles of fallen trees, peopled by white egrets, ghostly storks, and solitary herons. In the evening we passed *Almeyrim*. The hills, according to *Von Martius*, who landed here, are about 800 feet above the level of the river and are thickly wooded to the summit. They commence on the east by a few low isolated and rounded elevations ; but towards the west of the village they assume the appearance of elongated ridges, which seem to have been planed down to a uniform height by some external force. The next day we passed in succession a series of similar flat-topped hills, some isolated and of a truncated-pyramidal shape, others prolonged to a length of several miles. There is an interval of low country between these and the *Almeyrim* range, which has a total length of about 25 miles : then commences abruptly the *Serra de Marauaquá*, which is succeeded in a similar way by the *Velha Pobre* range, the *Serras de Tapaiuna-quára*, and *Parauá-quára*. All these form a striking contrast to the *Serra de Almeirim* in being quite destitute of trees. They have steep, rugged sides, apparently clothed with short herbage, but here and there exposing bare white

patches. Their total length is about 40 miles. In the rear, towards the interior, they are succeeded by other ranges of hills communicating with the central mountain chain of Guiana, which divides Brazil from Cayenne.

As we sailed along the southern shore, during the 6th and two following days, the table-topped hills on the opposite side occupied most of our attention. The river is from four to five miles broad, and in some places long, low wooded islands intervene in mid-stream, whose light-green, vivid verdure formed a strangely beautiful foreground to the glorious landscape of broad stream and grey mountain. Ninety miles beyond Almeirim stands the village of Monte Alegre, which is built near the summit of the last hill visible of this chain. At this point the river bends a little towards the south, and the hilly country recedes from its shores to re-appear at Obydos, greatly decreased in height, about a hundred miles further west. Twenty-five miles to the south-west of Monte Alegre, high land again appears, but now on the opposite side of the river. This is the northernmost limit of the table-land of Brazil, as the hills of Monte Alegre are the southernmost of that of Guiana. In no other part of the river do the high lands on each side approach each other so closely. Beyond Obydos they gradually recede, and the width of the river valley consequently increases, until in the central parts of the Upper Amazons, near Ega, it is no less than 540 miles. At this point, therefore, the valley or river plain of the Amazons is contracted to its narrowest



FLAT-TOPPED MOUNTAINS OF PARAUÁQUÁRA, LOWER AMAZONS.

breadth, reckoning from the places 2000 miles from its mouth, where the river and its earliest tributaries rush forth between walls of rock through the easternmost ridges of the Andes. It is, perhaps, necessary to take this in consideration when studying the geographical distribution of the plants and animals which people these vast wooded plains.

We crossed the river three times between Monte Alegre and the next town, Santarem. In the middle the waves ran very high, and the vessel lurched fearfully, hurling everything that was not well secured from one side of the deck to the other. On the morning of the 9th of October, a gentle wind carried us along a "remanso," or still water, under the southern shore. These tracts of quiet water are frequent on the irregular sides of the stream, and are the effect of counter movements caused by the rapid current of its central parts. At 9 a.m. we passed the mouth of a Paran -mirim, called Mahic , and then found a sudden change in the colour of the water and aspect of the banks. Instead of the low and swampy water-frontage which had prevailed from the mouth of the Xing , we saw before us a broad sloping beach of white sand. The forest, instead of being an entangled mass of irregular and rank vegetation as hitherto, presented a rounded outline, and created an impression of repose that was very pleasing. We now approached, in fact, the mouth of the Tapajos, whose clear olive-green waters here replaced the muddy current against which we had so long been sailing. Although this is a river of great extent—1000 miles in length, and, for the last eighty miles of its course,

four to ten in breadth—its contribution to the Amazons is not perceptible in the middle of the stream. The white turbid current of the main river flows disdainfully by, occupying nearly the whole breadth of the channel, whilst the darker water of its tributary seems to creep along the shore, and is no longer distinguishable four or five miles from its mouth.

We reached Santarem at 11 a.m. The town has a clean and cheerful appearance from the river. It consists of three long streets, with a few short ones crossing them at right angles, and contains about 2500 inhabitants. It lies just within the mouth of Tapajos, and is divided into two parts, the town and the aldeia or village. The houses of the white and trading classes are substantially built, many being of two and three stories, and all white-washed and tiled. The aldeia, which contains the Indian portion of the population, or did so formerly, consists mostly of mud huts, thatched with palm leaves. The situation of the town is very beautiful. The land, although but slightly elevated, does not form, strictly speaking, a portion of the alluvial river plains of the Amazons, but is rather a northern prolongation of the Brazilian continental land. It is scantily wooded, and towards the interior consists of undulating campos, which are connected with a series of hills extending southward as far as the eye can reach. I subsequently made this place my head-quarters for three years; an account of its neighbourhood is therefore reserved for another chapter. At the first sight of Santarem, one cannot help being struck with the advantages of

its situation. Although 400 miles from the sea, it is accessible to vessels of heavy tonnage coming straight from the Atlantic. The river has only two slight bends between this port and the sea, and for five or six months in the year the Amazonian trade wind blows with very little interruption, so that sailing ships coming from foreign countries could reach the place with little difficulty. We ourselves had accomplished 200 miles, or about half the distance from the sea, in an ill-rigged vessel, in three days and a half. Although the land in the immediate neighbourhood is perhaps ill adapted for agriculture, an immense tract of rich soil, with forest and meadow land, lies on the opposite banks of the river, and the Tapajos leads into the heart of the mining provinces of interior Brazil. But where is the population to come from to develop the resources of this fine country? At present the district within a radius of twenty-five miles contains barely 6500 inhabitants; behind the town, towards the interior, the country is uninhabited, and jaguars roam nightly, at least in the rainy season, close up to the ends of the suburban streets.

From information obtained here, I fixed upon the next town, Obydos, as the best place to stay at a few weeks, in order to investigate the natural productions of the north side of the Lower Amazons. We started at sunrise on the 10th, and being still favoured by wind and weather, made a pleasant passage, reaching Obydos, which is nearly fifty miles distant from Santarem, by midnight. We sailed all day close to the southern shore, and found the banks here and there

dotted with houses of settlers, each surrounded by its plantation of cacao, which is the staple product of the district. This coast has an evil reputation for storms and mosquitoes, but we fortunately escaped both. It was remarkable that we had been troubled by mosquitoes only on one night, and then to a small degree, during the whole of our voyage.

I landed at Obydos the next morning, and then bid adieu to my kind friend Joaõ da Cunha, who, after landing my baggage, got up his anchor and continued on his way. The town contains about 1200 inhabitants, and is airily situated on a high bluff, 90 or 100 feet above the level of the river. The coast is precipitous for two or three miles hence to the west. The cliffs consist of the parti-coloured clay, or Tabatinga, which occurs so frequently throughout the Amazons region; the strong current of the river sets full against them in the season of high water, and annually carries away large portions. The clay in places is stratified alternately pink and yellow, the pink beds being the thickest, and of much harder texture than the others. When I descended the river in 1859, a German Major of Engineers, in the employ of the Government, told me that he had found calcareous layers, thickly studded with marine shells interstratified with the clay. On the top of the Tabatinga lies a bed of sand, in some places several feet thick, and the whole formation rests on strata of sandstone, which are exposed only when the river reaches its lowest level. Behind the town rises a fine rounded hill, and a range of similar elevations extends six miles westward, terminating at the mouth of

the Trombetas, a large river flowing through the interior of Guiana. Hills and lowlands alike are covered with a sombre rolling forest. The river here is contracted to a breadth of rather less than a mile (1738 yards), and the entire volume of its waters, the collective product of a score of mighty streams, is poured through the strait with tremendous velocity.* It must be remarked, however, that the river valley itself is not contracted to this breadth, the opposite shore not being continental land, but a low alluvial tract, subject to inundation more or less in the rainy season. Behind it lies an extensive lake, called the Lago Grande da Villa Franca, which communicates with the Amazons, both above and below Obydos, and has therefore the appearance of a by-water or an old channel of the river. This lake is about thirty-five miles in length, and from four to ten in width ; but its waters are of little depth, and in the dry season its dimensions are much lessened. It has no perceptible current, and does not therefore now divert any portion of the waters of the Amazons from their main course past Obydos.

I remained at Obydos from the 11th of October to the 19th of November. I spent three weeks here, also,

* It was formerly believed that the river at the strait of Obydos could not be sounded on account of its great depth and the velocity of the current. Lieut. Herndon, of the United States navy, succeeded in doing so, however, in 1852. He found a depth of 30 to 35 fathoms, but in one place he thought he had not touched the bottom at 40 fathoms. Von Martius, estimating the depth in the middle at 60 fathoms, and on the side at 20, and the velocity of the current at 2·4 feet per second, estimated that 499,584 cubic feet of water passed through the strait in each second of time. The tides are felt here in the dry season, but the flood does not press back the current of the Amazons.

in 1859, when the place was much changed through the influx of Portuguese immigrants and the building of a fortress on the top of the bluff. It is one of the pleasantest towns on the river. The houses are all roofed with tiles, and are mostly of substantial architecture. The inhabitants, at least at the time of my first visit, were naïve in their ways, kind and sociable. Scarcely any palm-thatched huts are to be seen, for very few Indians now reside here. It was one of the early settlements of the Portuguese, and the better class of the population consists of old-established white families, who exhibit however, in some cases, traces of cross with the Indian and negro. Obydos and Santarem have received, during the last eighty years, considerable importations of negro slaves; before that time a cruel traffic was carried on in Indians for the same purpose of forced servitude, but their numbers have gradually dwindled away, and Indians now form an insignificant element in the population of the district. Most of the Obydos townfolk are owners of cacao plantations, which are situated on the low lands in the vicinity. Some are large cattle proprietors, and possess estates of many square leagues' extent in the campo, or grass-land districts, which border the Lago Grande, and other similar inland lakes, near the villages of Faro and Alemquer. These campos bear a crop of nutritious grass; but in certain seasons, when the rising of the Amazons exceeds the average, they are apt to be flooded, and then the large herds of half-wild cattle suffer great mortality from drowning, hunger, and the alligators. Neither in cattle-keeping nor cacao-growing are any but the laziest

and most primitive methods followed, and the consequence is, that the proprietors are generally poor. A few, however, have become rich by applying a moderate amount of industry and skill to the management of their estates. People spoke of several heiresses in the neighbourhood whose wealth was reckoned in oxen and slaves ; a dozen slaves and a few hundred head of cattle being considered a great fortune. Some of them I saw had already been appropriated by enterprising young men, who had come from Pará and Maranhão to seek their fortunes in this quarter.

The few weeks I spent here passed away pleasantly. I generally spent the evenings in the society of the townspeople, who associated together (contrary to Brazilian custom) in European fashion ; the different families meeting at one another's houses for social amusement, bachelor friends not being excluded, and the whole company, married and single, joining in simple games. The meetings used to take place in the sitting-rooms, and not in the open verandahs—a fashion almost compulsory on account of the mosquitoes ; but the evenings here are very cool, and the closeness of a room is not so much felt as it is in Pará. Sunday was strictly observed at Obydos ; at least all the shops are closed, and almost the whole population went to church. The vicar, Padre Raimundo do Sanchez Brito, was an excellent old man, and I fancy the friendly manners of the people, and the general purity of morals at Obydos, were owing in great part to the good example he set to his parishioners.

One day the owner of the house in which I occupied

a room, Major Martinho da Fonseca Seixas, came over from his estate on the opposite bank of the river. He was a man of great importance in the district, and the only one who had had enterprise sufficient to establish a sugar-mill. He crossed over soon after sunrise in a small boat, with four dark-skinned paddlers, who made the morning air ring with a wild chorus which their master, I was told, always made them sing, to beguile the way. I found him a tall, wiry, and sharp-featured old gentleman, with a shrewd but good-humoured expression of countenance—quite a typical specimen, in fact, of the old school of Brazilian planters. He landed in dressing-gown and slippers, and came up the beach chattering, scolding, and gesticulating. Several friends joined him, and we soon had the house full of company. After taking coffee and a hot buttered roll, he dressed and went to mass, whilst I slipped off to spend an hour or two in the woods. When I came back I found the Major with his friends seated in hammocks, two by two, slung in the four corners of the room, and all engaged in a lively discussion on political questions. They had a demijohn of *cashaca* in their midst, and were helping themselves freely, drinking out of little tea-cups. One of the company was a dark-skinned *Cametaense*, named *Senhor Calisto Pantoja*, a very agreeable fellow, and as full of talk as the Major. Like most of his townsmen, he was a *Santa Luzia*, or *Liberal*, whilst the old gentleman was a *rabid Tory*. *Pantoja* rather nettled the old man by saying that the *Cametá* people had held their town against the rebels in 1835, whilst the whites of *Obydos* abandoned theirs to be pillaged by them. The Major

then launched out into a denunciation of the Cametaenses and the Liberals in general. He said he was a pure white, a "Massagonista;"* the blood of the Fidalguia of Portugal flowed in his veins, whilst the people of Cameté were a mixed breed of whites and Indians. I noticed that this boasting was ill received by the rest; it is generally, in fact, considered bad taste in Brazil to boast of purity of descent. Soon afterwards most of the visitors departed, and we dined in quiet. A few days afterwards I crossed the river to the Major's place, and spent two days with him. The house was a very large two-story building, having a large verandah to the upper floor. There was an appearance of disorder and cheerlessness about the place which was very dispiriting. The old gentleman was a widower. His only son had been brutally massacred by the rebels in 1835, whilst he was crossing the river in a small boat, and his two daughters were now completing their education at a seminary in Pará. The household affairs appeared to be managed by a middle-aged mulatto woman; and a number of dirty negro children were playing about the rooms. Amongst the outbuildings there were several large sheds, containing the cane-mill and sugar factory, and beyond these a curral, or enclosure for cattle. The mill for grinding the sugar-cane was a rude affair, worked by bullocks. The cane was pressed between wooden cylinders, and the juice received in troughs formed of hollowed logs. Sugar-cane here grows to a height of 18

* The Massagonistas are the descendants of the Portuguese colonists of Massagaõ, in Morocco, who forsook this place in a body in 1769, and migrated to the banks of the Amazons.

to 20 feet, the sugar-yielding part of the stem being about 8 feet in length and 3 inches in diameter. The land for miles around the establishment is rich alluvial soil, and as level as a bowling-green. Beyond the belt of forest which runs along the banks of the river, there is a large tract of soft green meadow with patches of woodland and scattered trees, combining to form a landscape like that of an English park. But a meadow on the banks of the Amazons is a very different thing from what it is in a temperate climate : the vegetation is rank and monotonous, and there are absolutely no flowers. The old gentleman had built a pretty little chapel on his estate, on the occasion of a visit from the Bishop of Pará, who sometimes travels through his diocese, and I slept in the Bishop's room attached to the building. The abundance of mosquitoes is a great drawback to the rich agricultural country on this side of the river. A little before night sets in, the inhabitants are obliged to close the doors and windows of their sleeping apartments ; and it is singular that this simple means of keeping out the pests seems to be pretty successful. On the Upper Amazons the precaution is of no use, and every one is obliged to sling his hammock under a mosquito tent. The whole of this coast, as well as the banks of the many inlets which intersect it, is inhabited by scattered settlers. The population of the municipal district of Obydos, which comprises about twenty miles of river frontage, is estimated at 12,000 souls.

I made a large collection in the neighbourhood of Obydos, chiefly of insects. The forest is more varied

than it is in the Amazons region generally. There is only one path leading into it for any considerable distance. It ascends first the rising ground behind the town, and then leads down through a broad alley where the trees arch overhead, to the sandy margins of a small lake choked up with aquatic plants, on the opposite bank of which rises the wooded hill before mentioned. Passing a swampy tract at the head of the lake, the road continues for three or four miles along the slopes of a ravine, after which it dwindles into a mere picada or hunter's track, and finally ceases altogether. Another shorter road runs along the top of the cliff westward, and terminates at a second small lake, which fills a basin-shaped depression between the hills, and is called Jauareté-paúa, or the Jaguar's Mud-hole. The vegetation on this rising ground is, of course, different from that of the low land. The trees, however, grow to an immense height. Those plants, such as the Heliconiæ and Marantaceæ, which have large, broad, and glossy leaves, and which give so luxuriant a character to the moister areas, are absent; but in their stead is an immense diversity of plants of the Bromeliaceous or pineapple order, which grow in masses amongst the under-wood, and make the forest in many places utterly impenetrable. Cacti also, which are peculiar to the drier soils, are very numerous, some of them growing to an unwieldy size, and resembling in shape huge candelabra.

The forest seemed to abound in monkeys, for I rarely passed a day without seeing several. I noticed four species: the Coaitá (*Ateles paniscus*), the *Chrysothrix*

sciureus, the *Callithrix torquatus*, and our old Pará friend, *Midas ursulus*. The Coaitá is a large black monkey, covered with coarse hair, and having the prominent parts of the face of a tawny flesh-coloured hue. It is the largest of the Amazonian monkeys in stature, but is excelled in bulk by the "Barrigudo" (*Lagothrix Humboldtii*) of the Upper Amazons. It occurs throughout the low lands of the Lower and Upper Amazons, but does not range to the south beyond the limits of the river plains. At that point an allied species, the White-whiskered Coaitá (*Ateles marginatus*) takes its place. The Coaitás are called by some French zoologists spider monkeys, on account of the length and slenderness of their body and limbs. In these apes the tail, as a prehensile organ, reaches its highest degree of perfection; and on this account it would, perhaps, be correct to consider the Coaitás as the extreme development of the American type of apes. As far as we know, from living and fossil species, the New World has progressed no farther than the Coaitá towards the production of a higher form of the Quadrumanous order. The tendency of Nature here has been, to all appearance, simply to perfect those organs which adapt the species more and more completely to a purely arboreal life; and no nearer approach has been made towards the more advanced forms of anthropoid apes, which are the products of the Old World solely. The tail of the Coaitá is endowed with a wonderful degree of flexibility. It is always in motion, coiling and uncoiling like the trunk of an elephant, and grasping whatever comes within reach. Another remarkable character of the Coaitá is the ab-

sence of a thumb to the anterior hands. It is worthy of note that this strange deficiency occurs again in the Quadrumanous order only in the Colobi, a genus of apes peculiar to Africa. The Colobi, however, are not furnished with prehensile tails, and belong, in all their essential characters, to the Catarhinæ, or Old World monkeys, a group entirely distinct from the Platyrrhinæ, or South American sub-order. The want of the thumb, therefore, is not a sign of near relationship between the Colobi and the Coaitás, but is a mere analogical character, which must have originated, in each case, through independent, although perhaps similar, causes. One species of Coaitá has a rudiment of thumb, without a nail. The flesh of this monkey is much esteemed by the natives in this part of the country, and the Military Commandant of Obydos, Major Gama, every week sent a negro hunter to shoot one for his table. One day I went on a Coaitá hunt, borrowing a negro slave of a friend to show me the way. On the road I was much amused by the conversation of my companion. He was a tall, handsome negro, about forty years of age, with a staid, courteous demeanour and a deliberate manner of speaking. Strangely enough in a negro, he was a total abstainer from liquors and tobacco. He told me he was a native of Congo, and the son of a great chief or king. He narrated the events of a great battle between his father's and some other tribe, in which he was taken prisoner and sold to the Portuguese slave-dealers. When in the deepest part of the ravine we heard a rustling sound in the trees overhead, and Manoel soon pointed out a Coaitá to me. There was something

human-like in its appearance, as the lean, dark, shaggy creature moved deliberately amongst the branches at a great height. I fired, but unfortunately only wounded it in the belly. It fell with a crash headlong about twenty or thirty feet, and then caught a bough with its tail, which grasped it instantaneously, and then the animal remained suspended in mid-air. Before I could reload it recovered itself, and mounted nimbly to the topmost branches out of the reach of a fowling-piece, where we could perceive the poor thing apparently probing the wound with its fingers. Coaitás are more frequently kept in a tame state than any other kind of monkey. The Indians are very fond of them as pets, and the women often suckle them when young at their breasts. They become attached to their masters, and will sometimes follow them on the ground to considerable distances. I once saw a most ridiculously tame Coaitá. It was an old female, which accompanied its owner, a trader on the river, in all his voyages. By way of giving me a specimen of its intelligence and feeling, its master set to and rated it soundly, calling it scamp, heathen, thief, and so forth, all through the copious Portuguese vocabulary of vituperation. The poor monkey, quietly seated on the ground, seemed to be in sore trouble at this display of anger. It began by looking earnestly at him, then it whined, and lastly rocked its body to and fro with emotion, crying piteously, and passing its long, gaunt arms continually over its forehead; for this was its habit when excited, and the front of the head was worn quite bald in consequence. At length its master altered his tone. "It's all a lie,

my old woman ; you're an angel, a flower, a good affectionate old creature," and so forth. Immediately the poor monkey ceased its wailing, and soon after came over to where the man sat. The disposition of the Coaitá is mild in the extreme : it has none of the painful, restless vivacity of its kindred, the Cebi, and no trace of the surly, untameable temper of its still nearer relatives, the Mycetes, or howling monkeys. It is, however, an arrant thief, and shows considerable cunning in pilfering small articles of clothing, which it conceals in its sleeping place. The natives of the Upper Amazons procure the Coaitá, when full grown, by shooting it with the blow-pipe and poisoned darts, and restoring life by putting a little salt (the antidote to the Urarí poison with which the darts are tipped) in its mouth. The animals thus caught become tame forthwith. Two females were once kept at the Jardin des Plantes of Paris, and Geoffroy St. Hilaire relates of them that they rarely quitted each other, remaining most part of the time in close embrace, folding their tails round one another's bodies. They took their meals together ; and it was remarked on such occasions, when the friendship of animals is put to a hard test, that they never quarrelled or disputed the possession of a favourite fruit with each other.

The neighbourhood of Obydos was rich in insects. In the broad alleys of the forest a magnificent butterfly of the genus *Morpho*, six to eight inches in expanse, the *Morpho Hecuba*, was seen daily gliding along at a height of twenty feet or more from the ground. Amongst the lower trees and bushes numerous kinds of

Heliconii, a group of butterflies peculiar to tropical America, having long narrow wings, were very abundant. The prevailing ground colour of the wings of these insects is a deep black, and on this are depicted spots and streaks of crimson, white, and bright yellow, in different patterns according to the species. Their elegant shape, showy colours, and slow, sailing mode of flight make them very attractive objects, and their numbers are so great that they form quite a feature in the physiognomy of the forest, compensating for the scarcity of flowers. Next to the Heliconii the *Catagrammas* (*C. astarte* and *C. peristera*) were the most conspicuous. These have a very rapid and short flight, settling frequently and remaining stationary for a long time on the trunks of trees. The colours of their wings are vermilion and black, the surface having a rich velvety appearance. The genus owes its Greek name *Catagramma* (signifying "a letter beneath") to the curious markings of the underside of the wings, resembling Arabic numerals. The species and varieties are of almost endless diversity, but the majority inhabit the hot valleys of the eastern parts of the Andes. Another butterfly nearly allied to these, *Callithea Leprieurii*, was also very abundant here at the marshy head of the pool before mentioned. The wings are of a rich dark-blue colour, with a broad border of silvery green. These two groups of *Callithea* and *Catagramma* are found only in tropical America, chiefly near the equator, and are certainly amongst the most beautiful productions of a region where the animals and plants seem to have been fashioned in nature's choicest moulds. A great variety

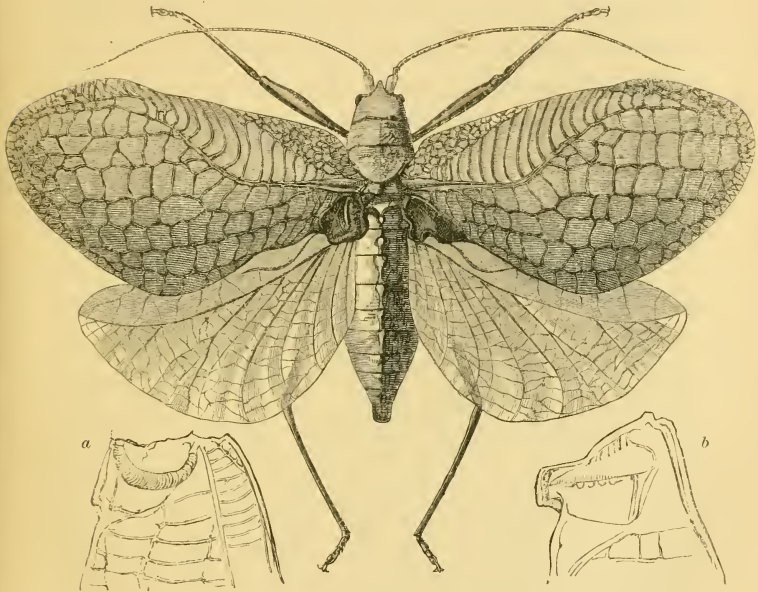
of other beautiful and curious insects adorned these pleasant woods. Others were seen only in the sunshine in open places. As the waters retreated from the beach, vast numbers of sulphur-yellow and orange coloured butterflies congregated on the moist sand. The greater portion of them belonged to the genus *Callidryas*.* They assembled in densely packed masses, sometimes two or three yards in circumference, their wings all held in an upright position, so that the beach looked as though variegated with beds of crocuses. These *Callidryades* seem to be migratory insects, and have large powers of dissemination. During the last two days of our voyage the great numbers constantly passing over the river attracted the attention of every one on board. They all crossed in one direction, namely, from north to south, and the processions were uninterrupted from an early hour in the morning until sunset. All the individuals which resort to the margins of sandy beaches are of the male sex. The females are much more rare, and are seen only on the borders of the forest, wandering from tree to tree, and depositing their eggs on low mimosas which grow in the shade. The migrating hordes, as far as I could ascertain, are composed only of males, and on this account I believe their wanderings do not extend very far. In confirmation of this is the fact that, although the same species generally

* More than three-fourths of the individuals in these congregations of butterflies consisted of a pale sulphur-coloured species, *C. Statira* : two yellow kinds, *C. Eubule* and *C. Trite*, and one orange-coloured, *C. Argante*, were less numerous. A few of a much larger species (*C. Leachiana*), sulphur-coloured with orange tips to the wings, now and then occurred amidst the masses.

has a very wide range, some being found from the central parts of the United States down to 32° S. lat., yet each distant region has its tolerably distinct local variety. But the effect of this general wandering habit of the group is, in the long run, a wide dissemination of the species; the formation of local varieties showing that the process is, nevertheless, a slow one. None of the species are found much beyond the tropics, but the genus is well represented within the tropical zone throughout the world; and an East Indian kind (*C. Alcmeone*) is so nearly allied to a South American one (*C. Statira*), as to have been mistaken for it by some authors.

A strange kind of wood-cricket is found in this neighbourhood. The males produce a very loud and not unmusical noise by rubbing together the overlapping edges of their wing-cases. The notes are certainly the loudest and most extraordinary that I ever heard produced by an orthopterous insect. The natives call it the *Tananá*, in allusion to its music, which is a sharp, resonant stridulation resembling the syllables *ta-na-ná*, *ta-na-ná*, succeeding each other with little intermission. It seems to be rare in the neighbourhood. When the natives capture one they keep it in a wicker-work cage for the sake of hearing it sing. A friend of mine kept one six days. It was lively only for two or three, and then its loud note could be heard from one end of the village to the other. When it died he gave me the specimen, the only one I was able to procure. It is a member of the family *Locustidæ*, a group intermediate between the *Crickets* (*Achetidæ*) and the *Grasshoppers*

(Acridiidae). The total length of the body is two inches and a quarter ; when the wings are closed the insect has an inflated vesicular or bladder-like shape, owing to the great convexity of the thin but firm parchemty wing-cases, and the colour is wholly pale-green. The instru-



Musical Cricket (*Chlorocelus Tananá*).

a. b. Lobes of wing-cases transformed into a musical instrument.

ment by which the Tananá produces its music is curiously contrived out of the ordinary nervures of the wing-cases. In each wing-case the inner edge, near its origin, has a horny expansion or lobe ; on one wing (*b*) this lobe has sharp raised margins ; on the other (*a*), the strong nervure which traverses the lobe

on the under side is crossed by a number of fine sharp furrows like those of a file. When the insect rapidly moves its wings, the file of the one lobe is scraped sharply across the horny margin of the other, thus producing the sounds; the parchenty wing-cases and the hollow drum-like space which they enclose assisting to give resonance to the tones. The projecting portions of both wing-cases are traversed by a similar strong nervure, but this is scored like a file only in one of them, in the other remaining perfectly smooth. Other species of the family to which the Tananá belongs have similar stridulating organs, but in none are these so highly developed as in this insect; they exist always in the males only, the other sex having the edges of the wing-cases quite straight and simple. The mode of producing the sounds and their object have been investigated by several authors with regard to certain European species. They are the call-notes of the males. In the common field-cricket of Europe the male has been observed to place itself, in the evening, at the entrance of its burrow, and stridulate until a female approaches, when the louder notes are succeeded by a more subdued tone, whilst the successful musician caresses with his antennæ the mate he has won. Any one who will take the trouble may observe a similar proceeding in the common house-cricket. The nature and object of this insect music are more uniform than the structure and situation of the instrument by which it is produced. This differs in each of the three allied families above mentioned. In the crickets the wing-cases are symmetrical; both have straight edges and

sharply-scored nervures adapted to produce the stridulation. A distinct portion of their edges is not, therefore, set apart for the elaboration of a sound-producing instrument. In this family the wing-cases lie flat on the back of the insect, and overlap each other for a considerable portion of their extent. In the Locustidæ the same members have a sloping position on each side of the body, and do not overlap, except to a small extent near their bases; it is out of this small portion that the stridulating organ is contrived. Greater resonance is given in most species by a thin transparent plate, covered by a membrane, in the centre of the overlapping lobes. In the Grasshoppers (Acridiidæ) the wing-cases meet in a straight suture, and the friction of portions of their edges is no longer possible. But Nature exhibits the same fertility of resource here as elsewhere; and in contriving other methods of supplying the males with an instrument for the production of call-notes indicates the great importance which she attaches to this function. The music in the males of the Acridiidæ is produced by the scraping of the long hind thighs against the horny nervures of the outer edges of the wing-cases; a drum-shaped organ placed in a cavity near the insertion of the thighs being adapted to give resonance to the tones.

I obtained very few birds at Obydos. There was no scarcity of birds, but they were mostly common Cayenne species. In early morning the woods near my house were quite animated with their songs—an unusual thing in this country. I heard here for the first time the pleasing wild notes of the Carashué, a species of thrush,

probably the *Mimus lividus* of ornithologists. I found it afterwards to be a common bird in the scattered woods of the campo district near Santarem. It is a much smaller and plainer-coloured bird than our thrush, and its song is not so loud, varied, or so long sustained; but the tone is of a sweet and plaintive quality, which harmonizes well with the wild and silent woodlands, where alone it is heard in the mornings and evenings of sultry tropical days. In course of time the song of this humble thrush stirred up pleasing associations in my mind, in the same way as those of its more highly endowed sisters formerly did at home. There are several allied species in Brazil; in the southern provinces they are called Sabiahs. The Brazilians are not insensible to the charms of this their best songster, for I often heard some pretty verses in praise of the Sabiah sung by young people to the accompaniment of the guitar. I found several times the nest of the Carashué, which is built of dried grass and slender twigs, and lined with mud; the eggs are coloured and spotted like those of our blackbird, but they are considerably smaller. I was much pleased with a brilliant little red-headed manikin, which I shot here (*Pipra cornuta*). There were three males seated on a low branch, and hopping slowly backwards and forwards, near to one another, as though engaged in a kind of dance. In the pleasant airy woods surrounding the sandy shores of the pool behind the town, the yellow-bellied Trogon (*T. viridis*) was very common. Its back is of a brilliant metallic-green colour, and the breast steel blue. The natives call it the Suruquá do Ygapó, or Trogon of the flooded

lands, in contradistinction to the red-breasted species, which are named *Suruquás da terra firma*. I often saw small companies of half a dozen individuals quietly seated on the lower branches of trees. They remained almost motionless for an hour or two at a time, simply moving their heads, on the watch for passing insects; or, as seemed more generally to be the case, scanning the neighbouring trees for fruit; which they darted off now and then, at long intervals, to secure, returning always to the same perch.

The species of mammals, birds, and insects found at Obydos are, to a great extent, the same as those inhabiting the well-explored tract of country lying along the seacoast of Guiana. No other locality visited in the Amazons region supplied, among its productions, so large a proportion of Guiana forms. The four monkeys already mentioned all recur at Cayenne. A general resemblance of the species to those of Guiana is one of the principal features in the zoology of the Amazons valley; but in the low lands a great number exist only in the form of strongly modified local varieties; indeed, many of them are so much transformed that they pass for distinct species; and so they truly are, according to the received definitions of species. In the somewhat drier district of Obydos, the forms are more constant to their Guiana types. We seem to obtain here a glimpse of the manufacture of new species in nature. The way in which these modifications occur merits a few remarks. I will therefore give an account of one very instructive case which presented itself in this neighbourhood.

The case was furnished by certain kinds of handsome butterflies belonging to the genus *Heliconius*,* a group peculiar to Tropical America, abounding in individuals everywhere in the shades of its luxuriant forests, and presenting clusters of varieties and closely allied species, as well as many distinct, better marked forms. The closely allied species and varieties are a great puzzle to classifiers; in fact, the group is one of those wherein great changes seem to be now going on. A conspicuous mem-

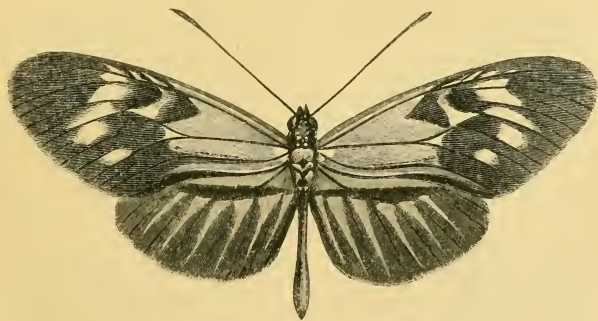


Heliconius Melpomene.

ber of the group is the *H. Melpomene* of Linnæus. This elegant form is found throughout Guiana, Venezuela, and some parts of New Granada. It is very common at Obydos, and reappears on the south side of the river in the dry forests behind Santarem, at the mouth of the Tapajos. In all other parts of the Amazons valley, east-

* This genus has long been known under the name of *Heliconia*: a most inconvenient term, as a botanical genus bears the same name. An author has lately proposed to revert to the masculine termination of the words as first employed by Linnæus (Felder, in the "Wiener Entomologische Monatschrift," March, 1862), and, as I think the correction a good one, I adopt it.

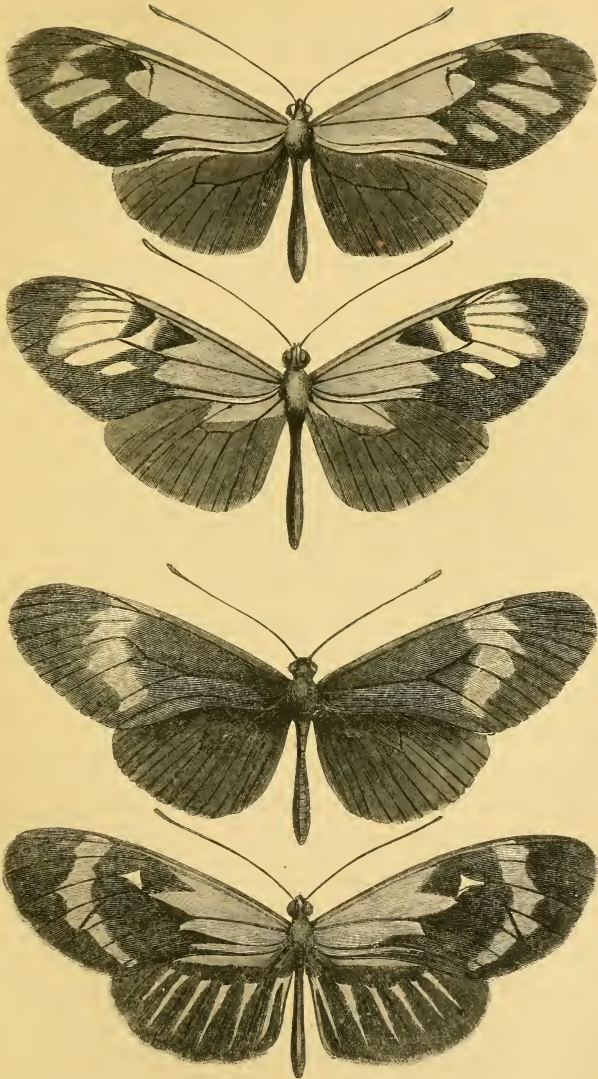
ward to Pará and westward to Peru, it is entirely absent. This absence at first appeared to me very strange; for the local conditions of these regions did not appear so strongly contrasted as to check, in this abrupt manner, the range of so prolific a species; especially as at Obydos and Santarem it occurred in moist woods close to the edge of the river. Another and nearly allied species, however, takes its place in the forest plains; namely, the *H. Thelxiope* of Hübner. It is of the same size and shape as its sister kind, but differs very strikingly in colours: *H. Melpomene* being simply black with a large crimson spot on its wings, whilst *H. Thelxiope* has these beautifully rayed with black and crimson, and is further adorned with a number of bright yellow spots. Both have the same habits. *H. Melpomene* ornaments the



Heliconius Thelxiope.

sandy alleys in the forests of Obydos, floating lazily in great numbers over the lower trees; whilst *H. Thelxiope*, in a similar manner and in equal numbers, adorns the moister forests which constitute its domain. No one

who has studied the group has doubted for a moment that the two are perfectly and originally distinct species, like the hare and rabbit, for instance, or any other two allied species of one and the same genus. The following facts, however, led me to conclude that the one is simply a modification of the other. There are, as might be supposed, districts of forest intermediate in character between the drier areas of Obydos, &c., and the moister tracts which compose the rest of the immense river valley. At two places in these intermediate districts, namely, Serpa, 180 miles west of Obydos, on the same side of the river, and Aveyros, on the lower Tapajos, most of the individuals of these *Heliconii* which occurred were transition forms between the two species. Already, at Obydos, *H. Melpomene* showed some slight variation amongst its individuals in the direction of *H. Thelxiope*, but not anything nearly approaching it. It might be said that these transition forms were hybrids, produced by the intercrossing of two originally distinct species; but the two come in contact in several places where these intermediate examples are unknown, and I never observed them to pair with each other. Besides which, many of them occur also on the coast of Guiana, where *H. Thelxiope* has never been found. These hybrid-looking specimens are connected together by so complete a chain of gradations that it is difficult to separate them even into varieties, and they are incomparably more rare than the two extreme forms. They link together gradually the wide interval between the two species. One is driven to conclude, from these facts, that the two were originally one and the same: the



Transition forms between *Heliconius Melpomene* and *H. Thelixiope*.

mode in which they occur and their relative geographical positions being in favour of the supposition that *H. Thelxiope* has been derived from *H. Melpomene*. Both are nevertheless good and true species in all the essential characters of species; for, as already observed, they do not pair together when existing side by side, nor is there any appearance of reversion to an original common form under the same circumstances.

In the controversy which is being waged amongst Naturalists, since the publication of the Darwinian theory of the origin of species, it has been rightly said that no proof at present existed of the production of a physiological species,—that is, a form which will not interbreed with the one from which it was derived, although given ample opportunities of doing so, and does not exhibit signs of reverting to its parent form when placed under the same conditions with it. Morphological species,—that is, forms which differ to an amount that would justify their being considered good species, have been produced in plenty through selection by man out of variations arising under domestication or cultivation. The facts just given are, therefore, of some scientific importance; for they tend to show that a physiological species can be and is produced in nature out of the varieties of a pre-existing closely allied one. This is not an isolated case; for I observed, in the course of my travels, a number of similar instances. But in very few has it happened that the species which clearly appears to be the parent coexists with one that has been evidently derived from it. Generally the sup-

posed parent also seems to have been modified, and then the demonstration is not so clear, for some of the links in the chain of variation are wanting. The process of origination of a species in nature, as it takes place successively, must be ever perhaps beyond man's power to trace, on account of the great lapse of time it requires. But we can obtain a fair view of it by tracing a variable and far-spreading species over the wide area of its present distribution; and a long observation of such will lead to the conclusion that new species in all cases must have arisen out of variable and widely-disseminated forms. It sometimes happens, as in the present instance, that we find in one locality a species under a certain form which is constant to all the individuals concerned; in another exhibiting numerous varieties; and in a third presenting itself as a constant form, quite distinct from the one we set out with. If we meet with any two of these modifications living side by side, and maintaining their distinctive characters under such circumstances, the proof of the natural origination of a species is complete: it could not be much more so were we able to watch the process step by step. It might be objected that the difference between our two species is but slight, and that by classing them as varieties nothing further would be proved by them. But the differences between them are such as obtain between allied species generally. Large genera are composed, in great part, of such species; and it is interesting to show how the great and beautiful diversity within a large genus is brought about by the working of laws within our comprehension.

A few remarks on the way races are produced will be here in place. Naturalists have been generally inclined to attribute the formation of local varieties or races of a species to the direct action of physical conditions on individuals belonging to it which have migrated into new localities. It might be said, therefore, that our *Heliconius Thelxiope* of the moist forests has resulted from such operation of the local conditions on *H. Melpomene*, especially as intermediate varieties are found in districts of intermediate character and position. It is true that external agencies—such as food and climate, causing delayed or quickened growth,—have great effect on insects, acting on their adolescent states, and so by correlation of growth on the shape and colours of the adult forms.* But there is no proof that a complete local variety or race has been produced wholly by this means, modifications acquired by individuals not being generally transmissible to offspring. The examination of these races or closely allied species of *Heliconii*, with reference to their geographical distribution, throws light also on this subject. Thus *Heliconius Thelxiope* is disseminated over a district 2000 miles in length from east to west, from the mouth of the Amazons to the eastern slopes of the Andes, but shows no remarkable modification throughout all that area; some slight variations only occurring at the extreme points of it. If local conditions

* M. Bellier de la Chavignerie, in the "Annales de la Société Entomologique de France, 1858," p. 299, relates experiments on the effect of retardation of the pupa development through exposure to unusual cold, showing that striking varieties of the adult insects are producible by this means.

acting directly on individuals had originally produced this race or species, they certainly would have caused much modification of it in different parts of this region ; for the upper Amazons country differs greatly from the district near the Atlantic in climate, sequence of seasons, soil, forest clothing, periodical inundations, and so forth. These differences moreover graduate away, so that the species is subjected to a great diversity of physical conditions from locality to locality, and ought in consequence to present an endless series of local varieties, on the view mentioned, instead of one constant form throughout. Besides, how should we explain the fact of *H. Thelxiope* and *H. Melpomene* both existing under the same local conditions ; and how account for the diversified modifications presented in one and the same locality as at Serpa and on the Tapajos ?*

There is evidently therefore some more subtle agency at work in the segregation of a race than the direct operation of external conditions. The principle of natural selection, as lately propounded by Darwin, seems to offer an intelligible explanation of the facts. According to this theory, the variable state of the species exhibited in the districts above mentioned would be owing to *Heliconius Melpomene* having been rendered vaguely instable by the indirect action of local conditions dis-

* As the action of external influences would be on the early states of the insects and not on the adults, it is well to mention that the broods of the *Heliconii* appear to be social ; the larvæ feeding together and undergoing their last transformation on the same tree. This I observed with regard to the *H. Erato*, a species closely allied to *H. Thelxiope*.

similar to those where it exists under a constant normal form. In these districts selection has not operated, or it is suitable to the conditions of life there prevailing, that the species should exist under an instable form. But in the adjoining moister forests, as the result shows, the local conditions were originally more favourable to one of these varieties than to the others. The selected one, therefore, increased more rapidly than its relatives ; and the fact of the entire absence of these latter from an area whence they are now separated only by a few miles, points to the conclusion that they could not there maintain their ground. Those individuals of successive broods which were still better suited to the new conditions would for the same reasons be preferred over their relatives ; and this process going forward for a few generations, the extreme form of *H. Thelxiope* would be reached. At this point the race became well adapted to the new area, which we may suppose to have been at that epoch in process of formation as the river plains became dry land, at the last geological changes in the level of the country. In the higher and drier areas of Guiana and the neighbouring countries, *H. Melpomene* has been the selected form ; in the lower and more humid regions of the Amazons, *H. Thelxiope* has been preferred. An existing proof of this perfect adaptation is shown by the swarming abundance of the species ; the derivation of *H. Thelxiope* from *H. Melpomene* is made extremely probable by the existence of a complete series of connecting links ; and lastly, its permanent establishment is made evident by its refusal to intercross with its parent form, or revert

to its former shape when brought by natural redistribution into contact with it.*

* If this explanation of the derivation of *Heliconius Thelxiope* be true, the origination by natural process of a host of now distinct allied species of this genus, as well as, in fact, all other genera containing numerous closely related species, will have to be admitted. A species allied to *H. Thelxiope*, namely, *H. Vesta*, seems to have been derived also from *H. Melpomene*, for amongst the numerous varieties already mentioned are many examples intermediate between the two. There is this difference, however, between *H. Thelxiope* and *H. Vesta*: the former is confined in its range to the Amazons valley, whilst *H. Vesta* extends beyond this region over Guiana and the central valleys of the Andes; it seems, therefore, to have acquired a power of adaptation to a much wider diversity of local conditions. Insects seem to be well adapted to furnish data in illustration of this interesting but difficult subject. This arises chiefly from the ease with which ample suites of specimens can be obtained for comparison from many points in the areas of distribution, both of species and varieties. It is scarcely necessary to add that the conclusions thus arrived at will apply to all organic beings.

CHAPTER VII.

THE LOWER AMAZONS—OBYDOS TO MANAOS, OR THE BARRA OF THE RIO NEGRO.

Departure from Obydos—River banks and by-channels—Cacao planters—Daily life on board our vessel—Great storm—Sand-island and its birds—Hill of Parentins—Negro trader and Mauhés Indians—Villa Nova, its inhabitants, climate, forest, and animal productions—Cararaucú—A rustic festival—Lake of Cararaucú—Motúca flies—Serpa—Christmas holidays—River Madeira—A mameluco farmer—Mura Indians—Rio Negro—Description of Barra—Descent to Pará—Yellow fever.

A TRADER of Obydos, named Penna, was about proceeding in a cuberta laden with merchandise to the Rio Negro, intending to stop frequently on the road; so I bargained with him for a passage. He gave up a part of the toldo, or fore-cabin as it may be called, and here I slung my hammock and arranged my boxes, so as to be able to work as we went along. The stoppages I thought would be an advantage, as I could collect in the woods whilst he traded, and thus acquire a knowledge of the productions of many places on the river which in a direct voyage it would be impossible to do. I provided a stock of groceries for two months' consumption; and, after the usual amount of unnecessary fuss and delay on the part of the owner, we started on

the 19th of November. Penna took his family with him ; this comprised a smart, lively mameluco woman, named Catarina, whom we called Senhora Katita, and two children. The crew consisted of three men, one a sturdy Indian, another a Cafuzo, godson of Penna, and the third, our best hand, a steady, good-natured mulatto, named Joaquim. My boy Luco was to assist in rowing and so forth. Penna was a timid middle-aged man, a white with a slight cross of Indian ; when he was surly and obstinate, he used to ask me to excuse him on account of the Tapuyo blood in his veins. He tried to make me as comfortable as the circumstances admitted, and provided a large stock of eatables and drinkables ; so that altogether the voyage promised to be a pleasant one.

On leaving the port of Obydos we crossed over to the right bank, and sailed with a light wind all day, passing numerous houses, each surrounded by its grove of cacao trees. On the 20th we made slow progress. After passing the high land at the mouth of the Trombetas, the banks were low, clayey, or earthy on both sides. The breadth of the river varies hereabout from two and a half to three miles, but neither coast is the true terra firma. On the northern side a by-channel runs for a long distance inland, communicating with the extensive lake of Faro ; on the south, three channels lead to the similar fresh-water sea of Villa Franca ; these are in part arms of the river, so that the land they surround consists, properly speaking, of islands. When this description of land is not formed wholly of river deposit, as sometimes happens, or is raised above the level of the

highest floods, it is called *Ygapó alto*, and is distinguished by the natives from the true islands of mid-river, as well as from the terra firma. We landed at one of the cacao plantations. The house was substantially built; the walls formed of strong upright posts, lathed across, plastered with mud and whitewashed, and the roof tiled. The family were *mamelucos*, and seemed to be an average sample of the poorer class of cacao growers. All were loosely dressed and bare-footed. A broad verandah extended along one side of the house, the floor of which was simply the well-trodden earth; and here hammocks were slung between the bare upright supports, a large rush mat being spread on the ground, upon which the stout matron-like mistress, with a tame parrot perched upon her shoulder, sat sewing with two pretty little mulatto girls. The master, coolly clad in shirt and drawers, the former loose about the neck, lay in his hammock smoking a long gaudily-painted wooden pipe. The household utensils, earthenware jars, water-pots and saucepans, lay at one end, near which was a wood fire, with the ever-ready coffee-pot simmering on the top of a clay tripod. A large shed stood a short distance off, embowered in a grove of banana, papaw, and mango trees; and under it were the ovens, troughs, sieves, and all other apparatus for the preparation of *mandioca*. The cleared space around the house was only a few yards in extent; beyond it lay the cacao plantations, which stretched on each side parallel to the banks of the river. There was a path through the forest which led to the *mandioca* fields, and several miles beyond to other houses on the

banks of an interior channel. We were kindly received, as is always the case when a stranger visits these out-of-the-way habitations; the people being invariably civil and hospitable. We had a long chat, took coffee, and on departing one of the daughters sent a basket full of oranges for our use down to the canoe.

The cost of a cacao plantation in the Obydos district is after the rate of 240 reis or sixpence per tree, which is much higher than at Cametá, where I believe the yield is not so great. The forest here is cleared before planting, and the trees are grown in rows. The smaller cultivators are all very poor. Labour is scarce; one family generally manages its own small plantation of 10,000 to 15,000 trees, but at the harvest time neighbours assist each other. It appeared to me to be an easy, pleasant life; the work is all done under shade, and occupies only a few weeks in the year. The incorrigible nonchalance and laziness of the people alone prevent them from surrounding themselves with all the luxuries of a tropical country. They might plant orchards of the choicest fruit-trees around their houses, grow Indian corn, and rear cattle and hogs, as intelligent settlers from Europe would certainly do, instead of indolently relying solely on the produce of their small plantations, and living on a meagre diet of fish and farinha. In preparing the cacao they have not devised any means of separating the seeds well from the pulp, or drying it in a systematic way; the consequence is that, although naturally of good quality, it moulds before reaching the merchants' stores, and does not fetch more than half the price of the same article

grown in other parts of tropical America. The Amazons region is the original home of the principal species of chocolate tree, the *Theobroma cacao* ; and it grows in abundance in the forests of the upper river. The cultivated crop appears to be a precarious one ; little or no care, however, is bestowed on the trees, and even weeding is done very inefficiently. The plantations are generally old, and have been made on the low ground near the river, which renders them liable to inundation when this rises a few inches more than the average. There is plenty of higher land quite suitable to the tree, but it is uncleared, and the want of labour and enterprise prevents the establishment of new plantations.*

We passed the last houses in the Obydos district on the 20th, and the river scenery then resumed its usual wild and solitary character, which the scattered human habitations relieved, although in a small degree. We soon fell into a regular mode of life on board our little ark. Penna would not travel by night ; indeed, our small crew, wearied by the day's labour, required rest, and we very rarely had wind in the night. We used to moor the vessel to a tree, giving out plenty of cable, so as to sleep at a distance from the banks and free of mosquitoes, which although swarming in the forest, rarely came

* Next to india-rubber, cacao is the chief article of exportation from Pará. The yield, however, varies greatly in different years. The price also fluctuates considerably, and does not follow the abundance or scarcity of the crop. The following valuation of exports of the article is taken from an official statement of exports, given me by Mr. Bailey, U. S. Consul at Pará. In 1856, £99,247 7s. 9d. ; 1857, £208,926 ; 1858, £133,013 8s. The quantity in weight exported was in 1856, 4,343,136lb. ; in 1857, 7,428,480lb.

many yards out into the river at this season of the year. The strong current at a distance of thirty or forty yards from the coast steadied the cuberta head to stream, and kept us from drifting ashore. We all slept in the open air, as the heat of the cabins was stifling in the early part of the night. Penna, Senhora Katita, and I slung our hammocks in triangle between the mainmast and two stout poles fixed in the raised deck. A sheet was the only covering required, besides our regular clothing; for the decrease of temperature at night on the Amazons is never so great as to be felt otherwise than as a delightful coolness after the sweltering heat of the afternoons. We used to rise when the first gleam of dawn showed itself above the long, dark line of forest. Our clothes and hammocks were then generally soaked with dew, but this was not felt to be an inconvenience. The Indian Manoel used to revive himself by a plunge in the river, under the bows of the vessel. It is the habit of all Indians, male and female, to bathe early in the morning; they do it sometimes for warmth's sake, the temperature of the water being often considerably higher than that of the air. Penna and I lolled in our hammocks, whilst Katita prepared the indispensable cup of strong coffee, which she did with wonderful celerity, smoking meanwhile her early morning pipe of tobacco. Liberal owners of river craft allow a cup of coffee sweetened with molasses, or a ration of *cashaça*, to each man of their crews; Penna gave them coffee. When all were served, the day's work began. There was seldom any wind at this early hour; so if there was a remanso along the shore the men rowed, if

not there was no way of progressing but by *espia*. In some places the currents ran with great force close to the banks, especially where these receded to form long bays or *enseadas*, as they are called, and then we made very little headway. In such places the banks consist of loose earth, a rich crumbly vegetable mould, supporting a growth of most luxuriant forest, of which the currents almost daily carry away large portions, so that the stream for several yards out is encumbered with fallen trees, whose branches quiver in the current. When projecting points of land were encountered, it was impossible, with our weak crew, to pull the cuberta against the whirling torrents which set round them; and in such cases we had to cross the river, drifting often with the current, a mile or two lower down on the opposite shore. There generally sprung a light wind as the day advanced, and then we took down our hammocks, hoisted all sail, and bowled away merrily. Penna generally preferred to cook the dinner ashore, when there was little or no wind. About midday on these calm days we used to look out for a nice shady nook in the forest, with cleared space sufficient to make a fire upon. I then had an hour's hunting in the neighbouring wilderness, and was always rewarded by the discovery of some new species. During the greater part of our voyage, however, we stopped at the house of some settler, and made our fire in the port. Just before dinner it was our habit to take a bath in the river, and then, according to the universal custom on the Amazons, where it seems to be suitable on account of the weak fish diet, we each took half a tea-cup full of neat

cashaca, the "abre" or "opening," as it is called, and set to on our mess of stewed pirarucú, beans, and bacon. Once or twice a week we had fowls and rice; at supper, after sunset, we often had fresh fish caught by our men in the evening. The mornings were cool and pleasant until towards midday; but in the afternoons the heat became almost intolerable, especially in gleamy, squally weather, such as generally prevailed. We then crouched in the shade of the sails, or went down to our hammocks in the cabin, choosing to be half stifled rather than expose ourselves on deck to the sickening heat of the sun. We generally ceased travelling about nine o'clock, fixing upon a safe spot wherein to secure the vessel for the night. The cool evening hours were delicious; flocks of whistling ducks (*Anas autumnalis*), parrots, and hoarsely-screaming macaws, pair by pair, flew over from their feeding to their resting places, as the glowing sun plunged abruptly beneath the horizon. The brief evening chorus of animals then began, the chief performers being the howling monkeys, whose frightful unearthly roar deepened the feeling of solitude which crept on as darkness closed around us. Soon after, the fireflies in great diversity of species came forth and flitted about the trees. As night advanced, all became silent in the forest, save the occasional hooting of tree-frogs, or the monotonous chirping of wood-crickets and grasshoppers.

We made but little progress on the 20th and two following days, on account of the unsteadiness of the wind. The dry season had been of very brief duration this year; it generally lasts in this part of the Amazons from July to January, with a short interval of showery

weather in November. The river ought to sink thirty or thirty-five feet below its highest point; this year it had declined only about twenty-five feet, and the November rains threatened to be continuous. The drier the weather the stronger blows the east wind; it now failed us altogether, or blew gently for a few hours merely in the afternoons. I had hitherto seen the great river only in its sunniest aspect; I was now about to witness what it could furnish in the way of storms.

On the night of the 22nd the moon appeared with a misty halo. As we went to rest, a fresh watery wind was blowing, and a dark pile of clouds gathering up river in a direction opposite to that of the wind. I thought this betokened nothing more than a heavy rain which would send us all in a hurry to our cabins. The men moored the vessel to a tree alongside a hard clayey bank, and after supper all were soon fast asleep, scattered about the raised deck. About eleven o'clock I was awakened by a horrible uproar, as a hurricane of wind suddenly swept over from the opposite shore. The cuberta was hurled with force against the clayey bank; Penna shouted out, as he started to his legs, that a *trovoada de cima*, or a squall from up river, was upon us. We took down our hammocks, and then all hands were required to save the vessel from being dashed to pieces. The moon set, and a black pall of clouds spread itself over the dark forests and river; a frightful crack of thunder now burst over our heads, and down fell the drenching rain. Joaquim leapt ashore through the drowning spray with a strong pole, and tried to pass the cuberta round a small projecting point, whilst we on

deck aided in keeping her off and lengthened the cable. We succeeded in getting free, and the stout-built boat fell off into the strong current further away from the shore, Joaquim swinging himself dexterously aboard by the bowsprit as it passed the point. It was fortunate for us that we happened to be on a sloping clayey bank, where there was no fear of falling trees; a few yards further on, where the shore was perpendicular and formed of crumbly earth, large portions of loose soil, with all their superincumbent mass of forest, were being washed away; the uproar thus occasioned adding to the horrors of the storm.

The violence of the wind abated in the course of an hour, but the deluge of rain continued until about three o'clock in the morning; the sky being lighted up by almost incessant flashes of pallid lightning, and the thunder pealing from side to side without interruption. Our clothing, hammocks, and goods were thoroughly soaked by the streams of water which trickled through between the planks. In the morning all was quiet; but an opaque, leaden mass of clouds overspread the sky, throwing a gloom over the wild landscape that had a most dispiriting effect. These squalls from the west are always expected about the time of the breaking up of the dry season in these central parts of the Lower Amazons. They generally take place about the beginning of February, so that this year they had commenced much earlier than usual. The soil and climate are much drier in this part of the country than in the region lying further to the west, where the denser forests and more clayey, humid soil produce a considerably cooler

atmosphere. The storms may be therefore attributed to the rush of cold moist air from up river, when the regular trade-wind coming from the sea has slackened or ceased to blow.

On the 26th we arrived at a large sand bank connected with an island in midriver, in front of an inlet called Maracá-uassú. Here we anchored and spent half a day ashore. Penna's object in stopping was simply to enjoy a ramble on the sands with the children, and give Senhora Katita an opportunity to wash the linen. The sandbank was now fast going under water with the rise of the river; in the middle of the dry season it is about a mile long and half a mile in width. The canoe-men delight in these open spaces, which are a great relief to the monotony of the forest that clothes the land in every other part of the river. Further westward they are much more frequent, and of larger extent. They lie generally at the upper end of islands; in fact, the latter originate in accretions of vegetable matter formed by plants and trees growing on a shoal. The island was wooded chiefly with the trumpet tree (*Cecropia peltata*), which has a hollow stem and smooth pale bark. The leaves are similar in shape to those of the horse-chestnut, but immensely larger; beneath they are white, and when the welcome trade-wind blows they show their silvery undersides,—a pleasant signal to the weary canoe traveller. The mode of growth of this tree is curious: the branches are emitted at nearly right angles with the stem, the branchlets in minor whorls around these, and so forth, the leaves growing at their extremities; so that the total appearance is that of a huge

candelabrum. Cecropiæ of different species are characteristic of Brazilian forest scenery; the kind of which I am speaking grows in great numbers everywhere on the banks of the Amazons where the land is low. In the same places the curious Monguba tree (*Bombax ceiba*) is also plentiful; the dark green bark of its huge tapering trunk, scored with gray, forming a conspicuous object. The principal palm-tree on the low lands is the Jauarí (*Astryocaryum Jauarí*), whose stem, surrounded by whorls of spines, shoots up to a great height. On the borders of the island were large tracts of arrow-grass (*Gynerium saccharoides*), which bears elegant plumes of flowers, like those of the reed, and grows to a height of twenty feet, the leaves arranged in a fan-shaped figure near the middle of the stem. I was surprised to find on the higher parts of the sandbank the familiar foliage of a willow (*Salix Humboldtiana*). It is a dwarf species, and grows in patches resembling beds of osiers; as in the English willows, the leaves were peopled by small chrysomelideous beetles. In wandering about, many features reminded me of the seashore. Flocks of white gulls were flying overhead, uttering their well-known cry, and sandpipers coursed along the edge of the water. Here and there lonely wading-birds were stalking about; one of these, the Curicáca (*Ibis melanopis*), flew up with a loud cackling noise, and was soon joined by a unicorn bird (*Palamedea cornuta*), which I startled up from amidst the bushes, whose harsh screams, resembling the bray of a jackass, but shriller, disturbed unpleasantly the solitude of the place. Amongst the willow bushes were flocks of a handsome bird belonging

to the Icteridæ or troupial family, adorned with a rich plumage of black and saffron-yellow. I spent some time watching an assemblage of a species of bird called by the natives Tamburí-pará, on the Cecropia trees. It is the *Monasa nigrifrons* of ornithologists, and has a plain slate-coloured plumage with the beak of an orange hue. It belongs to the family of Barbets, most of whose members are remarkable for their dull inactive temperament. Those species which are ranged by ornithologists under the genus *Bucco* are called by the Indians, in the Tupí language, Tai-assú uirá, or pig-birds. They remain seated sometimes for hours together on low branches in the shade, and are stimulated to exertion only when attracted by passing insects. This flock of Tamburí-pará were the reverse of dull; they were gambolling and chasing each other amongst the branches. As they sported about, each emitted a few short tuneful notes, which altogether produced a ringing, musical chorus that quite surprised me.

On the 27th we reached an elevated wooded promontory, called Parentins, which now forms the boundary between the provinces of Pará and the Amazons. Here we met a small canoe descending to Santarem. The owner was a free negro named Lima, who, with his wife, was going down the river to exchange his year's crop of tobacco for European merchandise. The long shallow canoe was laden nearly to the water level. He resided on the banks of the Abacaxí, a river which discharges its waters into the Canomá, a broad interior channel which extends from the river Madeira to the Parentins, a distance of 180 miles. Penna offered him

advantageous terms, so a bargain was struck, and the man saved his long journey. The negro seemed a frank, straightforward fellow ; he was a native of Pernambuco, but had settled many years ago in this part of the country. He had with him a little Indian girl belonging to the Mauhés tribe, whose native seat is the district of country lying in the rear of the Canomá, between the Madeira and the Tapajos. The Mauhés are considered, I think with truth, to be a branch of the great Mundurucú nation, having segregated from them at a remote period, and by long isolation acquired different customs and a totally different language, in a manner which seems to have been general with the Brazilian aborigines. The Mundurucús seem to have retained more of the general characteristics of the original Tupí stock than the Mauhés. Senhor Lima told me, what I afterwards found to be correct, that there were scarcely two words alike in the languages of the two peoples, although there are words closely allied to Tupí in both.* The little girl had not the slightest trace of the savage in her appearance. Her features were finely shaped, the cheek-bones not at all prominent, the lips thin, and the expression of her countenance frank and smiling. She had been brought only a few weeks previously from a remote settlement of her tribe on the banks of the Abacaxí, and did not yet know five words of Portuguese. The Indians, as a general rule, are very manageable when they are young, but it is a general complaint that

* Thus the word Woman, in Mauhé, is Unihá ; in Tupí, Cunhá ; in Mundurucú, Taishí. Fire in Mauhé, is Ariá ; in Tupí, Tatá ; in Mundurucú, Idashá or Tashá.

when they reach the age of puberty they become restless and discontented. The rooted impatience of all restraint then shows itself, and the kindest treatment will not prevent them running away from their masters ; they do not return to the malocas of their tribes, but join parties who go out to collect the produce of the forests and rivers, and lead a wandering semi-savage kind of life.

We remained under the Serra dos Parentins all night. Early the next morning a light mist hung about the tree-tops, and the forest resounded with the yelping of Whaiápu-sai monkeys. I went ashore with my gun and got a glimpse of the flock, but did not succeed in obtaining a specimen. They were of small size and covered with long fur of a uniform gray colour. I think the species was the *Callithrix donacophilus*. The rock composing the elevated ridge of the Parentins is the same coarse iron-cemented conglomerate which I have spoken of as occurring near Pará and in several other places. Many loose blocks were scattered about. The forest was extremely varied, and inextricable coils of woody climbers stretched from tree to tree. Thongs of cacti were spread over the rocks and tree-trunks. The variety of small, beautifully-shaped ferns, lichens, and boleti made the place quite a museum of cryptogamic plants. I found here two exquisite species of Longicorn beetles, and a large kind of grasshopper (*Pterochroza*) whose broad fore-wings resembled the leaf of a plant, providing the insect with a perfect disguise when they were closed ; whilst the hind-wings were decorated with gaily-coloured eye-like spots.

The negro left us and turned up a narrow channel, the Paran -mirim dos Ramos (the little river of the branches, *i.e.*, having many ramifications), on the road to his home, 130 miles distant. We then continued our voyage, and in the evening arrived at Villa Nova, a straggling village containing about seventy houses, many of which scarcely deserve the name, being mere mud-huts roofed with palm-leaves. We stayed here four days. The village is built on a rocky bank, composed of the same coarse conglomerate as that already so often mentioned. In some places a bed of Tabatinga clay rests on the conglomerate. The soil in the neighbourhood is sandy, and the forest, most of which appears to be of second growth, is traversed by broad alleys which terminate to the south and east on the banks of pools and lakes, a chain of which extends through the interior of the land. As soon as we anchored I set off with Luco to explore the district. We walked about a mile along the marly shore, on which was a thick carpet of flowering shrubs, enlivened by a great variety of lovely little butterflies, and then entered the forest by a dry watercourse. About a furlong inland this opened on a broad placid pool, whose banks, clothed with grass of the softest green hue, sloped gently from the water's edge to the compact wall of forest which encompassed the whole. The pool swarmed with water-fowl; snowy egrets, dark-coloured striped herons, and storks of various species standing in rows around its margins. Small flocks of Macaws were stirring about the topmost branches of the trees. Long-legged pios cas (*Parra Jacana*) stalked over the water-

plants on the surface of the pool, and in the bushes on its margin were great numbers of a kind of canary (*Sycalis brasiliensis*) of a greenish-yellow colour, which has a short and not very melodious song. We had advanced but a few steps when we startled a pair of the Jaburú-moleque (*Mycteria Americana*), a powerful bird of the stork family, four and a half feet in height, which flew up and alarmed the rest, so that I got only one bird out of the tumultuous flocks which passed over our heads. Passing towards the farther end of the pool I saw, resting on the surface of the water, a number of large round leaves, turned up at their edges; they belonged to the Victoria water-lily. The leaves were just beginning to expand (December 3rd), some were still under water, and the largest of those which had reached the surface measured not quite three feet in diameter. We found a montaria with a paddle in it, drawn up on the bank, which I took leave to borrow of the unknown owner, and Luco paddled me amongst the noble plants to search for flowers, meeting, however, with no success. I learnt afterwards that the plant is common in nearly all the lakes of this neighbourhood. The natives call it the furno do Piosoca, or oven of the Jacana, the shape of the leaves being like that of the ovens on which Mandioca meal is roasted. We saw many kinds of hawks and eagles, one of which, a black species, the Caracára-í (*Milvago nudicollis*), sat on the top of a tall naked stump, uttering its hypocritical whining notes. This eagle is considered a bird of ill omen by the Indians; it often perches on the tops of trees in the neighbourhood of their huts, and is then said to bring a warning of

death to some member of the household. Others say that its whining cry is intended to attract other defenceless birds within its reach. The little courageous fly-catcher Bem-ti-vi (*Saurophagus sulphuratus*) assembles in companies of four or five, and attacks it boldly, driving it from the perch where it would otherwise sit for hours. I shot three hawks of as many different species; and these, with a Magoary stork, two beautiful gilded-green jacamars (*Galbula chalcocephala*), and half-a-dozen leaves of the water-lily made a heavy load, with which we trudged off back to the canoe.

A few years after this visit, namely, in 1854-5, I passed eight months at Villa Nova. The district of which it is the chief town is very extensive, for it has about forty miles of linear extent along the banks of the river; but the whole does not contain more than 4000 inhabitants. More than half of these are pure-blood Indians, who live in a semi-civilized condition on the banks of the numerous channels and lakes. The trade of the place is chiefly in India-rubber, balsam of Copaiba (which are collected on the banks of the Madeira and the numerous rivers that enter the Canomá channel), and salt fish, prepared in the dry season, nearer home. These articles are sent to Pará in exchange for European goods. The few Indian and half-breed families who reside in the town, are many shades inferior in personal qualities and social condition to those I lived amongst near Pará and Cametá. They live in wretched dilapidated mud-hovels; the women cultivate small patches of mandioca; the men spend most of their time

in fishing, selling what they do not require themselves and getting drunk with the most exemplary regularity on *cashaça*, purchased with the proceeds.

The configuration of the district of country in which Villa Nova is situated, is remarkable. About a mile inland, there commences a chain of lakes of greater or lesser extent, which are connected together by narrow channels, and extend to the interior by-water of the Ramos. This latter communicates with the channel of Canomá, already mentioned as connected with the river Madeira. The whole tract of land, therefore, forms an island, or group of islands, which extends from a little below Villa Nova, to the mouth of the Madeira, a distance of 180 miles; the breadth varying from ten to twenty miles. The district is known by the name of the Island of Tupinambarána. The Canomá is an outlet to the waters of the Madeira when this river is fuller than the main Amazons, which is the case from November to February. But it also receives the contributions of eight other independent rivers, most of which have broad, lake-like expansions of water near their junction with the Canomá. One of them, the Andirá-mirim, I was told, is a league broad for some distance from its mouth. The country bordering these interior waters is extremely fertile, and the broad lakes have clear waters and sandy shores. They abound in fish and turtle. The country is healthy along the banks of the Canomá, and for some distance up its tributary streams. In certain places on the banks of these, intermittent fevers prevail, as they do on all those affluents of the Amazons which have clear, dark waters and slow cur-

rents. The incidence of this endemic is somewhat remarkable, for it exists on one side of the Andirámirim, where the land is high and rocky, and not on the other which is low and swampy. The old historians relate that the island of Tupinambarána was colonised by a portion of the great Tupí or Tupinámba nation, who were driven from the sea-coast near Pernambuco, by the early Portuguese settlers in the 16th century. I think, however, there is reason to conclude, that different tribes, having more or less affinity with the Tupís, originally existed in many places on the banks of the Amazons, and that they had frequent communication with each other, before the time of the Portuguese. Much partial migration probably occurred when the aborigines had the navigation of the main Amazons all to themselves. It seems to me very unlikely, that a compact body of Indians wandered at once from the sea-coast near Pernambuco to the central parts of the Amazons. However this may be, no trace of the aboriginal Tupís now exists in this quarter. The district is thinly populated, and the Indians who now reside here, are scattered hordes of the Mundurucú, Múra, and Mauhés tribes : semi-civilised families of the two latter live in or near the town.

I found some very friendly and intelligent people amongst the white and mameluco families residing at Villa Nova. The vicar, Father Torquato de Souza, is not quite unknown to the European public, having been the guide of Prince Adalbert of Prussia when he visited the Jurúna Indians on the Xingú, and mentioned in the published narrative of the journey. He is

now a distinguished citizen of the new Province of the Amazons, having been elected, several times in succession, President of the Provincial Chamber. Together with many other natives of the Amazons region, he affords a proof that an equatorial climate in the new world has not necessarily a deteriorating effect on the white race. He is a well-built man : above the middle height, with handsome features, and a fine, healthy, ruddy complexion. He is a most lively and energetic fellow. When we first landed at Villa Nova, in 1849, the church was being repaired, and as carpenters were scarce, he had buckled to the work himself, and I found him, with sleeves turned up, sawing and planing as though he was well used to the trade. Next to Padre Torquato, Senhor Meirelles, well deserves mention ; a more sensible, intelligent and kind-hearted man I never met with in Brazil. He also held some appointment under Government, but his time was chiefly taken up with the management of his plantations situated three miles below the village. Both these worthy men were fond of reading, and subscribed regularly to Rio Janeiro daily newspapers. Senhor Meirelles spent a deal of money on dear books, which he sent for by a parcel at a time from the metropolis, 2000 miles off. Some of these were Portuguese periodicals, on the plan of the English Penny Magazine ; most of them, however, were translations of romances chiefly French. They circulated freely amongst the many readers at Villa Nova. At the time of my visit "Uncle Tom's Cabin," translated into Portuguese, was a great favourite. I found a love of reading not at all uncommon amongst

the better sort of people in the towns and villages on the Amazons ; it seems natural to the climate, and is promoted by the occupation being well suited to the hot and lazy hours of mid-day. It is a pity the Portuguese language, on account of the poverty of its modern literature, is so poor a medium for acquiring knowledge, and that books are so scarce in Northern Brazil, otherwise the Amazonian people would not be condemned to the wretchedly narrow range of information which is now generally their lot. A system of popular education supported entirely by the Government, has been established for some time in Brazil, and a primary school for boys exists in every small town from Pará to the frontiers of the Empire. Padre Torquato was the schoolmaster, as well as the priest at Villa Nova. He had about thirty scholars, who were of all shades of colour, from the negro and Indian to the pure white. The schoolmasters, as mentioned in a former chapter, receive the same amount of salary as the priests, namely, 600 milreis, or about 70*l.* a year ; but they are entitled to a bonus if the number of scholars exceeds a certain limit. In some of the larger villages, schools for girls have also been established. It is very desirable that these should be well supported, for the future advancement of the Brazilian people towards a better social condition depends in a great measure on the improvement in the education of their women.

Villa Nova, like most places on the main Amazons, is very healthy ; it is considerably more so than Santarem, where the climate is much drier and hotter, or the regions further west, where the air is sultry and stag-

nant. The cool and invigorating east wind becomes neutralised before reaching the Rio Negro, but at Villa Nova, in average seasons, it blows daily, with the exception of a few weeks' interval in November, from the beginning of September to the end of January. The river, here about two and a half miles broad, makes a bold sweep of ten or twelve miles free of islands, the blue ridge of the Parentins terminating the prospect down stream. The broad, rapidly-flowing current, with the brisk counter-movement of the atmosphere, are no doubt the chief causes of the salubrity of the district. The seasons vary very considerably. Thus, in 1849, as already mentioned, the period of dryness and strong breezes was unusually short, and the river, in consequence, did not sink to its usual level. In 1854 I witnessed the opposite extreme. The wet season, from February to June, had been very severe, and the waters had risen to their highest point. It took us, in the months of June and July, in a well-manned vessel, fourteen days to ascend from Santarem, a distance of only 110 miles. The currents were very strong; all the low lands were flooded, and great portions of land planted with cacao on the coast of Obydos were swept away. At Villa Nova it was very hot, gleamy, and showery up to the end of August. The welcome dry winds then set in, and lasted until the 20th of November, by which time the river had receded to its lowest level. At that date commenced a series of heavy rains, which continued, however, only nine days; but the weather remained showery to the end of the year. On the 3rd of January a kind of second summer began,

and this was a most delightful time. The vegetation which had become parched up in November had been freshened by the showery weather of December, and the open places were covered with a carpet of the brightest verdure. The marly and sandy terrace-formed beaches were clothed with a great diversity of flowering shrubs. Birds and insects were far more numerous and active than they had been before. A species of swallow of a brown colour, with a short square tail (Cotyle), then made its appearance in great numbers, and built its nests in holes of the bank on which the village is built, trilling forth in the mornings and evenings a short but sweet song. The east wind recommenced. It blew at first gently, but increased in strength daily as the dryness augmented: and with it came a dense fog, a rare phenomenon in this country, but which I found to be of regular occurrence in the central parts of the Lower Amazons when the dry season was much prolonged. For three successive weeks the daily order of the weather was almost uniform. The mornings dawned with a clear sky, a stiff breeze blowing and tossing the waters into billows, searching through our dwellings, and communicating a healthful exhilarating glow to the body. As the sun ascended, a light mistiness crept along the lower strata of the atmosphere; after mid-day this increased in density, until an hour before sunset the sun became obscured, and no longer produced that sickening heat which at all other times was so depressing in the late hours of afternoon. An hour or two after sunset the mist cleared away, and the nights were starlit and deliciously cool. Every day the fog

increased in amount, until at the beginning of February a thick moist veil enveloped the whole landscape both night and day. The wind then increased to a gale; every sailing craft on the river was obliged to seek shelter; and when the monthly river steamer, a vessel of 400 tons burthen, anchored in the port, it pitched up and down as I have seen ships do in breezy weather in the Southampton water. This lasted three days, at the end of which the wind suddenly lulled, black clouds gathered in the east, the fog lifted up like a curtain, and down came the deluging rain which inaugurates the wet season.

I made, in this second visit to Villa Nova, an extensive collection of the natural productions of the neighbourhood. A few remarks on some of the more interesting of these must suffice. The forests are very different in their general character from those of Pará, and in fact those of humid districts generally throughout the Amazons. The same scarcity of large-leaved Musaceous and Marantaceous plants was noticeable here as at Obydos. The low-lying areas of forest or Ygapós, which alternate everywhere with the more elevated districts, did not furnish the same luxuriant vegetation as they do in the Delta region of the Amazons. They are flooded during three or four months in the year, and when the waters retire, the soil—to which the very thin coating of alluvial deposit imparts little fertility—remains bare, or covered with a matted bed of dead leaves, until the next flood season. These tracts have then a barren appearance; the trunks and lower

branches of the trees are coated with dried slime, and disfigured by rounded masses of fresh-water sponges, whose long horny spiculæ and dingy colours give them the appearance of hedgehogs. Dense bushes of a harsh, cutting grass, called *Tiriríca*, form almost the only fresh vegetation in the dry season. Perhaps the dense shade, the long period during which the land remains under water, and the excessively rapid desiccation when the waters retire, all contribute to the barrenness of these *Ygapós*. The higher and drier land is everywhere sandy, and tall coarse grasses line the borders of the broad alleys which have been cut through the second-growth woods. These places swarm with *carapátos*, ugly ticks belonging to the genus *Ixodes*, which mount to the tips of blades of grass, and attach themselves to the clothes of passers by. They are a great annoyance. It occupied me a full hour daily to pick them off my flesh after my diurnal ramble. There are two species; both are much flattened in shape, have four pairs of legs, a thick short proboscis and a horny integument. Their habit is to attach themselves to the skin by plunging their proboscides into it, and then suck the blood until their flat bodies are distended into a globular form. The whole proceeding, however, is very slow, and it takes them several days to pump their fill. No pain or itching is felt, but serious sores are caused if care is not taken in removing them, as the proboscis is liable to break off and remain in the wound. A little tobacco juice is generally applied to make them loosen their hold. They do not cling firmly to the skin by their legs, although each of these has a pair of sharp

and fine claws connected with the tips of the member by means of a flexible pedicle. When they mount to the summits of slender blades of grass, or the tips of

leaves, they hold on by their fore legs only, the other three pairs being stretched out so as to fasten on any ani-

mal which comes in their way. The smaller of the two species is of a yellowish colour ; it is much the most abundant, and sometimes falls upon one by scores. When distended it is about the size of a No. 8 shot ; the larger kind, which fortunately comes only singly to the work, swells to the size of a pea.

In some parts of the interior the soil is composed of very coarse sand and small angular fragments of quartz ; in these places no trees grow. I visited, in company with Padre Torquato, one of these treeless spaces or campos, as



Peuririma Palm (*Bactris*).

they are called, situated five miles from the village. The road thither led through a varied and beautiful forest, containing many gigantic trees. I missed the Assai, Mirití, Paxiúba, and other palms which are all found only on rich moist soils, but the noble Bacába was not uncommon, and there was a great diversity of dwarf species of Marajá palms (*Bactris*), one of which, called the Peuriríma, was very elegant, growing to a height of twelve or fifteen feet, with a stem no thicker than a man's finger. On arriving at the campo all this beautiful forest abruptly ceased, and we saw before us an oval tract of land, three or four miles in circumference, destitute even of the smallest bush. The only vegetation was a crop of coarse hairy grass growing in patches. The forest formed a hedge all round the isolated field, and its borders were composed in great part of trees which do not grow in the dense virgin forest, such as a great variety of bushy *Melastomas*, low *Byrsomina* trees, myrtles, and Lacre-trees, whose berries exude globules of wax resembling gamboge. On the margins of the campo wild pine-apples also grew in great quantity. The fruit was of the same shape as our cultivated kind, but much smaller, the size being that of a moderately large apple. We gathered several quite ripe; they were pleasant to the taste, of the true pine-apple flavour, but had an abundance of fully developed seeds, and only a small quantity of eatable pulp. There was no path beyond this campo; in fact all beyond is terra incognita to the inhabitants of Villa Nova.

The only interesting Mammalian animal which I saw

at Villa Nova was a monkey of a species new to me ; it was not, however, a native of the district, having been brought by a trader from the river Madeira, a few miles above Borba. It was a howler, probably the *Mycetes stramineus* of Geoffroy St. Hilaire. The howlers are the only kinds of monkey which the natives have not succeeded in taming. They are often caught, but they do not survive captivity many weeks. The one of which I am speaking was not quite full grown. It measured sixteen inches in length, exclusive of the tail ; the whole body was covered with rather long and shining dingy-white hair, the whiskers and beard only being of a tawny hue. It was kept in a house, together with a Coaitá and a Caiarára monkey (*Cebus albifrons*). Both these lively members of the monkey order seemed rather to court attention, but the *Mycetes* slunk away when any one approached it. When it first arrived, it occasionally made a gruff subdued howling noise early in the morning. The deep volume of sound in the voice of the howling monkeys, as is well known, is produced by a drum-shaped expansion of the larynx. It was curious to watch the animal whilst venting its hollow cavernous roar, and observe how small was the muscular exertion employed. When howlers are seen in the forest there are generally three or four of them mounted on the topmost branches of a tree. It does not appear that their harrowing roar is emitted from sudden alarm ; at least, it was not so in captive individuals. It is probable, however, that the noise serves to intimidate their enemies. I did not meet with the *Mycetes stramineus* in any other part of the Amazons region ; in the neigh-

bourhood of Pará a reddish-coloured species prevails (*M. Belzebuth*) ; in the narrow channels near Breves I shot a large, entirely black kind ; another yellow-handed species, according to the report of the natives, inhabits the island of Macajó, which is probably the *M. flavimanus* of Kuhl ; some distance up the Tapajos the only howler found is a brownish-black species ; and on the Upper Amazons the sole species seen was the *Mycetes ursinus*, whose fur is of a shining yellowish-red colour.

In the dry forests of Villa Nova I saw a rattlesnake for the first time. I was returning home one day through a narrow alley, when I heard a pattering noise close to me. Hard by was a tall palm tree, whose head was heavily weighted with parasitic plants, and I thought the noise was a warning that it was about to fall. The wind lulled for a few moments, and then there was no doubt that the noise proceeded from the ground. On turning my head in that direction, a sudden plunge startled me, and a heavy gliding motion betrayed a large serpent making off almost from beneath my feet. The ground is always so encumbered with rotting leaves and branches that one only discovers snakes when they are in the act of moving away. The residents of Villa Nova would not believe that I had seen a rattlesnake in their neighbourhood ; in fact, it is not known to occur in the forests at all, its place being the open campos, where, near Santarem, I killed several. On my second visit to Villa Nova I saw another. I had then a favourite little dog, named Diamante, who used to accompany me in my rambles. One day he rushed into the thicket, and made a dead set at a large snake, whose

head I saw raised above the herbage. The foolish little brute approached quite close, and then the serpent reared its tail slightly in a horizontal position and shook its terrible rattle. It was many minutes before I could get the dog away ; and this incident, as well as the one already related, shows how slow the reptile is to make the fatal spring.

I was much annoyed, and at the same time amused, with the Urubú vultures. The Portuguese call them *corvos* or crows ; in colour and general appearance, they somewhat resemble rooks, but they are much larger, and have naked, black, wrinkled skin about their face and throat. They assemble in great numbers in the villages about the end of the wet season, and are then ravenous with hunger. My cook could not leave the open kitchen at the back of the house for a moment, whilst the dinner was cooking, on account of their thievish propensities. Some of them were always loitering about, watching their opportunity, and the instant the kitchen was left unguarded, the bold marauders marched in and lifted the lids of the saucepans with their beaks to rob them of their contents. The boys of the village lie in wait and shoot them with bow and arrow ; and vultures have consequently acquired such a dread of these weapons, that they may be often kept off by hanging a bow from the rafters of the kitchen. As the dry season advances, the hosts of Urubús follow the fishermen to the lakes, where they gorge themselves with the offal of the fisheries. Towards February, they return to the villages, and are then not nearly so ravenous as before their summer trips.

The insects of Villa Nova are, to a great extent, the same as those of Santarem and the Tapajos. A few species of all orders, however, are found here, which occurred nowhere else on the Amazons, besides several others which are properly considered local varieties or races of others found at Pará, on the Northern shore of the Amazons or in other parts of Tropical America. The Hymenoptera were especially numerous, as they always are in districts which possess a sandy soil ; but the many interesting facts which I gleaned relative to their habits will be more conveniently introduced when I treat of the same or similar species found in the localities above-named. One of the most conspicuous insects peculiar to Villa Nova is an exceedingly handsome butterfly, which has been named *Agrias Phalcidon*. It is of large size, and the colours of the upper surface of its wings, resemble those of the *Callithea Leprieurii*, already described, namely, dark blue, with a broad silvery-green border. When it settles on leaves of trees, fifteen or twenty feet from the ground, it closes its wings and then exhibits a row of brilliant pale-blue eye-like spots with white pupils, which adorns their under surface. Its flight is exceedingly swift, but when at rest it is not easily made to budge from its place ; or if driven off, returns soon after to the same spot. Its superficial resemblance to *Callithea Leprieurii*, which is a very abundant species in the same locality, is very close. The likeness might be considered a mere accidental coincidence, especially as it refers chiefly to the upper surface of the wings, if similar parallel resemblances did not occur between other species of the same two

genera. Thus, on the Upper Amazons, another totally distinct kind of *Agrias* mimicks still more closely another *Callithea*; both insects being peculiar to the district where they are found flying together. Resemblances of this nature are very numerous in the insect world. I was much struck with them in the course of my travels, especially when, on removing from one district to another, local varieties of certain species were found accompanied by local varieties of the species which counterfeited them in the former locality, under a dress changed to correspond with the altered liveries of the species they mimicked. One cannot help concluding these imitations to be intentional, and that nature has some motive in their production. In many cases, the reason of the imitation is sufficiently plain. For instance, when a fly or parasitic bee has a deceptive resemblance to the species of working bee, in whose nest it deposits the egg it has otherwise no means of providing for, or when a leaping-spider, as it crouches in the axil of a leaf waiting for its prey, presents an exact imitation of a flower-bud; it is evident that the benefit of the imitating species is the object had in view. When, however, an insect mimicks another species of its own order where predaceous or parasitic habits are out of the question, it is not so easy to divine the precise motive of the adaptation. We may be sure, nevertheless, that one of the two is assimilated in external appearance to the other for some purpose useful,—perhaps of life and death importance—to the species. I believe these imitations are of the same nature as those in which an insect or lizard is coloured and marked

so as to resemble the soil, leaf, or bark on which it lives ; the resemblance serving to conceal the creatures from the prying eyes of their enemies ; or, if they are predaceous species, serving them as a disguise to enable them to approach their prey. When an insect, instead of a dead or inorganic substance, mimicks another species of its own order, and does not prey, or is not parasitic, may it not be inferred that the mimicker is subject to a persecution by insectivorous animals from which its model is free ? Many species of insects have a most deceptive resemblance to living or dead leaves ; it is generally admitted, that this serves to protect them from the onslaughts of insect-feeding animals who would devour the insect, but refuse the leaf. The same might be said of a species mimicking another of the same order ; one may be as repugnant to the tastes of insect persecutors, as a leaf or a piece of bark would be, and its imitator not enjoying this advantage would escape by being deceptively assimilated to it in external appearances. In the present instance, it is not very clear what property the *Callithea* possesses to render it less liable to persecution than the *Agrias*, except it be that it has a strong odour somewhat resembling *Vanilla*, which the *Agrias* is destitute of. This odour becomes very powerful when the insect is roughly handled or pinched, and if it serves as a protection to the *Callithea*, it would explain why the *Agrias* is assimilated to it in colours. The resemblance, as before remarked, applies chiefly to the upper side ; in other species* it is equally close on both surfaces of the wings. Some birds, and the

* *Agrias Hewitsonius* and *Callithea Markii*.

great *Æschnæ* dragon-flies, take their insect prey whilst on the wing, when the upper surface of the wings is the side most conspicuous.

In the broad alleys of the forest where these beautiful insects are found, several species of *Morpho* were common. One of these is a sister form to the *Morpho Hecuba*, which I have mentioned as occurring at Obydos. The Villa Nova kind differs from *Hecuba* sufficiently to be considered a distinct species, and has been described under the name of *M. Cisseis*; but it is clearly only a local variety of it, the range of the two being limited by the barrier of the broad Amazons. It is a grand sight to see these colossal butterflies by twos and threes floating at a great height in the still air of a tropical morning. They flap their wings only at long intervals, for I have noticed them to sail a very considerable distance without a stroke. Their wing-muscles and the thorax to which they are attached, are very feeble in comparison with the wide extent and weight of the wings: but the large expanse of these members doubtless assists the insects in maintaining their aerial course. *Morphos* are amongst the most conspicuous of the insect denizens of Tropical American forests, and the broad glades of the Villa Nova woods seemed especially suited to them, for I noticed here six species. The largest specimens of *Morpho Cisseis* measure seven inches and a half in expanse. Another smaller kind, which I could not capture, was of a pale silvery-blue colour, and the polished surface of its wings flashed like a silver speculum, as the insect flapped its wings at a great elevation in the sunlight.

To resume our voyage. We left Villa Nova on the 4th of December. A light wind on the 5th carried us across to the opposite shore and past the mouth of the Paranámirim do arco, or the little river of the bow, so called on account of its being a short arm of the main river of a curved shape, rejoining the Amazons a little below Villa Nova. On the 6th, after passing a large island in mid-river, we arrived at a place where a line of perpendicular clay cliffs, called the Barreiros de Cararaucú, diverts slightly the course of the main stream, as at Obydos. A little below these cliffs were a few settlers' houses ; here Penna remained ten days to trade, a delay which I turned to good account in augmenting very considerably my collections.

At the first house a festival was going forward. We anchored at some distance from the shore, on account of the water being shoaly, and early in the morning three canoes put off laden with salt fish, oil of manatee, fowls and bananas, wares which the owners wished to exchange for different articles required for the festa. Soon after I went ashore. The head man was a tall, well-made, civilised Tapuyo named Marcellino, who, with his wife, a thin, active, wiry old squaw, did the honours of their house, I thought, admirably. The company consisted of 50 or 60 Indians and Mamelucos ; some of them knew Portuguese, but the Tupí language was the only one used amongst themselves. The festival was in honour of our Lady of Conception ; and when the people learnt that Penna had on board an image of the saint handsomer than their own, they put off in their canoes to borrow it ; Marcellino taking charge of the doll, cover-

ing it carefully with a neatly-bordered white towel. On landing with the image, a procession was formed from the port to the house, and salutes fired from a couple of lazarino guns, the saint being afterwards carefully deposited in the family oratorio. After a litany and hymn were sung in the evening, all assembled to supper around a large mat spread on a smooth terrace-like space in front of the house. The meal consisted of a large boiled Pirarucú, which had been harpooned for the purpose in the morning, stewed and roasted turtle, piles of mandioca-meal and bananas. The old lady, with two young girls, showed the greatest activity in waiting on the guests, Marcellino standing gravely by, observing what was wanted and giving the necessary orders to his wife. When all was done hard drinking began, and soon after there was a dance, to which Penna and I were invited. The liquor served was chiefly a spirit distilled by the people themselves from mandioca cakes. The dances were all of the same class, namely, different varieties of the "Landum," an erotic dance similar to the fandango originally learnt from the Portuguese. The music was supplied by a couple of wire-stringed guitars, played alternately by the young men. All passed off very quietly considering the amount of strong liquor drunk, and the ball was kept up until sunrise the next morning.

We visited all the houses one after the other. One of them was situated in a charming spot, with a broad sandy beach before it, at the entrance to the Paran -mir m do Mucambo, a channel leading to an interior lake peopled by savages of the M ra tribe. This seemed to be the

abode of an industrious family, but all the men were absent, salting Pirarucú on the lakes. The house, like its neighbours, was simply a framework of poles thatched with palm-leaves, the walls roughly latticed and plastered with mud : but it was larger, and much cleaner inside than the others. It was full of women and children, who were busy all day with their various employments ; some weaving hammocks in a large clumsy frame, which held the warp whilst the shuttle was passed by the hand slowly across the six feet breadth of web ; others spinning cotton, and others again scraping, pressing, and roasting mandioca. The family had cleared and cultivated a large piece of ground ; the soil was of extraordinary richness, the perpendicular banks of the river, near the house, revealing a depth of many feet of crumbling vegetable mould. There was a large plantation of tobacco, besides the usual patches of Indian-corn, sugar-cane, and mandioca ; and a grove of cotton, cacao, coffee and fruit-trees surrounded the house. We passed two nights at anchor in shoaly water off the beach. The weather was most beautiful ; scores of Dolphins rolled and snorted about the canoe all night. I saw here, for the first time, the flesh-coloured species (*Delphinus pallidus* of Gervais?), which rolled always in pairs, both individuals being of the same colour. In the day-time the margin of the beach abounded with a small tiger-beetle (*Cicindela hebræa* of Klug), which flew up like a swarm of house-flies before our steps as we walked along. It is not easily detected, for its colour is assimilated to that of the moist sand over which it runs. I have a pleasant recollection of this

sand-bank, from having here observed, for the first time, in ascending the river, one of the handsomest of the many handsome butterflies which are found exclusively in the interior parts of the South American continent, namely the *Papilio Columbus*. It is of a cream-white colour bordered with black, and has a patch of crimson near the commencement of its long slender tails. In the forest, amongst a host of other beautiful and curious insects, I found another species of the same genus, which was new to me, namely, the *Papilio Lysander*, remarkable for the contrasted colours of its livery—crimson and blue-green spots on a black ground. This conspicuous insect may be cited as affording another illustration of the way in which species so very commonly become modified according to the different localities they inhabit. *P. Lysander* is found throughout the interior of the Amazons country, from Villa Nova to Peru, and also in Dutch and British Guiana. In the Delta region of the Amazons it is replaced by a form which has been treated as a distinct species, namely, the *P. Parsodes* of Gray. In French Guiana, however, numerous varieties intermediate between the two are found, so that we are compelled to consider them as local modifications of one and the same species. The difference between the two local forms is of a slight nature, and many naturalists on this account alone would consider them to belong to the same species; but the numerous existing intermediate shades of variation show how many grades are possible between even two local varieties of a species. In fact, the steps of modification are found

to be exceedingly small and numerous in all cases where the filiation of races or species can be traced ; and this circumstance may be held as confirming the truth of the axiom, "*Natura non facit saltum*," which has been impugned by some writers.

About two miles beyond this sand-bank was the miserable abode of a family of Mura Indians, the most degraded tribe inhabiting the banks of the Amazons. It was situated on a low terrace on the shores of a pretty little bay at the commencement of the high barreiros. With the exception of a cluster of bananas there were no fruit-trees or plantation of any description near the house. We saw in the bay several large alligators, with head and shoulders just reared above the level of the water. The house was a mere hovel ; a thatch of palm-leaves supported on a slender framework of upright posts and rafters, bound with flexible lianas, and the walls were partially plastered up with mud. A low doorway led into the dark chamber ; the bare earth floor was filthy in the extreme ; and in a damp corner I espied two large toads whose eyes glittered in the darkness. The furniture consisted of a few low stools ; there was no mat, and the hammock was a rudely woven web of ragged strips of the inner bark of the *Mongúba* tree. Bows and arrows hung from the smoke-blackened rafters. An ugly woman, clad in a coarse petticoat, and holding a child astride across her hip, sat crouched over a fire roasting the head of a large fish. Her husband was occupied in notching pieces of bamboo for arrow-heads. Both of them seemed rather disconcerted at our sudden entrance ; we could get nothing but curt

and surly answers to our questions, and so were glad to depart.

We crossed the river at this point, and entered a narrow channel which penetrates the interior of the island of Tupinambarána, and leads to a chain of lakes called the Lagos de Cararaucú. A furious current swept along the coast, eating into the crumbling earthy banks, and strewing the river with débris of the forest. The mouth of the channel lies about twenty-five miles from Villa Nova; the entrance is only about forty yards broad, but it expands, a short distance inland, into a large sheet of water. We suffered terribly from insect pests during the twenty-four hours we remained here. At night it was quite impossible to sleep for mosquitos; they fell upon us by myriads, and without much piping came straight at our faces as thick as raindrops in a shower. The men crowded into the cabins, and then tried to expel the pests by the smoke from burnt rags, but it was of little avail, although we were half suffocated during the operation. In the daytime the Motúca, a much larger and more formidable fly than the mosquito, insisted upon levying his tax of blood. We had been tormented by it for many days past, but this place seemed to be its metropolis. The species has been described by Perty, the author of the Entomological portion of Spix and Martius' travels, under the name of *Hadaus lepidotus*. It is a member of the Tabanidæ family, and indeed is closely related to the *Hæmatopota pluvialis*, a brown fly which haunts the borders of woods in summer time in England. The Motúca is of a bronzed-black colour; its proboscis is formed of a bundle

of horny lancets, which are shorter and broader than is usually the case in the family to which it belongs. Its puncture does not produce much pain, but it makes such a large gash in the flesh that the blood trickles forth in little streams. Many scores of them were flying about the canoe all day, and sometimes eight or ten would settle on one's ankles at the same time. It is sluggish in its motions, and may be easily killed with the fingers when it settles. Penna went forward in the montaria to the Pirarucú fishing stations, on a lake lying further inland; but he did not succeed in reaching them on account of the length and intricacy of the channels; so after wasting a day, during which, however, I had a profitable ramble in the forest, we again crossed the river, and on the 16th continued our voyage along the northern shore.

The clay cliffs of Cararaucú are several miles in length. The hard pink and red-coloured beds are here extremely thick, and in some places present a compact stony texture. The total height of the cliff is from thirty to sixty feet above the mean level of the river, and the clay rests on strata of the same coarse iron-cemented conglomerate which has already been so often mentioned. Large blocks of this latter have been detached and rolled by the force of currents up parts of the cliff where they are seen resting on terraces of the clay. On the top of all lies a bed of sand and vegetable mould which supports a lofty forest growing up to the very brink of the precipice. After passing these barreiros we continued our way along a low uninhabited coast, clothed, wherever it was elevated above high water-mark, with the usual

vividly-coloured forests of the higher Ygapó lands, to which the broad and regular fronds of the Murumurú palm, here extremely abundant, served as a great decoration. Wherever the land was lower than the flood height of the Amazons, Cecropia trees prevailed, sometimes scattered over meadows of tall broad-leaved grasses, which surrounded shallow pools swarming with water-fowl. Alligators were common on most parts of the coast; in some places we saw also small herds of Capybaras (a large Rodent animal, like a colossal Guinea-pig) amongst the rank herbage on muddy banks, and now and then flocks of the graceful squirrel monkey (*Chrysothrix sciureus*), and the vivacious Caia-rára (*Cebus albifrons*) were seen taking flying leaps from tree to tree. On the 22nd we passed the mouth of the most easterly of the numerous channels which lead to the large interior lake of Saracá, and on the 23rd threaded a series of passages between islands, where we again saw human habitations, ninety miles distant from the last house at Cararaucú. On the 24th we arrived at Serpa.

Serpa is a small village consisting of about eighty houses, built on a bank elevated twenty-five feet above the level of the river. The beds of Tabatínga clay, which are here intermingled with scoria-looking conglomerate, are in some parts of the declivity prettily variegated in colour; the name of the town in the Tupí language, Ita-coatiára, takes its origin from this circumstance, signifying striped or painted rock. It is an old settlement, and was once the seat of the district government, which had authority over the Barra of the Rio

Negro. It was in 1849 a wretched-looking village, but it has since revived, on account of having been chosen by the Steamboat Company of the Amazons as a station for steam saw-mills and tile manufactories. We arrived on Christmas-eve, when the village presented an animated appearance from the number of people congregated for the holidays. The port was full of canoes, large and small—from the *montaria*, with its arched awning of woven lianas and *Maranta* leaves, to the two-masted *cuberta* of the peddling trader, who had resorted to the place in the hope of trafficking with settlers coming from remote *sítios* to attend the festival. We anchored close to an *igarité*, whose owner was an old *Jurí* Indian, disfigured by a large black tattooed patch in the middle of his face, and by his hair being close cropped, except a fringe in front of the head. In the afternoon we went ashore. The population seemed to consist chiefly of semi-civilised Indians, living as usual in half-finished mud hovels. The streets were irregularly laid out and overrun with weeds and bushes swarming with “*mocuin*,” a very minute scarlet *acarus*, which sweeps off to one’s clothes in passing, and attaching itself in great numbers to the skin causes a most disagreeable itching. The few whites and better class of *mameluco* residents live in more substantial dwellings, white-washed and tiled. All, both men and women, seemed to me much more cordial, and at the same time more brusque in their manners than any Brazilians I had yet met with. One of them, Captain Manoel Joaquim, I knew for a long time afterwards; a lively, intelligent, and thoroughly good-hearted man, who had quite a reputation throughout the interior

of the country for generosity, and for being a firm friend of foreign residents and stray travellers. Some of these excellent people were men of substance, being owners of trading vessels, slaves, and extensive plantations of cacao and tobacco.

We stayed at Serpa five days. Some of the ceremonies observed at Christmas were interesting, inasmuch as they were the same, with little modification, as those taught by the Jesuit missionaries more than a century ago to the aboriginal tribes whom they had induced to settle on this spot. In the morning all the women and girls, dressed in white gauze chemises and showy calico print petticoats, went in procession to church, first going the round of the town to take up the different "mordomos" or stewards, whose office is to assist the Juiz of the festa. These stewards carried each a long white reed, decorated with coloured ribbons; several children also accompanied, grotesquely decked with finery. Three old squaws went in front, holding the "sairé," a large semicircular frame, clothed with cotton and studded with ornaments, bits of looking-glass, and so forth. This they danced up and down, singing all the time a monotonous whining hymn in the Tupí language, and at frequent intervals turning round to face the followers, who then all stopped for a few moments. I was told that this sairé was a device adopted by the Jesuits to attract the savages to church, for these everywhere followed the mirrors, in which they saw as it were magically reflected their own persons. In the evening, good-humoured revelry prevailed on all sides. The negroes, who had a saint of their own colour—St. Bene-

dito—had their holiday apart from the rest, and spent the whole night singing and dancing to the music of a long drum (*gambá*) and the *caracashá*. The drum was a hollow log, having one end covered with skin, and was played by the performer sitting astride upon it and drumming with his knuckles. The *caracashá* is a notched bamboo tube, which produces a harsh rattling noise by passing a hard stick over the notches. Nothing could exceed in dreary monotony this music and the singing and dancing, which were kept up with unflagging vigour all night long. The Indians did not get up a dance; for the whites and *mamelucos* had monopolised all the pretty coloured girls for their own ball, and the older squaws preferred looking on to taking a part themselves. Some of their husbands joined the negroes, and got drunk very quickly. It was amusing to notice how voluble the usually taciturn red-skins became under the influence of liquor. The negroes and Indians excused their own intemperance by saying the whites were getting drunk at the other end of the town, which was quite true.

The forest which encroaches on the ends of the weed-grown streets yielded me a large number of interesting insects, some of which have been described in the preceding chapter. The elevated land on which Serpa is built appears to be a detached portion of the *terra firma*; behind, lies the great interior lake of Saracá, to the banks of which there is a foot-road through the forest, but I could not ascertain what was the distance. Outlets from the lake enter the Amazons both above and below the village. The woods were remarkably dense, and the profoundest solitude reigned at the

distance of a few minutes' walk from the settlement. The first mile or two of the forest road was very pleasant ; the path was broad, shady, and clean ; the lower trees presented the most beautiful and varied foliage imaginable, and a compact border of fern-like selaginellas lined the road on each side. The only birds I saw were ant-thrushes in the denser thickets, and two species of *Ceræba*, a group allied to the creepers. These were feeding on the red gummy seeds of *Clusia* trees, which were here very numerous, their thick oval leaves, and large, white, wax-like flowers making them very conspicuous objects in the crowded woods. The only insect I will name amongst the numbers of species which sported about these shady places is the *Papilio Ergeteles*, and this for the purpose of again showing how much may be learned by noting the geographical relations of races and closely-allied species. The *Papilio Ergeteles* is of a velvety black colour, with two large spots of green and two belts of crimson on its wings. Its range is limited to the North side of the lower Amazons from Obydos to the Rio Negro ; on the south side of the river it is replaced by a distinct kind called the *Papilio Echelus*. The two might be considered, as they have been hitherto, perfectly distinct species, had not an intermediate variety been found to inhabit Cayenne, where neither extreme form occurs. The two forms are as distinct as any two allied species can well be, and they are different in both sexes. They are found in no other part of America than the districts mentioned. The intermediate varieties, however, link the two together, so that they cannot be considered other-

wise than as modifications of one and the same species ; one produced on the North, the other on the South side of the Amazons. It is worthy of especial mention that here as well as in the cases of *P. Lysander* and the *Heliconii*, described in the preceding chapter, the connecting links are found inhabiting distinct localities, and not mingled with the extreme forms which they connect.

We left Serpa on the 29th of December, in company of an old planter named *Senhor Joaõ Trindade* ; at whose sitio, situated opposite the mouth of the Madeira, Penna intended to spend a few days. Our course on the 29th and 30th lay through narrow channels between islands. On the 31st we passed the last of these, and then beheld to the south a sea-like expanse of water, where the Madeira, the greatest tributary of the Amazons, after 2000 miles of course, blends its waters with those of the king of rivers. I was hardly prepared for a junction of waters on so vast a scale as this, now nearly 900 miles from the sea. Whilst travelling week after week along the somewhat monotonous stream, often hemmed in between islands, and becoming thoroughly familiar with it, my sense of the magnitude of this vast water system had become gradually deadened ; but this noble sight renewed the first feelings of wonder. One is inclined, in such places as these, to think the *Paraenses* do not exaggerate much when they call the Amazons the Mediterranean of South America. Beyond the mouth of the Madeira, the Amazons sweeps down in a majestic reach, to all appearance not a whit less in breadth before than

after this enormous addition to its waters. The Madeira does not ebb and flow simultaneously with the Amazons; it rises and sinks about two months earlier, so that it was now fuller than the main river. Its current therefore poured forth freely from its mouth, carrying with it a long line of floating trees and patches of grass, which had been torn from its crumbly banks in the lower part of its course. The current, however, did not reach the middle of the main stream, but swept along nearer to the southern shore.

A few items of information which I gleaned relative to this river may find a place here. The Madeira is navigable for about 480 miles from its mouth; a series of cataracts and rapids then commences, which extends with some intervals of quiet water, about 160 miles, beyond which is another long stretch of navigable stream. Canoes sometimes descend from Villa Bella, in the interior province of Matto Grosso, but not so frequently as formerly, and I could hear of very few persons who had attempted of late years to ascend the river to that point. It was explored by the Portuguese in the early part of the eighteenth century; the chief and now the only town on its banks, Borba, 150 miles from its mouth, being founded in 1756. Up to the year 1853, the lower part of the river, as far as about 100 miles beyond Borba, was regularly visited by traders from Villa Nova, Serpa, and Barra, to collect salsaparilla, copaiba balsam, turtle-oil, and to trade with the Indians, with whom their relations were generally on a friendly footing. In that year many India-rubber collectors resorted to this region, stimulated by the high

price (2s. 6*l.* a pound) which the article was at that time fetching at Pará; and then the Aráras, a fierce and intractable tribe of Indians, began to be troublesome. They attacked several canoes and massacred every one on board, the Indian crews as well as the white traders. Their plan was to lurk in ambush near the sandy beaches where canoes stop for the night, and then fall upon the people whilst asleep. Sometimes they came under pretence of wishing to trade, and then as soon as they could get the trader at a disadvantage shot him and his crew from behind trees. Their arms were clubs, bows, and Taquára arrows, the latter a formidable weapon tipped with a piece of flinty bamboo shaped like a spear-head; they could propel it with such force as to pierce a man completely through the body. The whites of Borba made reprisals, inducing the warlike Mundurucús, who had an old feud with the Aráras, to assist them. This state of things lasted two or three years, and made a journey up the Madeira a risky undertaking, as the savages attacked all comers. Besides the Aráras and the Mundurucús, the latter a tribe friendly to the whites, attached to agriculture, and inhabiting the interior of the country from the Madeira to beyond the Tapajos, two other tribes of Indians now inhabit the lower Madeira, namely, the Parentintins and the Muras. Of the former I did not hear much; the Muras lead a lazy quiet life on the banks of the labyrinths of lakes and channels which intersect the low country on both sides of the river below Borba. The Aráras are one of those tribes which do not plant mandioca; and indeed have no settled habitations. They

are very similar in stature and other physical features to the Mundurucús, although differing from them so widely in habits and social condition. They paint their chins red with Urucú (Anatto), and have usually a black tattooed streak on each side of the face, running from the corner of the mouth to the temple. They have not yet learnt the use of firearms, have no canoes, and spend their lives roaming over the interior of the country, living on game and wild fruits. When they wish to cross a river they make a temporary canoe with the thick bark of trees, which they secure in the required shape of a boat by means of lianas. I heard it stated by a trader of Santarem, who narrowly escaped being butchered by them in 1854, that the Aráras numbered two thousand fighting men. The number I think must be exaggerated, as it generally is with regard to Brazilian tribes. When the Indians show a hostile disposition to the whites, I believe it is most frequently owing to some provocation they have received at their hands; for the first impulse of the Brazilian red-man is to respect Europeans; they have a strong dislike to be forced into their service, but if strangers visit them with a friendly intention they are well treated. It is related, however, that the Indians of the Madeira were hostile to the Portuguese from the first; it was then the tribes of Muras and Torazes who attacked travellers. In 1855 I met with an American, an odd character, named Kemp, who had lived for many years amongst the Indians on the Madeira, near the abandoned settlement of Crato. He told me his neighbours were a kindly-disposed and cheerful people, and that the onslaught of

the Aráras was provoked by a trader from Barra, who wantonly fired into a family of them, killing the parents, and carrying off their children to be employed as domestic servants.

We remained nine days at the sitio of Senhor Joaõ Trindade. It is situated on a tract of high Ygapó land, which is raised, however, only a few inches above high-water mark. This skirts the northern shore for a long distance; the soil consisting of alluvium and rich vegetable mould, and exhibiting the most exuberant fertility. Such districts are the first to be settled on in this country, and the whole coast for many miles was dotted with pleasant-looking sitios like that of our friend. The establishment was a large one, the house and out-buildings covering a large space of ground. The industrious proprietor seemed to be Jack-of-all-trades; he was planter, trader, fisherman, and canoe-builder, and a large *igarité* was now on the stocks under a large shed. There was greater pleasure in contemplating this prosperous farm from its being worked almost entirely by free labour; in fact, by one family, and its dependents. Joaõ Trindade had only one female slave; his other workpeople were a brother and sister-in-law, two godsons, a free negro, one or two Indians, and a family of Muras. Both he and his wife were *mamelucos*; the negro children called them always father and mother. The order, abundance, and comfort about the place, showed what industry and good management could effect in this country without slave-labour. But the surplus produce of such small plantations is very trifling.

All we saw, had been done since the disorders of 1835-6, during which Joaõ Trindade was a great sufferer; he was obliged to fly, and the Mura Indians destroyed his house and plantations. There was a large, well-weeded grove of cacao along the banks of the river, comprising about 8000 trees, and further inland, considerable plantations of tobacco, mandioca, Indian corn, fields of rice, melons, and water-melons. Near the house was a kitchen garden, in which grew cabbages and onions introduced from Europe, besides a wonderful variety of tropical vegetables. It must not be supposed that these plantations and gardens were enclosed or neatly kept, such is never the case in this country where labour is so scarce; but it was an unusual thing to see vegetables grown at all, and the ground tolerably well weeded. The space around the house was plentifully planted with fruit-trees, some, belonging to the Anonaceous order, yielding delicious fruits large as a child's head, and full of custardy pulp which it is necessary to eat with a spoon; besides oranges, lemons, guavas, alligator pears, Abús (*Achras cainito*), Genipapas and bananas. In the shade of these, coffee trees grew in great luxuriance. The table was always well supplied with fish, which the Mura, who was attached to the household as fisherman, caught every morning a few hundred yards from the port. The chief kinds were the Surubim, Pira-peüa and Piramutába, three species of Siluridæ, belonging to the genus *Pimelodus*. To these we used a sauce in the form of a yellow paste, quite new to me, called Arubé, which is made of the poisonous juice of the mandioca root, boiled down before the starch or tapioca is pre-

cipitated, and seasoned with capsicum peppers. It is kept in stone bottles several weeks before using, and is a most appetising relish to fish. Tucupí, another sauce made also from mandioca juice, is much more common in the interior of the country than Arubé. This is made by boiling or heating the pure liquid after the tapioca has been separated, daily for several days in succession, and seasoning it with peppers and small fishes ; when old it has the taste of essence of anchovies. It is generally made as a liquid, but the Jurí and Miranha tribes on the Japurá, make it up in the form of a black paste by a mode of preparation I could not learn ; it is then called Tucupí-pixúna, or black Tucupí. I have seen the Indians on the Tapajos, where fish is scarce, season Tucupí with Saüba-ants. It is there used chiefly as a sauce to Tacacá, another preparation from mandioca, consisting of the starch beaten up in boiling water.

I thoroughly enjoyed the nine days we spent at this place. Our host and hostess took an interest in my pursuit ; one of the best chambers in the house was given up to me, and the young men took me long rambles in the neighbouring forests. I saw very little hard work going forward. Everyone rose with the dawn, and went down to the river to bathe ; then came the never-failing cup of rich and strong coffee, after which all proceeded to their avocations. At this time, nothing was being done at the plantations ; the cacao and tobacco crops were not ripe ; weeding time was over, and the only work on foot was the preparation of a little farinha by the women. The men dawdled about ; went shooting and fishing, or did trifling jobs about the house.

The only laborious work done during the year in these establishments is the felling of timber for new clearings ; this happens at the beginning of the dry season, namely, from July to September. Whatever employment the people were engaged in, they did not intermit it during the hot hours of the day. Those who went into the woods took their dinners with them—a small bag of farinha, and a slice of salt fish. About sunset all returned to the house ; they then had their frugal suppers, and towards 8 o'clock, after coming to ask a blessing of the patriarchal head of the household, went off to their hammocks to sleep.

There was another visitor besides ourselves, a negro, whom João Trindade introduced to me as his oldest and dearest friend, who had saved his life during the revolt of 1835. I have, unfortunately, forgotten his name ; he was a freeman, and had a sitio of his own, situated about a day's journey from this. There was the same manly bearing about him that I had noticed with pleasure in many other free negroes ; but his quiet, earnest manner, and the thoughtful and benevolent expression of his countenance showed him to be a superior man of his class. He told me he had been intimate with our host for thirty years, and that a wry word had never passed between them. At the commencement of the disorders of 1835 he got into the secret of a plot for assassinating his friend, hatched by some villains whose only cause of enmity was their owing him money and envying his prosperity. It was such as these who aroused the stupid and brutal animosity of the Múras against the whites. The negro, on obtaining this news,

set off alone in a montaria on a six hours' journey in the dead of night, to warn his "compadre" of the fate in store for him, and thus gave him time to fly. It was a pleasing sight to notice the cordiality of feeling and respect for each other shown by these two old men. They used to spend hours together enjoying the cool breeze, seated under a shed which overlooked the broad river, and talking of old times. Joaõ Trindade was famous for his tobacco and Tauarí cigarettes. He took particular pains in preparing the Tauarí, the envelope of the cigarettes. It is the inner bark of a tree, which separates into thin papery layers. Many trees yield it, amongst them the *Courataria Guianensis* and the *Sapucaya* nut-tree (*Lecythis ollaria*), both belonging to the same natural order. The bark is cut in long strips, of a breadth suitable for folding the tobacco; the inner portion is then separated, boiled, hammered with a wooden mallet, and exposed to the air for a few hours. Some kinds have a reddish colour and an astringent taste, but the sort prepared by our host was of a beautiful satiny-white hue, and perfectly tasteless. He obtained sixty, eighty, and sometimes a hundred layers from the same strip of bark. The best tobacco in Brazil is grown in the neighbourhood of Borba, on the Madeira, where the soil is a rich black loam; but tobacco of very good quality was grown by Joaõ Trindade and his neighbours along this coast, on similar soil. It is made up into slender rolls, an inch and a half in diameter and six feet in length, tapering at each end. When the leaves are gathered and partially dried, layers of them, after the mid-ribs are plucked

out, are placed on a mat and rolled up into the required shape. This is done by the women and children, who also manage the planting, weeding, and gathering of the tobacco. The process of tightening the rolls is a long and heavy task, and can be done only by men. The cords used for this purpose are of very great strength. They are made of the inner bark of a peculiar light-wooded and slender tree, called *Uaissíma*, which yields, when beaten out, a great quantity of most beautiful silky fibre, many feet in length. I think this might be turned to some use by English manufacturers, if they could obtain it in large quantity. The tree is abundant on light soils on the southern side of the Lower Amazons, and grows very rapidly. When the rolls are sufficiently well pressed they are bound round with narrow thongs of remarkable toughness, cut from the bark of the climbing *Jacitára* palm tree (*Desmoncus macracanthus*), and are then ready for sale or use.

A narrow channel runs close by this house, which communicates at a distance of six hours' journey (about eighteen miles) with the *Urubú*, a large and almost unknown river, flowing through the interior of Guiana. Our host told me the *Urubú* presented an expanse of clear dark water, in some places a league in width, and was surrounded by an undulating country, partly forest and partly campo. Its banks are fringed with white sandy beaches, and peopled only by a few families of *Múra* savages. The family now in his employ, and who were living gipsy fashion, the only way they can be induced to live, under a wretched shed on his grounds,

were brought from this river six months previously. The channel was navigable by montarias only in the rainy season ; it was now a half-dry watercourse, the mouth lying about eight feet above the present level of the Amazons. The principal mouth of the Urubú lies between this place and Serpa. The river communicates with the lake of Saracá, but I could make out nothing clearly as to its precise geographical relations with that large sheet of water, which is ten or twelve leagues in length and one to two in breadth, and has an old-established Brazilian settlement, called Silves, on its banks.

It was very pleasant to roam in our host's cacaoal. The ground was clear of underwood, the trees were about thirty feet in height, and formed a dense shade. Two species of monkey frequented the trees, and I was told committed great depredations when the fruit was ripe. One of these, the macaco prego (*Cebus cirrifer* ?), is a most impudent thief ; it destroys more than it eats by its random, hasty way of plucking and breaking the fruits, and when about to return to the forest, carries away all it can in its hands or under its arms. The other species, the pretty little *Chrysothrix sciureus*, contents itself with devouring what it can on the spot. A variety of beautiful insects basked on the foliage where stray gleams of sunlight glanced through the canopy of broad soft-green leaves. Numbers of an elegant, long-legged tiger-beetle (*Odontocheila egregia*) ran and flew about over the herbage. It belongs to a sub-genus peculiar to the warmest parts of America, the species of which are found only in the shade of the forest, and are seen quite

as frequently pursuing their prey on trees and herbage as on the ground. The typical tiger-beetles, or *Cicindelæ*, inhabit only open and sunny situations, and are wholly terrestrial in their habits. They are the sole forms of the family which occur in the Northern and Central parts of Europe and North America. In the Amazons region, the shade-loving and semi-arboreal *Odontocheilæ* outnumber in species the *Cicindelæ* as twenty-two to six; all but one of this number are exclusively peculiar to the Amazonian forests, and this affords another proof of the adaptation of the Fauna to a forest-clad country, pointing to a long and uninterrupted existence of land covered by forests on this part of the earth's surface.

We left this place on the 8th of January, and on the afternoon of the 9th, arrived at Matarí, a miserable little settlement of Múra Indians. Here we again anchored and went ashore. The place consisted of about twenty slightly-built mud-hovels, and had a most forlorn appearance, notwithstanding the luxuriant forest in its rear. A horde of these Indians settled here many years ago, on the site of an abandoned missionary station, and the government had lately placed a resident director over them, with the intention of bringing the hitherto intractable savages under authority. This, however, seemed to promise no other result than that of driving them to their old solitary haunts on the banks of the interior waters, for many families had already withdrawn themselves. The absence of the usual cultivated trees and plants, gave the place a naked and poverty-stricken aspect. I entered one of the hovels, where several women were employed cooking a meal. Portions of a

large fish were roasting over a fire made in the middle of the low chamber, and the entrails were scattered about the floor, on which the women with their children were squatted. These had a timid, distrustful expression of countenance, and their bodies were begrimed with black mud, which is smeared over the skin as a protection against musquitoes. The children were naked, the women wore petticoats of coarse cloth, ragged round the edges, and stained in blotches with murixí, a dye made from the bark of a tree. One of them wore a necklace of monkey's teeth. There were scarcely any household utensils; the place was bare with the exception of two dirty grass hammocks hung in the corners. I missed the usual mandioca sheds behind the house, with their surrounding cotton, cacao, coffee, and lemon trees. Two or three young men of the tribe were lounging about the low open doorway. They were stoutly-built fellows, but less well-proportioned than the semi-civilised Indians of the Lower Amazons generally are. Their breadth of chest was remarkable, and their arms were wonderfully thick and muscular. The legs appeared short in proportion to the trunk; the expression of their countenances was unmistakeably more sullen and brutal, and the skin of a darker hue than is common in the Brazilian red man. Before we left the hut, an old couple came in; the husband carrying his paddle, bow, arrows, and harpoon, the woman bent beneath the weight of a large basket filled with palm fruits. The man was of low stature and had a wild appearance from the long coarse hair which hung over his forehead. Both his lips were pierced

with holes, as is usual with the older Múras seen on the river. They used formerly to wear tusks of the wild hog in these holes whenever they went out to encounter strangers or their enemies in war. The gloomy savagery, filth, and poverty of the people in this place, made me feel quite melancholy, and I was glad to return to the canoe. They offered us no civilities; they did not even pass the ordinary salutes, which all the semi-civilised and many savage Indians proffer on a first meeting. The men persecuted Penna for cashaça, which they seemed to consider the only good thing the white man brings with him. As they had nothing whatever to give in exchange, Penna declined to supply them. They followed us as we descended to the port, becoming very troublesome when about a dozen had collected together. They brought their empty bottles with them and promised fish and turtle, if we would only trust them first with the coveted aguardente, or cau-im, as they called it. Penna was inexorable: he ordered the crew to weigh anchor, and the disappointed savages remained hooting after us with all their might from the top of the bank as we glided away.

The Múras have a bad reputation all over this part of the Amazons, the semi-civilised Indians being quite as severe upon them as the white settlers. Every one spoke of them as lazy, thievish, untrustworthy, and cruel. They have a greater repugnance than any other class of Indians to settled habits, regular labour, and the service of the whites; their distaste, in fact, to any approximation towards civilised life is invincible. Yet most of these faults are only an exaggeration of the fun-

damental defects of character in the Brazilian red man. There is nothing, I think, to show that the Múras had a different origin from the nobler agricultural tribes belonging to the Tupí nation, to some of whom they are close neighbours, although the very striking contrast in their characters and habits would suggest the conclusion that they had, in the same way as the Semangs of Malacca, for instance, with regard to the Malays. They are merely an offshoot from them, a number of segregated hordes becoming degraded by a residence most likely of very many centuries in Ygapó lands, confined to a fish diet, and obliged to wander constantly in search of food. Those tribes which are supposed to be more nearly related to the Tupís are distinguished by their settled agricultural habits, their living in well-constructed houses, their practice of many arts, such as the manufacture of painted earthenware, weaving, and their general custom of tattooing, social organisation, obedience to chiefs, and so forth. The Múras have become a nation of nomade fishermen, ignorant of agriculture and all other arts practised by their neighbours. They do not build substantial and fixed dwellings, but live in separate families or small hordes, wandering from place to place along the margins of those rivers and lakes which most abound in fish and turtle. At each resting-place they construct temporary huts at the edge of the stream, shifting them higher or lower on the banks, as the waters advance or recede. Their canoes originally were made simply of the thick bark of trees, bound up into a semi-cylindrical shape by means of woody lianas; these are now rarely seen, as most families possess montarias, which they have

contrived to steal from the settlers from time to time. Their food is chiefly fish and turtle, which they are very expert in capturing. It is said by their neighbours that they dive after turtles, and succeed in catching them by the legs, which I believe is true in the shallow lakes where turtles are imprisoned in the dry season. They shoot fish with bow and arrow, and have no notion of any other method of cooking it than by roasting. It is not quite clear whether the whole tribe were originally quite ignorant of agriculture ; as some families on the banks of the streams behind Villa Nova, who could scarcely have acquired the art in recent times, plant mandioca ; but, as a general rule, the only vegetable food used by the Múras is bananas and wild fruits. The original home of this tribe was the banks of the Lower Madeira. It appears they were hostile to the European settlers from the beginning ; plundering their sitios, waylaying their canoes, and massacring all who fell into their power. About fifty years ago the Portuguese succeeded in turning the warlike propensities of the Mundurucús against them ; and these, in the course of many years' persecution, greatly weakened the power of the tribe, and drove a great part of them from their seats on the banks of the Madeira. The Múras are now scattered in single hordes and families over a wide extent of country bordering the main river from Villa Nova to Catuá, near Ega, a distance of 800 miles. Since the disorders of 1835-6, when they committed great havoc amongst the peaceable settlements from Santarem to the Rio Negro, and were pursued and slaughtered in great numbers by the Mundurucús in

alliance with the Brazilians, they have given no serious trouble.

The reasons which lead me to think the Múras are merely an offshoot from the Mundurucús, or some other allied section of the widely-spread Tupí nation, and not an originally distinct people, are founded on a general comparison of the different tribes of Amazonian Indians. In the first place, there is no sharply-defined difference between sections of the Indian race, either in physical or moral qualities. They are all very much alike in bodily structure; and, although some are much lower in the scale of culture than others, yet the numerous tribes in this respect form a graduated link from the lowest to the highest. The same customs reappear in tribes who are strongly contrasted in other respects and live very wide apart. The Mauhés, who live in the neighbourhood of the Mundurucús and Múras, have much in common with both; but, according to tradition, they once formed part of the Mundurucú nation. The language of the Múras is entirely different from that of the tribes mentioned; but language is not a sure guide in the filiation of Brazilian tribes; seven or eight different languages being sometimes spoken on the same river, within a distance of 200 or 300 miles. There are certain peculiarities in Indian habits which lead to a quick corruption of language and segregation of dialects. When Indians, men or women, are conversing amongst themselves, they seem to take pleasure in inventing new modes of pronunciation, or in distorting words. It is amusing to notice how the whole party will laugh when the wit of the circle perpetrates a new slang term,

and these new words are very often retained. I have noticed this during long voyages made with Indian crews. When such alterations occur amongst a family or horde, which often live many years without communication with the rest of their tribe, the local corruption of language becomes perpetuated. Single hordes belonging to the same tribe and inhabiting the banks of the same river thus become, in the course of many years' isolation, unintelligible to other hordes, as happens with the Collínas on the Jurúa. I think it, therefore, very probable that the disposition to invent new words and new modes of pronunciation, added to the small population and habits of isolation of hordes and tribes, are the causes of the wonderful diversity of languages in South America.

There is one curious custom of the Múras which requires noticing before concluding this digression ; this is the practice of snuff-taking with peculiar ceremonies. The snuff is called Paricá, and is a highly stimulating powder, made from the seeds of a species of Ingá, belonging to the Leguminous order of plants. The seeds are dried in the sun, pounded in wooden mortars, and kept in bamboo tubes. When they are ripe, and the snuff-making season sets in, they have a fuddling-bout, lasting many days, which the Brazilians call a *Quarentena*, and which forms a kind of festival of a semi-religious character. They begin by drinking large quantities of caysúma and cashirí, fermented drinks made of various fruits and mandioca, but they prefer cashaça, or rum, when they can get it. In a short time they drink themselves into a soddened semi-intoxicated state, and

then commence taking the Paricá. For this purpose they pair off, and each of the partners, taking a reed containing a quantity of the snuff, after going through a deal of unintelligible mummerly, blows the contents with all his force into the nostrils of his companion. The effect on the usually dull and taciturn savages is wonderful; they become exceedingly talkative, sing, shout, and leap about in the wildest excitement. A re-action soon follows; more drinking is then necessary to rouse them from their stupor, and thus they carry on for many days in succession. The Mauhés also use the Paricá, although it is not known amongst their neighbours the Mundurucús. Their manner of taking it is very different from that of the swinish Múras, it being kept in the form of a paste, and employed chiefly as a preventive against ague in the months between the dry and wet seasons, when the disease prevails. When a dose is required, a small quantity of the paste is dried and pulverised on a flat shell, and the powder then drawn up into both nostrils at once through two vulture quills secured together by cotton thread. The use of Paricá was found by the early travellers amongst the Omaguas, a section of the Tupís, who formerly lived on the Upper Amazons, a thousand miles distant from the homes of the Mauhés and Múras. This community of habits is one of those facts which support the view of the common origin and near relationship of the Amazonian Indians.

After leaving Matarí, we continued our voyage along the northern shore. The banks of the river were of moderate elevation during several days' journey; the

terra firma lying far in the interior, and the coast being either low land or masked with islands of alluvial formation. On the 14th we passed the upper mouth of the Parana-mirim de Eva, an arm of the river of small breadth, formed by a straggling island some ten miles in length, lying parallel to the northern bank. On passing the western end of this, the main land again appeared; a rather high rocky coast, clothed with a magnificent forest of rounded outline, which continues hence for twenty miles to the mouth of the Rio Negro, and forms the eastern shore of that river. Many houses of settlers, built at a considerable elevation on the wooded heights, now enlivened the river banks. One of the first objects which here greeted us was a beautiful bird we had not hitherto met with, namely, the scarlet and black tanager (*Ramphocœlus nigrogularis*), flocks of which were seen sporting about the trees on the edge of the water, their flame-coloured liveries lighting up the masses of dark-green foliage.

The weather, from the 14th to the 18th, was wretched; it rained sometimes for twelve hours in succession, not heavily, but in a steady drizzle, such as we are familiar with in our English climate. We landed at several places on the coast, Penna to trade as usual, and I to ramble in the forest in search of birds and insects. In one spot the wooded slope enclosed a very picturesque scene: a brook, flowing through a ravine in the high bank, fell in many little cascades to the broad river beneath, its margins decked out with an infinite variety of beautiful plants. Wild bananas arched over the watercourse, and the trunks of the trees in its

vicinity were clothed with ferns, large-leaved species belonging to the genus *Lygodium*, which, like *Osmunda*, have their spore-cases collected together on contracted leaves. On the 18th, we arrived at a large fazenda (plantation and cattle-farm), called Jatuarána. A rocky point here projects into the stream, and as we found it impossible to stem the strong current which whirled round it, we crossed over to the southern shore. Canoes, in approaching the Rio Negro, generally prefer the southern side on account of the slackness of the current near the banks. Our progress, however, was most tediously slow, for the regular east wind had now entirely ceased, and the *vento de cima* or wind from up river, having taken its place, blew daily for a few hours, dead against us. The weather was oppressively close, and every afternoon a squall arose, which, however, as it came from the right quarter and blew for an hour or two, was very welcome. We made acquaintance on this coast with a new insect pest, the Piúm, a minute fly, two-thirds of a line in length, which here commences its reign, and continues henceforward as a terrible scourge along the upper river, or Solimoens, to the end of the navigation on the Amazons. It comes forth only by day, relieving the mosquito at sunrise with the greatest punctuality, and occurs only near the muddy shores of the stream, not one ever being found in the shade of the forest. In places where it is abundant it accompanies canoes in such dense swarms as to resemble thin clouds of smoke. It made its appearance in this way the first day after we crossed the river. Before I was aware of the presence of flies, I felt a slight itching

on my neck, wrist, and ankles, and on looking for the cause, saw a number of tiny objects having a disgusting resemblance to lice, adhering to the skin. This was my introduction to the much-talked of Piúm, On close examination, they are seen to be minute two-winged insects, with dark-coloured body and pale legs and wings, the latter closed lengthwise over the back. They alight imperceptibly, and squatting close, fall at once to work ; stretching forward their long front legs, which are in constant motion and seem to act as feelers, and then applying their short, broad snouts to the skin. Their abdomens soon become distended and red with blood, and then, their thirst satisfied, they slowly move off, sometimes so stupefied with their potations that they can scarcely fly. No pain is felt whilst they are at work, but they each leave a small circular raised spot on the skin and a disagreeable irritation. The latter may be avoided in great measure by pressing out the blood which remains in the spot ; but this is a troublesome task when one has several hundred punctures in the course of a day. I took the trouble to dissect specimens to ascertain the way in which the little pests operate. The mouth consists of a pair of thick fleshy lips, and two triangular horny lancets, answering to the upper lip and tongue of other insects. This is applied closely to the skin, a puncture is made with the lancets, and the blood then sucked through between these into the œsophagus, the circular spot which results coinciding with the shape of the lips. In the course of a few days the red spots dry up, and the skin in time becomes blackened with the endless num-

ber of discoloured punctures that are crowded together. The irritation they produce is more acutely felt by some persons than others. I once travelled with a middle-aged Portuguese, who was laid up for three weeks from the attacks of Piúm; his legs being swelled to an enormous size, and the punctures aggravated into spreading sores.*

A brisk wind from the east sprang up early in the morning of the 22nd: we then hoisted all sail, and made for the mouth of the Rio Negro. This noble stream at its junction with the Amazons, seems, from its position, to be a direct continuation of the main river, whilst the Solimoens which joins at an angle and is somewhat narrower than its tributary, appears to be a branch instead of the main trunk of the vast water-system. One sees therefore at once, how the early explorers came to give a separate name to this upper part of the Amazons. The Brazilians have lately taken to applying the convenient term Alto Amazonas (High or Upper Amazons), to the Solimoens, and it is probable that this will gradually prevail over the old name. The Rio Negro broadens considerably from its mouth upwards, and presents the appearance of a great lake; its black-dyed waters having no current, and seeming to be dammed up by the impetuous flow of the yellow, turbid Solimoens, which here belches forth a continuous line of uprooted trees

* The Piúm belongs probably to the same species as the Mosquito of the Orinoco, described by Humboldt, and which he referred to the genus Simulium, several kinds of which inhabit Europe. Our insect is nearly allied to Simulium, but differs from the genus in several points, chiefly in the nervures of the wings.

and patches of grass, and forms a striking contrast with its tributary. In crossing, we passed the line, a little more than half-way over, where the waters of the two rivers meet and are sharply demarcated from each other. On reaching the opposite shore, we found a remarkable change. All our insect pests had disappeared, as if by magic, even from the hold of the canoe: the turmoil of an agitated, swiftly flowing river, and its torn, perpendicular, earthy banks, had given place to tranquil water and a coast indented with snug little bays, fringed with sloping sandy beaches. The low shore and vivid light green endlessly-varied foliage, which prevailed on the south side of the Amazons, were exchanged for a hilly country, clothed with a sombre, rounded, and monotonous forest. Our tedious voyage now approached its termination; a light wind carried us gently along the coast to the city of Barra, which lies about seven or eight miles within the mouth of the river. We stopped for an hour in a clean little bay, to bathe and dress, before showing ourselves again among civilised people. The bottom was visible at a depth of six feet, the white sand taking a brownish tinge from the stained but clear water. In the evening I went ashore, and was kindly received by Senhor Henriques Antony, a warm-hearted Italian, established here in a high position as merchant, who was the never-failing friend of stray travellers. He placed a couple of rooms at my disposal, and in a few hours I was comfortably settled in my new quarters, sixty-four days after leaving Obydos.

The town of Barra is built on a tract of elevated, but

very uneven land, on the left bank of the Rio Negro, and contained in 1850, about 3000 inhabitants. There was originally a small fort here, erected by the Portuguese to protect their slave-hunting expeditions amongst the numerous tribes of Indians which peopled the banks of the river. The most distinguished and warlike of these were the Manáos, who had many traits in common with the Omaguas, or Cambevas, of the Upper Amazons, the Mundurucús of the Tapajos, the Jurúnas of the Xingú, and other sections of the Tupí nation. The Manáos were continually at war with the neighbouring tribes, and had the custom of enslaving the prisoners made during their predatory expeditions. The Portuguese disguised their slave-dealing motives under the pretext of ransoming (*resgatando*), these captives; indeed, the term *resgatar* (to ransom) is still applied by the traders on the Upper Amazons to the very general, but illegal, practice of purchasing Indian children of the wild tribes. The older inhabitants of the place remember the time when many hundreds of these captives were brought down by a single expedition. In 1809, Barra became the chief town of the Rio Negro district; many Portuguese and Brazilians from other provinces then settled here; spacious houses and warehouses were built, and it grew, in the course of thirty or forty years, to be, next to Santarem, the principal settlement on the banks of the Amazons. At the time of my visit it was on the decline, in consequence of the growing distrust, or increased cunning, of the Indians, who once formed a numerous and the sole labouring class, but having got to know that the laws

protected them against forced servitude, were rapidly withdrawing themselves from the place. When the new province of the Amazons was established, in 1852, Barra was chosen as the capital, and was then invested with the appropriate name of the city of Manáos.

The situation of the town has many advantages ; the climate is healthy ; there are no insect pests ; the soil is fertile and capable of growing all kinds of tropical produce (the coffee of the Rio Negro, especially, being of very superior quality), and it is near the fork of two great navigable rivers. The imagination becomes excited when one reflects on the possible future of this place, situated near the centre of the equatorial part of South America, in the midst of a region almost as large as Europe, every inch of whose soil is of the most exuberant fertility, and having water communication on one side with the Atlantic, and on the other with the Spanish republics of Venezuela, New Granada, Ecuador, Peru, and Bolivia. Barra is now the principal station for the lines of steamers which were established in 1853, and passengers and goods are transhipped here for the Solimoens and Peru. A steamer runs once a fortnight between Pará and Barra, and a bi-monthly one plies between this place and Nauta in the Peruvian territory. The steam-boat company is supported by a large annual grant, about 50,000*l.* sterling, from the imperial government. Barra was formerly a pleasant place of residence, but it is now in a most wretched plight, suffering from a chronic scarcity of the most necessary articles of food. The attention of the settlers was formerly devoted almost entirely to the collection of the spontaneous pro-

duce of the forests and rivers ; agriculture was consequently neglected, and now the neighbourhood does not produce even mandioca-meal sufficient for its own consumption. Many of the most necessary articles of food, besides all luxuries, come from Portugal, England, and North America. A few bullocks are brought now and then from Obydos, 500 miles off, the nearest place where cattle are reared in any numbers, and these furnish at long intervals a supply of fresh beef, but this is generally monopolised by the families of government officials. Fowls, eggs, fresh fish, turtles, vegetables, and fruit, were excessively scarce and dear in 1859, when I again visited the place ; for instance, six or seven shilings were asked for a poor lean fowl, and eggs were twopence half-penny a piece. In fact, the neighbourhood produces scarcely anything ; the provincial government is supplied with the greater part of its funds from the treasury of Pará ; its revenue, which amounts to about 50 contos of reis (5,600*l.*), derived from export taxes on the produce of the entire province, not sufficing for more than about one-fifth of its expenditure. The population of the province of the Amazons, according to a census taken in 1858, is 55,000 souls ; the municipal district of Barra, which comprises a large area around the capital, containing only 4500 inhabitants. For the government, however, of this small number of people, an immense staff of officials is gathered together in the capital, and, notwithstanding the endless number of trivial formalities which Brazilians employ in every small detail of administration, these have nothing to do the greater part of their time. None of the people

who flocked to Barra on the establishment of the new government, seemed to care about the cultivation of the soil and the raising of food, although these would have been most profitable speculations. The class of Portuguese who emigrate to Brazil seem to prefer petty trading to the honourable pursuit of agriculture. If the English are a nation of shopkeepers, what are we to say of the Portuguese? I counted in Barra, one store for every five dwelling-houses. These stores, or *tavernas*, have often not more than fifty pounds' worth of goods for their whole stock, and the Portuguese owners, big lusty fellows, stand all day behind their dirty counters for the sake of selling a few coppers' worth of liquors, or small wares. These men all give the same excuse for not applying themselves to agriculture, namely, that no hands can be obtained to work on the soil. Nothing can be done with Indians; indeed, they are fast leaving the neighbourhood altogether, and the importation of negro slaves, in the present praiseworthy temper of the Brazilian mind, is out of the question. The problem, how to obtain a labouring class for a new and tropical country, without slavery, has to be solved before this glorious region can become what its delightful climate and exuberant fertility fit it for—the abode of a numerous, civilised, and happy people.

I found at Barra my companion, Mr. Wallace, who, since our joint Tocantins expedition, had been exploring, partly with his brother, lately arrived from England, the north-eastern coast of Marajó, the river Capim (a branch of the Guamá, near Pará), Monte Alegre, and Santarem.

He had passed us by night below Serpa, on his way to Barra, and so had arrived about three weeks before me. Besides ourselves, there were half-a-dozen other foreigners here congregated,—Englishmen, Germans, and Americans; one of them a Natural History collector, the rest traders on the rivers. In the pleasant society of these, and of the family of Senhor Henriques, we passed a delightful time; the miseries of our long river voyages were soon forgotten, and in two or three weeks we began to talk of further explorations. Meantime we had almost daily rambles in the neighbouring forest. The country around Barra is undulating and furrowed by ravines, through which flow rivulets of clear cold water, along whose banks many picturesque nooks occur. The whole surface of the land down to the water's edge is covered by the uniform dark-green rolling forest, the *caá-apoam* (convex woods) of the Indians, characteristic of the Rio Negro. This clothes also the extensive areas of low land, which are flooded by the river in the rainy season. The olive-brown tinge of the water seems to be derived from the saturation in it of the dark green foliage during these annual inundations. The great contrast in form and colour between the forests of the Rio Negro and those of the Amazons arises from the predominance in each of different families of plants. On the main river, palms of twenty or thirty different species form a great proportion of the mass of trees; whilst on the Rio Negro they play a very subordinate part. The characteristic kind in the latter region is the Jará (*Leopoldinia pulchra*), a species not found on the margins of the Amazons, which has a scanty

head of fronds with narrow leaflets of the same dark green hue as the rest of the forest. The stem is smooth, and about two inches in diameter; its height is not more than twelve to fifteen feet; it does not, therefore, rise amongst the masses of foliage of the exogenous trees, so as to form a feature in the landscape, like the broad-leaved Murumurú and Urucurí, the slender Assaí, the tall Jauarí, and the fan-leaved Murití of the banks of the Amazons. On the shores of the main river the mass of the forest is composed, besides palms, of Leguminosæ, or trees of the bean family, in endless variety as to height, shape of foliage, flowers, and fruit; of silk-cotton trees, colossal nut-trees (Lecythideæ), and Cecropiæ, the underwood and water-frontage consisting in great part of broad-leaved Musacæ, Marantacæ, and succulent grasses: all of which are of light shades of green. The forests of the Rio Negro are almost destitute of these large-leaved plants and grasses, which give so rich an appearance to the vegetation wherever they grow; the margins of the stream being clothed with bushes or low trees, having the same gloomy monotonous aspect as the mangroves of the shores of creeks near the Atlantic. The uniformly small but elegantly-leaved exogenous trees, which constitute the mass of the forest, consist in great part of members of the Laurel, Myrtle, Bignoniaceous, and Rubiaceous orders. The soil is generally a stiff loam, whose chief component part is the Tabatinga clay, which also forms low cliffs on the coast in some places, where it overlies strata of coarse sandstone. This kind of soil and the same geological formation prevail, as we have seen, in many places on the banks of

the Amazons, so that the great contrast in the forest-clothing of the two rivers cannot arise from this cause.

I did not stay long enough at Barra to make a large collection of the animal productions of the neighbourhood. I obtained one species of monkey; not more than a dozen birds, and about 300 species of insects. Judging from these materials, the fauna appears to have much in common with that of the sea-coast of Guiana; but, at the same time, it contains a considerable number of species not hitherto found in Guiana, or in any other part of South America. The resemblance between the eastern shore of the Rio Negro and the distant coast of Guiana, in this respect, appears to be greater than that between the Rio Negro and the banks of the Upper Amazons.*

The species of monkey mentioned above was rather

* My own material is perhaps not sufficient to establish this view of the relations of the fauna, for it requires the comparison of an extensive series of species to obtain sound results on such subjects. A few conspicuous instances, however, pointed to the conclusion above mentioned. For example: in birds, the beautiful seven-coloured Tanager, *Calliste tatao*, the "sete cores" of the Brazilians, a Cayenne bird, is common to Guiana and the neighbourhood of Barra, but does not range further westward to the banks of the Solimoens; where, from Ega to Tabatinga, the allied form of *Calliste Yeni* takes its place. The *Ramphastos Toco*, or *Tocano pacova* (so named from its beak resembling a banana or *pacova*), a well-known Guianian bird, is found also at Barra, but not further west at Ega. In Coleopterous insects such species as *Aniara sepulchralis*, *Agra ænea*, *Stenocheila Lacordairei*, and others, confirm this view, being common to Cayenne and the Rio Negro, but not found further west on the banks of the Solimoens. Mr. Wallace discovered that the Rio Negro served as a barrier to the distribution of many species of mammals and birds, certain kinds being peculiar to the east, and others to the west bank (*Travels on the Amazons and Rio Negro*, p. 471). The Upper Amazons Fauna, nevertheless, contains a very large proportion of Guiana species.

common in the forest ; it is the *Midas bicolor* of Spix, a kind I had not before met with, and peculiar, as far as at present known, to the eastern bank of the Rio Negro. The colour is brown, with the neck and arms white. Like its congeners, it keeps together in small troops, and runs along the main boughs of the loftier trees, climbing perpendicular trunks, but never taking flying leaps. The locality seemed to be a poor one for birds and insects. I do not know how far this apparent scarcity is attributable to the rainy weather which prevailed, and to the unfavourable time of the year. The months spent here (from January to March) I always found to be the best for collecting Coleopterous insects in this climate, but they are not so well for other orders of insects or for birds, which abound most from July to October. The forest was very pleasant for rambling. In some directions broad pathways led down gentle slopes, through what one might fancy were interminable shrubberies of evergreens, to moist hollows where springs of water bubbled up, or shallow brooks ran over their beds of clean white sand. But the most beautiful road was one that ran through the heart of the forest to a waterfall, which the citizens of Barra consider as the chief natural curiosity of their neighbourhood. The waters of one of the larger rivulets which traverse the gloomy wilderness, here fall over a ledge of rock about ten feet high. It is not the cascade itself, but the noiseless solitude, and the marvellous diversity and richness of trees, foliage, and flowers, encircling the water basin, that form the attraction of the place. Families make picnic excursions to this spot ; and the

gentlemen—it is said the ladies also—spend the sultry hours of midday bathing in the cold and bracing waters. This place is classic ground to the Naturalist, from having been a favourite spot with the celebrated travellers Spix and Martius, during their stay at Barra in 1820. Von Martius was so much impressed by its magical beauty that he commemorated the visit by making a sketch of the scenery serve as background in one of the plates of his great work on the palms.

Birds and insects, however, were scarce amidst these charming sylvan scenes. I often traversed the whole distance from Barra to the waterfall, about two miles by the forest road, without seeing or hearing a bird, or meeting with so many as a score of Lepidopterous and Coleopterous insects. In the thinner woods near the borders of the forest many pretty little blue and green creepers of the Dacnidæ group, were daily seen feeding on berries; and a few very handsome birds occurred in the forest. But the latter were so rare that we could obtain them only by employing a native hunter; who used to spend a whole day, and go a great distance, to obtain two or three specimens. In this way I obtained, amongst others, specimens of the Trogon pavoninus (the Suruquá grande of the natives), a most beautiful creature, having soft golden green plumage, red breast, and an orange-coloured beak; also the Ampelis Pompadoura, a rich glossy-purple chatterer with wings of a snowy-white hue. The borders of the forest yielded me more insects also than the shady central pathways. A few species occurred which I had previously found at Obydos and Serpa, but certain kinds

were met with which are not known in any other part of South America. The small-leaved bushes and low trees on the skirts of the forest and along the more open pathways were sparingly tenanted by a variety of curious phytophagous beetles. None of these offered any remarkable feature, except perhaps the species of *Chlamys*. These are small beetles of a cubical shape and grotesque appearance, the upper surface of their bodies being studded with tubercles. They look like anything rather than insects; some of them are an exact imitation of the dung of caterpillars on leaves; others have a deceptive likeness to small flower-buds, galls, and other vegetable excrescences, whilst some large kinds are like fragments of metallic ore. They are very sluggish in their motions, and live in the most exposed situations on the surface of leaves; their curious shapes are therefore no doubt so many disguises to protect them from the keen eyes of insectivorous birds and lizards. A nearly allied group, the *Lamprosomas*, of which several species occurred in the same places, have perfectly smooth convex bodies; these glitter like precious stones on the foliage, and seem to be protected by the excessive hardness of their integuments. The *Eumolpidæ* and *Galerucidæ*, two groups belonging also to the leaf-eating family, were much more numerous than the *Chlamydes* and *Lamprosomas*, although having neither the disguised appearance of the one nor the hard integuments of the other; but many of them secrete a foul liquor when handled, which may perhaps serve the same purpose of passive defence. The *Chlamydes* are almost confined to the warmer parts of America, and

the species, although extremely numerous (about 300 are known in collections), are nearly all very rare. It is worthy of note that mimicking insects are very generally of great scarcity; that is, few examples of each species occur in the places where they are found, and they constitute groups which are remarkable for the strongly-marked diversity and limited ranges of their species.

After we had rested some weeks in Barra, we arranged our plans for further explorations in the interior of the country. Mr. Wallace chose the Rio Negro for his next trip, and I agreed to take the Solimoens. My colleague has already given to the world an account of his journey on the Rio Negro, and his adventurous ascent of its great tributary the Uapés. I left Barra for Ega, the first town of any importance on the Solimoens, on the 26th of March, 1850. The distance is nearly 400 miles, which we accomplished in a small cuberta, manned by ten stout Cucama Indians, in thirty-five days. On this occasion, I spent twelve months in the upper region of the Amazons; circumstances then compelled me to return to Pará. I revisited the same country in 1855, and devoted three years and a-half to a fuller exploration of its natural productions. The results of both journies will be given together in subsequent chapters of this work; in the meantime, I will proceed to give an account of Santarem and the river Tapajos, whose neighbourhoods I investigated in the years 1851-4.

A few words on my visit to Pará in 1851, may be

here introduced. I descended the river from Ega to the capital, a distance of 1400 miles, in a heavily-laden schooner belonging to a trader of the former place. The voyage occupied no less than twenty-nine days, although we were favoured by the powerful currents of the rainy season. The hold of the vessel was filled with turtle oil contained in large jars, the cabin was crammed with Brazil nuts, and a great pile of salsaparilla, covered with a thatch of palm leaves, occupied the middle of the deck. We had, therefore (the master and two passengers), but rough accommodation, having to sleep on deck exposed to the wet and stormy weather under little toldos or arched shelters, arranged with mats of woven lianas and maranta leaves. I awoke many a morning, with clothes and bedding soaked through with the rain. With the exception, however, of a slight cold at the commencement I never enjoyed better health than during this journey. When the wind blew from up river or off the land, we sped away at a great rate; but it was often squally from those quarters, and then it was not safe to hoist the sails. The weather was generally calm, a motionless mass of leaden clouds covering the sky and the broad expanse of waters flowing smoothly down with no other motion than the ripple of the current. When the wind came from below, we tacked down the stream; sometimes it blew very strong, and then the schooner, having the wind abeam, laboured through the waves, shipping often heavy seas which washed everything that was loose from one side of the deck to the other.

On arriving at Pará, I found the once cheerful and

healthy city desolated by two terrible epidemics. The yellow fever, which visited the place the previous year (1850) for the first time since the discovery of the country, still lingered, after having carried off nearly 5 per cent. of the population. The number of persons who were attacked, namely, three-fourths of the entire population, showed how general is the onslaught of an epidemic on its first appearance in a place. At the heels of this plague came the smallpox. The yellow fever had fallen most severely on the whites and mamelucos, the negroes wholly escaping ; but the smallpox attacked more especially the Indians, negroes, and people of mixed colour, sparing the whites almost entirely, and taking off about a twentieth part of the population in the course of the four months of its stay. I heard many strange accounts of the yellow fever. I believe Pará was the second port in Brazil attacked by it. The news of its ravages in Bahia, where the epidemic first appeared, arrived some few days before the disease broke out. The government took all the sanitary precautions that could be thought of ; amongst the rest was the singular one of firing cannon at the street corners, to purify the air. Mr. Norris, the American consul, told me, the first cases of fever occurred near the port, and that it spread rapidly and regularly from house to house, along the streets which run from the waterside to the suburbs, taking about twenty-four hours to reach the end. Some persons related that for several successive evenings before the fever broke out the atmosphere was thick, and that a body of murky vapour accompanied by a strong stench, travelled from street to

street. This moving vapour was called the "Maí da peste," "the mother or spirit of the plague"; and it was useless to attempt to reason them out of the belief that this was the forerunner of the pestilence. The progress of the disease was very rapid. It commenced in April, in the middle of the wet season. In a few days, thousands of persons lay sick, dying or dead. The state of the city during the time the fever lasted, may be easily imagined. Towards the end of June it abated, and very few cases occurred during the dry season from July to December.

As I said before, the yellow fever still lingered in the place when I arrived from the interior in April. I was in hopes I should escape it, but was not so fortunate; it seemed to spare no new comer. At the time I fell ill, every medical man in the place was worked to the utmost in attending the victims of the other epidemic; it was quite useless to think of obtaining their aid, so I was obliged to be my own doctor, as I had been in many former smart attacks of fever. I was seized with shivering and vomit at 9 o'clock in the morning. Whilst the people of the house went down to the town for the medicines I ordered, I wrapped myself in a blanket and walked sharply to and fro along the verandah, drinking at intervals a cup of warm tea, made of a bitter herb in use amongst the natives, called Pajéma-rióba, a leguminous plant growing in all waste places. About an hour afterwards, I took a good draught of a decoction of elder blossoms as a sudorific, and soon after fell insensible into my hammock. Mr. Philipps, an English resident with whom I was then

lodging, came home in the afternoon and found me sound asleep and perspiring famously. I did not wake till towards midnight, when I felt very weak and aching in every bone of my body. I then took as a purgative, a small dose of Epsom salts and manna. In forty-eight hours the fever left me, and in eight days from the first attack, I was able to get about my work. Little else happened during my stay, which need be recorded here. I shipped off all my collections to England, and received thence a fresh supply of funds. It took me several weeks to prepare for my second and longest journey into the interior. My plan now was first to make Santarem head-quarters for some time, and ascend from that place the river Tapajos, as far as practicable. Afterwards I intended to revisit the marvellous country of the Upper Amazons, and work well its natural history at various stations I had fixed upon, from Ega to the foot of the Andes.

END OF VOL. I.



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