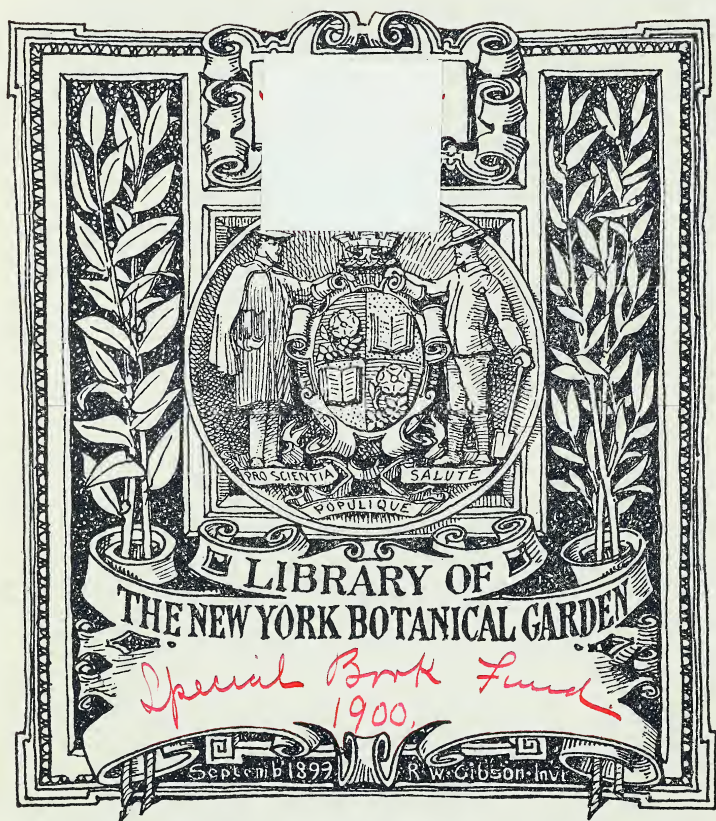


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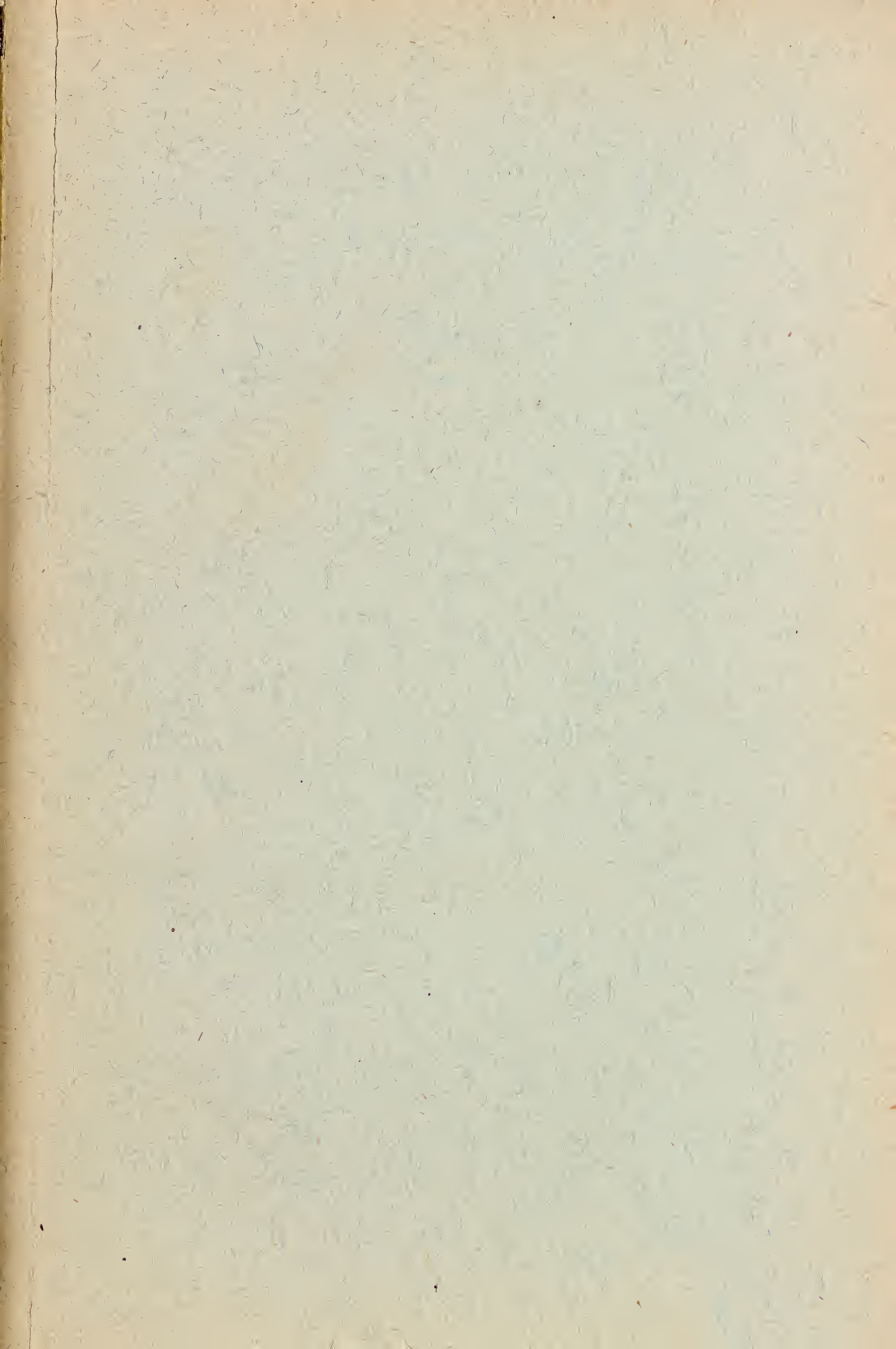


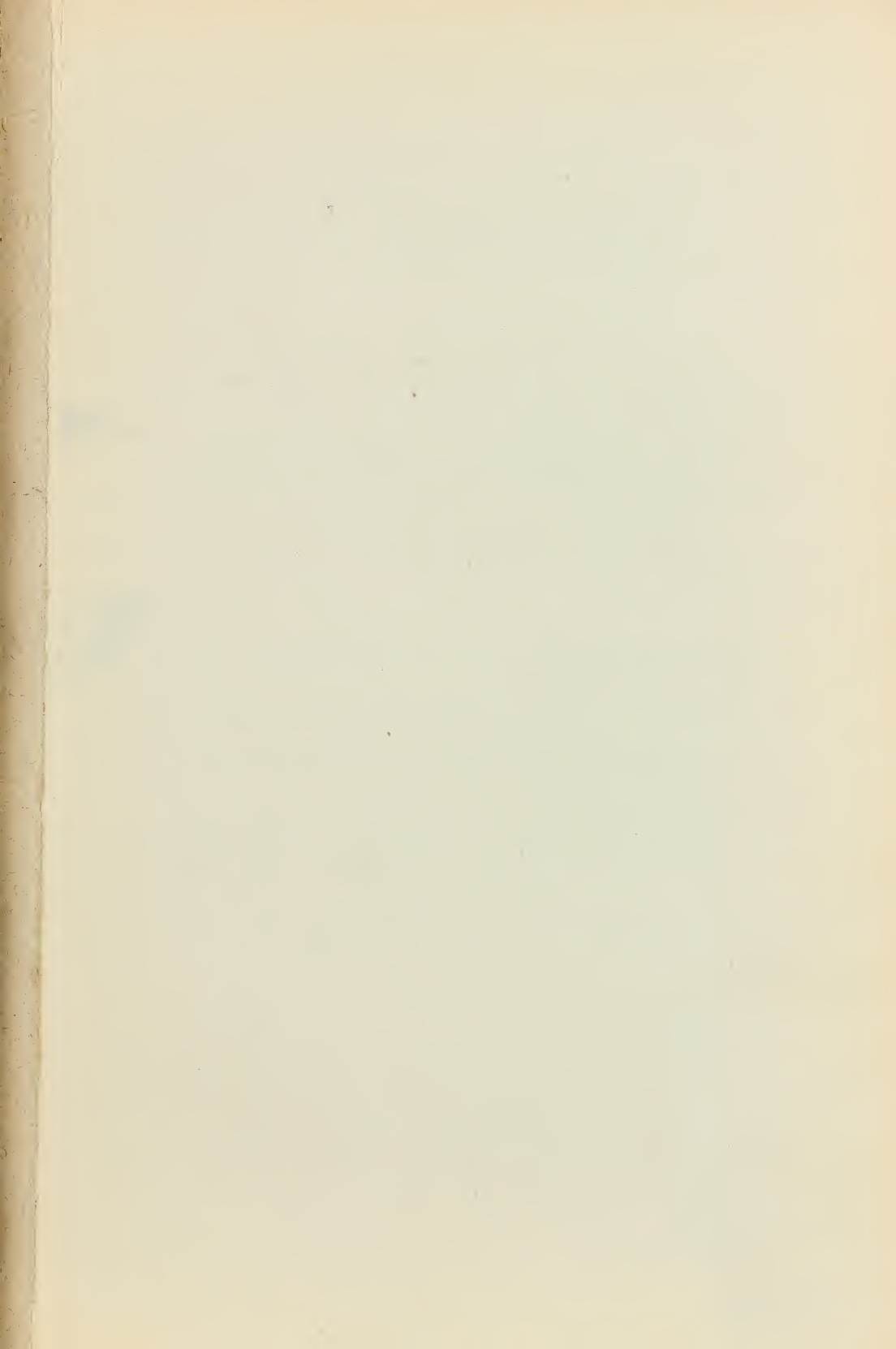
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BOTANICAL REMINISCENCES

IN

BRITISH GUIANA

BY

RICHARD SCHOMBURGK, Dr. Phil., Director,

KNIGHT OF THE IMP. ORDER OF THE CROWN, THE ORDER OF MERIT OF PHILIP THE MAGNANIMOUS AND THE ORDER OF THE CROWN OF ITALY; MEMB. OF THE IMPER. CAROL. LEOPOLDIN. ACADEMY; COR. MEMB. ZOOL. SOC., LONDON; COR. MEMB. ROYAL BOT. SOC., LONDON; COR. MEMB. BOT. SOC., EDINBURGH; COR. MEMB. GÉO. SOC., VIENNA, BERLIN, AND DRESDEN; COR. MEMB. SOC. NATIONALE, CHERBOURG, FRANCE; COR. MEMB. SOC. PHYSICO. MEDICA., ERLANGEN; COR. MEMB. HORT. SOC., BERLIN AND FRANKFORT-ON-MAIN; HON. MEMB. HORT. SOC., VICTORIA; HON. MEMB. BOT. SOC., MAGDEBURG; HON. MEMB. ROYAL SOC., SYDNEY, &c., &c., &c.

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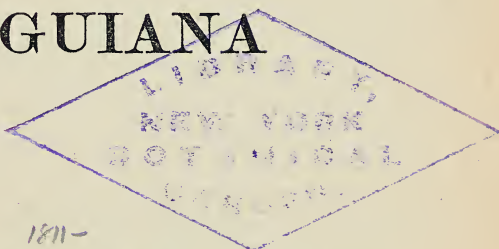
1876.

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DEDICATION.

To Dr. W. Wyatt, J.P.

MY DEAR DOCTOR WYATT—

In dedicating these Botanical Reminiscences to you, I offer it as a proof of the esteem in which I hold your scientific knowledge and talents, and the great interest you take in all connected with this establishment and its progress.

I am, my dear Dr. Wyatt,

Most faithfully yours,

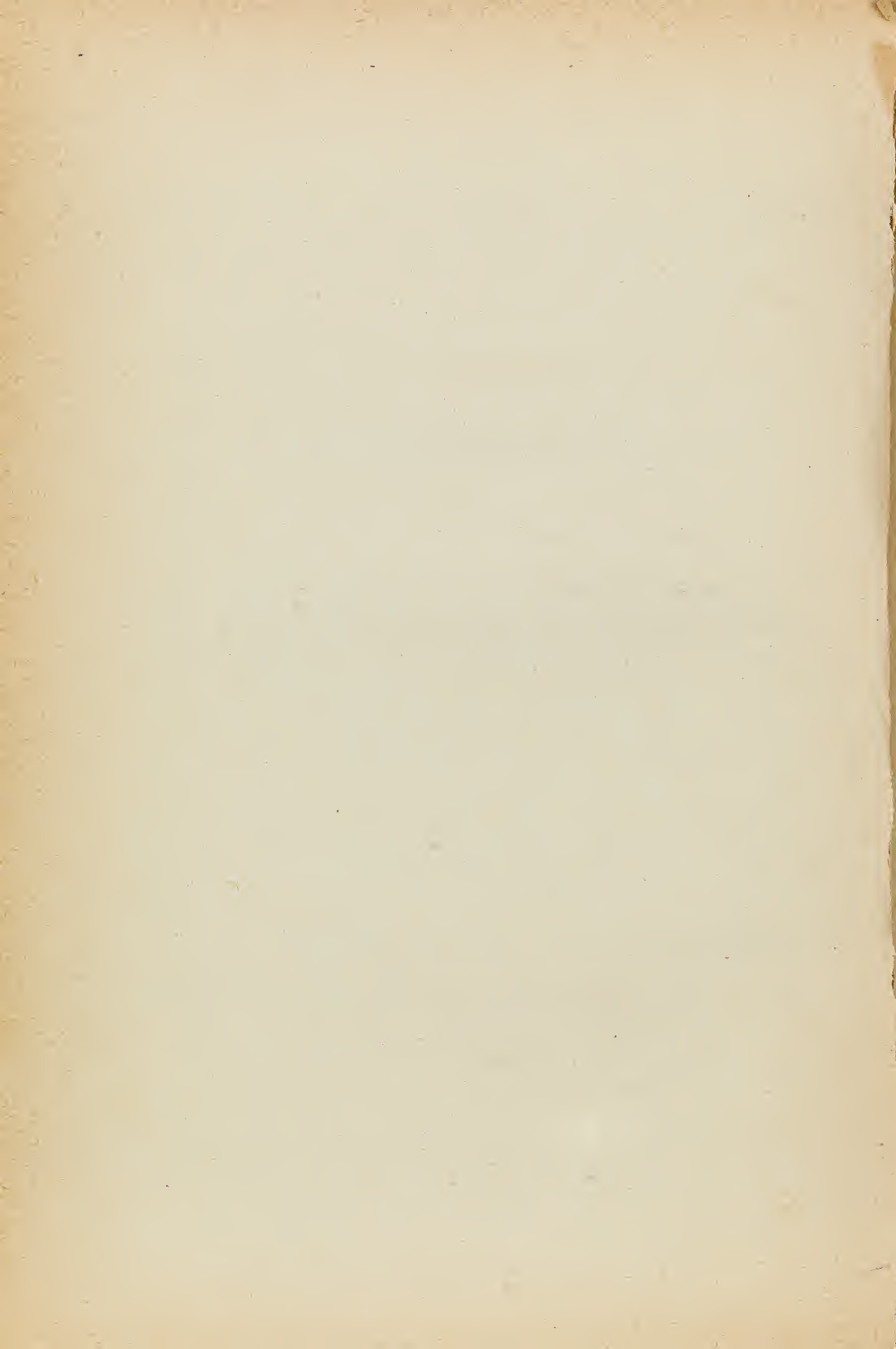
RICHARD SCHOMBURGK.

Botanic Garden, Adelaide, June, 1876.

INTRODUCTION.

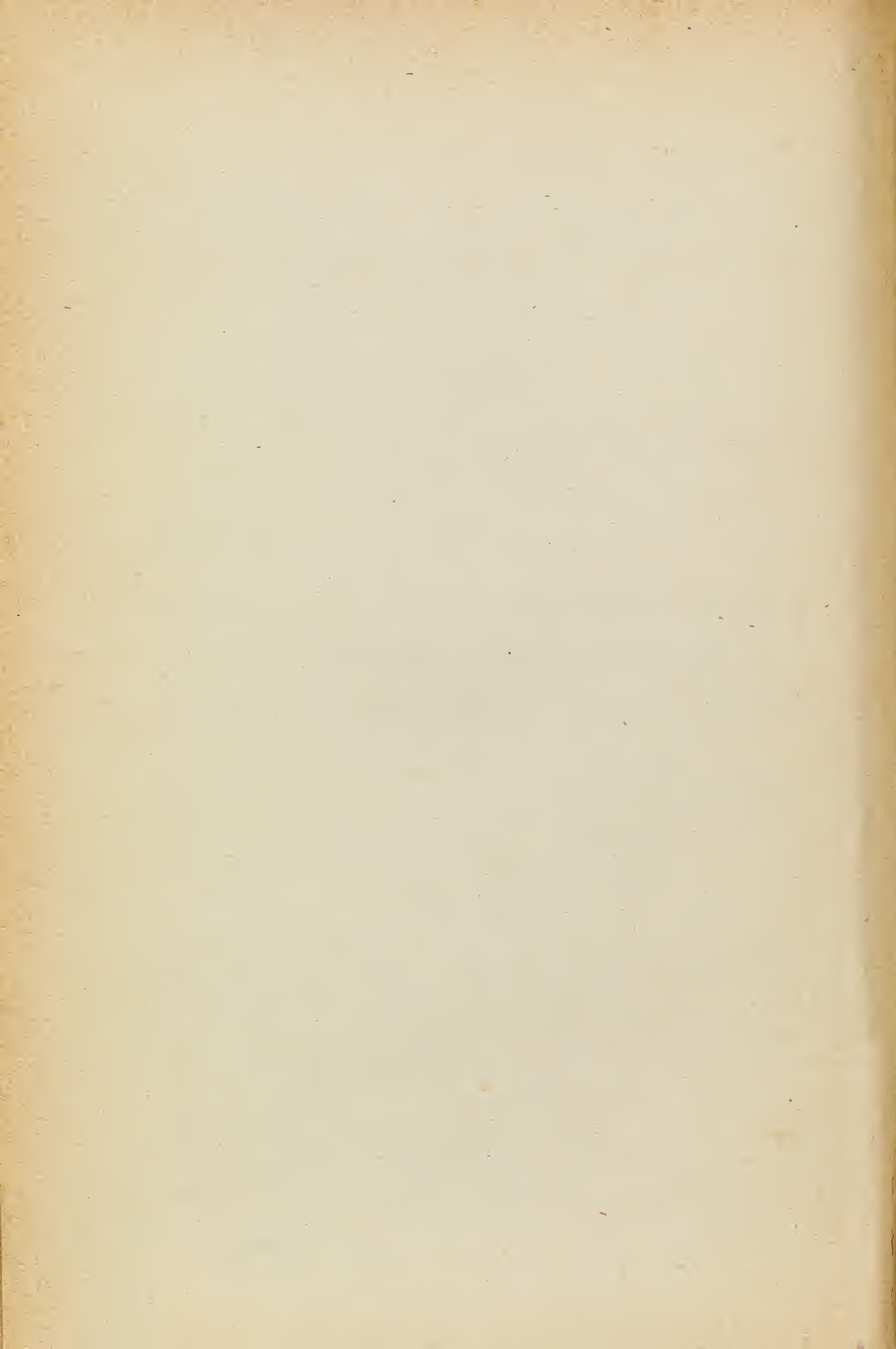
THE powers of Nature, in the enchanting grandeur of the vegetation, which I witnessed during my travels in British Guiana, have become indelibly stamped upon my mind ; and since my return to Europe and my sojourn in Australia, by comparing the vegetation and scenery of these countries with those of tropical regions, they have become more and more vivid at the present time. Many years have elapsed since these lovely pictures unfolded themselves before my eyes ; and being still as fresh in my memory as if I had seen them but yesterday, I am induced, on the eve of my life, to offer a slight sketch of them to the lovers of Botany.

R. SCHOMBURGK.



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BOTANICAL REMINISCENCES.

PART I.—UP THE RIVER BARIMA.

The Boundary Expedition to British Guiana, under the command of my late brother, Sir Robert, to which, by the permission of Her Majesty's Government, I had been attached as naturalist in behalf of the Prussian Government, had reached the mouth of the River Barima, which discharges its waters into the mighty Orinoco, and which we intended to ascend as far as possible.

In the Warrau settlement, Cumaka, situated on one of the numerous tributaries of the Barima, we stayed a few days to make the necessary preparations for our ascent of the Barima. Our little flotille consisted of four large boats, and the necessary rowers had been engaged amongst the inhabitants of Cumaka.

Everything had been arranged, each one had taken his place in the boats, under the acclamation of the inhabitants of Cumaka, who were assembled on the landing-place, we set our boats in motion, and very soon those assembled on the bank had vanished from our view.

In consequence of the previous heavy rains the Barima had overflowed its banks, and our rowers had to exert their utmost strength to resist the force of the stream. The vegetation of the banks were *Rhizophora*, *Avicennia*, *Laguncularia*, and *Conocarpus*. The coast rivers, are under the influence of the ebb and flood tide; and as the latter set in, it assisted us materially in our progress.

Already evening was approaching, and we looked in vain for a dry place where we might sling our hammocks, and light the fires. Nothing could be seen but an immense mass of water from the overflow of the river, the rain having continued for the last four days. At last the Indians discovered the long sought for place. To our right we saw a dark space above the water, to which we rowed. Several trunks of trees lying close together showed that this served the travel-

ing Indians for their camping place. Although the water nearly overflowed the trunks, we were determined to camp here. Certainly the comfortable fires were denied to us, and myriads of mosquitos, the distant noise and crashing of the falling trees, undermined by the water, the heavy fall of a tropical rain, drove away sleep, and made the night one of the most uncomfortable we had yet passed.

The dense darkness concealed from us the rising of the river, and we were not a little surprised when one of the Indians, who left his hammock before daybreak, warned us that the water had begun to overflow our camp. We of course jumped into the boats with the utmost haste. Having reached the bed of the Barima again, we proceeded on our voyage. Numberless flocks of the pretty swallows, *Hirundo fasciata*, Latt., were resting on the projecting dry branches of sunken trees, with great noise they rose, as we neared them, for a few minutes, to return to their favorite places as soon as we had passed them. Hundreds of mocking birds, *Cassicus persicus*, Daud., and *hemorrhus*, Daud., had built their purse formed nests on the overhanging branches of the bushes, near the surface of the water, not expecting the heavy flood. The rising waters had already immersed a good many of the nests, others nearly so; the old birds were fluttering with woful cries, fearing for their immersed nests, containing their eggs or young ones, while others, unconcerned at the danger, the waters not having reached their nests, were hatching or feeding their young ones, joyfully chirping, or bringing the material for new nests, not paying the slightest attention to the lamentations of their unfortunate mates. The life in this small colony was the image of the life in larger towns; like these had also the mocking birds, their nests peaceable, side by side, without taking the slightest notice of the others affliction.

In the course of this rainy and monotonous day we met only with a few of the large kingfishers, *Alcedo torquata*, Lin. We passed the mouth of the River Kaituma, which enters the Barima from the south.

To-day, again, we should have been obliged to continue our journey through the night under incessant rain, which came down in torrents, had it not been for our rowers, who strained every nerve to reach the Warrau settlement of Honobo before sundown. The sun was yet on the horizon when the air conveyed to us the dull noise of Indian drums, and the

distant sounds of a wild song. Like an electric spark the first sound operated on the muscles and nerves of our rowers. The boats flew more quickly towards the alluring sounds. The sharp ears of the Indians very soon discovered that the inhabitants were assembled at a drinking debauch. Our Indians, who up to this time had been mute and dull, became other beings. One encouraged the other to greater speed to join in partaking the expected paiwari.

Soon we reached the left bank of the mouth of the rivulet Honobo, on which the Warrau settlement of the same name was situated. The high water facilitated our following the snake-like course of the creek, and after a short time the village Honobo, situated on a gentle rise, was lying before us. As soon as the Indians spied the roof of the first hut they broke out into loud cries, to inform the inhabitants that new guests had arrived. This had attracted the population of the village, who hastened to the landing-place, where they greeted us in loud voices. At the entrance of the settlement we observed an Indian in European attire—a great coat—who, on each side, had a drummer, which both, the nearer we came, increased the beating of their drums.

Under this deafening noise we were welcomed by the dressed person, who was the chief Maronari. The first glance convinced us that the strength of the pawari had very nearly overpowered the chief; some of his wives were also in the same state, and it was with great difficulty that they, as well as their lord, could keep their equilibrium. Accompanied by the staggering, noisy inhabitants, we entered the settlement, which consisted of five large huts, surrounded by the most luxuriant provision fields. When we, at the request of the chief to choose any of the huts for the night, made an inspection of the same, we observed several Indians had fallen victims to the intoxicating drink. This spectacle prevented our occupying one of the huts, and we were just in the act of slinging our hammocks outside when the wild cries of a woman attracted our curiosity, when we found in one of the huts an Indian woman, who was raging in a hammock of which the opening was tied together. We were told that it was one of the amiable chieftain's wives who had assisted in the feast, and had taken more than was good for her. When the woman observed the white and black people in her hut she increased her screaming, and tried all in her power to free herself.

The joy of our own Indians very soon changed into the greatest ill-humor, their hope to participate in the festivities being frustrated, because the beverage had been all drunk to the last drop—and yet it seemed that the immense trough had held at least more than a hundred gallons.

Bixa Orellana, Lin., *Crescentia Cujete*, Lin., luxuriated round the village. From the seeds of the first, which are covered with an orange red waxen pulp or pellicle, and which is separated by washing, the Indians prepare the red color known as arnotto, for painting their bodies; and from the great gourd-like fruit of the latter they prepare their calabashes, or drinking vessels. Numberless trumpet trees, *Cecropia peltata*, Lin., with their smooth, grayish-white stems and large peltate leaves, formed an interesting contrast to the dark green background. The branches of the *Cecropia*, which grow at right angles from the stem, give the tree a peculiar appearance.

Proceeding on our journey at daybreak, the whole village was in motion; and scarcely had we left our hammocks when the chieftain, with his whole harem, appeared to wish us a "Good morning"—and Oh, wonder! he had changed his great coat for a modern dress coat, pressed over his naked body, while his wives appeared in a state of nudity. What is the pride of a perfectly elegant swell of our saloons in comparison with the feelings of imposing dignity which filled the breast of this chieftain. Every look, every move of his dark face, every motion of his body bespoke the highest satisfaction of his vanity and of his proud consciousness. To make the already happy chief happier yet, we supplied his wardrobe with some additions which were still wanted. Not to see his harem against the laws of gallantry neglected altogether, we presented the fair ones with some strings of glass beads.

Curious to see the fair disturber of peace yesterday we asked our host to introduce us to her. He pointed out the oldest of his wives, who was even seen now concealing herself behind the younger ones.

After sunrise we left Honobo and returned to the Barima. The further we proceeded up the river the more it lost its character of a coast river. The *Rhizophora*, *Avicennia*, and *Conocarpus* disappeared, and their places were taken by representative of the orders of *Leguminosae*, *Rubiaceae*, and *Laurineae*. The banks were covered with underwood which often covered the surface of the water near them with its luxuriant branches. In this magnificent carpet of vegetation

the beautiful white flowers of the *Ingas*, next to the scarlet of the handsome *Combretum laxum*, Aubl., and *Cacoutia coccinea*, Aubl., were especially attractive, and a sure sign that the saline waters had nearly ceased to have any influence on the vegetation, although the effect of the ebb and flood tide was observable only with the difference that it was found to be about forty minutes later than in the lower part of the river, and showed only five and a-half hours flood and only five hours ebb.

Every stroke of the oars taking us forward showed us the banks in a new charm, the *Inga* bushes changed with surprising iridescence with *Dichorisandra Aubletiana*, Schult., *Justicia coccinea*, Aubl., *Ucriana Humboldtii*, Spreng., and *Lisianthus coerulescens*, Aubl. Dense masses of *Spermacoce longiflora*, Aubl., formed a beautiful carpet along the banks, while the gorgeous flowers of the *Carolinea princeps*, Lin., were observed already in the distance, and their branches were bowed down by the weight of their large heavy fruits. The peculiarly formed white flowers of the *Marcgravia umbellata*, Lin., were nearly immersed in the water, and their congener *Noranta guianensis*, Aubl., proudly overran, with its gorgeous flowers, the highest tops of the trees. A number of the elegant, but very prickly palm, *Bactris acanthocarpa*, Mart., with their red fruits enhanced the lovely picture before us.

In the background towered the graceful Truly palm, *Manicaria saccifera*, Gaert. Not alone is the fruit used for food by the Indians, but its gigantic leaves are employed as the best thatch by the Indians as well as the colonists, and forms a great and important commerce in the colony; but it furnishes also the Indians with clothes. Underneath the outer bark of the stem is a layer of fibrous matter similar to coarse canvass, which is easily stripped off the stem after beating it with a stick. The Indians cut it to the required lengths, make arm holes, then sew the sleeves on, and the shirt is ready.

Gigantic trees appeared, *Lecythis parviflora* Aubl., *Dimorpha grandiflora*, Willd., *Swartzia tomentosa*, Dec., *Byrsonima altissima*, Dec., *Eperua falcata*, Aubl., and the green heart of the colonists, *Nectandra Rodiei*, Schomb., one of the most useful timber trees which Guiana possesses. The seeds, the size of a walnut, possess a strong bitter, which has been extracted and been used with great advantage as a powerful febrifuge.

With the abundance of the vegetable kingdom vied also that of the ornithological. Whole flocks of the beautiful birds, *Ampelis rubricollis*, Tem., and *A. cayano*, Lin., fluttered between the flowering branches of the trees, filling the air with their notes. The Indians imitating their peculiar notes perfectly, decoyed them down to the lower branches, where our guns could reach them. Numbers of the pretty ducks, *Anas autumnalis*, Lin., made their appearance, and were an easy prey.

After a few hours' progress, the first elevations appeared—a chain of hills which bordered the horizon. On one of these hills, situated on the left bank, we observed a friendly hut which had been built by the Warrau Chief, Clementy, for his residence. The hut looked so comfortable and inviting, that we resolved to spend the night under its hospitable roof. Notwithstanding the noise made by our landing, nobody appeared outside the hut. When we had reached the residence of the mighty chief, it was soon distinguished, from all the Warrau architecture I had as yet noticed, as it consisted not only of two stories, but was also provided with a gallery which surrounded the whole house.

In the middle of the large reception room, the chief was sitting in a stiff, grand position, attired in an old blue dress coat, the collar of which was turned up, and white trousers. He was sitting on a low stool, and received us *without* rising from his seat, with a long speech, the sense of which, in brief, was that he had been already acquainted with our arrival, that we were welcome to him, and that he offered us with pleasure, his house for a residence during our stay.

His wives were busy plaiting hammocks, and examined us with curious glances. When one of the hospitable ladies observed that our black cook began to arrange his utensils, she brought a number of yams, sweet potatoes, and a calabash covered with leaves, which contained a collection of finger-long maggots, the larvæ of the large beetle *Calandra palmarum*. Our cook, Hamlet, who had an eagle eye for everything connected with his profession, and was acquainted with the best mode of preparing the most heterogeneous delicacies, assured us that these larvæ, on which we looked with disgust, were the most dainty dish he knew of when fried in fat. Hamlet's mess of larvæ tasted tolerably well; and, full of expectation, the ingenious cook watched us from the distance to see what recognition his so much praised dish

would find with us. But when he saw that the roasted ducks were more patronized by us Europeans, he exclaimed in anger "that white people did not know what was good."

Heavy rain kept us the next day until one o'clock p.m. in Clementy's place, when we started in company with the chieftain, whose canoes increased our flotilla. In addition to his two sons-in-law, and his two favorite wives, he took all his wardrobe, which consisted of some colored printed shirts, a white jacket, his blue dress coat, and several white trousers, and a hat-box, from which he took a blue felt hat, in despite of its evident age, carefully wrapped up in paper in which it had been bought in Georgetown. With folded arms he let his wives pack all these treasures, with his hammock, in a large, neatly-plaited basket. Now and then he favored us with a look to see what impression the sight of these treasures made on us. The women had supplied themselves with the necessary utensils for cooking, some implements for fishing, and a large quantity of Cassava bread. They had a hard fight with their dogs, which had looked at these preparations of the journey with impatience, and now set up a howling, seeing their expectation frustrated.

During our progress up the Barima, a large dead tree on the bank attracted my attention. Hundreds of the long purse-formed nests of the *Cassicus cristatus*, Daud., were suspended from its branches. After a hasty counting, I numbered about three hundred. Equally remarkable as the association of these birds in breeding time, like *C. persicus* and *haemorrhus*, is their instinct in choosing the branches of a tree, on which already exists the nests of the dangerous wasps, *Vespa nidulans* and *Morio*, with which the birds, it seems, enter into a league of protection. None of their numerous enemies, monkeys, tiger cats, would venture to come near the nests for the sake of the eggs or young ones as long as the allies live in harmony. It was now the breeding time, and the most stirring life reigned in this colony.

We landed at a small Warrau settlement. The huts were among the most miserable we had ever met with, and they, as well as their inhabitants, were so glutted with filth that we Europeans could not bear the sight of it. But a more terrible sight was the frightful ophthalmia by which the whole population suffered. The eyes of some of them were blood-shot, whilst in others, especially the poor children, the eye-ball seemed forced out of socket. The mothers, not caring for the

pain suffered by the little ones, not even troubled themselves to remove the dirt which surrounded their eyes.

A prolonged stay amongst this unfortunate people was impossible, and we left, having given some presents to the sufferers.

The water of the Barima had now lost its saline taste entirely, but the influence of ebb and tide were still perceptible. The banks on both sides became higher, and the character of the vegetation also altered. The palms disappeared, and only now and then we observed a dense group of the prickly *Bactris acanthocarpa*. Amongst the new forms of climbing plants, were *Aristolochia*, *Passiflora*, and *Echites*. The large dark pink flowers of the last, similar to those of the Oleander, which were suspended in festoons by their slender tendrils, were the sport of the gentle morning breeze, whilst *Echites lucida*, Roem. and Schult., with its radiating yellow flowers, as also the snow white and remarkably formed flowers of the *Calyptrion Aubletii*, Ging., with the scarlet of the *Combretum lacum* and the tender tinged of the *Hirtella racemosa*, Lam., ornamented the rich carpet with the most varied change of colors.

Having passed in the course of the day several small tributaries of the Barima, its bed became narrower and more winding, so much that our progress was more slowly. The banks increased in height, and the vegetation became more luxuriant until, with the appearance of that gigantic trees of the *Mora excelsa*, Benth., which may be called the oak of the tropics, it reached its culmination. There is none of the European forest trees which could be paralleled with it as a representative. Our large oaks would only seem dwarfs if standing near one of these giants, the stem of which is overshadowed by the most beautiful dark green foliage. The Indians give this noble tree the name of the "Chief of the Forests," and this is the most appropriate name which could have been chosen.

We were often deceived by these giant trees when we suddenly rounded one of the bends of the river, imagining we saw before us in the distance a number of wooded hills, which, when nearer, changed into single groups of *Mora* trees, towering high above the surrounding vegetation.

No idea can be formed of a *Mora* forest; it is so thick that the sight of heaven is denied to those who enter it. Everything is drowned in a mass of shadows; the eye can only

behold a labyrinth of trees of gigantic proportions which astonish and overawe him, garnished with a dome of foliage that darkens the atmosphere, and renders it intolerably heavy and gloomy. Lianes of immense thickness entwine with giant arm these trunks, and ramp to the highest branches, where they crown these giants; then again grow down from this giddy height on to the smaller trees, the branches of which they entwine, and so fetter one tree to the other with a network, and hold in their strong arms those giants standing close on the banks of the rivers, whose secure position is often undermined by the rapid streams, thus preventing their sudden fall; but should such a giant succumb, by his fall he will carry all the trees entwined by the same lianes with him to destruction.

The importance of the *Mora* for the marine, which my late brother had already pointed out in his first travels, has been confirmed since. On the upper Barima this valuable tree is found in such numbers, and of such immense size, that the trees growing near the banks of the river alone would be sufficient to supply a whole fleet with material. The wood is so close and cross-grained that it is difficult to split it; it is considered by the most competent judges to be superior to oak, as it is not subject to the dry rot.

With the appearance of these giants the vegetation near the banks assumed a new character—trees, flowers, fruits, not before seen surrounded me. Amongst these new forms were magnificent flowers of the *Brownea racemosa*, Jacq. I fear no artist is born yet who could produce on paper what nature has lavished on this dazzling favorite of hers. The elegant form of the pretty tree, by the brilliancy of its foliage, the abundance of large, indescribable, tenderly-formed flowers glowing with such dazzling color that the eye can scarcely bear their sparkling fire; every part combines to captivate admiration—even when the flowers have disappeared the large red legumes offer a pretty picture.

Although the *Brownea* belongs to quite a different order of plants, and its flowers differ from those of the rose, I cannot find a more appropriate name for it than “The Rose of the Tropics.” The large wax-like white flower of the *Gustavia fastuosa*, Willd. and *Clusias*, increased the preponderating charm. The banks bordered with the sixty to eighty feet high wall-like vegetation, which could be compared to a gigantic clipped hedge, over which hung

down in festoons the blue flowers of *Petrea volubilis*, Jacq., and *Schomburgkii*, Schau., also the beautiful red flowers of the *Cacoutia coccinea*, Aubl. Nature had even coveted the branches of the gigantic trees, on which numberless Orchids, Tillandsias, Ferns, and Aroids luxuriated, from which the last mentioned ones suspended to the ground their rope-like roots, resembling the cordage of a ship.

The *Vanilla*, *V. planifolia*, Andr., and *bicolor*, Lindl., already seen in the lower part of the river, appeared here more frequently, and filled the air, especially in the morning and evening hours, with the aromatic fragrance of its flowers. The plant climbs in a straight line up the trunks of the trees, fastened to the stem by its air roots, their handsome leaves spread symmetrically. Thus it grows from branch to branch, again it descends and strikes roots in the ground and ascends again. Although the monkeys consider the long, fleshy capsules a great delicacy, we found a large number of the fruits.

We observed on one of the hills which appeared now along the banks, a Warrau settlement, at which we landed to pay a visit to the inhabitants. The first human being we met with was a young Warrau woman nursing at one breast her child, and, a wonder, at the other a young monkey, no doubt a strange family picture for the eye of an European; we later became used to such heterogeneous sights. In fact, with the exception of the carnivorous, we have seen all kinds of animals suckled and reared by Indian women. The animal, generally caught very young, becomes so attached to its new mother that it follows her every step, even when full grown. Entering an Indian settlement the stranger is struck with the number of tame animals and birds which are solely domesticated by the women. We found a large assembly of men painted with roucu, and ornamented with the various colored feather dresses predicted the celebration of a festival. We approached the large building, used for such festivities and the abode for visitors, and soon observed the mighty trough filled with paiwari and the circulating calabashes. Several young girls who performed the duty of ganymede attracted at once our attention, not alone by their pretty and clean cotton dresses, but also by their good figures and faces. The fair sex of the Warraus we had seen formerly never offered such an agreeable picture.

When the chieftain and the partakers of the feast observed

us they jumped out of their hammocks, the former laid hold of his emblem of chieftainship, a carved staff, which had been carefully wrapped up in palm leaves, and, with it in his hands, he solemnly bid us welcome in a long and fluent speech.

The Indians are passionately inclined to dissipation and entertainment. Until now we were only acquainted with their songs and wild dances; here we became witness to their games. We often before heard of their wrestling games, but had never had an opportunity of seeing them. When we were informed that a game of this kind was to be performed we were nearly dissatisfied in our hopes to witness it, because the Warraus are not accustomed to begin their games before evening, when all the guests are assembled. It needed some presents to persuade them to depart from their custom.

The place selected for the games was an extensive circle, situated outside the village, and carefully cleared of all grass. The players separated in four parties, who, with challenging gestures, moved to the place of combat. On a given signal, the single combats with the ha ha, a kind of shield, with which the combatants tried to force away one another from a certain place within the circle, which was maintained by the victor up to such a time until he had to make way for another combatant who was his superior in agility and power. The two who maintain the ground to the last, are with triumphant shouts declared victors, and are conducted to the paiwari trough, where they are met—young girls offering them calabashes filled with the intoxicating drink.

As simple as the game is, it cannot be denied that it must assist in the development and activity of the limbs and the strengthening of the muscles, and we Europeans followed with great attention, and with the most lively interest, the snake-like windings and extraordinary quickness with which the combatants took advantage of every favorable position and every offered advantage to gain their purpose; and this bloodless game called to mind the more serious one of the gladiators of the ancient Romans.

The vessels filled with intoxicating beverage seemed to have a great attraction for our boatmen, as only the strictness of the chieftain Clementy could move them to go to the boats, when they seized their paddles with unmistakable signs of discontent.

We left the Barima and entered the River Curuwara, a tributary of Barima, and, having ascended the river for several hours, we changed this river for that of the Manari, a tributary of the Curuwara, with a very strong current, which we followed, and entered the territory of the Waika or Ackaway tribe.

The banks of both rivers became perfectly flat, and all the profusion of vegetation disappeared. The stems of the trees along the banks were covered with mosses and *Jungermannias*, and only the numerous luxuriantly growing orchids, as *Stanhopea grandiflora*, Lindl., *Rodriguezia secunda*, Humb. and Bonpl., and *stricta*, Steud., *Gongora maculata*, Lindl., *nigrita*, Lindl., *Maxillarias*, *Epidendrums*, enlivened the surrounding monotonous picture.

The water had overflowed the low banks, and our chieftain wishing to visit a Warrau settlement I accompanied him to the village in one of his boats, which took us right through the forest to the first hut. The settlement occupied a swamp surrounded by water, and the miserable huts were erected on platforms, which were built on piles, five to six feet high, for which purpose the close growing trees had been cut off about six feet above the ground to serve as pillars, across which the split stems of the palm, *Euterpe oleracea*, had been laid as a floor, and on this the roof of the huts had been built. A heap of earth in the middle of the hut served as the hearth, to prevent the constant burning fires from burning through the floor. The roofs of the huts were mostly thatched with palm leaves, and a notched stem of a tree leaning against the hut served as a ladder, to which at high water the canoes were fastened. Such habitations of the Warraus, who inhabit the often inundated vast region of the delta of the Orinoco, are not seldom met, and no doubt gave rise to the exaggerated stories of earlier travellers, that they had met Indian tribes who built their huts upon high trees.

Even during the dry season the ground is so boggy that the inhabitants had been obliged to erect a dam to the higher ground.

Large heaps of empty shells of the large snail, *Ampulluria urceus*, Fer., which I saw here for the first time, made me suppose that this snail was one of the delicacies of the inhabitants.

Towards evening we reached the Waika or Akawai settlement Manari, which formed a pleasant contrast to the miserable hovels we had seen this afternoon. The huts not

only exceeded by the care with which they were built but also by their neatness and cleanness. The pleasing impression made by their superior huts was increased still more by the appearance of the inhabitants, and the neatness of themselves and their children.

Although the women being in the midst of the delicate work of baking and chewing bread, showed infallible signs that we should shortly be witnesses of a *paiwari* festival, made an agreeable effect upon us after a long intercourse with the less clean *Warrau* tribe. All the men, except the chief, were out hunting to procure the necessary game for the festival. The chief, an old man, received us with the utmost civility, and immediately gave orders to prepare one of the best huts for our abode during our stay.

These people bore a nearer resemblance to us than those we had previously visited. Their figures were well-formed, their physiognomies more regular than those of the *Warraus*. Over the whole female part of the inhabitants, and especially the younger ones, was spread such a natural, unaffected bashfulness which I found so often afterwards, and which, without a doubt, stood so much higher in its pure humanity than the unnatural prudery of an overstrained civilization.

Here we met, amongst the fair sex, with truly perfect female forms, and amongst them, the palm of beauty was due to the twin daughters of the chief. Had the complexion of these truly plastic beauties not been so dark, and had the number been three, the illusion that the graces had gone astray into this world, and now came to meet us from the neat hut of the chief with delicate modesty, would have been excusable. But notwithstanding the brown complexion, and the number two, our surprise was not much less, because none of us had until now seen such perfect symmetry of form and feature, the charm of which was enhanced by the long black hair falling down over the beautiful shoulders.

From friendly hands I had received, when leaving home, several ornaments, with the request to give them to the handsomest Indian girl I should meet: the two daughters of the chieftain, if not dead, most probably will wear the necklaces and bracelets yet.

The occupation in which we found the fair sex engaged did not, however, assist our imagination, for their cheeks were filled with cassava bread, and they chewed the same while performing their other household duties—from

time to time hastening to the large trough to empty their cheeks of the chewed pap, and to take another mouthful of the bread. This tended somewhat too much to disturb our fantastic dreams, and show us these children of nature in the mirror of reality.

The Indians prepare different beverages of diverse fruits, and Indian corn; but the favorite drink is paiwari, which is prepared from cassava bread. The bread is for the purpose made thicker and is carbonized on its surface. It is then broken in pieces, and after boiling water has been poured over it, the women begin to turn it about with their hands, the large lumps being taken out and chewed, and then put into the water again. This disgusting process, they say, increases the fermentation of the decoction, and renders it intoxicating. Till now I had always hesitated to taste the drink; but an icy coldness ran over me when I saw with my own eyes the preparation of it, and knew that I should be compelled to put this horrible brewing to my lips, which was presented to us by the fair daughters of the chieftain; and even then, if these had been only engaged in the preparation of the ingredients of the paiwari, it would have filled me with disgust. But the Indians of Guiana know nothing of the pipe of peace; but he knows the drink of peace, and to refuse this would be equal to treating the offered friendship with contempt.

Scarcely had we taken possession of our hut, and our package had been brought from the boats, we opened them, and unpacked the contents to convince us of the state of the same. The constant rain which had accompanied us from Cumaka to this place, without intermission, we feared the worst for our treasures, that water had found access. Only those persons who have experienced something similar can judge of the sadness which must affect anyone when he opens the boxes supposed impervious to moisture, and expects to find the treasures he had collected with the utmost care and caution in good order, he sees nothing but mould. I have experienced this often. Here, mostly my botanical and entomological collections had been destroyed by wet and dampness. Even our articles for barter had felt the destructive influence of the damp atmosphere; and also, that we and our crew were subjected to it, was shown the next morning, several of our men were laying in their hammocks attacked by fever.

A general shout of joy announced to us the next day, that the men who had gone out to procure game for the feast had returned with an abundant supply. I viewed with admiration the fine, powerful, well-formed figures of the hunters and their fine dogs.

The Waikas are, without doubt, the handsomest men and women amongst the coast tribes. As much as we were surprised to see such fine men, they were as much to see the many strange guests; but they welcomed us most friendly, and offered us part of their venison, which they heaped first before their chief. The hunters having been away for several days, it had been necessary to smoke the greater part of the game, to prevent it from spoiling, which gave, especially to the large howling monkeys, *Mycetes seniculus*, Kuhl., which were not skinned, but merely singed, a terrible appearance, and it was a long time before I could rid myself of the idea that these singed monkeys were negro children who had died in convulsions.

The game consisted mostly of Deer, Agutis, Pecaries, and feathered game. We choose from the offered delicacies deer, Pecarie, and birds.

Our European stomachs were yet too much under the influence of imagination, which could not familiarize itself with the terrible figures of the bent monkeys; although this abhorrence was overcome in our future travel.

After the return of the hunters from their successful expedition the activity of the inhabitants increased. The next day the older women returned from the provision ground laden with heavy baskets of cassava roots, sweet potatoes, and yams, whilst the men carried large burdens of sugarcane, the juice of which was to be added to the paiwari. The entire fair sex, old and young, were grouped round the baskets to peel, grate, and press the roots of the cassava to make them into bread, whilst the potatoes and yams were boiled in large pots. Not a syllable could be heard, every communication and explanation was done by gestures, because the mouth was filled with cassava bread.

Another beverage which I saw here, prepared from maize, sweet potatoes, and sugar-cane juice, was named by the Indians, "Kasiri." The maize was crushed in a vessel, which had the form of a mortar, and then boiled into a pap, the same was done with the sweet potatoes, and then mixed with the juice of the sugar-cane. So far, there was nothing ob-

jectionable in the preparation to the most sensitive taste of an European, if there had not been at last added to it a vessel with chewed maize, which was already in perfect fermentation, to quicken the same of the whole; a quantity of water is then added to make it more liquid. The taste of this drink is by no means disagreeable.

The gigantic trough (which held about 150 gallons), as well as all the greater vessels, had been filled with paiwari and kasiri, and after covering them with palm leaves, the inhabitants thought of themselves. The women fetched their small pots, filled with oil made from the fruit of the *Carapa guianensis*, Aubl., and after their bath in the morning, anointed their bodies as well as their hair, the abundance of which latter is ascribed to the beneficial operation of the oil. To make this admirable preparation the women collect the fruits of the *Carapa*, which are similar to our horse chestnut, put them in a heap in a damp place, where they remain until they begin to rot; they then clean the fruits from their pericarps and crush the kernels into a pap, which they frequently knead through with warm water, and then expose it to the sun in oval vessels, made from the bark of trees, when the oily substance of the kernel appears on the surface. Also the small boxes made from palm leaves, containing the roucu and caracru, were got ready to paint the face and body next morning. The seed of the *Bixa Orellana* provides them with red, and the fruits of the *Genipa americana*, Lin., with a bluish-black color called caracru.

Before I describe the festivities we witnessed, I will mention the manner in which the invited are made to understand on what day the banquet is to take place, or on what day those who have to transact any business are desired to appear, the Indians having no special designations for the single day.

If the chief is to give a festival, he chooses as many threads as he intends to make invitations to distant friends, and strings on each separate, either as many glass beads, or seeds, or makes as many knots as there are days between it and the celebration of the festivity. Speedy messengers are now sent in all directions with these threads, to inform every friend of the chief at one and the same time verbally of the invitation, and to deliver the thread, which the invited friend fastens on his hammock, to take off a bead, or seed, or untie a knot every morning. On the day on which all the knots are

undone, or the seeds and beads taken off, the guest will arrive. The chief himself, who invites, to prevent any mistake, retains also a thread, and observes the same procedure.

What a lively spectacle did the breaking day present to us. The first glance towards the open huts showed us that more than half of the inhabitants of the settlement were busy making their toilette. Mothers painted their offspring, and I was especially amused by the little impatient boys, who showed by every look that the operation robbed them of too much time, which they might have spent with their playmates already running about in front of the huts, and it was only the short and strict call of admonition of their mother which could make them stand still for a minute. At last, the tormenting minutes had passed, and followed by the approving looks of the proud mother, they run to their playmates.

A pretty little girl had to pacify another impatient creature, namely, her pet monkey, which was unwilling to have the stripes made on his face, as her brother was when the mother painted his, which the sister tried to copy on the monkey's visage, and the monkey tried to prevent by droll bites and trampling. What wonder that these loud and short exclamations uttered by the mother, had to be repeated ten times oftener by the little girl. At last, the difficult task of painting was accomplished, some strings of glass beads finished the dress of the impatient animal.

The older girls smoothed and anointed their luxuriant black hair before small looking-glasses which they had exchanged, while the men were sitting in their hammocks combing their hair, the wives kneeling before them and painting their feet up to the ankles with red color, which gave the feet the appearance as if they had red buskins on. Other groups of girls again strung the glass beads, which we had presented them, on threads to wear round their necks. Old mothers tripped from one pot to the other, tasted the beverage, covered it closer with leaves, while others increased the supply of cassava bread, or cleaned and put to the fire the vension which had to be prepared for the guests.

The first rays of the sun saw the chieftain already in his complete vestments. He was sitting on a low stool before his hut dressed in a colored shirt, white pantaloons, his head covered with a military cap, and conversing with Clementy, who was sitting next to him; he was dressed in his blue dress-coat, the collar of the same standing up, covering nearly

his ears and almost reaching to the blue hat, which was still in the paper cover. His wives were to-day adorned in their printed dresses.

My eyes searched for the twin sisters to admire them in their attire, but found that they were still busy stringing the beads, making some alteration in their bracelets, and smoothing and anointing the rich dark hair which covered their beautifully formed shoulders. Towards noon the toilet was finished.

The rivers being the means of communication in the primitive forest, the guests arrived in their canoes, and announced their arrival at the landing-place of the village by a loud shout, when they approached the village under the conduct of their chief at a slow pace.

He was a fine, manly figure, dressed in a colored shirt, the head covered with a felt hat; in his hand his chieftain staff. Close to him followed his retainers, mostly fine men, their heads covered with fantastic feather caps, the faces marked with a number of white and red lines running in right angles and parallel, while the whole body to the feet was covered with angled figures—the feet below the ankle were painted red. The necks were ornamented with necklaces made of the teeth of monkeys and pekaries, from which were suspended down their backs large tassels made from the skins of the Toucans and other bird skins. The ankles were entwined with strings of the hollow seeds of the *Thevetia nerifolia*, Juss., which at every step produced a strange bell-like sound. In simple bead ornaments, but profusely painted, the women leading the children on their hands, closed the procession.

Although our large boats at the landing-place must have excited the curiosity of the guests at their arrival in a high degree, and the appearance of so many strangers, black and white, who filled the village, must have increased their astonishment, the procession passed us stern and solemn, without taking the least notice of us. Only the children, who most probably had never seen white or black men before, cast timid and clandestine looks towards us, and clung frightened to their mothers.

As soon as the procession had arrived at the hut of the chieftain, mutual greetings were exchanged, and the chief sat down on a stool provided for him, whilst his subjects surrounded him, standing in a circle. The form of salutation amongst the Akawais is short. Guest: "I come." Host:

"'Tis good ; hast thou arrived ?" Guest : " Yes, I am here." As soon as the guest had spoken the last word, the wife of the chief of Manari handed him a calabash with paiwari, whilst another put a dish with meat before him. After he had drank he hands the calabash to his neighbor to the right, and then begins to eat of the meat ; when the host excuses himself that he is unable to treat him with anything better, an excuse which is set aside by the answer " it is good."

All the other men were now provided with paiwari and meat, whilst the women, who are not permitted to eat at the same time as the men, cast curious glances towards us.

As soon as the men had finished eating and drinking they approached one or the other of the inhabitants ; not before the women were permitted to quench their thirst and satisfy their hunger.

In this manner came one procession after another, and at each the forms of reception were repeated.

At the whole numerous assembly I could not find two individuals whose painted figures or faces were similar.

Every guest provides himself with his own hammock, which is immediately fetched by the women from their canoes and slung in one of the huts, and taken possession of by their owners, who then begun to indulge with his neighbor in making witty or satirical observations concerning us, our men, or our luggage, which are laughed at most heartily by the rest of them. The calabashes continually going round enlivened, of course, the conversation more and more.

That the master of ceremonies had a grand day was shown by his richly ornamented vestment. Shortly after sundown he took in his hand his long bamboo cane, ornamented with long strings of seeds of the *Thevetia*, which produced a rattling noise by every movement of the staff, and with it he gave the sign to begin the dance. Several torches, made of thick cotton threads dipped repeatedly in melted wax, illuminated the hut and the trough containing the paiwari.

On a given sign of the master of ceremonies all the men jumped out of their hammocks and placed themselves in a circle around the paiwari trough. The master of ceremony then moved in a stooped position slowly around the same, when he advanced two paces towards the trough, and then again retreated two steps, which was imitated by the whole line of dancers, the left hand resting on the right shoulders of the next man, not in a stooping position but quite erect.

This slow and measured procession kept time with a monotonous song. About the sense of the words uttered at the time we could get no information, because the present generation of the Akawais do not understand them themselves. The words of the song had been inherited from father to son, but the language seems to have altered so much in the course of time that at present the form, the expression of the thoughts, the words, but not the understanding of the same sense, has been preserved.

The master of ceremony always led the song with a few words, which were repeated by the choir; and that with such a precision and exactness that it appeared to be one voice. Of the women none had joined but the wife of the chief and an old matron, whom I considered the oldest member of the whole female community.

The procession having moved round the trough several times the master of ceremonies suddenly stood still, the dancers drew new breath, then broke out in a fearful yell. The women and girls now hastened to the trough with calabashes, filled them, and presented to the men, and supplied every one who showed a desire to refresh himself. After a short pause the line of dancers moved on again to the accompaniment of a new song.

During the pauses those who were exhausted were replaced by other dancers, and the more they imbibed the oftener the pauses were repeated, the movements began to be more irregular, the songs became louder, and at last degenerated into a wild roaring.

But what are our notorious drinking bouts compared with such a festival of the Indians. I saw men empty the calabash containing at least half a gallon in one draught; they then hurried towards a tree, pressed against their stomach to discharge the beverage, and to take from the hands of the waiting ganymede another filled calabash, to discharge it the same way. In the enjoyment of the paiwari the Indian is never satisfied; and also here the dance and singing, if the confused roaring could be called singing, until the last drop of the intoxicating beverage had been finished.

The old proverb, *in vino veritas*, is also applicable to the forests of Guiana, only with the alteration, *in paiwari veritas*. With every calabash emptied the true state of mind showed itself more openly. Animosity, hatred, and offences, which the offended seemed to have forgotten for years, came to

light again, and were expressed in reproaches "you are the son of him who killed my father, or has seduced my wife; thou hast poisoned my wife; thou hast slain my son," utterances which would have been avoided with cunning precaution, had the Indian been sober. Such reproaches, without doubt, would have been followed by taking the most sanguinary revenge, had not the prudent and experienced wives removed all the weapons at the first shade of intoxication. Besides this, they allure their noisy husbands into their hammocks, where they were well secured by them.

Our Warraus also, whose talent in drinking I had often had the opportunity to admire, had made full use of the occasion, and in such a manner, that on the following morning, when we intended to leave Manari, they were lying about senseless in all directions, and like the Akawais, did not wake up from their wild intoxication until late in the afternoon. According to the effect caused by that beverage, it must be a great deal more stupefying than that caused by spirits.

A great number of the large snail, *Ampullaria urceus*, which were prepared and cooked already before daybreak by some busy women, showed us pretty clearly that these were considered a remedy for the distracted system of ganglions, whilst part of the women were busy with the preparation of the snails, the others began to put their muscles into motion again to prepare fresh paiwari, so that their lords should not miss their daily draughts.

As with the other tribes in Guiana the whole burden of the work rests on the poor women, to whom I must give the laudable testimony, that whilst I was amongst them I had never seen them idle. The work in the provision fields, when the men have felled the trees for cleaning, all the household work is done by them; even the firewood for cooking, and for the fires which are kept under the hammocks, was provided for by the women. The husband who helps, either has only one wife, or belongs to that scarce genus amongst the Indians—a polite husband.

PART II.—ACROSS THE SAVANNAS.

After six weeks struggle up the Rivers Essequibo and Rupununi, the expedition landed at Wai-ipucari or Morocco, a small inlet which the Rupununi forms in $3^{\circ} 42'$ N. latitude. The Macusi settlement, Pirara, our intended head-quarters, is about eleven miles distant from the landing-place, and is situated near the Lake Amucu, through which flows the River Pirara, its source being in the neighborhood of the village.

On leaving the River Rupununi we passed over undulating ground, thickly covered with small trees of the *Curatella americana*, Lin., and shrubs of stunted growth. The stately palm, *Mauritia flexuosa*, Lin., which gives to the savannas of South America so characteristic an appearance, in the lower grounds formed little groves. The savannas, which extended to the distant Pacaraima mountains, might be compared to a sea of verdure, which illusion was powerfully increased by the waving motion of the deceptive mirage. On the west the savannas were bounded by the horizon.

The village Pirara was situated on a rising ground, affording an extensive view over the savannas to the picturesque mountain chain, known to the geographers by the name of Pacaraima. The village, the largest I met during my travels, contained forty huts and about 200 inhabitants, who received us friendly, and had emptied two huts for us to take possession of during our stay. I still look back with pleasure, when on the first morning I jumped out of my hammock and stepped before the door of the hut, and gazed at the landscape before me. I stood on traditional, classical, and mythical soil, which Keymes described as the site "Mar de Aguas blancas. The "Mar-del-Dorado," the sea with the gold-covered capital Manoa, which was built on a vast lake, surrounded by mountains, so pregnant with the precious metal, that they shone with dazzling splendor. After which the most daring adventurers of England, Spain, and Portugal, as Walter Raleigh, Domingo de Vera, Keymes, Don Manuel Centurion, in the 16th century, followed the phantom that led them to encounter dangers, privations, and a waste of human life, unparalleled in the history of imaginary schemes. The great and unlucky Walter Raleigh, from 1595 to 1617, having alone undertaken four expeditions.

The researches of the most eminent traveller of our age—the late celebrated Humboldt—proved, by deep reasoning, founded either upon personal experience, or upon inspection of every document of this fabulous Lake Parima, that it no longer existed; and with its erasure from our maps, vanished the last vestiges of the extraordinary illusion.

The errors of geographers respecting a great interior lake having been corrected and explained by Humboldt's able pen, the long entertained and pleasing idea of a surrounding country rich in gold, has been abandoned in our enlightened times; yet such is the charm of these illusions, over which the description of Sir Walter Raleigh has spread so romantic a hue, that, although we are now aware the tale is exaggerated, we read it with interest.

The Lake Amucu, east and west for about three miles, at the period of the dry season, when little rain falls, was covered with rushes, only here and there presenting patches of water. It is, however, a large inland sea when, during the tropical winter, the rivers overflow their banks—whence originated the myth of the El Dorado. Three islets rise from the middle of the lake, and the Pirara flows through it. The lake is called Amucu, the group of islands the *Islas Ipomucena*, described by Santos—names so closely associated with the phantom of El Dorado and the *Laguna de Parima*. The absorbing interest of the landscape before me travellers can alone conceive, who tread *terra incognita*, connected with such associations.

After a few weeks' stay in Pirara the expedition prepared for the journey to that remarkable mountain group *Roraima*, in $5^{\circ} 9'$ N. latitude, $61^{\circ} 48'$ W. longitude.

The morning of the 10th September found us in great activity. The village itself looked very much like a disturbed ant-hill. Old and young were assembled in front of our huts, for the Indians accompanying us had to take leave of their wives and children. Although the baggage had been distributed amongst the carriers the day before, many alterations had to be made in the package of it for the more convenient carrying.

Already in the afternoon of the day preceding, the village appeared more lively, the women had to prepare delicacies for their journeying husbands, and had to arrange their toilet articles—such as paint boxes, combs, looking-glasses, the drinking cups, tobacco, and some of the paper-like bark of

the *Lecythis Ollaria*, Lin., in which the tobacco leaves are wrapt up like a cigar and smoked, all of which articles are required by an Indian when travelling, and are generally packed in a watertight basket.

Although it was well known that the Indian, when he undertakes a journey, partly from his peculiar indolence, to which the wife must submit, never leaves his wife at home, we had notwithstanding made the agreement with the carriers and guides, except our principal interpreters, Sororeng and Aiyucande, a piai or medicine man, and a most influential Indian amongst the whole Macusi tribes, none of them should take their wives and children, to prevent the increase of the party, which was already large enough.

When the medicine man arrived at our hut with his daughter and Baruh, his future second wife, a fine girl with long ringlets, who had a deep rooted aversion to her future husband, he was followed by several Indians with their wives and children, with bag and baggage ready for the journey. If we intended to proceed on the journey, we had to put on a pleasant face to an unpleasant necessity; to prevent the women from accompanying their husbands, would have insured the desertion of the men as a consequence.

When the men, wives, and children assembled before our huts, they, of course, were followed by their dogs, which by their barking, showed their pleasure at accompanying the party. Fortunately the inclination of the dogs was in opposition to those of their masters, of which fact the dogs were soon convinced, by receiving a sound thrashing and repeated volleys of stones.

After having settled all matters, the party, consisting of forty-nine persons, began to move on, the women forming the rearguard. The road leading towards the savanna in a westerly direction, brought us, after half an hour, to the banks of the Pirara, at a place where it flows from the Lake Amucu, and where the river was so shallow that we could ford it without much trouble. The pretty shrubs of *Helicteres quasumaefolia*, Humb. and Bonpl., covered with their scarlet flowers, which grew on the banks of the Pirara, were soon left behind us. Our direction was now a north-westerly one. With the altered formation of the savanna a change in the soil took place also; the clay, which in general forms the substratum, lost its red color, the round glittering fragments of quartz, which attain a reddish color by being mixed with

iron oxyde, and cover the undulating savanna for miles were missing, and the grotesque hills of the termites became less. This tract of land lies one hundred feet lower than the settlement Pirara, and forms in the rainy season the mythical sea Amucu or Parima. The *Byrsonima verbascifolia*, Dec., was predominant, being scattered over the savanna in all directions, and giving, with its silvery leaves and yellow flowers, a change to the general monotony which certainly had reached its culmination, it being the end of the dry season. *Cyperaceæ*, such as *Cyperus amentaceus*, Rudge.; *Isolepis junciformis*, Humb. and Bonpl.; *capillaris*, Roem. and Schult.; *Hypolytrum pungens*, Vahl.; *Chlorideen* and *Festucaceæ*, which were frequently interspersed with *Eriocauloneen*, covered the surface. A special interest attaches to the *Paepalanthus capillaceus*, Kl., as it appears that the Indians, by burning the grass of the savanna, accelerate its flowering, for in two or three days after all the leaves have been burnt and destroyed, numberless fragrant head-shaped flowers appear out of the strong, short, leafless, blackened stems, and not before the flowers have entirely disappeared, the leaves begin to grow again. In a very few cases only I have found plants which had escaped the fire had flowers and leaves at the same time.

One kind of grass, which I never found in flower, covered exclusively whole tracts, and became interesting to me through its name, called by the Macusis "vannah," and the tracts where it grows "vandai." Should this be the origin of the word "savanna"? I must leave the decision to etymologists. The ground was so cracked by the intense heat that it appeared like a network, with rents three or four inches wide.

Our trip would have been monotonous in the highest degree had it not been relieved by the Canuku and Pacaraima mountain chains, which appeared in the south and north. Another mitigation was the numerous blue flowers of the *Eichhornia azurea*, Knth., *Heteranthera limosa*, Vahl., and the large flocks of ducks, which rose with whistling noise from the Lake Venturu, at the present time, almost without water. These ducks, *Anas viduata*, Lin., and *brasiliensis*, Gm., provided us to a great extent with game for our next meal. The plains were also inhabited by the Caracara eagle, *Polyborus Cheriway*, Cab., running about on the dried-up morass, and small flocks of the *Ibis albicollis*, Vieill. The latter, when

disturbed by us, would rise with their peculiar rattling voice. Very seldom did I observe this ibis on the borders of the swamps, but generally on the dry savanna, where they are principally found in flocks of from six to eight. The giant stork, *Mycteria americana*, Lin., and *Ciconia Maguari*, Temm., and cranes were seen only on such places where a little water still remained.

About mid-day the heat had reached to 125° Fahrenheit, accompanied by those effects of the reflecting rays of the sun, which make all objects appear in a dancing, dazzling motion.

A peculiar, and at the same time, a new meteorological phenomenon were the whirlwinds and the columns of dust produced by them, which were not observed by me in such numbers over the savannas. Suddenly, the dust and dry leaves of the shrubs, rising from a certain point very nearly horizontal, gradually take the true form of a spiral column, which remains in the air for a short time motionless, and afterwards being driven with great velocity across the savanna, and getting more transparent at its extremity towards the ground, breaks in the middle, and then disappears in the air. The appearance of so many dust columns, no doubt, arises from the reflected heat of the sun, and the consequent inequality of the temperature, and also from the currents of air, which, although parallel, move in opposite directions.

Since we left the Lake Venturu, the water of which was hardly drinkable, we had travelled again from eight to ten miles without being able to quench our thirst, the heat reaching, at about three o'clock, 130° Fahr. in the sun.

The long Indian file was broken long before, and when looking back we could see the weary rear guard in the distance, and some of them were lost sight of altogether.

We left Pirara with all the signs of joking and rejoicing, but in the same measure as the heat increased the joyous voices became silent. Wherever a crippled tree gave a little shade, we would see the Europeans and negroes hasten to it to take a rest. The Indians, on the contrary, would not permit themselves to show such weakness, and carried their heavy burdens without a complaint regarding the heat. Most vigorously they proceeded on the narrow paths, and when pressing questions were put to them how far was it to the mouth of the Pirara River, the aim of our day's travel, they would reply, "Very far, very far," certainly a poor consolation for anybody who was tired and parched with

thirst. At last we discovered on the horizon in dazzling movement a row of trees—they were the wooded banks of the Pirara. Every nerve was strained to escape from the tormenting state we were in, and to strengthen our tired limbs in the shade of the trees. About sundown we reached the longed-for El Dorado, where we could satisfy our ardent desire for rest under the umbrageous trees, and with it the mouth of the Pirara, where it enters into the River Mahu.

Many of the stragglers did not arrive until late at night; the remainder, mostly Europeans and negroes, did not even arrive until next morning. We had travelled about thirty miles, a march, with the thermometer showing 115-130° Fahr. in a treeless savanna, not so inconsiderable as it appears.

At a small distance from the mouth of the river, near the bank of the Pirara, we found a gigantic *Maran-tree*, *Copaiifera Jacquini*, Desf., which showed on its large trunk by old and fresh marks how often the balsam of the tree had been gathered, the entire absence of underwood proving that this spot had been used as a camping place, and it served us for the same purpose.

To collect the balsam of the *Copaiifera* the Indians make a half round excavation in the lower part of the trunk, which extends to the heart of the tree. In certain months, especially in February and March, the resinous juice flows in large quantity and fills the excavation, which from time to time is emptied. We found the hollows full of the balsam, and great numbers of wasps and bees collected around it, who no doubt use the balsam as a cement for their nests. Except for wounds and for the purpose of anointing their body and hair the Indians do not use it for any other purpose. The devastating disease for which it is generally used being entirely unknown to the Indians. They collect it because it forms an article of barter very much sought for by the Brazilians, and is collected without much trouble.

From here we continued our journey in three boats up the rivers Mahu, Murumu, and Continga, and after three weeks struggle against numerous cataracts, the impediments in the Cotinga increasing daily stopped our further navigation, and we were obliged to abandon the boats and continue our journey on foot across the savanna.

Ascertaining from our guides that about six miles from our

landing place, towards the north, we should find a Macusi settlement named Torong-Yauwise (bird's nose), it was resolved to bring our baggage there and thence continue our long and tedious journey to the Roraima mountains.

We were busy unloading the boats when our attention was called to a number of Indians standing on a high rock, about half a mile distant, and watching our proceedings. All signs to them to come to us were fruitless until we sent the interpreter, Sororeng, to inform them of our friendly intentions. After a short palaver three Indians returned with him, but the others remained motionless on the rock until they saw the friendly reception of their friends, when the whole troupe came moving towards us, followed by some old women carrying baskets of bread, and large vessels filled with some liquid.

These were part of the inhabitants of Torong-Yauwise, who had been informed of our visit. The chief, an old and intelligent man, promised every assistance, and invited us to stay a while in the village.

The cassava bread and contents of the vessel were a welcome present, although the liquid, which had the color of lime water, and which they called also "kasiri," was not at all agreeable to our European taste, though relished by the Indians.

On the 9th of October we forwarded the remainder of our luggage to Torong-Yauwise, and followed in company of the old chief. After crossing the River Waikueh, our road led us over isolated hills and through pleasant valleys, until we again reached the summit of a hill, and spread out before us lay a large plain, which had the appearance of a cemetery, with numerous monuments; reaching the place, we seemed walking across the graves of a departed race, but instead of tombstones we found only flat pieces of granite, some projecting from the ground in upright position, and others lying flat on the ground. It was a great pity that our interpreter had gone before us, as we were thus unable to understand the traditions connected with this peculiar region of rocks, communicated to us in an uninterrupted harangue by the old chieftain, of which we only understood a few sentences now and then.

Leaving this remarkably curious valley, rich in traditions, we ascended a chain of wooded hills, in descending the slope we passed through the provision grounds of the inhabitants

of Torong-Yauwise, which were mostly planted with maize, the plantations of the cassava being insignificant.

Torong-Yauwise consisted of half a dozen large huts, inhabited by about fifty people, who stood in groups waiting for our arrival.

The men came towards us and shook hands, but the women and children kept at a respectable distance, not being able to suppress a laugh at our strange appearance. If we Europeans were suspicious to them, our negroes were, I think, taken for bad spirits, because if they only moved one step towards them, the whole of the young inhabitants took to flight with all the signs of a panic fear, concealing themselves behind the rocks near the place.

That fine figures, interesting and agreeable features were a scarcity in Torong-Yauwise, we had already observed when we received the visitors on the landing-place; now, as we saw all the inhabitants grouped round us, the impression became a general fact, indeed, with the exception of the chief and a few young men and women, the inhabitants of Torong-Yauwise were endowed with the ugliest features I had ever met with. There was a remarkable family resemblance, which was shown by a certain stupid expression, increased by the long uncombed hair hanging round their shoulders. The perfection of ugliness was a middle aged man, whose face had an angle of scarcely sixty degrees, the profile reminded me always of that of a monkey.

The chief kept his promise, and allowed us to occupy his hut, the largest in the village. Our luggage was placed near large heaps of maize. We were told that the cassava does not grow well in the mountains, wherefore the inhabitants were obliged to pay more attention to the cultivation of the maize, which grows more luxuriantly. They prepare their bread from a mixture of cassava and maize. Yams, sweet potatoes, pumpkins, and excellent water melons formed also part of their provision ground.

From the village, we enjoyed the view of one of the most enchanting landscapes; we were now right in the middle of the region of mountains. Mountains towered above, mountains, out of which rose in the north-west, the dome-like Zabang, the Olympus of the Macusi tribe, the dwelling of their Great Spirit, to which the Indians called our attention at every possible opportunity.

In a strictly geographical view, the Pacaraima mountains

cannot rank with the Cordilleras, as they do not consist of a connected chain, but of irregular groups, for the most part of bare mountains separated by plains and savannas. They surpass each other in fantastic rocky formations, their summits appearing in the form of pyramids or towers. Connected with these peculiar rocks, the active imagination of the Indians has its tradition; I will mention one of these relating to the Murapa-yeng (Mountain of the Bat).

A long, long time ago a gigantic bat inhabited the monstrous rocks, and spread fear and terror amongst the Macusis. As soon as the sun disappeared in the west the spectre-like monster left its haunts, hovered over their peaceful habitations (like the eagle would over the lair of a young doe) ready to precipitate itself on every one who appeared outside the huts, when it would take hold of its victim with its talons, carry it to its unknown lurking place, and there devour it. Terror reigned in the evening in every village, and lamentation would fill the air in the morning when, often, several persons were missing. Not one night passed away without a victim being sacrificed, and the tribe diminished in number. The conjurors exorcised the spirit; the warriors went to find the abode of the mischievous destroyer—it could not be found: the Great Spirit was not with them.

There appeared, to prevent the annihilation of the tribe (who would not here be reminded of Marcus Curtius,) an old woman who was willing to sacrifice her life for the welfare of the tribe. Night came on, the woman took her position in the middle of the village, and carried a covered-up firebrand. Trembling, the rest of the inhabitants were listening, when the noise of the wings of the bat were heard; the heroine was seized by the talons of the monster, and carried towards the mountain. Now the woman uncovered her firebrand; the air was lighted up by a long streak of fire, and showed the waiting people the direction where their brethren and sisters had been carried to. The column of fire of the burning nest marked the place, to which the whole tribe moved next morning to kill the monster. The nest was on the top of the mountain, which, until this day, is called Murapa-yeng (Mountain of the Bat).

The tradition does not say whether the woman paid her heroic deed with her life; but to this day it is said by the Indians that bones of human beings are found there. The want of knowledge of the language prevented us to a great

extent from becoming acquainted with the traditions connected almost with every mountain of a singular configuration, which were related to us.

On the same, as also on another, occasion it had been spread abroad through the surrounding country that Paranaghieris (white people) had arrived in Torong-Yauwise, and already the next and following day the generally quiet valleys and plain became lively with people in their best and gaudy ornaments, advancing in long files towards the village, whilst echo repeated the wild beat of the drums and shrill notes of the pipes by which they were accompanied. Every one of these caravans which we could observe from the distance called us forth from our huts to see them pass, and to enjoy the sight of their fantastic dresses, the headdresses made of the beautiful feathers of the Macaws, the weapons such as the war club, and bows and arrows. According to the custom of each tribe, as there were Macusis, Wapisianas, Pauixanas, and Arekunas, the men, women, and children were painted red and black. The chief preceded them, immediately following came the musicians, who produced extraordinary sounds on their drums and pipes, the latter made of the femurs of their killed enemies. They were again followed by the other men in Indian file, while next came the women carrying their infants, and panting under the burden of articles of barter carried in baskets, and the whole procession was closed by young girls and boys, the latter being armed with small war clubs, bows, and arrows. As soon as they arrived in the village the procession stopped. The chief approached us with outstretched hand, and shaking hand with us calling out the word "Matti" (friend), when he directed his subordinates to do the same, which was done by the women and children with hesitation, fear, and trembling.

This ceremony was certainly very tedious, and it was with difficulty we kept from laughing when one of these almost naked kings approached us, being proud to get possession and to be clad in clothes of civilized men, which were of heterogene description. Yet we had to be firm and to refrain from showing any signs of the proceedings being ridiculous to us.

A powerful Wapisiana chief was adorned with the shabby red uniform of a slender Lieutenant of the Colonial Militia, into which he had with difficulty squeezed his naked body, dripping with perspiration; the same uniform having

travelled, in consequence of continued exchange, the distance of about 600 miles. A second was clad in the riding habit of a lady, which had been cut off near the knees, being otherwise inconvenient in walking, and this most likely had been worn in former days by the charming figure of a Creole lady, of Georgetown, who had inflamed the hearts of the dandies on the Ring, the Rotten Row of the colonial town. A prouder heart could never have beaten under it than at present. Others again were clad in ladies garments, the remains of shirts and petticoats, their heads ornamented with old hats, minus their rims or crowns; or with caps that had lost their original colors; and all those thus ornamented had not the least idea how much more imposing their brethren appeared in their own beautiful feather dresses.

Our party occupied two huts, consequently there was scarcely room for the newly-arrived chiefs and their men in the other huts, so poles were driven into the open ground to sling the hammocks.

As soon as a new party arrived and the customary salutation had been given, they hastened to the nearest forest and returned to the village, laden with small trees and boughs, to fix round their hammocks as a shelter from the burning rays of the sun. It was the walking of Birnam forest to Dunsinane; but we had no cause to exclaim with Macbeth—

“Arm, arm, and out;
If this, which he avouches does appear,
There is no flying hence nor tarrying here!”

In the evenings numerous fires—lighted partly for protection against those plagues the mosquitoes, which had appeared again, also for the purpose of cooking—shed a magic light over the busy and lively camp. Hundreds of human forms would emerge, and as quickly vanish again in the dark veil of night; whilst in other places numbers of people were sitting round their fires, and the noise of those talking, the monotonous singing of others, or the sharp sound of the pipes, and the wild beating of the drums, awoke us often during the night.

In a few days the number of Indians assembled were about 500. The hospitality of the Indians requires that the chief of Torong-Yauwise should make provision for the food of the guests during their stay, and often was our old honest host at his wits end, and it was with regret that we observed the stock of maize in our huts becoming smaller every day.

From morning until night the fires were lighted, over which was placed large pots holding from forty to fifty gallons, which contained a mess of maize and pumpkins, this being their nourishment, and of which they partook the whole day with few intermissions. Three to four old Indian women were constantly stirring the mess with sticks, in the form of small paddles, to prevent its burning, accompanying these movements with a monotonous murmuring or humming voice. Old and young came with their calabashes to obtain the boiling mess with which they returned to their hammocks; others were satisfied to impress only the bottom of the calabash into the mess, and to lick off the adhering stuff which became sooner cool. Equally disgusting was the employment of several other old women who were sitting round some large vessels filled with that thin liquid prepared from maize, with which we were made acquainted at our landing on the Cotinga. With their hands they fished out the maize from the bottom of the vessel, put it in their mouths, and, after chewing it, spit it back into the vessel. In a few hours the decoction would begin to ferment, accelerated, as the Indians say, by the saliva, but before this took place they would continue taking the decoction.

The sediment remaining at the bottom was mixed with the cassava flour for making bread, which to some extent spoiled our appetite when eating such bread; but necessity knows no law, and if we would not hunger we had to eat the bread.

Although there were five tribes represented the utmost unanimity reigned, neither dispute nor quarrel interrupted the general rejoicing, and we six Europeans felt as secure amongst those 500 children of nature, who for the greatest part had never seen a white man, as if we had been in one of our cities at home.

When the sun was declining towards the horizon, and the air became a little cooler, the young men began to assemble and to amuse us with their games and dances. Balls were made from the husks of the maize, and were (by the partakers of the game, standing in a circle) thrown in the air, and the one to whom the ball was thrown had, before it reached the ground, to send the ball back again with the flat of his hand, so that they remained in the air in continued dancing movements. If the ball were missed by one of the players, and

fell to the ground, he would be greeted by a general scornful laughter, in ridicule of his awkwardness. Very often we mixed in the circle of the players, and were, as a rule, the object of the jeering laughter of young and old.

No sooner had the sun disappeared than the several dances were proceeded with, and every one was full of life and cheerfulness; even the austere and grave features, so common to age in the American race, disappeared as if by magic, and the smiling faces of the old men rested on the wonderful, quick movements of the younger ones, revelling in the remembrance of the past; the fair sex, who did not take part in the dances, at the same time criticising the awkward, and praising the active.

In the so-called monkey dance they imitated the capers and leaps of a flock of monkeys to such a perfection, that no one could but believe he looked at his Darwinian brethren, which kept us in a continued roar of laughter. In the tiger dance the most powerful of the young Indians was leading the line of animals they represented, two other Indians, who represented tigers, in imitating the movements of these animals, had, during the dance, to carry one out of the line by cunning or force, and to bring him to a place indicated. The dance was continued until the last of the Indians had been caught, who was then with shoutings of joy greeted as conqueror.

¶ Their common dance was the same we had observed among other tribes. A monotonous song coming from hundreds of voices regulated the line. The subject of their songs was mostly a glorification of the wonders of the surrounding scenery; but as often the subject of their poetical effusions was a description of our demeanor towards them, or of our figures, or an account of the purpose of our travelling in their country, as far as they were acquainted with it. This kind of improvisation is not restricted to their brethren of the north, but is also customary in the south of America.

With little modulation of the voice they give descriptive songs concerning their deeds in war and hunting, yielding sometimes to an inexhaustible effusion of humor or satire, of which mode of expressing their minds the Indians are particularly fond.

The introduction and finale of such festivities is a deafening shout, similar to the barking of dogs, which has for its purpose the driving away of the mischievous spirits.

Although we were several days in their company, the women and children could not overcome a certain shyness, yet it seemed that in their eyes we Europeans were not so displeasing as our negroes; if any of them came unawares near the women or children, they would run away and hide themselves.

The greatest joy we could cause the men, and the most fearful fright we could give to the women and children, was when we fired off our small mortars, the report of which was repeated a hundred times by the echoes. As soon as the women found out that we gave in to the pressing wishes and saw us loading the mortars, they would run away with their fingers in their ears.

Under the direction of Doctor Freyer, who possessed some pyrotechnical knowledge, we prepared some fireworks to let off for the assembled Indians one evening. We opened the spectacle with some signal rockets, after which followed some firewheels, crackers, etc. The effect surprised these children of nature more than would have been imagined; they became even unfaithful to their hereditary stoicism, and broke out in a cry of astonishment upon seeing and hearing the rockets. Their minds were too much agitated for sleep that night, and we often heard them imitating the noise of the ascending rockets. Instead of firing off the mortars they begged us now to let more "fire rain fall."

Here as well as on other occasions we observed amongst the men sores from terrible wounds received either in war or from hunting rapacious animals. A Wapisiana chief, a strong and powerful man, while fishing a short time ago in the River Zuruma in low water, was seized by a kaiman by one leg, but, without losing his presence of mind, the Indian with a stick which he had in his hand struck the monster on his head, so that it let go its victim, who, however, lost the calf of his leg, which was also broken in the struggle. The other Indians saved the man from drowning. Without the help of a doctor the wounds were dressed and healed so well that the man was able to undertake a four days' journey to Torong-Yauwise to see the white men.

According to the Indians, the number of people who lose their lives by the kaimans must be very considerable. They also assert that when the kaiman has tasted human flesh, he will become bolder and more savage.

All preparations for the continuance of our journey were

made. Our road leading over high mountain chains, and through almost impassible ravines; the load for one Indian was not heavier than about forty or fifty pounds, which, in consequence of having so many astronomical instruments, and provisions, maize, yams, cassava bread, etc., required at least about 100 Indians. The difficulty we had experienced in engaging carriers in the neighborhood of Pirara was here repeated. The wants of the greatest part of the visitors round us had been satisfied by selling us provisions, etc., and receiving in return knives, axes, beads, combs, fish hooks, etc., therefore there was no inducement to accept the offer of accompanying us. When we bargained with them in the evening about the price they would require to accompany us to Roraima, we got as a reply, that they would not venture to follow us, as the road was leading through a part of the country in which lately a war had been carried on amongst the Arekunas, and as the killed had not been buried, the smell had driven everybody from the neighborhood, and as most of the villages had been burnt, no provisions would be got.

Our plan was to follow the same road which my brother in his first expedition had then used, but this was so generally objected to, even by our followers from Pirara, that we were obliged to give in to Indian stubbornness, although on this road we would have fallen in with a great many settlements of Arekunas, and have been supplied with provisions.

Individually, the news of the war, and the fact that those killed had not been buried, led me to hope to get possession of skulls and skeletons. The Indians' abhorrence and superstitious fear of direct contact with the remains of their fellow creatures was stronger than our persuasion. When we stepped out of our huts in the morning, we did not recognize the place, as at least two thirds of the visitors assembled had noislessly left during the night.

After endless trouble, and the promise that we would entirely follow their guidance, whatever the difficulties to cope with might be, we at last brought the number of carriers to fifty, which made it necessary to diminish our baggage, already scanty enough, to half the quantity, leaving the remainder to be fetched afterwards. We were unable to leave one of our men to protect the packages that were to remain at Torong-Yauwise, which for the most part consisted of articles of barter, as was well known to the inhabitants;

but with confidence in the stainless honesty of those children of nature, who had not yet come into contact with Europeans, from whom they generally learn first their vices and bad habits, we left the parcels behind under the safe protection of the old chief, quite convinced that we should on our return find everything untouched—which was indeed the case.

Torong-Yauwise, where we had spent such an interesting time, is situated under $4^{\circ} 16'$ N. latitude and $60^{\circ} 18'$ W. longitude.

A few days before starting we dispatched two Indians to acquaint the inhabitants of the far settlements we should touch at of our approach, and to induce them to prepare bread—in short, to get us provisions.

Our caravan left the village on the 29th of October at daybreak, amounting, women and children included, to eighty people—the old chief, with his wives, escorting us for a few days.

The road took us in a north-westerly direction, through an undulating valley, here and there interspersed with small oasis of a dwarfish vegetation, while the surface of the savanna was generally covered with sharp-edged fragments of quartz and granite, which rendered our travelling most difficult, the sharp-edged quartz fragments penetrating our shoes. A dense vegetation, distant about two miles, made us believe that we were near the bed of a river. It was the Cotinga, which was flowing from the north-east. For want of a boat we had to wade the river, which was managed after great difficulty, the current being very rapid—the water reaching to our armpits, and the bottom being full of sharp pebbles, made our footing very insecure. The Indians had to take the packages on their heads, and the women crossed with the children on their shoulders.

After reaching the opposite bank we proceeded on our journey, in a northerly direction, wet to the skin, and the road brought us over a mountain from 250 to 300 feet high, which was covered with large blocks of granite and quartz. One of the prettiest views towards the mountains, lining in every direction, compensated us richly for the exertion of ascending. For some time we were walking silently on the ridge between large blocks of rocks, till we came to the northerly declivity, which we descended into a beautiful valley, watered by a small river called “Ariopa,” winding between dense groups of that beautiful palm the *Mauritia*

flexuosa, and luxuriant groves of the *Curatella americana*. The steep and fantastic summits of the surrounding mountains gave our imagination occasion again to make all kinds of comparisons with old ruins of castles on the banks of the Rhine. Tired with the exertion and unaccustomed travelling, we decided to pitch our camp in this valley for the night. In consequence of scarcity of poles, it was easier said than executed, to pitch the tents. Scarcely had we overcome the difficulties, when suddenly a thunderstorm arose, just as if it had waited for the finishing of our work. Accompanied by a fearful storm, the day was changed into night, which now and then was interrupted by the vivid lightning, while the thunder was so loud, that we imagined all the mountains were overthrown. It was but a short time that our tents would protect us from the pouring down rain. The storm ceasing, a bright starlight night followed, but the temperature being very perceptible caused us to proceed on our journey before daylight. We proceeded in a north-westerly direction through the valley. During the day we crossed the rivulet Marico, which waters a second valley, and flows into the Tapuring.

Our attention was called to a number of large ant hills, of which several were 18 to 20 feet high, built in a spiral form, which form we had never observed before.

The *Mauritia* palms had nearly taken possession of the whole valley. The sight of such a forest was the more surprising to us as we had only as yet found this magnificent palm, with its scanty reddish-colored fruits, single or in small groups on the swampy plains of the savannas. Here they grow so closely together that they lost a great deal of their imposing beauty, as the fine fronds were interwoven with each other.

Whenever this palm appeared the eye would rest with admiration on the magnificent sight. We met with them on the savannas extending more than 14,000 square miles, through which the tributaries of the mighty rivers the Amazon, Orinoco, and Essequibo flow, and also near the Roraima at an absolute height of 4,000 feet above the level of the sea; though it was stated by the great traveller Martius, in his magnificent work, "The Palms," that they were only found at a height of 800. In all situations the trees appeared to have the same vigorous growth and perfection as on the savannas of the Rupunini and Rio Branco.

The oldest as well as recent travellers in South America—the Jesuit Cumilla, in his “Orinoco Illustrato,” and Gili, in his “Storia Americana,” Hartsink, Aublet, and Alexander Humboldt describe this most magnificent of all palms with the same enthusiasm, and enumerate its manifold advantages and utility to the natives; and no doubt were the Indians inclined towards worshipping idols, this palm would be the subject of their adoration as it supplies nearly all their wants.

The dense forest contained palms from 80 to 100 feet high. Scarcely had we entered it when the axes were freely used, as our Indians wanted sandals and were also eager for the juice, which contains a deal of sugar. The experiment made with this juice in the Colony have, in relation to the quantity of the sugar it contains, given far better results than those made with the sap of the sugar maple, *Acer saccharinum*. The most agreeable juice is no doubt contained in the flower spike, of which a beverage not unlike champagne is prepared.

Excavations were made in the stems of the fallen trees, from which we took the juice in cups, or by kneeling down and drinking from the cavities. The quick flowing of the juice the Indians effected by raising the stem on one end, to the height of about six inches, spreading a little dry wood underneath and lighting it.

After having refreshed ourselves and replaced the sandals, made from the midrib of the leaves, by new ones, we followed the valley in a more westerly direction, when in the evening we met one of the dome-like Macusi huts, which we occupied as our quarters for the night. The hut was almost new but uninhabited, and its considerable circumference, neatness of execution; as also the cause why it had been built in this solitude excited our curiosity. We had the builder in our midst, it was our host from Torong-Yauwise, who possessed several other huts in the mountains, having a passion for building, and possessing a great deal more taste for architecture than I had observed in any of the other Indians.

The rest we expected for the night we did not get, as, from the first moment we laid down in our hammocks until the moment we left them, we were tormented by an insect, which in spite of all endeavors to catch it we did not succeed. The skin of the head seemed to have a special attraction to the tormentor. We carried the marks of their attachment with us, which consisted in red spots of the size of peas.

At daybreak our old chief left us, and returned with his

wives to Torong-Yauwise, while we continued our journey in a north-westerly direction through a valley. We crossed the River Tupuring; its banks were bordered by a dense forest of *Mauritia* palms.

The cool and enjoyable hours in the morning, when every one felt vigorous and jocund, while raillery and humor continued, were only of a short duration. With the ascent of the sun the jokers became silent, the dense Indian file became more broken, and very soon we were at more or less distance from our front or hind man; conversation ceased entirely; the heat in the shade had risen already to 108° Fahr., and it was not yet noon.

Towards midday we left the valley with its vigor killing heat, and ascended the ridge of a mountain of about 600 feet, which was covered with innumerable fragments of granite. In the north-west the Zabang was towering above numerous mountain peaks, while in the north the long chain of the Pawai-iring and Pakara-wari mountains extended, exciting our interest—the heat not being so oppressive at this elevation.

We continued our journey for some time along the ridge of the mountain, covered with immense blocks of granite and quartz; our road brought us again to a valley, which ran in a north-westerly direction. We followed the River Tukere, between slender *Mauritia* palms and dazzling white masses of quartz which covered also the bed of the river, the blocks projected here and there above the surface of the water, in other places formed picturesque cascades and currents. At last we crossed the river, and stood before a precipice which irresistibly invited us to take a rest in its cool shade.

The outcry "A snake! A snake!" and a peculiar movement of the surface of the water in the river cautioned us that a large snake was crossing, apparently towards our resting-place. The noise made by the Indians warned the cunning reptile of approaching danger, for it changed its direction, and though several of the Indians pursued it, made its escape. From the motion of the water and the size of its back, which several times appeared, it must have been a boa of considerable size.

A few small birds here and there, skipping through the stunted shrubs, and some solitary birds of prey, soaring above us, were the only living animals seen since we left Torong-Yauwise—even my search for new plants was fruitless, the

scanty vegetation, except the *Mauritia* palm, being limited to a few species. Although it seemed impossible to us to proceed on our journey, over the precipices before us, we were told by our guides that this steep ridge must be crossed. After a long search we succeeded at last in finding an accessible path up to the ridge, which we followed in a north-westerly direction. Tracts, covered with rocks and boulders in great confusion, had attracted our attention for some days; but such a wild chaos as we found here we had not met with before. For every particularly-formed rock the Indians had a special name, and would relate a separate legend. Most remarkable was one of these formations. On a granite rock, rising about sixteen feet perpendicular, and rounded at the top, was lying another block of an oval shape, which was again crowned by one somewhat smaller, of a round form. Had there been a possibility that human hands could have erected such a structure we could not have denied it. The whole of it rose a little more than twenty-five feet above the proper ridge of the mountain. In whatever direction the eye would look it would meet the most peculiar, grotesque rocks, ridges, and riffs.

On the banks of some rivulets which we crossed in the afternoon, appeared again a shrubby vegetation. The pleasure was heightened when these shrubs were seen covered with flowers, which I had not met with before; they belonged to the orders of *Proteaceae* and *Ternstroemiaceae*, and were the first representatives of the very interesting genera *Rhopala* and *Ternstroemia*. The whole air was perfumed with the vanilla-like fragrance of the *Rhopala complicata*, Humb. and Bonpl. This interesting genus appears at an elevation of 1,200 to 1,500 feet above the level of the sea, although I found the *Rhopala nitida*, Rudge, in the neighborhood of Pirara. The *Ternstroemia* proved to be a new species, *T. rubicunda*, Klotzsch. Small trees of a *Humiriaceae*, and shrubs of the peculiar oderiferous *Antonia pilosa*, Hook, changed with the above named plants, and formed an interesting border along the banks of the rivulet. An oasis, through which it was flowing, invited us to fix our camp near it. I detected some new forms of plants, to which belonged the *Hyptis membranacea*, Benth., with its tender light blue lip shaped flowers, and green calyx, which, according as the rays of the sun fell on it, changed from green to white, and to pink. The leaves of this magnificent tree, which reaches a height of

from thirty to forty feet, omitted a strong aromatic smell. Its wood is very hard. This is, undoubtedly, the only tree like *Labiatae*, indigenous in British Guiana. Mr. Gardener, the well-known traveller and botanist, found this species also in Brazil, in the diamond district, Minas Geraes, near Cidado do Serro, as one of the most common trees; its distribution, therefore seems to be over a large area in South America. A new *Swartzia* and *Rhopala*, *S. capparoides*, Klotzsch., and *Rh. suaveolens*, Klotzsch., I found also here.

On returning from my botanical excursion to the camp I was surprised to meet with so many dejected and mournful looks. The stock of our provisions was nearly exhausted, the rations, which already yesterday had been reduced one-half, had undergone a still further reduction to keep at last a small quantity for to-morrow's breakfast. We expected to reach an Arekuna settlement in the afternoon. At night we suffered a good deal from the cold—the thermometer showed 77° Fahr. at daybreak.

At sunrise we continued our journey through short, yellowish grass, damp from the night's dew. The cold, which was very perceptible, made us walk fast, when suddenly, on arriving at a precipice of the mountain chain, our eyes were enraptured by the view of a wide valley spread out below us. Was it illusion of the senses? Was it enchantment which thus transported us from a wilderness into a fairy land? A sea of mist was moving slowly and gradually over the valley, lying in ring-like circles on the luxuriant tops of the trees or on the summits of the low hills, which portion released from the envious veil were seen like islands rising above the white cloudy surface. Each glance discovered a new wonder; instead of the former ragged, sharp summits and peaks, a table-like belt of mountains rose above the mist in the north-east towards west, with a towering ridge or stone wall 3 to 400 feet high, and on the summit of it was observed a luxuriant vegetation. They were the Sandstone Mountains, Humirida. Speechless with rapture we looked into the charming undulating valley, and across the sea of mist, which became more transparent every minute, and from which emerged a vegetation of the most wonderful tints, getting more attractive every moment.

Extensive luxuriant plains were interwoven by long yellow stripes and patches of flowering trees, recalling to our minds the flowering fields of rape at home in the

spring; they were the flowers of the beautiful *Cassia polystachia*, Benth., which appeared here as a tree, forming whole groves, and supplanting all other kinds of trees and shrubs. Giving still a backward glance to the country which we had passed, where the unfettered power of nature had worked in fierce revolution, we descended into the charming valley, which we reached after much fatigue over and between large blocks of quartz and granite, which was the more difficult the rocks being slippery from the heavy dew. We turned towards the west to a woody oasis, watered by a small tributary of the River Muyang, and formed by gigantic forest trees, beautiful palms, luxuriant *Heliconias*, and ferns. Our road was barred by a fall of earth of about twenty feet deep, in which the fallen trees were lying in wild confusion, and we were necessitated to take a roundabout way. Leaving the oasis we ascended a small hill, where we observed assembled a number of Indians, pointed out to us as Arekunas. As soon as we neared them, they left the hill and descended into the valley; following them, we saw before us the longed for Arekuna settlement. We had put our foot on the territory of the Arekunas, one of the powerful and warlike tribes in British Guiana, which, it appears, used to inhabit the tributaries of the River Uaupes, and were described by Monteiro and Ribeiro as cannibals. The tribe now inhabits the mountains and savannas on the sources of the Rivers Caroni, Cuyuni, and Mazaruni. Before we reached the settlement, in front of which were standing a couple of red figures, we had to cross a small rivulet.

That we had been expected we easily concluded, not only from the scouts set, but from the careful toilet. Their whole body, including the hair, was painted red with arnatto, whilst the face was painted in stripes and points with caravera, a color made from the *Bignonia Chica*, Humb. and Bonpl. The chief who was almost blind welcomed us with a long pathetic speech, from which we understood through our interpreter that we could get neither bread nor meat, only some bananas, yams, and sugar-cane.

The expression of the Arekunas is more warlike than that of the Macusis, their bodies more powerful and robust. Their skin was also darker than that of the other tribes of Guiana. In the pierced septum of the nose they wore pieces or bamboo about eight inches long, painted and ornamented with all kinds of carved work; the earlaps were also pierced, and

occasionally the underlip had undergone the same operation. Some of them had, instead of the small sticks, the heads of little birds in their earlaps. The belt round their waists consisted of human hair, the neck was ornamented by chains hanging down their back, made of the husks of the pecari, or teeth of monkeys, and these necklaces were ornamented with large tassels made of bird skins, or roughly stuffed native squirrels. We saw very little or nothing of the women and girls, who watched us from their hiding place, keeping a respectful distance. They also had their bodies painted with arnatto. Their necklaces consisted of the gnawing teeth of the Aguti, Laba, or the corner teeth of the monkeys, from the corners of their mouth towards the ears they were tattooed, and their long black hair was carefully plaited and below the neck made into a knot. This was the toilet of the else well formed fair sex.

A great number of the inhabitants were afflicted with a disease of the eyes; two were quite blind, and the chief nearly so. The blind ones would at least have the satisfaction to feel us, and were conducted to shake hands with us and feel our faces and hair. The eyes were not inflamed, but covered with a whitish skin. This horrid disease astonished us the more as we never had found it so prevalent except amongst the tribe of the Warraus inhabiting the coast.

The only difference in the language of the Arekunas and Macusis seems to be in the dialect, as the tribes understand each other.

Our two Indians, gone before us, had left already in the morning, and the provisions which could be spared by the inhabitants were placed in the front of the chief's hut, but little and not substantial at all for hungry stomachs; and the assurance of the chief, that in any of the settlements, before reaching Roraima, we would find as little as we found with him, dejected us more than the disappointed hope of an abundant meal to-day.

In consequence of the family war to which our attention had been called at Torong-Yauwise, a good many Arekunas had gone towards the west; the provision fields had been destroyed by the victorious party, and left uncultivated. Game was neither seen in the valley nor on the mountains, and the small-sized fish in the rivers, not longer than a finger, belonging to the genus *Hypostoma*, would need to have been caught by thousands to satisfy such half

starved men. Vegetables were the only things we could depend on.

After the sad news our stay could only be of short duration, and after accepting the offer of two young men to accompany us to the Roraima (although adding two more hungry individuals to our company), we left the settlement Yawangra sadder than we entered it. As we left, two old women took courage to bring us three small cakes of cassava bread, some roasted maize, and several calabashes with Kasiri; the latter we gave up to our Indians with the greatest of pleasure. The two old crones were rewarded with beads and a comb. We were told that in a few hours walk we should find another settlement, but no provisions.

We followed the valley, in which are the sources of the Muyang, in a westerly direction, and very soon entered a dense oasis with magnificent trees and palms. Leaving it our road led us again through a wide savanna.

The chain of the sandstone mountain Humirida formed, about five miles distant, the northerly barrier of the valley—the green plains now and then interrupted by yellow tracts of the flowering *Cassia polystachia*, which extended to the middle of the mountains, where they lost themselves in the gullies. One of the largest oasis we passed consisted only of palms and *Musaceae* which, with their colored flower-sheaths, gave a pleasing change of color through the dark green foliage. The palms consisted of *Iriartea exorrhiza*, Mart., and *ventricosa*, Mart., *Martinezia caryataefolia*, Humb. & Bonpl., and several of the elegant *Geonoma* excelled by the remarkable luxuriance in shape and formation of their fronds. *Ravenala* and *Phenacospermum* also appeared here in such perfection as we had only met with them in the valleys of Tuaratu and Ossoschuni Mountains. Ferns, especially of the genera *Adiantum*, *Schizaea*, *Aneimia*, *Mertensia*, *Hymenophyllum* *Polypodium*, and *Acrostichum* covered the ground and the trunks of the trees.

In following the path through a deep gully, we had to cross a rivulet, forming a good many rapids. Its banks were bordered by several species of *Trichomanes*. Having refreshed ourselves with the cool and clear water, we ascended the opposite height, and arrived at a small savanna, where we observed the settlement. No human being did we perceive near the huts, and imagined that they were without inhabitants, when we observed on entering the village a young Indian standing in front of one

of the huts who welcomed us in a long pathetic speech with the beginning "Hure Macusi" (I am a Macusi). Such a fluency of speech I had not before heard, even amongst the palavers of the old men; none could be compared with him, regarding the laurel for eloquence. In the most flourishing language he told us that what we wanted (cassava bread and other provisions) they did not possess, that they themselves had no maize, and that they only had the few fruits of the forest to live upon, and only water to quench their thirst the same as the animals. In his hut we could sling our hammocks; the water of the River Mayang was all he could offer us; and in the settlements we would pass they could not better provide us than it was in his power to do.

Our two guides, who went before us, had communicated to him our plans and the purpose of our travelling; he understood it excellently, expressing himself for more than half an hour in a most fluent language, and on concluding his speech he shook hands with us.

The assertion that the Indians of South America have not the gift for oratory, is not proved by my experience amongst the tribes of Guiana, but on the contrary, in their palavers I have heard speeches, which for bold and striking sentences in relation to sound common sense, were the more surprising, because we only became acquainted with them through interpreters.

Through the open door of the hut before which the orator had received us, we saw the other inhabitants of the village assembled, who afterwards came out to welcome us. The greatest part of the male population were travelling.

Except a few palm fruits, no trace of any other provisions could be seen, our stay was therefore only short, especially as our host assured us that we would reach another settlement before sundown, where the inhabitants had been lucky enough to have had an harvest of maize. Without being asked, the orator joined our party, with wife and children.

With difficulty we pursued our journey, our tired limbs hardly being able to carry us; silently we continued it towards the north-west, crossing a number of tributaries of the River Mayang, through woody oasis, and across savannas. To judge from the strong smell of musk, ascribed by the Indians to snakes which frequently crossed our path, the oasis must have been infested with them. With the setting sun, we found ourselves in the neighborhood of the

western extremity of the Humirida mountains, their perpendicular walls being gilded by the sun; here we found the longed for settlement, which we welcomed with all our hearts.

Our looks must have betrayed our wishes, for before we could utter a word we were assured that except maize and some bananas there was nothing eatable in the settlement. The former they had already roasted for us.

The march of yesterday and to-day on empty stomachs had so exhausted us, that we required a day's rest, for which we fixed the following day. A charming spot at the base of the Humirida mountain and the banks of a picturesque rivulet, flowing from the mountain, offered a beautiful camping place. According to the astronomical observation made at night our camp was under $4^{\circ} 30'$ northern latitude.

Since leaving Torong-Yauwise it was almost regular that after sunset we would have a thunderstorm, which was as regularly followed by a clear beautiful night. To-day again we had the same phenomenon. Our rivulet changed in a very short time into a rapid raging stream.

At daybreak our hunters, armed with guns, or bows and arrows, hastened to the savanna and mountains to supply the scanty table with something better than maize.

Accompanied by two Indian boys I ascended the mountain to botanize, and was not disappointed with the result. The trouble and fatigue caused by climbing among the masses of projecting sandstone rocks was richly rewarded. Some of the rocks were covered with *orchids*, and with gigantic *Tillandsias* and *Cacti*. Ascending the mountain about 500 feet, I observed on the border of the forest, which extended to the sandstone wall, a gigantic tree, covered with magnificent large red flowers, it was the *Elisabetha Regia*, Schomb., discovered by my late brother in his first expedition.

No doubt the tree may be reckoned one of the greatest ornaments of the tropics, and vies in beauty with a most splendid production of the Eastern Hemisphere, the noble *Amherstia*, the not less distinguished *Brownea*, the rose of the tropical region. Arrived at the tree, it was found impossible to climb it, even from my little copper-coloured boys; one, who in consequence of his great agility in climbing had attained the nickname "Matziki" (the tiger-cat), looked with eager eyes towards the knife I offered him as a reward for some flowering branches. Measuring the

height of the tree with his intelligent eyes, but downhearted, he shook his head not venturing the hazard.

On my return to the camp, the hunters one after the other made their appearance, but empty-handed. A few Toucans were the only booty of the hunting excursion.

The following day we were to scale the sandstone ridge, and the cool morning was considered the best time for it, therefore the first rays of the sun found us in motion. The valley in a western direction was followed along the base of the Humirida, and crossing a small tributary of the Muyang we arrived at the place which was pointed out to us as the passage across the mountain, and although the ascent of the perpendicular stone wall seemed to us an impossibility, we were assured by our guides, who had travelled this road before, that though it was somewhat difficult it was possible. The mountain was entirely bare of all trees, and only covered here and there with low shrubs.

The hazardous feat was undertaken. Between colossal sandstone rocks we ascended. After the lapse of an hour we had not reached half-way; our strength was exhausted, our panting breast and trembling knees compelled us to rest every minute, and the scorching rays of the sun, from which we were unprotected, exhausted the little energy left us. We Europeans looked miserable objects, and yet we had nothing to carry but our walking-sticks; the Indians, who were laden with heavy burdens, fastened by means of a broad band around the forehead, were scaling the rocks with ease and activity, although the perspiration came down their bodies like a stream, as if they walked on even ground.

Our long Indian file moved like a serpent over the steep precipices. After an ascent lasting for several hours, we reached the base of the stone wall, which was about 500 feet high. To attempt the further dangerous ascent was at present impossible for us Europeans; we had first to collect our exhausted strength.

Mosses, Lichens, relieved the dull rock to some extent, while the crevices and recesses were covered with several kinds of *Orchids* and shrubs of a *Piperaceae*, the strong roots of the latter forming a network on the rock, which was some assistance to us in our ascent.

There certainly was a possibility of scaling the rock by means of this network, which could be used like a rope ladder; yet this was only depending on dauntless courage, the

perfect and free use of our hands, the examination of the firmness of the roots, and the crumbling sandstone wall, before we could trust our bodies to either of them. A slip of the foot, a losing of the balance, or the breaking of the roots, would have been followed not only by the terrible fall of an unfortunate, but most probably would have caused the destruction of many of the followers, who would have been knocked down by his fall.

In performing the dangerous feat each of the Europeans was preceded immediately by an Indian. In a zigzag we climbed the stone wall, following one another at certain intervals, to raise ourselves from one precipice to the other. The first look into the abyss made me shudder. Like ants the brown figures of the Indians scaled the rock; and the thought that one of the bands, the only thing holding their burden, might break and come down upon the followers, and precipitate them into the abyss, made me close my eyes, and I dared not look back.

The only sound which interrupted the deep silence was the falling of the crumbling stones. The Indian in front of me at last reached the edge, and I also with a deep breath stepped on to the firm ground, cast one look down the stone wall to close my eyes again and hasten away, because every minute I expected to hear a death cry of one precipitated into the abyss. As soon as one of the Indians had reached the top, he, as well as the others, who had already arrived, burst out into a loud and triumphant cry.

After the lapse of three hours the last had reached the ridge. We now began to breath freely, and the eyes could rest in deep admiration on the charming panorama, in the solemn stillness of a virgin nature we saw spread before us. Without avail the eyes looked for the roofs of the settlement we only left some hours ago; the work of man was hidden by the umbrageous vegetation below us. No sign of life, no noise of man's busy hands disturbed the deep peace in which nature appeared to us, and which she imparted to our souls.

According to the mountain barometer we were at an altitude of 3,690 feet above the level of the sea. It appeared to us as if the cool clear air had replenished us with new vigor, so wonderfully quick we found ourselves strengthened for the continuation of our journey.

On the rocks which still covered the undulating table-land I observed several *Orchids*, *Epidendrons*, and *Odontoglossums*,

besides these the *Marsetia taxifolia*, Dec., covered with pink flowers which had chosen the same situation; a plant with which I became acquainted here the first time, and which appeared to me in the distance to be an *Erica*. When we had reached the proper summit we saw before us expanded towards north-west and north-east a table-land, which was interrupted by small hills, groups of trees and shrubs until it was bounded again by high chains of mountains.

Over a soft, velvet-like carpet of turf, which was yet damp with the dew, a dense group of strange plants attracted my attention. They were of a most singular habit; the naked stems, several feet in circumference, dichotomous, and having bare branches, ending in long grass-like broad leaves. They were *Vellozias*, but without flowers or seeds. Between small sandstone rocks these peculiar-formed plants, projecting stiffly into the air, gave an uncommon character to the surrounding vegetation. The light north wind conveyed to us the most beautiful fragrance, and soon our eyes were attracted with admiration by other plants—flowerstems which reached far above the surrounding shrubs, were adorned with many white, violet, and purple flowers. They were groups of the charming *Sobralia Elisabethae*, Schomb., which exceeded all its congeners in height. I saw flowerstems five or six feet high, with flowers of the size of our lilies. But not alone the *Sobralias* but also the small trees and shrubs were unknown to me. I stood before a zone of plants of new and wonderful forms. The same astonishment, the same surprise, the same sentiment which had mastered my feelings when I set foot on the South American soil, rose in my breast, only with this difference that I imagined myself transferred from South America into a new world, between the *Proteaceae* of Africa and Australia, the *Melaleucas* of East India. The coriaceous shining leaves, the twisted branches, the strange formation of the flowers, their dazzling colors, everything was different in character from the flora of South America I was previously acquainted with. I hardly knew where to look first, whether towards the wax-like flowers of the *Thibaudia*, *Befaria*, and *Archytaea*, or towards the large camellia-like white flowers of a *Bonnetia*, or on the shrubs of the *Melastomas*, the *Abolboda*, *Vochysia*, *Ternstroemia*, *Andromeda*, *Clusia*, *Kielmeyera*, covered with thousands of their brilliant flowers, or on the quaint flowers of the *Sobralias*, *Cattleyas*, *Oncidium*s, *Odontoglossums*, which covered the humid sandstone blocks;

and how many plants were out of bloom, and how many kinds showed only their buds.

It appeared to me almost as if this boundless abundance of flowers was to compensate for the total absence of animal life; all was wrapt in deep solemnity, not even a gorgeous humming-bird, or a graceful honey-sucker was seen fluttering amongst the flowers.

My surprise was still increased when I stood before the first representatives of the *Cinchoneae*, of which I not only collected *Ladenbergia densiflora*, Klotzsch; *Roraimae*, Klotzsch; *Schomburgkii*, Klotzsch, but also *Cosmibuena triflora*, Klotzsch.

Every step brought something new; between flowering shrubs we reached the River Zuappi, which flowed towards the north-east, joining the River Cotinga.

In reaching this new zone of plants we had also arrived at a new watershed, that of the Orinoco, the streams flowing now towards that river. The flora became more interesting near the banks of the Zuappi, *Echites angustifolia*, Benth., *Macairea multinervia*, Benth., and *parvifolia*, Benth., *Bonnetia sessilis*, Benth., *Vaccinium puberulum*, Klotzsch, *Befaria grandiflora*, Humb. & Bonpl., and graceful trees of the so beautiful *Archytaea multiflora*, Benth., lined the banks of the river. Near a deserted Indian hut we partook of our scanty breakfast and refreshed ourselves with the cool water of the Zuappi. After arranging my botanical gain we proceeded on our journey through this magic park, when we entered a small forest, the borders of it enclosed with tall *cacti*, some of them twenty to thirty feet high. Numberless palms raised their proud crowns over the trees, the wide-spreading branches of the latter were covered with gigantic *Tillandsias*, *Orchids*, *Aroids*, and *Ferns*, while numberless lianes, the thickness of an arm, were climbing up the trees in strange and entangled twistings from branch to branch, sometimes straight, and in other places like loops. The further we entered into it the more charming, the more various became the vegetation—each preceding moment surpassed the impression of the foregoing one; but the culminating point was reached when, surrounded with *Zingiberaceen* *Musaceen* and gigantic grasses, the first group of tree-ferns appeared; they were the fairy-like genera *Cyathea* and *Alsophila*. No plant had yet excited in me such a peculiar feeling—such a deep enthusiasm; not even the first sight of the palms, and the unexpected vegetation which appeared before us to-day, with its anomalous forms of flowers in infinite variety.

From the slender stem, about twelve to sixteen feet high, were suspended the large, elegant, featherlike fronds hanging gracefully almost down to the ground and forming charming arches; a habit which especially was noticable in the *Cyathea*, The *Alsophila* were new and described by the late Dr. Klotzsch as a *oblonga* and *gibbosa*.

Walking through this magic forest on pretty even ground the path took an opposite character, at once it carried us down steep declivities, which we had to scale up again; roots of trees and almost impenetrable shrubs and plants disputing with us every step we made. Every summit we ascended was welcomed by the Indians with a hearty cry; though it was doubtful whether their joyful cry was not meant to welcome another abyss.

We again pursued our way down towards a deep ravine through which one of the smaller rivulets poured its water; we had again just scaled a steep declivity and the forest became thinner, and some rays of the sun stealing through the foliage told us that we had reached the end of it. We had to break through a dense mass of ferns overrun with numberless creepers; this thick border we soon noticed was the enclosure of a large cassava field; although the roots were far from ripe the field showed us that we were close to a settlement. With the expectation of finding there a supply of bread, we went through the luxuriant field descending a steep hill, when we noticed far beneath us the peaceful and welcome huts of the Arekuna village of Humesete.

Before us towards north-north-west and north-east again towered the high mountains. The picture of nature, as was unfolded before our eyes, was one of the grandest ever seen. organic and inorganic nature were contributing to it. The declivities of the mountains we stood on were covered with the most lovely ornament of flowers mixed in charming variety. Flora seemed to have strewn here extravagantly; the colors of the *Andromedas*, *Thibaudias*, *Vochysias*, *Bonnetias*, *Ternstroemias*, *Gomphias*, *Befarias*, and *Clethras* in unfettered humor and extravagance over the picturesque sandstone masses, laying in horizontal positions, which in some places formed pleasant terraces, in other wall-like declivities. Between thickets of *Sobralias* and *Orchids*, we went through a valley, and crossing a small rivulet entered the settlement. The fifty red-painted inhabitants gazed at us pale foreigners and our package with curiosity. But before we reached the

village our two guides communicated the disagreeable news that there were no more provisions in the village than just to keep us from starving. The unlucky family foil, which, like the Trojan one, had been caused by a woman, and had brought misery also in this beautiful valley. To such disappointments we had become accustomed, as it had been repeated in every settlement since we left Torong-Yauwise.

With a satirical pitiful laugh, our Indians looked first on their lean body, and then at a small piece of cassava bread not larger than a hand, and a couple of half ripe bananas, which was the ration each of us had to receive. With a stoic calmness, our followers withstood the continued fasting, and the more than usual exertion; they knew that it was not our fault, and quickly and willingly they fulfilled their duties. Although their lips were silent, their appearance told a different tale. I would have believed it impossible that men, in three or four days, could be reduced to such a state from not having their regular meals; their ribs and other bones began to show under the ill-nourished body, and the skin became folded.

We pitched our camp near the village, between picturesque groups of fern trees, and soon the inhabitants were collected round us.

The Indians who accompanied us from Torong-Yauwise had promised to come thus far; the want of provisions we met with at every settlement caused them to refuse to go any further, and the next morning they were to return to their home. Seeing so many young men amongst the inhabitants of Humeseta, and also the friendly and obliging demeanor of the chief, we were induced to ask the question, after distributing a few small presents, whether some of his men would not accompany our returning Indians to Torong-Yauwise and bring from there, some of our package left behind, especially such containing provisions, and bring them to Roraima, where we intended to stay several weeks. Very soon, the necessary number had been found; the honesty of the Indians was a surer guarantee than any guard we could get to protect our riches, and we were not disappointed, they brought their burdens safe to Roraima.

The awful, but beautiful phenomenon which we had experienced so often repeated itself to-night in a degree as it had never happened before. The roaring of the thunder; the flashes of the lightning, which almost uninterruptedly

illuminated the dark masses of clouds, lashed by the unfettered hurricane; the crashing of the gigantic trees of the neighboring forest, rooted out by the terrible whirlwinds, which seemed to tear everything near and round them; whilst the hollow sound of the rushing rain, and the claps of thunder gave the accompaniment—in short everything continued to fill us with terror. Such a tumult I had never experienced before. The quantity of rain which fell in one hour was about four inches.

Notwithstanding the uninterrupted lightning, it never did strike, and we were assured by the Indians that such happened very seldom. After the lapse of an anxious hour the stars shed again their faint light over the deep quietness of the reposing nature; only the falling raindrops from the branches and leaves told a story of the terrible storm which had been raging through the narrow valley.

The following morning, the thermometer showing 63° Fahr., made our teeth chatter, and urged us to quick continuance of our travel. After crossing a small rivulet our road led us over a hill, and in reaching its summit before us in the north-east in a misty blue distance rose, like a black sharp confined gigantic wall, a dark mass of rocks, which was welcomed by the Indians with the loud exclamation—"Roraima, Roraima" the limit of our journey. Scarcely had the echo of the loud exclamation died away, when an envious veil of clouds concealed the dark mass before we had time to get a good look at it.

Our old friend the dome-like gigantic mountain "Zabang," which we seldom lost sight of, towered again in proud majesty towards the east above the surrounding mountains, and maintained also here his well earned right as a representative of Olympus.

The mountains near us rose in gigantic terraces which human hands could not have built more skilfully. Here and there they sprang in regular bastions, which, in the exactness of their glacis, and accurate corresponding angles, could not keep us from the idea that rule and plummet had been used here.

Our road led us through a dense oasis full of tropical vegetation; beautiful tree-ferns and arborescent grasses. As we entered the savanna again we noticed a solitary hut. The astonished inhabitants put a little roasted maize before us to allay our hunger.

Just as we were preparing our camp for the night we observed a large ant-eater (*Myrmecophaga jubata*, Lin.) stepping from the oasis in the savanna—the first mammal we had seen since we left Torong-Yauwise, the poor animal not dreaming that death was so near him. The Indians surrounded and killed it after a hard struggle, and its meat was soon broiling over the fires.

The dawning morning found us on the road, and showed us an unbroken chain of toil and exertion. After ascending the westerly terrace-like declivity of the Makaripa for about 200 feet, we had to descend into the valleys again. The deeper the gullies and valleys became the more frequent appeared marshes, which were fed by a number of small mountain rivulets which precipitated from the steep declivities. In these swamps luxuriated *Limnanthus*, *Schultesia*, *Rhexia*, *Spinnera*, and *Commelyna*.

We again began the laborious work of ascending. The summit was covered here and there by that remarkable compositæ the *Pachydermatophyllum Schomburgkii*, C. Schultz., Bip. and also some gray-colored, stiff grass, which formed the only vegetation. Large sandstone rocks in horizontal layers at once forming steep walls, on which, to our great surprise, we discovered rows of Indian hieroglyphic writing, part of which, by atmospheric influence, was obliterated. The figures were mostly rough representations of the human form, kaimans, and snakes, in which they differed materially from the hieroglyphs we met with in the River Essequibo. According to the description which Alexander Humboldt gives of the hieroglyphs which he discovered on the granite rocks of the Caycara, they have been found, as yet, distributed over a space of at least 12,000 square miles, and in fact over the basin of the large rivers Corentyn, Essequibo, Orinoko, and part of the Amazon. My brother saw them in his first travels in British Guiana (ascending the Corentyn) on the rocks of the Timeri under 4° 37' N. latitude and 57° 45' W. longitude; and again near the great cataract under 4° 21' 30" N. latitude and 57° 45' 30" W. longitude. He also found them on the Berbice under 4° 56' N. latitude and 58° 9' W. longitude. This was also the case in his last expedition towards the River Trombetas, under 1° 27' N. latitude and 56° 41' W. longitude. He also discovered them on the Cuyuwini, which flows under 2° 16' N. latitude into the Essequibo; and besides this on the Upper Essequibo, and

1° 40' N. latitude on the Patiparu. They appear again under the 4° 40' N. latitude and 61° 3' W. longitude; and on the Orinoco and Culinacara, on the Casiquiare, and exactly agree with those found by von Martius, near the River Yepura; those we now saw belonged to the same age and to the same people.

As soon as they were observed by the Indians they murmured in a suppressed voice, "Makuneima, Makuneima." (God, God.)

The hieroglyphics discovered by Martius are situated between 75° to 76° west longitude, some minutes south of the equator; Alexander von Humboldt found them between 2°, 3°, 7°, and 8° north latitude, and 68° and 69° west longitude from Paris. From an approximate astronomical observation those which we found here were situated under 4° 40' north latitude, and 61° 3' west longitude from Greenwich. If we connect the discoveries of the first named gentleman with our observation, we see that these hieroglyphics and sculptures, as far as the Kukenam, run under 5° N. latitude, and 61° W. longitude. According to this survey these hieroglyphics are distributed from 1° 40' N. latitude, and 56° 41' to 62° W. longitude.

A mystery not yet solved hangs over these sculptured rocks. The Indians can give no account of their origin, Some tribes ascribe it to the good spirit, others to their forefathers.

Considering the hardness of the granite on which they are mostly found, and that by the discovery of America iron was unknown to the inhabitants, it is a riddle how they were produced in this hard stone. It is said that they were engraved by means of friction with quartz pebbles; what weary patience to accomplish it. Although I entirely forbear a critical examination of the many hypotheses which have been inquired into in promoting the knowledge of these remains of an unknown passage and state of culture, it appears to me that they certainly prove that the population of the past time has been not alone much more numerous but also more civilized.

The summit of the mountain rose several hundred feet above the place we now occupied. Far in the north towered the cloudy Roraima. Our eyes were directed towards a declivity in the distance over which was rushing a foaming stream which lost itself again among the thick vegetation on the base of the declivity. The cry of the Indians, "Rué-

imeru, Rué-imeru," told us that it was the fall of the River Rué. It was a long time before we could part with the lovely picture which unfolded itself below us in the valley of the Kukenam, and curiosity actuated us to hasten towards the imposing waterfall which made such an extraordinary impression on us even at a great distance.

As far as we could follow the valley of the River Kunkenam from where we stood, it came from the north-east, and was running towards the north-west. The small rivulets we crossed by the continuance of our journey, were bordered with dense shrubs of *Clusias*, covered with their wax-like large flowers. We soon stood on the banks of the mighty River Kukenam, so broad and deep as to prevent our crossing without a raft or boat, and we at once set to work to prepare the first, when an Arekuna Indian told us that, at a settlement a few miles off, they were in the possession of a boat, which he was willing to procure, in company with some other of our followers. They swam across the river, and disappeared in the dense forest. After the lapse of several hours, we heard in the distance the sounds of the rowers, and soon they appeared with a small corial, and at length we and our package were landed on the opposite bank, when we were able to proceed on our journey, and reached the Arekuna settlement, Barapang.

The inhabitants gave us a friendly welcome, not so the great number of dogs, which received us under furious barking and howling, and it was only with the greatest difficulty the inhabitants could keep them clear of us. It is curious that the Indian dogs have a special aversion to Europeans, consequently, it would be a bold undertaking of a European to approach an Indian village at night. With our copper colored companions, they were immediately on friendly terms. The same aversion towards us was also shown by all other domestic animals of an Indian home, monkeys, parrots, etc.

Some yams, a few unripe bananas, and the promise to send messengers to the neighboring settlements to induce the inhabitants to bring us provisions, was all we could receive.

It was too late to-day to visit the great waterfall of the Rué. We camped near the huts of the village, but our rest was much disturbed; the Piai or medicine man, one of our followers, endeavoring to cure the chief of the settlement, who was laid up with fever.

The cold temperature drove us by daybreak from our hammocks, the thermometer showing 60° Fahrenheit. We were now 3,930 feet above the level of the sea.

The intense interest for the grand spectacle in store for us, united with the cold, we hastened to the great fall, about three miles distant. The road to it was most interesting in regard to botany. The air was filled with fragrance. Between *Thibaudias*, *Andromedas*, *Ternstroemias*, and *Befarias* magnificent *Orchids*, trees of *Ladenbergias*, extended along our road.

With every step the wild roar of the falling water increased, until we saw before us the unfettered element in volumes of foam, rushing over the steep precipice, and witnessed one of the most picturesque waterfalls of British Guiana. Over 120 feet high, perfect perpendicular precipice of red jasper, the mass of water, which, when it had reached half-way, already dissolved in foam and vapour, rushes down to a layer of jasper, when, after this mighty fall, it forms ten other cascades of a perpendicular height of six to forty feet, and then, after the whole fall of 220 feet, it unites its water with that of the River Kukenam.

Struck with amazement, captivated by the awfully grand and imposing spectacle, we looked down into the wild drift of chasing waves, which with deafening thunder devoured any other sound.

Not without difficulty we made a road downward to the basis of the great fall through the wall-like vegetation, which, from the pressure of the air of the falling waters, waved in wild emotion, and covered us with flakes of foam. Looking upwards on the beautiful cascades, through the crystal water, tinged by the dark-brown red and pink colored layers of the Jasper, which showed through it in beautiful variegated colors, and through a vegetation which only a tropical climate and the ever humid atmosphere can produce.

Mosses, *Lichens*, and *Ferns* covered the gigantic rocks of *gneiss*, which appeared here and there along the banks with a green swelling bolster, while creeping *Aroids*, *Monstera*, *cannaefolia*, Schott., *Anthurium gracile*, Lindl., and other creepers like garlands were spread over the ground. The most beautiful fern-trees appeared amongst the large stone blocks, and the shadows of their moving fronds danced like fairies over the green carpet,

Even the crevices of the slippery masses of Jasper were not without living vestment; small luxuriant vegetating ferns,

Jungermannias, which in more or less dense turflike masses adhered to the red wall. *Cypripedium Schomburgkianum*, Klotzsch and Reichb., and the pretty *Angelonia salicariaefolia*, Humb. and Bonpl., had taken their places in the crevices. The vegetations on both sides of the banks consisted of *Qualea rosea*, Aubl., *Kielmeyera angustifolia*, Pohl., *Gomphia*, *Vochysia*, white flowering species of *Psidium*s and *Laurus*, above which rose proud slender palms, gracefully moved by the pressure of the air from the falling waters.

In returning to the summit by another road, we found a dense thicket of the remarkable *Rapatea Friderici Augusti*, Schomb., gigantic *Cyperaceen*, especially *Diplasia karataefolia*, Rich., *Cyperus ferox*, Rich., with its pine-apple-like leaves, five to six feet long, *Tillandsia bromeliaefolia*, Rudge, &c.

The River Rué comes from the north towards the precipice, having a width of thirty to forty feet. The fall and the junction of the Rué with the Kukenam is situated under the 4° 43' 4" N. latitude, and 61° 5' W. longitude.

Enraptured with what we had seen through the beautiful magic garden of flowers, we were especially interested by seeing large trees of the *Ladenbergia*. At the Humirida Mountains, in an altitude of 3,690 feet above the level of the sea, we found them only as shrubs, here we met them as trees.

No other order of plants could probably show a more abundant literature than the Cinchoneae, and yet the knowledge of the geographical distribution in South America of this valuable tree is very limited, as every new traveller has added other discoveries.

Many are the causes ascribed to the discovery of its wonderful effects of alleviating the sufferings of humanity. No doubt assertion made in proof of it belongs to the region of legends, by which generally an important discovery is accompanied. According to Geoffroy, an Indian afflicted with fever drank out of a pool into which had fallen trees of the fever bark, and by drinking had been cured of his illness. According to Condamine (although he himself doubts the truth of it), the American tigers, the pumas, were the first that drew the attention of men to it, because these animals, which are supposed to be attacked by fever, cured themselves by gnawing the bark of the Cinchona trees. Some of the oldest authors assert that the Indians were acquainted with the qualities of the bark before the arrival of the Spaniards; while others again maintain that they did not know its valuable quality.

It has been proved by later travellers, especially through

Alexander Humboldt, that the discovery of the bark as a medicine belongs to the Europeans, and not to the natives of South America. Just as unacquainted as the great traveller found the Indians with the qualities of the bark did my brother in his first travels, and even now we found this the case with the Arekunas, who lived in the Cinchona region. We gave the Indians, when we found them suffering from fever, quinine, and gained lasting gratitude for it; while a few steps from their sick bed the source of the remedy was growing in luxuriant abundance.

At our return to Barapang, we found several Indians from the neighboring settlement, who, in consequence of the war, could bring only a few bananas, of which roasted, our meal consisted that day. The stoical submission to fate was rewarded in the afternoon, when new visitors not only brought some cassava bread, but also two fowls. The former we parted amongst our starved followers, whilst the latter we claimed.

The next morning several Indians from Barapang followed us, although they knew very well that we would find no provisions in Roraima. Curiosity to travel with the white people was stronger than their consciousness of that fact.

Our road was towards the north-east, and after an hours march, we reached the River Ruè; after crossing which, we went along its bank lined with a rich vegetation, one tree especially attracting our attention, *Peridium ferrugineum*, Schott., by its peculiar flower spathes.

Along our road we met, now and then, some small isolated shrubs of *Byrsonima* and *Melastoma*.

Some settlements we saw in the distance, which, according to our guides, were left by their inhabitants. They had been built near the dense vegetation of the banks of the River Kukenam, and formed a picturesque interruption to the lonely but lovely scenery of the valley before us. Where the river came close to the base of the mountain the trees along the banks disappeared, and dense masses of *bamboos*, other arborescent *grasses*, and *Zingiberaceae* took their places. We now had reached the highest point of the mountains, and before us extended the remarkable Roraima, with its wall-like dark rocks. Following the path downwards we saw in the plain a large hut, before which we observed a number of Indians assembled, who must have observed us, as we concluded from the restless motions displayed by them. To abate the fright caused by our sudden appearance, and to prevent their

escape we dispatched two Arekunas who were to make them acquainted with our peaceful intentions. We reached the plain, and before us the hut, in front of which the now-appeased Indians received us, and in which, to our rejoicing, we were regaled with fresh cassava bread and some smoked game. This was such a meal as had not been enjoyed for many weeks. When we had consumed the provisions, and informed the Indians that we should stay for the night here, the hunters with their long blowpipes went to procure fresh game, in which they were successful, as they proved at their return. Amongst the Arekunas the blowpipe is the most common and approved weapon for killing the game with poisonous small arrows.

Amongst the surrounding vegetation, mostly unknown to me, were large trees of *Clusia insignis*, Mart., with its large, wax-like, white and pink-tinged flowers.

We found the night very cold, the thermometer showing only 61° Fahrenheit. When we started in the morning all the inhabitants, old and young, followed us, securing their huts with a door made of palm leaves. Our party in consequence increased considerably in number—of course the new followers had to look out for their own provisions

Near sundown, after crossing several oases, in which the Guttiferae, especially the genus *Clusia*, formed the predominant vegetation, I collected *Clusia insignis*, Mart., *rosea*, St. Hill, *bicolor*, Mart., *leprantha*, Mart., *macrocarpa*, Spr., *microcarpa*, Spr., and *nemorosa*, Meyer. Several of these species appeared as parasites on other trees; and this was often the case with the magnificent *Clusia insignis*.

The *Dimorphandra macrostachya*, Benth., with its brilliant flowers rose like majestic trees above the vegetation.

We soon approached the valley of the Kukenam again, and observed on its westerly bank two large dome-like huts, one in the course of erection, and round them a number of red painted Indians were assembled in festive attire. The Chief, a worthy old man, was sitting on a chair, clad in a shirt stiff with dirt, his head covered with an old hat crushed and bare of all hair, no doubt having from age, a red-yellow color. The chief was surrounded by the elders of the settlement, also clad in fragments, at one time white shirts, which were hanging down in rags over their red-colored bodies.

The chief looked at us for some time without speaking, and then began his oration, which we feared would never end; when he had ceased he rose to shake hands with each of the

Europeans, in which ceremony he was followed by all his subjects from the oldest man and oldest woman to the smallest boy and girl, with the exclamation, "Bakung-baimong (good day, and welcome).

Such a hearty reception we never had before received from the fair sex, and we were the more surprised at it as they had not seen an European before.

Men and women were distinguished not only by their fine forms but also by their regular physiognomy, and a great many amongst them by their wonderful long, black, curly hair. The men wore also pieces of bamboo through the septum of the nose, lips, and ears; the women were much tattooed.

After the ceremonies of welcome had been gone through the women and girls busied themselves in supplying us with fresh baked cassava bread, pepperpot, paiwari, even with a kind of cabbage, prepared from the young sprouts of the *Manihot*, but which delicacy, after the first mouthful, we declined as, in consequence of the strong addition of *capsicum*, we imagined we swallowed fire.

A look of the chief seemed to have commanded his wife and daughters to serve us with eatables, as they did not leave our side except to fetch another dish.

Amongst the delicacies which were served, small animals, which had been roasted with their skin, had great similarity with rats, which prevented us from tasting them. They called them "Atuh," and later we found that they were *Cavia leucopyga*, Brandt.

It was an interesting picture to see about 100 half-starved men in a number of groups squat round the dishes, which were emptied in a few moments, and to see how the craving of an Indian stomach was to be satisfied, an enjoyment which had been denied to them a long time.

To obtain here some important trigonometrical points for the map of British Guiana, it was necessary to stay for some time before ascending the Roraima mountains, which a few miles from us rose with all their imposing grandeur.

The inhabitants promised to supply us during our stay with provisions, therefore we at once set to work to build ourselves comfortable huts, assisted by the inhabitants.

Our Indians from Pirara followed our example, and in a few days rose a small settlement round our two huts, which we christened "Our Village."

PART III.—THE ASCENT OF THE RORAIMA MOUNTAINS.

We started from our camp on the morning of the 4th of November, accompanied by twenty Indians, to carry our baggage, full of expectation of what the next day would bring us—not anticipating that the first would be such a fatal one.

Our path led us through a wood which extends along the western bank of the River Kukenam, containing gigantic trees of the genera *Clusia*, *Styrax*, and *Laurus*. After an hour's walk we entered upon an open undulating savanna; on reaching the summit of a ridge we had a fine view of these remarkable mountains—the gigantic walls of the Roraima stood before us, shining in the bright morning sun in all their grandeur. Before we crossed the River Murre, which comes from a north-west direction, the Indians called our attention to a gigantic sandstone block, with some hieroglyphics on its surface; the same consisted of some curves, which were about an eighth of an inch deep, and looked exactly as if a person had drawn his hand in curves across it, leaving the impression on the stone. The Indians told us it was done by Makuneima (their great Spirit) when he was wandering over this place, and left this sign of his presence on earth for future generations. When I asked one of our Indians, who accompanied us from Pirara, a mission station, who Makuneima was, he answered without hesitation, "Jesus Christ."

After crossing the Murre our direction lay north-westerly, our path was crossed by a small rivulet, about ten feet wide; in the middle of this little stream lay a large sandstone block, which had already served the Indians in front of us as a bridge, who jumped on it from the bank—a manner which was imitated by all the followers. I was the sixteenth in the Indian file; immediately following was a young Indian woman, called Kate, who, on account of her cheerfulness, her affable and droll manner—a qualification very seldom met with amongst the fair sex in Guiana—had got permission to accompany her husband, who was one of our followers. She was the favorite of the whole expedition. When I arrived at the bank of the rivulet, some plants (*Schultesias*) attracted my attention, and to convince myself whether I had them already in my collec-

tion, I stood still for a moment before I made the jump. In the meantime Kate, challenging me impatiently, saying "I should not stand still for every flower, and, through it, keep the others from coming on," laughing I jumped on the stone; just at the moment as I intended to make the other jump, a terrific cry from Kate stopped me, and the next Indian following her cleared the rivulet in one bound, with the frightful cry, "Akuy, Akuy" (poisonous snake). This had happened whilst I was looking round towards Kate. She jumped on the block next to me, deadly pale, and pointing to the bank she had just left, with the cry, "Akuy." Terrified, I asked her whether she had been bitten. She began to weep most bitterly, and at the same moment I observed several drops of blood on her right leg, close to the knee. Only a poisonous snake could have inflicted such a wound, and only the most speedy help could save the life of our favorite. Misfortune would have it that the Doctor of the expedition, Mr. Fryer, with my brother, was the last; and the Indian who carried the medicine chest, which contained also the lancets, was one of the first of the long Indian file. In want of another bandage I took off my braces, scarified the wounds with my pocket knife, underbound them as firmly as possible, and got some of the Indians to suck the blood. I believe that in the first moment the poor woman did not know that she was bitten, although the snake had attacked and bitten her twice—once near the knee, and the other time in the calf. The excitement amongst the Indians nearest to the catastrophe had attracted the attention of her husband, who came running, deeply stricken with terror at the fate of his wife. He knelt down near her, and sucked the blood from the wound. Whilst this remedy was being applied Mr. Fryer, my brother, and the Indian with the medicine chest had arrived. Ammonia, externally and internally, was applied. We soon saw that the case was hopeless. After a lapse of six minutes the symptoms of the poisoning became apparent—vehement trembling shook her whole body, and the face became deadly pale. Soon a cold perspiration broke out, when the poor woman complained of acute pain of the whole side of the wounded leg, and more near the heart—feeling scarcely any pain where bitten. She was unable to move her foot. Spasmodic vomiting appeared very quickly, followed by vomiting of blood; the eyes became bloodshot, the nose commenced bleeding, and the pulsation was from 120°

to 130° in the minute. After twenty minutes we were unable to recognize our favorite, so changed were her features; the power of speech she had already lost when vomiting blood. During the time this happened the snake had been killed by the Indians. It was probable that when I jumped from the bank towards the stone I had touched the reptile, and it made the attack on poor Kate, who was close to me; unless Kate had disturbed it. The snake was lying close on the bank, coiled together, with erected head, making ready for a renewed attack—clearly showing the assertion that a snake, after the first attack will take to flight, is incorrect. The snake was one of the most poisonous vipers, *Trigonocephalus atrox*, and had just cast its skin, during which time snakes are considered to be most dangerous. The Indian called it Sororaima. Fourteen Indians and Mr. Goodall, the artist of the expedition, had passed the snake without observing or touching it, and poor Kate was the victim. Under Dr. Fryer's charge the poor woman was carried back in her hammock to our camp, which she left in the morning in joy and happiness. The look we gave her, who was now lying before us unconscious, we knew only too well was the last. In what state of mind we, and especially myself, who had so nearly escaped death, is easier to be felt than described. It was a long time before a word was uttered by any of the company, or the Indians. Thoughts were occupied with that which had just happened.

After half an hour's walk, we again stood on the bank of the River Kukenam, which we had to cross. The water reached to our chests, and we had to use all our strength to prevent being carried away by the rapid current. We followed now the easterly bank for some time. Pretty shrubs abounded, consisting of *Ternstrœmia*, *Tavomita*, *Gomphia*, with the beautiful *Dimorphandra*, the noble *Mauritia palm*, and a number of other plants new to me. We were now 3,600 feet above the level of the sea, yet this splendid palm showed the same vigor and luxuriant growth as on the savannas of the River Rupununi and Takutu. After an hour's travel (our course was towards north), we ascended a small table-land, and before us was spread the curving chain of mountains in its all-imposing majesty, without the bases as formerly, which, being hidden by hills, excluding the whole view from us. In smaller or wider stripes we could see the grassy spots extending from the foot nearly to where the gigantic, per-

pendicular stone wall, like a forum, rises, interchanging with wooded tracts, which had chosen the deep gullies and the banks of the creeks running from the top. The base of the perpendicular wall was surrounded by a forest. With amazement we looked at these imposing masses of rock, which, from the distance, would sooner be taken for basalt than for sandstone.

With the Roraima, the great watershed of the three great rivers of Guiana, the Amazon, Orinoco, and Essequibo, lay before us.

The Roraima, Kukenam, Ayang-Catisbang, and Marima form almost a square, of which the Roraima, the easterly side, is not only the highest but also the most interesting mountain of the group. The greatest extension in length is twenty-five geographical miles, and it rises 5,100 feet above the table-land, and 8,000 feet above the sea. The upper summit consists of a naked mass of sandstone almost perpendicular, rising, as already mentioned, 1,500 feet. In a north-westerly direction from the Roraima rises the Kukenam, with the same wall-like summit, as also the Ayang-Catisbang, and, in a northerly direction, the Marima. These four mountains have, from S.E. towards N.W., an area of ten geographical miles. Many waterfalls rush down from these rocks, and the most enthusiastic description would be thrown into the shade if compared with the truly-imposing, unspeakably-grand reality, with its thundering and foaming cataracts, and its wonderful, charming tropical vegetation. The River Cotinga rushes down from the easterly part of the Roraima, and carries its waters in connexion with the Takutu, Rio Branco, and Rio Negro into the largest river, the Amazon. The River Kukenam comes from the mountain Kukenam, and becomes, after joining the Yuruani and the Caroni, tributary to the Orinoco.

What immense volumes of water rush down from this precipitous elevation, with deafening thunder, may be judged of by the number of rivers which originate on the heights of the mountains; and not without cause is this group of mountains termed by the Indians, "The ever fruitful mother of streams." A similar interesting geognostic phenomenon will scarcely repeat itself anywhere else.

In silent admiration I gazed at the masses of mountains, with foaming strings of water, spreading before my eyes, until an envious veil of mist suddenly covered everything.

In consequence of the darkness which frequently prevails when thick clouds hover about the summit, it is likewise called "The night mountain," and the Indian songs in the neighborhood of the Roraima contain generally the following strophes—"Roraima, the red rock wrapped in clouds, the ever fertile source of streams;" or "Roraima, the red rock, I sing, where at daybreak night still prevails." The origin of this abundance of water can only be explained by the circumstance that the precipitation of atmospheric vapour is much promoted by those cold and high mural precipices, local peculiarity, and among these the thick forests, which towards the north extend from the foot of these mountains to the coast of the Atlantic, where large savannas spread to the south, may in many respects contribute to the increase of aqueous vapours. We proceeded with all possible haste across a "Bay of Biscay" ground, which was divided by a number of rivulets, tributaries of the Kukenam, which were bordered by a vegetation quite new to me, and which showed the luxuriancy and vigor of the tropical climate; but a hundred yards away from the banks the growth of shrubs was rather stunted. Our eyes were only attracted towards Roraima, and we took but little notice of anything else before or near us.

At last we arrived at the base of it, and began to ascend on a place where the rocks were fewer and vegetation less thick, between colossal, blackish, sandstone rocks, of fantastic shapes. The higher we ascended the more beautiful and surprising became the somewhat stunted vegetation—the soil and surrounding sandstone being black. On the latter, where the least soil had been collected in its crevices, *Clusias*, *Myricas*, *Gaultherias*, and *Thibaudias*; in the crevices the fine *Meisneria cordifolia*, Benth., was luxuriating. The rocks, bare of soil, were covered with *Açaves*, *Cacti*, *Gesnerias*, *Orchids*, *Algae*, and *Mosses*. We had reached half way to the base of the stone wall, when those masses of mist, which now appeared only on the summits, came lower and lower, and we were soon enveloped in it, and prevented from seeing more than six or eight paces before us. The mist changed into a burst of clouds, and in less than half an hour the descending rain reached several inches; we were thus rendered incapable of proceeding any further. Trembling with cold and exposed to the pouring rain, we tried to pitch our tents as quickly as possible, and to make a fire to warm ourselves;

the latter experiment was unsuccessful for some time, the rain having saturated all the wood we could find. At last, however, we succeeded, and in spite of the smoke which arose from the damp wood, we crowded round the miserable flame to warm our benumbed limbs. The rain and mist continued till night; the thermometer showed 58° Fahr. The poor naked Indians, who found no room in the tents, went to a thickly-timbered gully, where they looked out for a little shelter. Even we, who were a little protected, were disturbed from our sleep by the cold; a sensation which before had been unknown to us, being used to the 80° or 90° of the lowlands. The morning was anxiously looked for, and at last brought with it the warming sunrays, which soon made our teeth cease from chattering, and we continued our ascent, the magnificent shrubs glittering with dew and rain; the steep rock glowing in magic illuminations in the young morning. Though the ascent was a great deal more difficult in consequence of the rain which fell the day before, none of us observed the increased exertion, because with every step the vegetation became more interesting, and brought to view some unknown plant. Even in intervals of a hundred yards the zones of the plants changed—*Ladenbergia*, *Cesmibuena*, as shrubs only 4ft. to 5ft. high, and the most charming *Orchids*, were growing out of clefts and cracks of the mighty sandstone blocks of which I will only mention the Genera, *Cattleya*, *Oncidium*, *Odontoglossum*, *Maxillaria*. About one hundred feet higher the charming *Sobralia Elisabethae*, in all its varieties, with flower stalks from six to eight feet high, appeared in masses, through which we had to clear a way with our cutlasses. Every sandstone block was covered with the pretty moss *Octoplepharum albidum*, and *Algae*, viz., *Usnea australis*, *Cladonia rangiferina*, *cocomia*, and *carnea*. In eager expectation of what the next moment would bring us, we climbed over the pointed and sharp-edged rocks. Forward we went, until another exclamation of amazement at some new discovery, brought us to a standstill; and I must confess that during the first hour I moved in this botanical El Dorado, I became bewildered and saw nothing. Several times our road brought us along deeply ravined precipices, through which foaming rivulets rush towards the plains, amidst forests of ferns, which had supplanted all other vegetation. The trees did not show the luxuriant growth of their brethren on the plains, but the splendor of their flowers was unknown to the

others. Amongst the dazzling yellow of the *Gomphia*, *Vochysia*, the pure white of the *Qualea*, we could scarcely distinguish the simple whitish flowers of the *Ladenbergia*, of which the greatest part of the forest consisted. We passed a small forest, the border of which was one mass of flowering shrubs and trees, in all shades of colors—*Vochysia tetraphylla*, *Gomphia dura*, *Befaria*, *Gaultheria*, *Archytæa*, *Tibouchina*, *Hirtella*, and *Rhynchanthera*; isolated trees of the *Weinmannia ovalis*, Pav., so graceful in its growth, and covered with its white beautiful flowers. This constant change brought us to the forest surrounding the perpendicular wall, when spread before us lay a small marshy plain, on which Flora had assembled her most beautiful children—where the charm of flowers had culminated. The whole plain was covered with the dark blue *Utricularia*, *Humboldtii*, Schomb., the most beautiful species of this genus, with red-tinted flower stalks three to four feet high, from which three to four of the curious flowers were suspended. While the amazed eye was looking upon this charming carpet of flowers, it was especially attracted by the interesting *Heliamphora nutans*, with light green and red-ribbed leaves of a hollow urn-shaped petiole, open at the top, the lamina, forming a small concave lid, something like the *Nepenthes*, the tender flower stalk, bearing its white, and sometimes red-tinged flowers. High above these more tender plants, rose the flowers of the magnificent *Cypripedium Lindleyanum*, Schomb.; the charming *Kleistes*, the yellow flowers of *Rapateas*, of which I only mention the curious *Saxo-Fridericia Regalis*, Schomb., and the new genus *Stegilepis guianensis* Klotzsch. In the middle of this carpet of flowers, new to me, I thought to see a *Cycas*, and a few jumps over the marshy ground brought me to the imagined discovery, when I found it was a beautiful fern with large erect fronds similar to those of the *Cycas*. It was a new *Lomaria*, which the late Dr. Klotzsch described as *Lomaria Schomburgkii*. My eyes were dazzled by the splendor of the fresh green, and the brilliantly colored flowers of the herbaceous plants predominant on this plain, while the air was impregnated with delightful fragrance. I fancied myself in a magic garden; such a display of colors, such a variety on so small a space, having been up to that day unknown to me. The borders of the forest which enclosed this botanical El Dorado, consisted of the magnificent *Thibaudia nutans*, Klotzsch, a new charming

species. The young pink leaves which with their half red, half white, flowers, the yellow fragrant flowers of the root parasite *Loranthus Tagua*, Humb. Bonp., the most brilliant of the *Melastomas*, as also the elegant trees of the *Tabebuia triphylla*, Dec., covered with large flowers and tree-ferns in fantastic confusion, entwined by a number of creepers, formed a dense enclosure. Looking up to the gigantic sandstone wall of the height of 1,500 feet, and the waterfalls which rushed from its platform, I felt small and insignificant in comparison with these imposing masses; and I will not venture to describe, as my pen would not be equal to the task, the impression and the feeling invoked in me by such a sight. There were so many new objects presenting themselves to my eyes that at last I was unable to give my attention to one and the same plant for even a single minute. My feelings had, in fact, overcome me, but my heart was jubilant with rapture and delight. All the troubles we had gone through were forgotten; even the future, with its fears, yielded to the overhappy present. Without gathering a single flower I hurried to my companions, who were busy pitching the tents near this little El Dorado, between large rocks, covered with mosses and ferns. We were going to stay until the trigonometrical measurement had been executed—a period of three or four days.

Our camp was 6,000 feet above the level of the sea, in $5^{\circ} 9'$ northern latitude, and $60^{\circ} 57'$ western longitude; the height to the summit of the Roraima from our camp was, according to our trigonometrical measurement, 2,000 feet. The meteorological instruments, for the observations to be taken, had been fixed, and except the rather disagreeable cold, we felt neither any pressure on the chest nor any difficulty in breathing. The horribly troublesome mosquitoes and sandflies of the plains had disappeared here.

A view of the plains was denied us as yet; a thick mist covering it from our sight when we reached our camping place.

After having pitched our tents and arranged other matters, the poor Indians, without any covering, built small huts from the fronds of the fern trees, between the rocks, and immediately lighting large fires, they were seen cowering round or sitting in their hammocks, which were slung, their feet as nearly as possible towards the fire.

About 7 o'clock p.m. the mist changed to rain, which came

down in torrents, accompanied by a heavy thunder storm; it was a terrible revolution, which forced the rain through our tents, having only canvas roofs, and in a short time we and our packages were perfectly saturated, the sides of our tents being open, and ourselves sitting down with chattering teeth, as the fire would not burn. The thermometer showed 57° ; this uproar lasted about an hour, when the storm calmed down, the heavy clouds parted, and the firmament was again clear and bright. The moon and stars shone upon a scene of undescribable grandeur; by the silver light the swollen masses of water were seen rushing down from 1,500 feet high gigantic walls, with a bewildering noise, as if of hundreds of steam-engines at work. From the Kukenam it thundered as if the sea had broken its shores, and was rolling on to bury everything beneath it; but our amazement was yet to be increased, when suddenly a most beautiful lunar rainbow appeared—a phenomenon I never before had witnessed.

Trembling with cold, we awoke in the morning between the hours of 4 and 5; the thermometer showed 52° . Sleep under such a temperature was an impossibility, and we were thankful when the much coveted daylight appeared, enabling us to warm our benumbed limbs by a brisk walk, as the wet wood would not burn. The noise of the torrents, which had excited us so much the previous night, had ceased, the water had diminished, and the falls had regained their former size; all that had happened—all we had experienced, seemed a dream.

According to the traditions of the Indians, the summits of the flat-topped gigantic sandstone walls, which never can be reached by human beings, contain large lakes, full of remarkable fish-like dolphins, and continually encircled by gigantic white eagles—their eternal warders. The young day unfolded new charms; the Roraima and Kukenam, as also the other higher points, were perfectly bright and cloudless; but deep below the country was overcast by white mist, like a great carpet of snow, or a northern snow landscape illuminated by the rising sun, with the most extraordinary changes of light and refraction. The contrast between the luxuriant vegetation round and above us—the gigantic colossus, with its shining waterfalls, its dark red walls, was most surprising, and recalled to our minds the tales of the “One Thousand and

One Nights." Alexander von Humboldt said that it is in vain to search in the Alps for a perpendicular rock of 1,600 feet high; before us on the southern side, the Kamaiba rushed down 1,500 feet; the celebrated Staubbach, in Switzerland, rushes down a precipice of 900 feet; and the more celebrated Cascade de Gavarnie, the highest waterfall yet known, has a height of 1,266 feet. On the steep rocks we observed a shrub like vegetation, which, from where we stood, appeared a dazzling green mass, contrasted with the uncovered rocks. The platform of the Roaima seems to have in its centre an elevation, because we observed some vegetation there. After the terrible leap of the Kamaiba, down the precipice of 1,500 feet, it disappeared at the base among the green vegetation, suddenly appearing again about 100 feet from the rocks at a spot destitute of all vegetable life, and then again rushed down a precipice of 120 feet, to disappear entirely in the green vegetation. This charming scenery we were not to enjoy very long, as the mist began to rise from the depth like a thick cloud, which was dispersed by the wind, and again we and the rocks were wrapped in that envious, damp, and cold veil, impenetrable to the eyes. After eating our breakfast, consisting of a yam sup, I was roving over the slope of the mountain, detecting, I may say, at every step new botanical treasures, which were hailed by me with exclamations of joy. The most splendid and peculiar flora I found amongst and on the sandstone rocks, which covered the deep descent in wild confusion—a chaos of *Chusias*, *Thibaudias*, *Mimosae*, *Myrcias*, *Ternstroemias*, *Bonetrias*, *Befarias*, *Vacciniums*, *Gaultherias*, *Gomphias*, and *Stegilepis guianensis*; while on the edge of the gigantic rocks, which consisted of a gravelly red sandstone, were contained *Algæ*, of the genera *Cladonia*, *Evernia*, and *Usnea*; and mosses, viz., *Sphagnum*, *Octoblepharum*, *Calymperes*, and *Hypnum*; amongst these grow luxuriantly the pretty *Gnaphalium americanum*.

Wherever I cast my eyes they fell on the most charming Orchids, viz., *Stelis ophioglossoides*, Sw.; *Diothonea imbricata*, Lindl.; *Zygopetalum Mackai*, Hook.; *Masdevallia guianensis*, Lindl.; *Cleistes rosea*, Lindl.; *Oncidium pulchellum*, *Cattleya pumila*, Hook.; and *Mossiae*, Hook.; *Odontoglossums*, *Maxillarias*, and a number of *Expidendrons*; but the most lovely ornament were the *Sobralias*, which at this altitude vegetated in a

luxuriance unknown in Europe. Wherever in the crevices and recesses of the stone blocks the smallest portion of humus had collected, they reached the height of six and eight feet, with flowers of the size of our lillies, forming obstructions through which we could only make a road with our cutlasses. The reason why *Sobralias* so very seldom flower in the orchid-houses at home is, that we give them too warm a temperature; 69° Fahr. was at this altitude, where I found them so luxuriant, the highest, and 52° the lowest point of the thermometer. The meteorological tables kept during our stay at Roraima, show in what temperature not only the above-named orchids, but in general also the peculiar species of plants named, vegetate most luxuriantly.

The vegetation on the banks of the rivulets and brooks, which hurried towards the plains, consisted almost exclusively of those species of plants already mentioned, to which may be added *Rhynchartera*, *Microlicia*, and a new and magnificent species of *Melastomacea*. This beautiful tree, often twenty and thirty feet high, of an elegant *habitus*, frequently found in groups on the edge of a low forest, formed undoubtedly the most lovely ornament of the magic garden; the large white flowers, two inches in diameter, have the peculiarity that their blossoms when unfolding are tinged with the most delicate pink color, as the day advances, getting paler and paler, until at evening they have changed to the purest white—a peculiarity which the *Victoria Regia* also possesses, only with the difference that it changes from white to pink.

The splendid terrestrial orchids *Cleistes rosea*, Lindl., with its fine red flowers, between *Utricularia*, *Heliampora*, *Cypripedium*, *Stegilepis*, and the beautiful fern *Lomaria Schomburgkii*. But where shall I find words to describe the impression made by the innumerable flowering plants which followed one on the other to the base of the rock in unbroken abundance. Amongst the number of these pretty and manifold plants, which cover the slopes of the Roraima, is the genus *Befaria*, which was notable by the color and magnificence of its flowers. I collected three species, viz., *Befaria grandiflora*, *guianensis*, and a new species, *B. Schomburgkii*. These specimens, without any doubt, are the most beautiful representatives of these sandstone regions; they only appear at the altitude of 3,000, reaching to 6,000, where the beautiful shrubs are found in perfection. I am glad to see that this wonderful genus has been introduced by Professor Karsten,

from Columbia, and will no doubt form one of the brightest ornaments in our glass-houses.*

I intended to enter the lower forest, but was prevented doing so, as no human being would have been able to penetrate this chaos of *Ferns*, *Scitamineen*, entwined in the trees, whose branches in this altitude branched off close from the ground, and standing quite close together.

As poor as the valley was also the higher region, as far as the *Fauna* was considered. Only a few small birds of the genera *Fringilla* and *Trochilus* (*Trochilus anais*, Less.), and a species of the genus *Diglossa* *D. major*, Cab.; and *Arremon personatus*, Cab.; which were swiftly slipping through the lower shrubs, and eagerly searching for the few insects which live here, were the sole representatives of the *Fauna* I met with. Everything was still; there was no sign of animal life. Except the dull thunder of the waterfalls nothing broke the deep repose.

* I mention only a few representatives of the Roraima flora:—*Rondeletia capitata*, Benth.; *Chiococca nitida*, Benth.; *Perama humilis*, Benth.; *Echites angustifolia*, Benth.; *subcarnosa*, Benth.; *Waltheria viscosissima*, St. Hil.; *Vernonia dichocarpa*, Less.; *ehretifolia*, Benth.; *tricholepis*, Dec.; *Eupatorium scabrum*, Lin., fl.; *Lipochaeta scaberrima*, Benth.; *Spilanthes Poeppigii*, Dec.; *Calea divaricata*, Benth.; *Achyrocline flaccida*, Benth.; *Gnaphalium americanum*, Mill.; *Leria nutans*, Dec.; *Hyptis membranacea*, Benth.; *simplex*, St. Hil.; *Marsypianthes hypitoides*, Mart.; *Ormosia coccinea*, Jaek.; *Dimorphandra macrostachya*, Benth.; *Hirtella scabra*, Benth.; *Chaetogastra gracilis*, Dec.; *hypericoides*, Dec.; *divaricata*, Dec.; *glomerata*, Mart.; *Macairea rigida*, Benth.; *parvifolia*, Benth.; *Microlicia myrtridea*, Chamss.; *taxifolia*, Benth.; *Rhynchanthera monodynamia*, Dec.; *Diplochita Fothergilla*, Dec.; *parviflora*, Benth.; *Tococa cristata*, Benth.; *Roraimae*, Benth.; *Henriettea succosa*, Dec.; *Cnidemia capitata*, Benth.; *spicata*, Dec.; *pustulata*, Dec.; *rariflora*, Benth.; *radulaefolia*, Benth.; *desmantha*, Benth.; *Miconia alata*, Dec.; *nitens*, Benth.; *revoluta*, Benth.; *Myrcia subcordata*, Dec.; *ferruginea*, Dec.; *Utricularia Humboldtii*, Schomb.; *Helliamphora nutans*, Benth.; *Cypripedium Lindleyanum*, Schomb.; *Leiothamnus Elisabethae*, Schomb., sp. nov.; *Encholirium Augustae*, Schomb., sp. nov.; *Gomphia dura*, Klotzsch, sp. nov.; *Ternstroemia rubicunda*, Klotzsch, sp. nov.; *punctata*, Sw.; *Gaultheria cordifolia*, Humb. Bonp.; *Weinmannia ovalis*, Pav.; *guianensis*, Klotzsch, sp. nov.; *Vaccinium puberulum*, Klotzsch, sp. nov.; *Thibaudia nutans*, Klotzsch, sp. nov.; *Isertia hypoleuca*, Benth.; *Clusia cucullata*, Klotzsch, sp. nov.; *alba*, Lin.; *macropoda*, Klotzsch, sp. nov.; *Rhopala Schomburgkii*, Klotzsch, sp. nov.; *Befaria Schomburgkiana*, Klotzsch, sp. nov.; *grandiflora*, Humb. Bonp.; *guianensis*, Klotzsch, sp. nov.; *Bonnetia sessilis*, Benth.; *Archytea multiflora*, Benth.; *Stegilepis guianensis*, Klotzsch, sp. nov.; and *Saxo Fridericia Regalis*, Schomb., gen. nov.

The number of plants which I had collected made it necessary for me to return to the camp to press them, a feat which was easier determined than executed. The paper, when taken away from the fire, was so quickly saturated by the damp atmosphere that it was impossible to think of drying the plants, even if it was changed several times during the day. The humidity at this elevation was so great that Mr. Goodall, the artist, vainly tried to make a sketch of the Roraima on the wet paper. In spite of the most careful preservation of the astronomical instruments they became covered with rust. A loaded gun which had been standing a few hours would not discharge, the powder having changed into a greasy mass; and this humid atmosphere drove us to desperation.

Shortly after my return from this excursion Mr. Fryer arrived, with the news that poor Kate had died in the morning, at four o'clock, which was sixty-three hours after the accident had happened. The vomiting of blood had increased, and did not cease until she died. The bitten leg had swollen to an immense size, and mortification put an end to all her sufferings. Under the most violent convulsions she must have suffered fearfully, yet not a sigh, not a sound, was uttered by her. Immediately after her death the women in the camp assembled, and uttered words in the ears of the corpse. Mr. Fryer, during the preparations for Kate's interment, started for the Roraima to meet us. The news of the death of our favorite, though not altogether unexpected, cast a gloom over our small circle.

Whilst Mr. Fryer was relating the circumstances of the death of Kate, my eyes fell on a dead rattlesnake, which was lying in front of the tent. My brother with the Indians, being occupied with some trigonometrical measurement, were very nearly the victims of the snake. He only escaped his fate through a bold jump, when it was killed by the Indians. The more secure we had felt from snakes in this rough and humid locality, the more disagreeable was the certainty that they were to be met with even here. I always had a kind of satisfaction when I killed one of these dangerous reptiles, thinking that its death had saved, perhaps, the life of a fellow creature.

Eagerly we expected the return of our hunters, who, with their dogs, had followed to the plains the fresh tracks of a tapir; late in the evening they returned, but alas, as empty

handed as they had left. They told us that two of the hunters had only by a bold jump saved their lives from an attack of a rattlesnake, of which they observed several during the day; we therefore became more careful during our rambles.

Already the day before we had dispatched our Indians to make a passable track through the forest, up to the base of the gigantic stone wall; this had been executed, and on the following morning, in company with a few Indians, I began the difficult ascent almost in darkness. The surprising strength of vegetation, and the entanglement of trees and creepers, allowed us to advance but slowly; I never saw such a chaos of shrubs, trees, ferns, and creepers, standing close together, and their branches entwined. A humid vapor appeared here constantly held in suspension, and the rays of the sun are scarcely admitted through the thick canopy of foliage. *Arums*, *Mosses*, *Lichens*, *Orchids*, *Jungermannias* covered the trunks of the trees. The wearisome road led us over the graves of innumerable plants; humidity had changed everything into a mould, in which we often sank up to our knees. For a distance we had to walk over trees torn down by the storm, their trunks and big branches covered with lichens and mosses, so slippery as to cause us to slide almost at every step; then, again, I should fall up to my armpits between a lot of branches and trunks, only to be extricated by the help of my companions. Again, over pointed rocks and craggy precipices, which we were forced to descend by means of lianas and ladders of roots, which presented great danger. Where, in consequence of a break in the forest, the sun was able to shine and to warm the immense black, dark green, slippery rocks, and where the smallest particle of humus had collected, you would see that *Arums*, *Anthuriums*, *Gesnerias*, *Bromelias*, *Heliconias*, *Peperomia*, *Orchids*, contested the place.

Already for an hour we had pursued this dangerous and very fatiguing road, when, suddenly, in the middle of this labyrinth, I saw a large crimson-colored flower in the distance; agreeably surprised, I cleared the way to it to admire the new discovery; it was a suffruticose shrub, with pale green branches, and opposite long petioles, pale green acuminate leaves, which bore this magnificent flower. Its want of scent was repaid by its beauty, and it proved to be a new *Gentianeæ*; indeed, a new species of the very rare genus *Leiothamnus*. Her Majesty the late Queen Elizabeth gave

me her gracious permission to call this charming species *Leiothamnus Elisabethæ*.*

After making this discovery, I had ascended about 200 feet more, when the dark forest-like labyrinth became more clear; the trees, mostly *Cinchonæ* and *Melastomeæ*, intermingled with arborescent ferns, in appearance more resembling the stately palm than the fern. Amongst the herbaceous plants covering the ground, my eyes fell again on a beautiful new flower, it was a *Bromeliaceous* plant, and also a new species of the genus *Encholirium*, no doubt the most beautiful of the genus. The Princess of Prussia (now Her Majesty the Empress of Germany) graciously permitted me to call this charming *Encholirium*, *Encholirium Augustæ*.†

The surrounding vegetation assumed a charming character, which was especially due to the fern trees standing not so crowded, but that every single plant could display each large but delicate frond, without impediment from its neighbor. Ferns, nothing but ferns, formed the underwood, and comprising so many wonderful forms in such a small compass as I had never before met with; I will only name a few species of which I collected at the Roraima.‡ Amongst these

* *Leiothamnus Elisabethæ*, Rich. Schomb.; *Suffruticosa, Foliis oblongis, acuminatis basi attenuatis, opacis, subtus, glaucescenti-viridibus, floribus pedicellatis, terminalibus, solitariis, magnis, calycibus quinquepartitis, laciniis lanceolatis, acuminatis, margine membranaceis integerrimis, corollis hypocraterimorphis amoeneo-coccinis, fauce lacteo, limbo plano, dilatato, albido-striato.*

† *Encholirium Augustæ*, Rich. Schomb.; *Foliis sessilibus, semiamplexicaulibus, elongato-lanceolatis, attenuatis, involutis, laete-viridibus, apice cucullato-contractis, inferne spinoso-dentatis, bracteis foliis conformibus minoribusque subdistantibus, apice confertis, strobiliformibus; floribus in superiorum bractearum axillis, geminis aut ternis, brevi pedicellatis; Perigonii laciniis exterioribus sparsim hirsutis, laete fuscis, interioribus membranaceis, fusco-violaceis, obovatis, duplo brevioribus; Staminiibus-inclusis, tribus exterioribus epipetalis, stigmatibus styloque inclusis, rufescentibus; germine pyramidalo, subsemiinfero; columna centrali basi apiceque sterili.*

‡ *Aneimia humilis*, Sw.; *Schizaea dichotoma*, Sw.; *Hymenostachis elegans*, Presl.; *Trichomanes brachypus*, Kze.; *Ankersii*, Hook.; *cellulscum*, Klotzsch, sp. nov.; *rigidum*, Sw.; *Prieurii*, Kze.; *Hymenophyllum clavatum*, Sw.; *Mertensia longipinnata*, Hook.; *pubescens*, Willd.; *Cyathea hirtula*, Mart.; *pungens*, Kaulf.; *marginalis*, Klotzsch, sp. nov.; *Lindsaya pumila*, Klotzsch, sp. nov.; *dubia*, Spreng.; *rigescens*, Willd.; *tenuis*, Klotzsch, sp. nov.; *filiiformis*, Hook.; *Adiantum triangulatum*, Kaulf.; *glaucescens*, Klotzsch, sp. nov.; *tomentosum*, Klotzsch, sp. nov.; *hirtum*, Klotzsch, sp. nov.; *Lomaria Schomburgkii*,

I discovered also a very fine *Utricularia*, which luxuriated on the stems of the trees; the little plant was only one and a half inch in height, the leaves of a light green color, but the yellow flowers very large in comparison to the plant. I am sorry that I was not able to describe this pretty species more minutely, as I was attacked at my return to the camp by fever, which had also taken hold of the greatest part of the company; and the Indian boy, who was employed changing the paper of the plants, had lost this interesting species, which I only missed when it was too late to replace it. I only observed the plant in this particular spot.

The increasing number of rocks between which our way lay, made me believe that we were approaching the gigantic rock. The fine ferns disappeared, and we were again surrounded by a thick vegetation; large trees rooted in the clefts and overhanging the glens, added to the sombre character of the scene. We had again to climb up rocks and descend into abysses, and every time I looked back it seemed a miracle that we had succeeded in reaching such a height. We had just attained the top of one of these wild masses of rock, when before us rose the sandstone colossus of 1,500 feet, perpendicular as a wall; the highest summit rises by trigonometrical measurement to 5,000 feet above the level of the table-land.

I was lost in admiration looking up to the gigantic wall, the summit of which projected a little; my heart began to beat as if I apprehended danger, and a wish to escape from it. An oppressive solitude prevailed; there was not a sign of life, only the noise of the falling water was heard. Looking up to the giddy height, the mass of rock before me appeared wild and dreadful; round about large blocks of rock were scattered in demon-like confusion, which had been precipitated from the summit and steep declivity, the surrounding

Klotzsch, sp. nov.; *Plumieri*, Desv.; *Xiphopteris serrulata*, Kaulf.; *Aspidium cicutarium*, Sw.; *coriaceum*, Kze.; *Polyp. nervosum*, Klotzsch, sp. nov.; *brevipes* Kze.; *Richardii*, Klotzsch, sp. nov.; *lepidopteris*, Kze.; *pavonianum*, Klotzsch, sp. nov.; *areolatum*, Humb. Bonp.; *Pteris litobrochioides*, Klotzsch, sp. nov.; *deflexa*, Link.; *biformis*, Splitg.; *Salpiglaena volubilis*, Sm.; *Asplenium Serra*, Langd.; *integerrimum*, Spreng.; *auritum*, Sw.; *alleopteron*, Kze., sp. nov.; *Schomburgkianum*, Klotzsch, sp. nov.; *cuneatum*, Lam. From the *Lycopodiums* I gathered:—*Lycopodium robustum*, Klotzsch; *carolinianum*, Lin.; *Jussieui*, Desv.; *linifolium*, Lin.; *Selaginella Breynii*, Spr.; and *puberula*, Klotzsch.

trees among which they fell being shattered into fragments. The grandeur and the sublimity of the gigantic mass of this marvel of nature, created the continued sensation that the projecting summit would fall suddenly and bury me under its ruins, and called forth a feeling quite heavy and strange to me. A great number of *Orchids*, *Bromeliaceae*, with large scarlet flowers; ferns, whose delicate fronds were gracefully moved by the wind, small shrubs with yellow or white flowers, creepers covered with flowers, grew luxuriantly in the chinks of the humid rock, and laughingly and provokingly nodded from the high stone wall towards me, as if to say, "You won't dare to disturb us here, and we are safe from your aggression." The hope that the motion caused by the wind would break some of them off was never realized. What botanical treasures are contained on this stone wall, and how many are secreted on the top of it; but they are secured too well from any aggressor, as the ascent is an impossibility. The rock consists of a fine-grained red sandstone, on its base luxuriantly grew a species of *Rubus*, whose sweet berries were eagerly eaten by us; it was a new species, which the late Dr. Klotzsch has described as *Rubus Schomburgkii*, and is probably the only species found in the tropics; also a small *Melastomaceae*, with sulphur yellow flowers, which, at a closer examination, proved to be a species *Cambessedesia*, to which I could not give, I believe, a more characteristic specific name than that of *Roraimae*, as this peculiar plant was only found by me on the rock of the Roraima.

The forest, which reached to the base, and the wild mass of ferns, prevented a view of the landscape before us. My oppression only ceased when we began to descend, and I began to breath more freely, when I was out of the reach of the stone wall.

The descent was far more difficult than the ascent. Had I taken a mud bath, I could not have arrived in a more dirty state to the camp. I had just finished laying my gathered treasures between the damp paper, when I had to take to my hammock, being attacked by one of the most acute cases of intermittent fever, from which I suffered so much during my travels in Guiana.

Our hunters had not given up the hopes of tracing the tapir, and therefore had left the camp at daybreak; this time they had been successful, they arrived with part of the vension at the camp. For ten days we had no meat, and it was not

long before everyone but myself was busy in enjoying the savory meal; the vicious fever deprived me of any appetite to take a part at the banquet.

The following morning, the 22nd November, we left this, in a geological, but especially in a botanical respect, most interesting place. During this short stay I had collected more than 100 species of phanerogamen, and eighty-three species of ferns, of which the greater number were new, and yet we had arrived in the same month in this inexhaustible botanical El Dorado, in which my late brother had arrived in the year 1838, when he collected a great number of new plants; besides which how many were already out of flower, how many just on the point of flowering, I never have seen even an approach to such abundance of charming plants as appeared here, where one is really at a loss whether most to admire the endless variety or the beauty of their flowers. The most trifling change in the soil, the altitude, or the strata, the different degree of humidity of any one, or all of these circumstances, causes a corresponding change in the vegetation, which in so small a compass may be looked for in vain on the almost horizontal territories of the Essiquebo, Orinoco, and Amazon. I had only one desire, to be able to remain here for a whole year, as I am convinced every week, every month, would have opened a large inexhaustible rich field for my botanical knowledge. But the expedition started, and I was obliged to follow, and had to bid farewell to this botanical El Dorado.

The poor naked Indians, who had suffered very much from the cold atmosphere, were delighted as the command for the descent was given, shouldering their packages, and, under shouting and singing to their hearts content, our long Indian file moved downwards.

PART IV.—THE FLORA OF BRITISH GUIANA.

Although British Guiana does not offer such changes and contrasts in the formation of its surface as Brazil and Peru do, and at the same time there is a greater equality in its climate, yet, as far as the abundance and variety of its flora is concerned, it can compare with the richest tracts of South America in relation to both of these—it can almost be said exceeds it.

What my late brother, assisted by the previous labors of Aublet, G. F. W. Meyer, and Rudge, has done for the knowledge of the flora of British Guiana, and what I endeavored to do, during my sojourn there, may be considered as only a small step towards such a thorough acquaintance with the inexhaustible treasures of the flora of South America as may be made available for the arrangement of a complete and comprehensive work.

To contribute to this end as much as possible with the already existing materials, and the results gathered during the course of our travels, I attempted to form at least a synopsis of the flora of British Guiana, in which work I was assisted by Dr. Klotzsch, Nees von Esebeck Bartling, Griesebach, and C. H. Schultz Bip. This synopsis was published in my "Travels in British Guiana," but could not be reprinted in the "Botanical Reminiscences," therefore I will give only an aspect of the flora of British Guiana.

Before proceeding to describe the most noteworthy characteristic of the several districts or regions of vegetation, it may not be uninteresting to the botanist if I endeavor to give a picture in outline of the general flora of British Guiana with its most prominent variations, for such a description will render the special changes and differences depending upon local circumstances more characteristic and intelligible.

I am not aware that since our sojourn in Guiana other travellers have published their investigations regarding its botany.

The whole vegetation of British Guiana shows, with reference to its habitus, at least on the greater part of its area, that a large number of families and species are more closely related than at the first glance they appeared to be.

Luxuriant growth and a profusion of branches are common,

not alone to trees but also to shrubs; in both, complete development of the single parts and the several organs take place; the plant arrives at perfection without being interrupted in development by adverse influences, and this is plainly shown by the leaves, which are full of sap, as well as by the superabundance of the bright-colored flowers, which for the most part are red, yellow, or violet. As on the southern part of the South American continent, where the *Cryptogamic* plants and grasses are found in the form of trees, the European botanist is made aware in a most convincing manner that he has entered another zone. The bark on most of the trees is generally smooth, seldom rough or lacerated, which no doubt is to be accounted for by the atmospherical changes being less sudden and influential than in the north. The same is also observed in regard to the surface of the leaves, for example, the hairy-like appearance, which is only of limited extent in certain species, viz., the *Melastomaceae*, and others, and also only in certain localities, especially the savannas, in which it is considered characteristic. The circumference and shape of the leaves, their basis, their texture, are variously affected by locality; also the greater or less firmness of texture of the timber and alburnum, the proportion of resin escaping from the trees containing it, viz., *Amyrideae*, *Humiriaceae*, *Caesalpineae*, which is greater on hilly or stony places than it is on the level near the coast.

If we now review the several families, we find then that the flora of British Guiana is characterized by the remarkable scarcity of *Umbelliferae*, and by the almost entire exclusion of *Cruciferae*. Predominant are the *Leguminosae*, *Rubiaceae*, *Myrtaceae*, *Melastomaceae*, *Euphorbiaceae*, *Laurineae*, *Malpighiaceae*, *Orchideae*, and *Filices*. The flowers are also developed at different periods in the several localities, according to the latitude. Trees, shrubs, and herbs, which bloom as early as April in the 1st and 2nd degree of north latitude, are only seen in perfect blossom in November and December, in the 5th or 6th degree. The same influence is exercised also by locality on the development of the flowers as to size, which in the flora of British Guiana (if we except some *Bombaceae*, as *Carolinaea*, *Bombax*, *Clusiaceae*, as *Clusia*, *Nymphaeaceae*, as *Victoria*, and several *Orchids*), by no means equals that of plants of other tropical zones, while they are also excelled in the extraordinary enamel of their colors, though hardly equalled

in regard to the surprisingly fantastic form of the flowers, especially of the *Orchideae*, *Marcgraviaceae*; and *Bromeliaceae* the splendor of color in the inflorescence, their degree of luxuriance (that is their comparative fulness and size in relation to each other), and the leaves, essentially depend upon the place where they grow, as to latitude, elevation, and soil, and also the age of the plant. In reference to age, it is also very remarkable that the common habit of the plant is often entirely changed by it—a fact which may be also proved by the special state of the period of its development, and of its life; the individual parts of those which are not flowering and fruit-bearing being different. This anomaly caused by age and period does not only refer to the dimensions of leaves and flowers, but also to texture.

Having given a general description of the flora of British Guiana, I proceed now to the special peculiarities of the same as existing in the several districts or regions, which by their peculiar vegetable life—by the predominance of one or more families, are distinguished; although the boundary is in no way so sudden or restricted as to prevent certain plants from spreading over many regions, especially trees, which at the same time are equally found in the forests along the coast or the oases in the savanna. Among the perennial plants there are also a great number which are indigenous to the savanna as well as to the region of the sandstone and to the coast. The essential deviation, however, retains even in this case a marked character. Notwithstanding the less strictly apparent difference in the formation of its surface and its climate, the flora of British Guiana introduces itself to the botanist, in its geographical extension, according to the localities, in such different characters that it may be classified according to its precise peculiar forms of plants in four regions. These are—1. Region of the Coast; 2. Region of the Primitive Forest; 3. Region of the Sandstone Formation; and 4. Region of the Savanna.

Region of the Coast.

This territory includes the part near the Atlantic Ocean, from the entrance of the River Barima into the Orinoko, as far as the entrance of the River Corentyn into the Atlantic Ocean; that is, from 57° to 60° longitude west of Greenwich.

This territory includes, at the same time, the entrance of the whole of the large rivers of British Guiana, viz.:—The

Waini, Pomeroon, Essequibo, Demerara, Berbice, and Corentyn. The whole tract consist of low alluvial land, which extends in some parts ten or twelve miles; of other parts even further inland. The formation is a bluish, stiff, rich, clayey marsh land, which is frequently mixed with saline and vegetable substances.

The proper vegetation near the coast stretches only so far inland as the salt water is driven upwards by the flood, which in some rivers extends to the distance of ten or twelve miles. The greatest part of this region is in a state of culture—sugar, coffee, cotton, &c., fruit trees, ornamental shrubs, perennials and annuals have been introduced from other parts of the world, as Asia, Africa, Europe, and a great many of them have increased in their new home, and become almost indigenous. But the tracts not cultivated retain their original vegetation of the coast, viz.:—*Avicennia*, *Rhizophora*, *Conocarpus*, *Laguncularia*, and *Ficus*, which in such places form dense forests. About two to three miles from the coast, and such parts of it as are not intercepted by the mouths of rivers, the vegetation assumes a different character. *Leguminosæ*, *Laurinææ*, *Melastomaceæ*, and *Palms* appear in the place of the plants just mentioned. The medium temperature is 81° Fahr. This region is specially characterized by having two rainy seasons in the year, the rainfall being 80·90 inches.

The Primitive Forest Region.

Immediately joining the region of the coast extends that of the Primitive Forest, and includes the before-mentioned large rivers of the Coast Region, except that between the Corentyn and Demerara it is interrupted by a tract of savanna.

The forest extends along the course of the Essequibo, Demerara, Berbice, and Corentyn, as far as their sources. The elevations of this extensive region, which stretches between the 57° and 59° W. longitude, and from the equator to the 7° N. latitude, does not rise in any way abruptly from the coast to the mountains, but gradually by ranges of hills, reaching at last in the Canuku, Carawaimi and Acarai Mountains to an absolute height of 4,000 feet. Up to this elevation the mountains are luxuriantly wooded, the same as the low land near the coast. In its geological character the area of the forest belongs almost entirely, in its different modifications, to the primary formation—granite predominating.

Between the 4th and 5th degrees of latitude the flora

changes its character. A great many species common to the lower parts of the coast disappear almost entirely, and others related to them take their places. This remarkable change, limited to the indicated locality, is caused by a chain of mountains dividing British Guiana in a south-easterly direction, and which also belongs to the primary formation, which appears in large masses of projecting granite, gneiss, and basalt. Whenever this chain of mountains crosses one of the above-mentioned rivers it originates imposing cataracts and rapids. The forests consist of a remarkably luxuriant, I might say an inexhaustible, flora. There exists no underwood, except only in places where the forest is thin. It is in many places replaced by *Scitamineæ* *Aroideæ* and ferns. The vegetation close to the river banks is an exception—the same does not only consist in underwood, but also of herbaceous plants, which very seldom appear in the forest itself. Very few kinds of trees lose their leaves during the dry season; these belong mostly to the order of *Bignoniaceæ* and *Erythroxyloæ*. The surface of the forest consists of deep mould—strong clay mixed with sand of a reddish color, from being mixed with oxide of iron. The mean temperature of this region is about 78° Fahrenheit.

The two rainy seasons, termed the large and small, on the coast, only reach as far as the lower part of the forest. From the 4th degree of latitude to the equator only one rainy season prevails. The vigorous growth of vegetation is almost incredible, appearing with commencement of the rain. The gigantic trees begin to thrive, and the young green, by its mixture with the old foliage, produces a variety of tints in the leaves of the giants of the forest such as only exists in a tropical country.

In our zones we only know the tender, virgin-like green of the Spring, when the entire vegetation awakes to new life. Different is it in a tropical country—every single tree possessing variation in the coloring of its foliage, as is especially shown by the *Laurineæ*, *Leguminosæ*, *Rubiaceæ*, and *Euphorbiaceæ*, gives the landscape a truly fairy-like charm which could not be imitated by the painter, and for which the poet could not find words. In addition to this infinite variety of coloring in the foliage, we admire the yet richer diversity of forms in the flowers. How charming when this green sea is interrupted by tracts of *Tecomas*, *Cassias*; gigantic lianes, as *Bauhinias*, *Bignonias*—the latter

covering the tops of the trees, and forming, in their abundance, islands of yellow flowers in the changing sea of vegetation.

The luxuriant and rapid development of the vegetation of the trees and shrubs is assisted by the moist atmosphere of the forest in the growth of the wonderful *Orchids*, the *Aroids*, *Piperaceae*, and *Bromeliaceae*, which cover the branches and trunks of the trees, and display in manifold gradation their peculiar formation of flowers.

The Sandstone Region.

The first elevations of the sandstone formation from the coast we find on the banks of the rivers Mazaruni and Cuyuni, both tributaries of the Essequibo. At the Cuyuni the sandstone appears under $6^{\circ} 2'$ north latitude. The ground suddenly rises several thousand feet in wall-like cliffs, and forms for the next hundred miles a table-land. In this remarkable group of mountains we find the Roraima, at its easterly point of culmination, up to an absolute height of 8,000 feet above the level of the sea. As suddenly as the sandstone region begins it again ceases under the $4^{\circ} 30'$ north latitude, in the Humirida Mountains, where quartz and granite appear.

The valleys of the large plateau, generally of a height of 3,000 feet above the sea, are savannas—they interchange with steep mountainous cliffs, small cavities, large high tablelands, and hills of 4,000 to 8,000 feet.

The region of the sandstone possesses an extraordinary abundance of springs, and it is intersected by numerous rivers and rivulets, which, almost without exception, have their origin in the summits of the mountains.

The quantity of rain which falls in this region, during the whole year, even exceeds the quantity which falls along the coast, as it may be always fixed at 100 inches, while the medium temperature does not exceed 73° Fahr.

The sandstone appears in three principal modifications; first, fine-grained reddish, and containing small scales of white mica; secondly, as a variegated sandstone; and, thirdly, a flinty, solid sandstone. In some places appears jasper in great masses. As far as abundance and change of vegetation are concerned, no other country could be compared with this region. A change in the soil, difference of altitude, or change in the stratum (may they ever be so insignificant relative to their neighborhood), a deviation in the degree of humidity—

any one of these circumstances, or all connected, unfold and bring forth a change in the vegetation.

A special characteristic of this region is the splendor of the flowers and the color of the representatives. Many species of plants found in other regions disappear here, and others appear, viz.:—*Cinchoneae*, *Proteaceae*, *Ternstroemiaceae*, *Ericaceae*, *Vellosiaceae*, gigantic *Terrestrial Orchids*, and tree ferns. The forests are less extensive, and do not attain the gigantic growth of the primitive forest, but are remarkable for their thick coriaceous glossy foliage. They mostly extend along the valleys, generally only up to the middle of the mountains. The other parts of the mountains are woodless, but covered with grass, on which appears, in groups and singly, a great variety of beautiful flowering shrubs and herbaceous plants. The grasses which cover the hills and table-lands are distinguished from those of the savanna, not only by their fresh green, but also by their more tender leaves.

As rain is always falling in this region, there are no changes in the growth of the vegetation.

Region of the Savanna.

The central table-land or great savanna of British Guiana between 58° and 62° of west longitude, is bounded in a northerly direction by the treeless Pacaraima Mountains, 4° north latitude; southerly by the Carawaimi Mountains, and 3° 40' north latitude; easterly by the forest region. The whole area of the savanna, in an absolute altitude of 350 to 400 feet above the level of the sea, may amount to 14,400 miles.

The region of the savanna is also well watered. The main rivers are the Rio Branco, Takutu, Rupununi, Mahu, Zuruma, and Cotinga. The smaller creeks of the savanna are generally waterless during the dry season. In their main character the savannas of British Guiana differ from the Llanos and Pampas of the southern parts of South America; in the former the monotonous plains do not exist, the area which rises undulating, and here and there broken by groups of hills of isolated granite rocks, often 500 or 600 feet high—mighty blocks of conglomerate of oxide of iron, reddish colored masses of quartz and clay, which appear partly in single hardened fragments, but also in large blocks, cover in certain localities the surface. The heights of the undulating ground are generally covered with small

brown ironstone fragments, which now and then alternate with sharp fragments of quartz and granite. Small forests, which I have called oases, sometimes to the extent of miles, otherwise more limited, mostly of a circular form, rise from the savanna like islands out of the ocean. They mostly consist of the noble forest trees, but which seldom reach the luxuriance and height of the trees in the forest. The soil of these oases of course entirely differs from that of the savanna. It consists chiefly of a rich humus or marshy land, often also of heavy clay mixed with sand and vegetable matter. In such oases as have marshy ground, or contain sources of rivers and rivulets, the predominating vegetation are palms, ferns, and *Scitamineae*.

A border of vegetation 100 to 200 feet wide, sometimes more or less luxuriant, but very dense growing trees and shrubs, follow the rivers of the savanna. The stratum of humus covering the savanna occasions also an essential alteration of the vegetation.

The grasses are rough and squarrose, and consist mostly of *Cyperaceæ*, interspersed with numbers of prickly herbaceous or woody plants of the order of *Malpighiaceæ*, *Leguminosæ*, *Rubiaceæ*, *Myrtaceæ*, *Malvaceæ*, *Convolvulaceæ*, *Menispermaceæ*, *Apocynaceæ*, etc. The growth of the isolated trees, especially on the elevated ground, as *Curatella americana*, *Bowdichia major*, is stunted.

In marshy ground the savanna is occupied by the *Mauritia palm*, sometimes single, sometimes forming copses.

In this region occurs only one rainy season, commencing generally during April, and ending in July or the beginning of August. The quantity of rain falling is about eighty to ninety inches.

During the dry months an equable climate exists. The horizon is generally clear, often for months without any change, without rain, and with a constant easterly wind. The medium temperature fluctuates then between 80° to 86° Fahr. The humidity required for vegetation is kept up by heavy dews, which appear not only in the region of the forest, but also in the savanna, so strong that in the morning the vegetation is saturated as if heavy rain had fallen.

Most of the small creeks and rivulets become dry during the dry season—vegetation ceases, but only a few trees in the oases and on the banks of the rivers lose their foliage. These mostly belong to the *Bignoniaceæ*, *Tecoma Jacaranda*, and *Erythroxyleæ* as *Erythroxylon*.

At the beginning of the rainy season these plants assume new life in a very short time, and generally flower before their foliage appears.

The savanna then appears in the same luxuriant green carpet as fresh and beautiful as any northern country can produce. With the grass recalled to new life, appear also the large fragrant flowers of the *Neurocarpum longifolium*, Mart.; *Pavonia speciosa* Humb. and Bonpl.; *Myrica*, *Iris*, *Comelyna*, *Jacquemontia*, *Amasonia erecta*, with its magnificent red and yellow bracts, whole tracts of the tender *Abolboda*, *Aubletii*, and *Schultesia*, whose delicate blue and pink flowers appear like flower beds from among the grass, and above which rise like white stars the scented flowers of the *Hippeastrum*, the quaintly-formed flowers of the terrestrial orchids, as *Habenaria*, *Stenorhynchus*, attract the attention.

Tender *Phaseolus* and *Clitorias* climb up the yellow haulms of the last year's grass which project from the green carpet, and quickly develop their large flowers, and every day adds new wonders; *Fugosia*, *Hibiscus* unfold their large sulphur yellow and violet flowers.

The small isolated groups of *Myrtaceae* are covered with their snow white flowers, whilst the *Malpighiaceae*, *Cassia*, the *Palicourea rigida*, one of the most common shrubs of the savanna, glitter in their yellow cloth of flowers. In their neighborhood are found the elegant shrubs of the *Casearia stipularis* and *C. petraea*, which, from the insignificance of their flowers, are not attractive; but, nevertheless, make a favorable impression by their elegant foliage. The flowering *Melastomaceae* have their branches entwined by magnificent *Astroemerias* and *Bomareas*.

The isolated small stunted trees of the savanna, as *Curtella americana*, bring forth their insignificant whitish green flowers; the *Bowdichia major* its magnificent blue flowers; the *Psidium*s and *Myrtus* their white, and the *Rhopala nitida* appearing here and there on stony tracts with its vanilla-scented flowers.

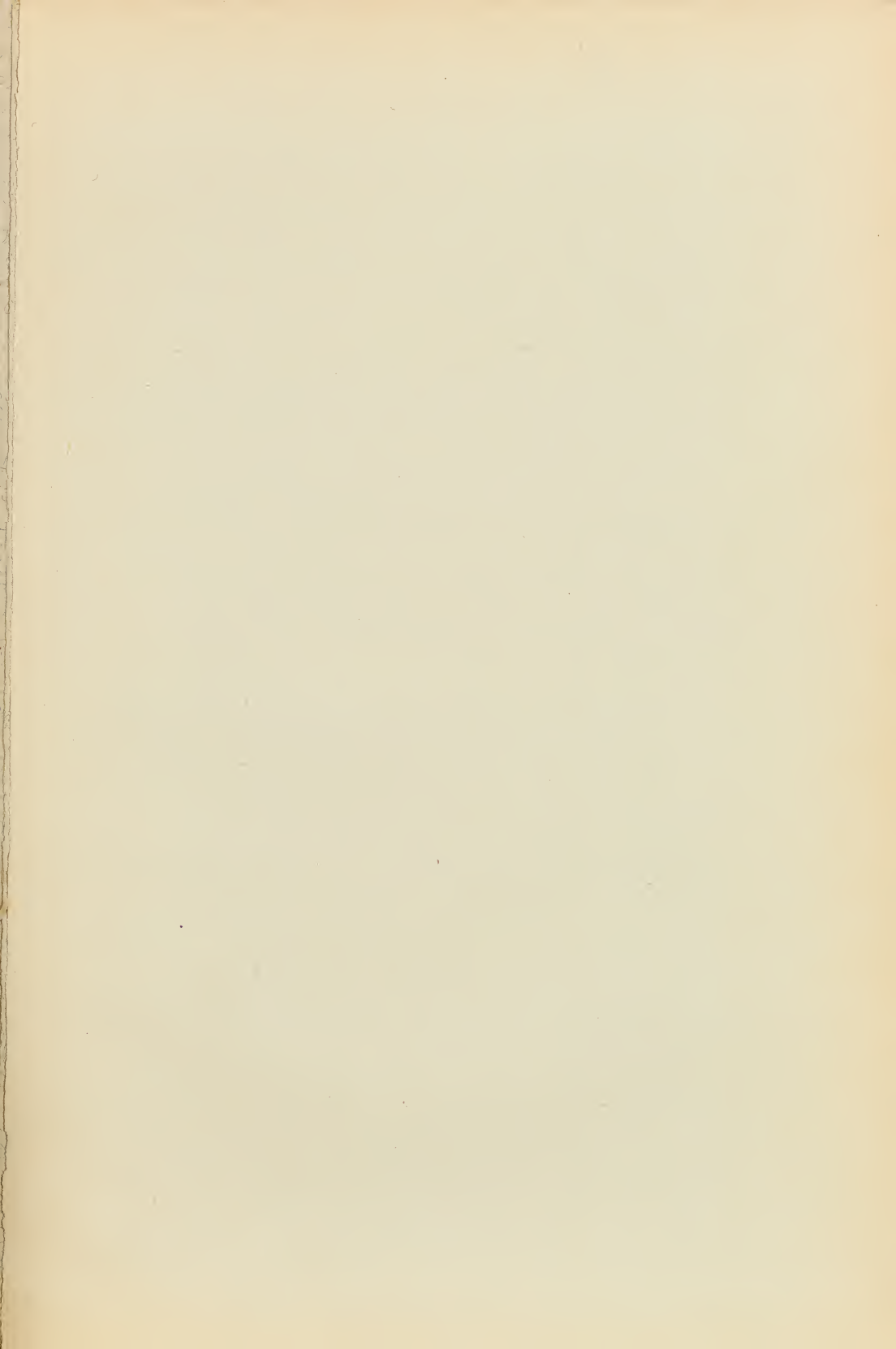
Mimosas, *Bauhinias*, *Eugenias*, *Lantanas* are seen along the borders of the oases. Amongst them the scarlet flowers of the *Helicteres guazumaefolia*, Humb. and Bonpl., shine forth, whilst the gaudy *Bignonias* and *Passifloras* form a most charming drapery. The *Ionidium Itoubou*, Humb. and Bonpl., extends along the border of the oases, with a snow white belt of its peculiar flowers, interspersed here and there by the yellow of the *Hypoxis*. Looking along the rivers,

the banks are seen lined with trees and shrubs covered with differently formed and manifold colored flowers.

The wonderful picture of the vegetation of the banks of the upper River Rupununi, which was mostly formed by the beautiful *Calycophyllum Stanleyanum* Schomb., with its large pink bracts and dark violet flowers, formed a brilliant veil, as well over the thickly-wooded declivities of the surrounding hills, as also over the luxuriant vegetation of the Rupununi, which has impressed itself so much on my mind that it is still as fresh as the day I saw it, and will never be forgotten.

The marshes and little lakes which had disappeared in the dry season are filled again with water, on the borders of the same: as if by magic, a broad belt is seen of the azure blue flowers of the *Eichhornia*, *Heteranthera*, the tender white flowers of the *Limnanthemum Humboldtii*, the yellow of the *Hydrocleis*, and whitish of the *Alisma*, and *Sagittaria*.

But the middle of the month of October changes the ground, which a short time ago appeared in such luxuriant green. The flower stems of the herbaceous plants and grasses become yellow, and the savanna may be compared to a ripe but very thinly-sown field of corn, and maintains a pale melancholy yellow color throughout the dry season.



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